SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

Principals:
Anthony Castillo, PE
Fuad Dahan, PhD, PE, LSRP
Franz W. Laki, PE
John M. Nederfield, PE
Justin M. Protasiewicz, PE
Jose M. Rodriguez, PE
Michael St. Pierre, PE

November 19, 2024 ***via email: caroline.jalanti@dec.ny.gov***

Caroline Jalanti, EIT
Assistant Engineer, Remedial Bureau C, Section B
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7014

RE: **Proposed Supplemental Pre-Design Investigation Work Plan**
Ossining Gas Works DPW Site
Ossining, New York
NYSDEC BCP Site #360172
SESI Project No. Project#11498

Dear Ms. Jalanti:

This letter and the attached plan present a Supplemental Pre-Design Investigation (PDI) plan for the PDI workplan dated October 11, 2024 **(Attachment A)** and approved by the New York State Department of Environmental Conservation (NYSDEC) on October 15, 2024.

On October 28-30, 2024, SESI advanced several borings with the NYSDEC present, to observe and delineate impacts that may be associated with coal tar on the northern portion of the site. In the field, representatives from the NYSDEC concluded that additional delineation to the north and east of BB-2 is still required after the demolition of the building and once access is obtained. This delineation for BB-2 will continue per the PDI Workplan.

Furthermore, on a call on Friday November 8, 2024, the NYSDEC required further investigation of the former tank structures that existed under the current eastern building to the north of the Sing Sing Brook after demolition of the building.

The attached plan (Figure 1A) shows the completed delineation borings and the proposed delineation and investigation boring location plan. The step out delineation and sampling for BB-2 and the investigation and sampling for the former tank structures will be completed per the PDI workplan Health and Safety Plan (HASP), Community Air Monitoring Plan (CAMP) and QA/QC.

Please let us know if you have any questions.

Regards,
SESI CONSULTING ENGINEERS

Fuad Dahan, PE (#090531)
Principal

Attachments:
Figure 1A Proposed Supplemental Investigation To Delineate Impacts North of the Sing Sing Kill
Attachment A: SESI PDI Work Plan

Figure

LEGEND:

- EXISTING STRUCTURE
- RETAINING WALL
- WATER
- TREE
- MONITORING WELL
- SOIL BORING
- HISTORICAL MGP STRUCTURE
- 5.0' — LIMITS AND DEPTH OF SOIL EXCAVATION
- 16' — LIMITS AND DEPTH OF ISS TREATMENT
- B-1 — SESI PHASE II BORING LOCATIONS AND RESULTS
- BCP BOUNDARY
- ADDITIONAL ISS TREATMENT AREA
- BB-1 — GEOTECHNICAL BORING FOR COAL TAR VISUAL
- [EG: 65] — APPROX. EXISTING ELEVATION (FT.)
- [55'] — BORING DEPTH (FT.)
- *(xx') — *DEPTH TO 50PPM ON PID OR OBSERVED SHEEN
- PROPOSED BORING LOCATIONS IN FORMER TANK STRUCTURES
- DELINEATION BORING COMPLETED ON 10/28 - 10/30/2024
- PROPOSED DELINEATION BORING PER DEC
- DELINEATION BORING NOT REQUIRED PER DEC
- CONTINGENT STEP-OUT LOCATIONS FOR PROPOSED BORING LOCATIONS IN FORMER TANK STRUCTURES

REFERENCE
SITE AND PROPOSED BUILDING LAYOUT TAKEN FROM "ALTERNATIVE ANALYSIS REPORT" PREPARED BY ARCADIC DESIGN AND CONSULTANCY.

SCALE: 1"=80'
0 80 160

dwg by: AW
chk by: FD
scale: AS NOTED
date: 11/12/2024

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL
959 ROUTE 46E, 3RD FLOOR, PARSIPPANY, NJ 07054 PH: 973.808.9050

project: PROPOSED RESIDENTIAL DEVELOPMENT
OSSINING DPW SITE
OSSINING, NY

title: PROPOSED SUPPLEMENTAL INVESTIGATION TO DELINEATE SOIL IMPACTS NORTH OF THE SING SING KILL

job no: 11498
drawing no:

FIG-1A

1 of 1

N:\ACAD\11498\CAD\NORT NAPL DELIN\11498 – FIG-1.A – PROPOSED SUPP INVES.DWG 11/15/24 09:19:40AM, alan.ward, LAYOUT:STEP-OUT

Attachment A:

SESI PDI Work Plan

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

Principals
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Fuad Dahan, PhD, PE, LSRP
Franz W. Laki, PE
John M. Nederfield, PE
Jose M. Rodriguez, PE
Justin M. Protasiewicz, PE
Michael St. Pierre, PE

October 11, 2024 ***via email:*** ***caroline.jalanti@dec.ny.gov***

Caroline Jalanti, EIT
Assistant Engineer, Remedial Bureau C, Section B
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7014

RE: Proposed Supplemental Pre-Design Investigation Work Plan
Ossining Gas Works DPW Site
Ossining, New York
NYSDEC BCP Site #C360172
SESI Project No. 11498

Dear Ms. Jalanti:

On behalf of WB 30 Water Street, LLC (the Volunteer), SESI Consulting Engineers (SESI) has prepared this updated workplan in response to the Department's August 9, 2024 correspondence to request approval of the proposed supplemental pre-design investigation activities at the Ossining Gas Works DPW Site (Site). The Site is located at 30 Water Street in Ossining, New York and is identified as New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Site No. C360172.

Introduction/Background

During SESI's geotechnical investigations at the Site in October 2023, some sporadic odors, sheens and what was described as "black coal tar like material" were observed at varying depths in certain soil borings that were advanced between Sing Sing Kill and Central Avenue, north of the Sing Sing Kill (locations BB-1, BB-2 and BB-3 as set forth in more detail in the attached boring logs [**Attachment A**] and **Figure 1**). A soil sample collected from one (1) of these borings (BB-2) was submitted for Petroleum Hydrocarbon Identification using the gas chromatography-flame ionization detection (GC-FID) method. The results indicated the material was similar to coal tar/creosote. While prior investigations in the area of the Site north of the Sing Sing Kill conducted by Con Edison in 2007 and 2023 and SESI in 2021 did not indicate the presence of significant subsurface impacts, targeted additional investigation is proposed in this area consistent with NYSDEC's May 2024 comment letter on the initial Draft Remedial Action Work Plan (RAWP) for the Site.

Proposed Scope of Work

To conduct this investigation north of the Sing Sing Kill, SESI proposes to install additional investigation borings as described below and depicted on **Figure 1**.

- Borings will be advanced using rotosonic drilling methods.
- During the advancement of the borings, a trained SESI environmental professional will continuously screen the soil column using a photoionization detector (PID) and document the soil types and visual and olfactory observations. The presence and extent of suspected coal tar will also be noted.
- SESI proposes first to advance borings in the locations where the visual observations were previously observed at BB-1, BB-2 and BB-3 during the geotechnical investigation. These borings will be advanced up to 60 feet below ground surface (ft bgs), to bedrock or until vertical visible impacts are no longer observed, whichever comes first.
- If significant visual impacts are observed in any of the above three (3) new borings, a total of four (4) step-out borings will be advanced in horizontal cardinal directions in a ring approximately 15 feet from the initial boring location that exhibits evidence of contamination to examine the horizontal extent of the observed impacts, as depicted on **Figure 1**.
    - Additional borings shall be advanced another approximately 15 feet (total 30 feet from the original boring) in the same cardinal direction should any significant visual impacts be observed in the corresponding first ring of step-out samples.
    - The above investigative borings will be advanced to horizontally and vertically delineate to depths consistent with impacts in the associated first boring location, to bedrock or until vertical visible impacts are no longer observed, whichever comes first.
- For each boring location, SESI will also be prepared to collect at minimum two (2) representative samples of Non-Aqueous Phase Liquid (NAPL)-impacted soils (based on visual and olfactory observations and PID readings). **Table 1** below presents the proposed analysis. Additional samples may be collected at each boring location if field observations suggest variable conditions and the need for additional characterization.

QA/QC samples will be collected as specified in the table below. Duplicates and MS/MSD will not be analyzed for fingerprint or forensic analyses.

# of Samples	Rationale	Analysis
Two (at minimum, if NAPL-impacted soils are observed) (If variable conditions are observed, additional samples may be collected)	Material Fingerprint	TCL VOCs by USEPA Method 8260 TCL SVOCs by USEPA Method 8270 TAL metals by USEPA 6010/7471b Hydrocarbon Fingerprinting via GC/FID (EPA 8015M) Forensic PAHs by USEPA Method 8270M (GC/MS/SIM-SCAN)
Duplicate: 1 sample for every 20 samples collected for analysis	QA/QC	Same analysis as the soil sample. Duplicates and MS/MSD will not be analyzed for fingerprint or forensic analyses.
Matrix Spike and matrix Spike Duplicate (MS/MSD): 1 per 20 samples collected for analysis	QA/QC	Same as the soil sample. Duplicates and MS/MSD will not be analyzed for fingerprint or forensic analyses.

- Any investigation-derived waste will be containerized in DOT-approved 55-gallon drums that will be stored on-site pending waste characterization and subsequently removed for off-site disposal at a properly licensed facility.

- Field activities will be conducted in accordance with the revised July 2024 Draft RAWP and associated documents, including, but not limited to, the Community Air Monitoring Plan (CAMP) (**Attachment B**) and Health and Safety Plan (HASP) (**Attachment C**) (attached).

- Upon completion of the borings and an assessment of the observations, a summary report will be prepared to document the findings and recommend next steps, if any, for further investigation or remediation.

I, Fuad Dahan, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Supplemental Pre-Design Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

We respectfully request concurrence with the proposed investigative activities before initiating the supplemental investigation activities described herein.

Sincerely,
SESI CONSULTING ENGINEERS

Fuad Dahan, PE (#090531)
Principal

Attachments: Figure
Attachment A: Geotechnical Borings
Attachment B: Community Air Monitoring Plan
Attachment C: Health and Safety Plan

Figure

LEGEND:

- EXISTING STRUCTURE
- RETAINING WALL
- WATER
- TREE
- MONITORING WELL
- SOIL BORING
- HISTORICAL MGP STRUCTURE
- 5.0' — LIMITS AND DEPTH OF SOIL EXCAVATION
- 16' — LIMITS AND DEPTH OF ISS TREATMENT
- B-1 — SESI PHASE II BORING LOCATIONS AND RESULTS
- BCP BOUNDARY
- ADDITIONAL ISS TREATMENT AREA
- BB-1 — PROPOSED RE-DRILLING OF GEOTECHNICAL BORING FOR COAL TAR VISUAL
- [EG: 65] — APPROX. EXISTING ELEVATION (FT.)
- [55'] — BORING DEPTH (FT.)
- *(xx') — *DEPTH TO 50PPM ON PID OR OBSERVED SHEEN
- PROPOSED CONTINGENT STEP-OUT DELINEATION BORING LOCATION

REFERENCE
SITE AND PROPOSED BUILDING LAYOUT TAKEN FROM "ALTERNATIVE ANALYSIS REPORT" PREPARED BY ARCADIC DESIGN AND CONSULTANCY.

SCALE: 1"=80'
0 80 160

dwg by: AW
chk by: FD
scale: AS NOTED
date: 08/27/2024

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL
959 ROUTE 46E, 3RD FLOOR, PARSIPPANY, NJ 07054 PH: 973.808.9050

project: PROPOSED RESIDENTIAL DEVELOPMENT
OSSINING DPW SITE
OSSINING, NY

title: PROPOSED INVESTIGATION TO DELINEATE SOIL IMPACT NORTH OF SING SING BROOK

job no: 11498
drawing no: FIG-1.0

1 of 1

N:\ACAD\11498\CAD\NORT NAPL DELIN\11498 – FIG-1 – PDI AND GEOTECH BORINGS.DWG 08/27/24 04:37:21PM, alan.ward, LAYOUT: SOIL IMPCT

Attachment A:

Geotechnical Borings

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-1
Originally SB-2

PROJECT NAME	Proposed Development	**PROJECT LOCATION**	30 Water Street, Ossining, New York
PROJECT NO.	11498	**ELEVATION DATUM**	NAVD-88
DATE STARTED	10-10-2023	**COMPLETED**	10-11-2023
DRILLING CONTRACTOR	Craig Geotechnical Drilling Co., Inc.	**SAMPLE HAMMER**	Auto
SAMPLER	SPT	**AUGER INNER DIAMETER**	
EQUIPMENT	CME 55	**ROTARY BIT DIAMETER**	3.88 in
DRILLING FOREMAN	Ryan	**CASING DIAMETER**	4.00 in
LOGGED BY	A. Dirle	**CASING DEPTH**	35.0 ft
LATITUDE	41.159236	**FINAL DEPTH**	46.3± ft

GROUND ELEVATION 14.0±
OUTER DIAMETER
GROUNDWATER LEVELS:
AT TIME OF DRILLING
AT END OF DRILLING Not Measured
AFTER DRILLING

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		4" Concrete Slab							
		Fill: Dark brown/black coarse to fine Sand, and medium to fine Gravel, trace Silt		SI		10	7-8-7-5 (15)		PID= 0.0 PPM
	9	Possible Fill: Dark red-brown medium to fine GRAVEL, some coarse to fine Sand, little Silt	5	S2		6	5-2-1-1 (3)		PID= 0.0 PPM
	4	Dark brown/black coarse to fine SAND, some coarse to fine Gravel, little Silt, with Cobbles	10	S3		9	9-8-33-6 (41)		Chatter at 9.5' Chatter at 11' PID= 0.0 PPM
	-1	Gray-brown coarse to fine SAND, some medium to fine Gravel, little Silt	15	S4		11	2-2-5-6 (7)		PID= 0.0 PPM
	-6	Gray-brown coarse to fine SAND, and coarse to fine Gravel, trace Silt	20	S5		7	10-15-18-17 (33)		PID= 0.0 PPM Chatter at 22'
	-11	Black/dark gray coarse to fine SAND, some medium to fine Gravel, trace Silt	25	S6		12	6-13-17-6 (30)		Switch to Mud Rotary PID= 99.2 PPM Strong odor Chatter at 27' Black coal tar like material
	-16	Black/dark gray coarse to fine SAND, and medium to fine Gravel, little trace Silt, with Cobbles	30	S7		3	7-50/3"		PID= 0.2 PPM chatter at 34' Collapse at 25'

Figure No. 2

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-1
Originally SB-2

PROJECT NAME Proposed Development
PROJECT LOCATION 30 Water Street, Ossining, New York
PROJECT NO. 11498
ELEVATION DATUM NAVD-88
GROUND ELEVATION 14.0 ft ±

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		Dark gray coarse to fine SAND, some coarse to fine Gravel, little Silt, with Cobbles		S8		6	18-24-36-26 (60)		Chatter at 35' PID= 0.0 PPM Chatter at 37-38'
	-26	Black/dark gray coarse to fine GRAVEL, some coarse to fine Sand, trace Silt	40	S9		8	13-13-12-10 (25)		PID= 0.0 PPM
	-31	Brown coarse to fine GRAVEL, some coarse to fine Sand, trace Silt	45	S10		7	17-18-50/4"		PID= 0.0 PPM Boring completed on weathered Rock
		BORING COMPLETED AT 46.3± FEET DUE TO SPLIT SPOON REFUSAL							
	-36		50						
	-41		55						
	-46		60						
	-51		65						
	-56		70						

Figure No. 2

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-2
Originally SB-3

PROJECT NAME	Proposed Development	**PROJECT LOCATION**	30 Water Street, Ossining, New York
PROJECT NO.	11498	**ELEVATION DATUM**	NAVD-88
DATE STARTED	10-12-2023	**COMPLETED**	10-12-2023
DRILLING CONTRACTOR	Craig Geotechnical Drilling Co., Inc.	**SAMPLE HAMMER**	Auto
SAMPLER	SPT	**AUGER INNER DIAMETER**	
EQUIPMENT	CME 55	**ROTARY BIT DIAMETER**	3.88 in
DRILLING FOREMAN	Ryan	**CASING DIAMETER**	4.00 in
LOGGED BY	A. Dirle	**CASING DEPTH**	50.0 ft
LATITUDE	41.159715	**FINAL DEPTH**	56.3± ft

GROUND ELEVATION 14.0±
OUTER DIAMETER
GROUNDWATER LEVELS:
AT TIME OF DRILLING
AT END OF DRILLING Not Measured
AFTER DRILLING

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		4" Concrete slab							Drill to 1'
		Fill: Gray/Black coarse to fine SAND, little Silt, trace Gravel		1		15	9-10-9-9 (19)		PID= 0.0 PPM
									Chatter at 4'
	9	Fill: Black coarse to fine Sand, some Silt, little medium to fine Gravel	5	S2		12	10-14-13-7 (27)		Sheen Observed in Shoe Sample; PID in Shoe's Sample= 170.9 PPM Black coal tar like material; strong odor
	4	Fill: Black coarse to fine SAND, little Silt, trace Gravel, with glass fragments	10	S3		12	2-4-2-2 (6)		PID= 10.8 PPM Black coal tar like material
	-1	Black coarse to fine SAND, little Silt, trace Gravel	15	S4		7	3-5-4-6 (9)		Sheen Observed; PID= 67.8 PPM Black coal tar like material; strong odor
	-6	White/gray GRAVEL, trace Sand, trace Silt	20	S5		2	8-9-6-6 (15)		Little Chatter at 21' PID= 11.7 PPM Sample Only in Shoe
	-11	Dark gray coarse to fine SAND, some medium to fine Gravel, trace Silt	25	S6		7	14-19-20-19 (39)		PID= 13.2 PPM Chatter at 27'
	-16	Gray coarse to fine SAND, some medium to fine Gravel, trace Silt	30	S7		10	8-13-27-33 (40)		PID= 34.1 PPM; strong odor

Figure No. 3

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-2
Originally SB-3

PROJECT NAME Proposed Development
PROJECT LOCATION 30 Water Street, Ossining, New York
PROJECT NO. 11498
ELEVATION DATUM NAVD-88
GROUND ELEVATION 14.0 ft ±

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		Black/dark gray coarse to fine SAND, little fine Gravel, little Silt		S8		8	6-11-17-26 (28)		PID= 16.0 PPM Chatter at 37'
	-26	Gray-brown coarse to fine SAND, some medium to fine Gravel, little Silt	40	S9		7	7-6-6-9 (12)		PID= 0.0 PPM W.C. = 16.8% (-200) = 14.4%
	-31	Gray-brown coarse to fine Sand, some coarse to fine Gravel, little Silt	45	S10		12	16-17-30-24 (47)		PID= 0.0 PPM Chatter at 48'
	-36	Black/brown coarse to fine GRAVEL, some medium to fine Sand, trace Silt	50	S11		5	24-15-16-21 (31)		PID= 109.0 PPM; strong odor
	-41	Brown/black coarse to fine Gravel, some coarse to fine Sand, some Silt	55	S12		11	18-42-50/4"		PID= 139.7 PPM; strong odor Boring completed on weathered Rock
		BORING COMPLETED AT 56.33± FEET DUE TO SPLIT SPOON REFUSAL							
	-46		60						
	-51		65						
	-56		70						

Figure No. 3

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-3
Originally SB-4

PROJECT NAME	Proposed Development	**PROJECT LOCATION**	30 Water Street, Ossining, New York
PROJECT NO.	11498	**ELEVATION DATUM**	NAVD-88
DATE STARTED	10-13-2023	**COMPLETED**	10-13-2023
DRILLING CONTRACTOR	Craig Geotechnical Drilling Co., Inc.	**SAMPLE HAMMER**	Auto
SAMPLER	SPT	**AUGER INNER DIAMETER**	
EQUIPMENT	CME 55	**ROTARY BIT DIAMETER**	3.88 in
DRILLING FOREMAN	Ryan	**CASING DIAMETER**	4.00 in
LOGGED BY	A. Dirle	**CASING DEPTH**	4.8 ft
LATITUDE	41.159487	**FINAL DEPTH**	51.1± ft

GROUND ELEVATION 13.0±
DRILLING METHOD Mud Rotary
OUTER DIAMETER
GROUNDWATER LEVELS:
AT TIME OF DRILLING
AT END OF DRILLING Not Measured
AFTER DRILLING

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		1.5" Asphalt, 10" subbase							
	8	Fill: Gray-brown coarse to fine SAND, little medium to fine Gravel, trace Silt	5	S1		8	8-11-7-5 (18)		PID= 0.0 PPM Grinding in casing at 5'
	3	Dark brown coarse to fine Sand, some Clayey Silt, some medium to fine Gravel	10	S2		12	2-3-5-3 (8)		PID= 0.0 PPM
	-2		15						
	-7	Black/dark brown medium to fine GRAVEL, some coarse to fine Sand, trace Silt	20	S3		7	10-6-14-19 (20)		PID= 63.0 PPM; strong odor Sheen Observed on Sample Chatter at 23' Black coal tar like material
	-12		25						
	-17	Gray-brown coarse to fine Sand, some medium to fine Gravel, little Silt	30	S4		7	10-9-11-6 (20)		PID= 4.1 PPM Chatter at 32'

Figure No. 4

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-3
Originally SB-4

PROJECT NAME Proposed Development
PROJECT LOCATION 30 Water Street, Ossining, New York
PROJECT NO. 11498
ELEVATION DATUM NAVD-88
GROUND ELEVATION 13.0 ft ±

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
	-27	Dark gray coarse to fine Sand, some Clayey Silt, little medium to fine Gravel	40	S5		2	3-5-3-3 (8)		PID= 1.0 PPM
									Chatter at 44'
	-32		45						Chatter at 46'
	-37	Gray-brown coarse to fine SAND, some coarse to fine Gravel, trace Silt	50	S6		8	14-50-50/1"		PID= 10.8 PPM
		BORING COMPLETED AT 51.1± FEET DUE TO SPLIT SPOON REFUSAL							Boring completed due to split spoon refusal on weathered Rock
	-42		55						
	-47		60						
	-52		65						
	-57		70						

Figure No. 4

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-4
Originally SB-11

PROJECT NAME	Proposed Development	**PROJECT LOCATION**	30 Water Street, Ossining, New York
PROJECT NO.	11498	**ELEVATION DATUM**	NAVD-88 **GROUND ELEVATION** 14.0±
DATE STARTED	10-10-2023 **COMPLETED** 10-10-2023	**DRILLING METHOD**	Rotary with Water
DRILLING CONTRACTOR	Craig Geotechnical Drilling Co., Inc.	**SAMPLE HAMMER**	Auto
SAMPLER	Split Spoon	**AUGER INNER DIAMETER**	**OUTER DIAMETER**
EQUIPMENT	CME 55	**ROTARY BIT DIAMETER**	3.88 in **GROUNDWATER LEVELS:**
DRILLING FOREMAN	Ryan **HELPER** Alex	**CASING DIAMETER**	4.00 in ▽ **AT TIME OF DRILLING**
LOGGED BY	A. Dirle **CHECKED BY**	**CASING DEPTH**	10.0 ft ▼ **AT END OF DRILLING** Not Measured
LATITUDE	41.158998 **LONGITUDE** -73.867750	**FINAL DEPTH**	35.1± ft ▼ **AFTER DRILLING**

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		10" of Concrete Slab							
		Fill: Brown/dark brown coarse to fine SAND, little medium to fine Gravel, trace Silt		S1		3	1-1-WOH-1 (1)		PID= 0.0 PPM
	9	Gray-brown coarse to fine SAND, and medium to fine Gravel, trace Silt, with Cobbles	5	S2		4	3-50/4"		PID= 0.0 PPM chatter at 6-8' chatter at 9'
	4	Brown coarse to fine Sand, some coarse to fine Gravel, some Silt	10	S3		5	4-1-2-2 (3)		PID= 0.0 PPM
	-1	Brown/dark brown coarse to fine Sand, some Silt, some medium to fine Gravel	15	S4		9	2-8-20-10 (28)		PID= 0.0 PPM
	-6	Brown coarse to fine SAND, little Silt, little medium to fine Gravel	20	S5		15	2-7-27-35 (34)		PID= 0.0 PPM (-200) = 15.2% W.C. = 15.1%
	-11	Brown coarse to fine SAND, and Clayey Silt, trace fine Gravel	25	S6		1	50/1"		PID= 0.0 PPM
	-16	Brown-gray coarse to fine SAND, little Silt, little medium to fine Gravel	30	S7		1	50/1"		
		(Good Rock Quality) 30.08-35.08 feet Light gray banded schist, medium to fine grained, slightly weathered, very close to moderate fracture spacing, narrow to wide fracture separation, stained to clean fractures, fractures near vertical to moderately dipping, strong		R1		REC = 94%; RQD = 76%	08:02 05:04 05:24 05:58 05:31		

Figure No. 5

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-4
Originally SB-11

PROJECT NAME Proposed Development
PROJECT LOCATION 30 Water Street, Ossining, New York
PROJECT NO. 11498
ELEVATION DATUM NAVD-88
GROUND ELEVATION 14.0 ft ±

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		(Good Rock Quality) 30.08-35.08 feet Light gray banded schist, medium to fine grained, slightly weathered, very close to moderate fracture spacing, narrow to wide fracture separation, stained to clean fractures, fractures near vertical to moderately dipping, strong BORING COMPLETED AT 35.08± FEET							Boring completed on Rock
	-26		40						
	-31		45						
	-36		50						
	-41		55						
	-46		60						
	-51		65						
	-56		70						

Figure No. 5

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-5
Originally SB-4B

PROJECT NAME Proposed Development
PROJECT NO. 11498
DATE STARTED 10-11-2023 **COMPLETED** 10-11-2023
DRILLING CONTRACTOR Craig Geotechnical Drilling Co., Inc.
SAMPLER SPT
EQUIPMENT CME 55
DRILLING FOREMAN Ryan **HELPER** Alex
LOGGED BY A. Dirle **CHECKED BY**
LATITUDE 41.159202 **LONGITUDE** -73.867591

PROJECT LOCATION 30 Water Street, Ossining, New York
ELEVATION DATUM NAVD-88 **GROUND ELEVATION** 40.0±
DRILLING METHOD Rotary with Water
SAMPLE HAMMER Auto
AUGER INNER DIAMETER **OUTER DIAMETER**
ROTARY BIT DIAMETER 3.88 in **GROUNDWATER LEVELS:**
CASING DIAMETER 4.00 in **AT TIME OF DRILLING**
CASING DEPTH 7.0 ft **AT END OF DRILLING** Not Measured
FINAL DEPTH 37.0± ft **AFTER DRILLING**

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		6" Topsoil							
		White/orange coarse to fine GRAVEL, some coarse to fine Sand, little Silt		S1		12	2-36-50/4"		PID= 0.0 PPM Highly Weathered Rock
	35	White/orange/gray coarse to fine SAND, some Silt, trace Gravel	5	S2		16	36-47-50/4"		PID= 0.0 PPM Highly Weathered Rock
	30	Brown/orange/gray coarse to fine SAND, some Silt, little medium to fine Gravel	10	S3		7	50-50/2"		PID= 0.0 PPM Highly Weathered Rock
	25	Gray/white/black/orange medium to fine SAND, some Clayey Silt, trace Gravel	15	S4		5	50/5"		PID= 0.0 PPM Highly Weathered Rock
	20	White/black medium to fine SAND, some Clayey Silt, trace Gravel	20	S5		3	50/4"		PID= 0.0 PPM Highly Weathered Rock
	15	White/black coarse to fine SAND, little Silt, trace Gravel	25	S6		4	50/4"		PID= 0.0 PPM Highly Weathered Rock
	10	White/black medium to fine SAND, little Silt, trace Gravel	30	S7		2	50/2"		PID= 0.0 PPM
		(Fair Rock Quality) 32-37 feet: Light gray banded schist, medium to fine grained, moderately weathered, very close to moderate fracture spacing, narrow to very wide fracture separation, stained to filled fractures, fractures near vertical to moderately dipping, weak to medium weak		R1	REC = 100%, RQD = 60%		04:39 04:39 05:12		

Figure No. 6

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-5
Originally SB-4B

PROJECT NAME Proposed Development
PROJECT LOCATION 30 Water Street, Ossining, New York
PROJECT NO. 11498
ELEVATION DATUM NAVD-88 **GROUND ELEVATION** 40.0 ft ±

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		(Fair Rock Quality)					04:59		
		32-37 feet: Light gray banded schist, medium to fine grained, moderately weathered, very close to moderate fracture spacing, narrow to very wide fracture separation, stained to filled fractures, fractures near vertical to moderately dipping, weak to medium weak					04:24		Boring completed on Rock
		BORING COMPLETED AT 37± FEET							

0 -5 -10 -15 -20 -25 -30

40 45 50 55 60 65 70

Figure No. 6

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-6
Originally B-8

PROJECT NAME	Proposed Development	**PROJECT LOCATION**	30 Water Street, Ossining, New York
PROJECT NO.	11498	**ELEVATION DATUM**	NAVD-88
DATE STARTED	10-13-2023	**COMPLETED**	10-13-2023
DRILLING CONTRACTOR	Craig Geotechnical Drilling Co., Inc.	**SAMPLE HAMMER**	Auto
SAMPLER	SPT	**AUGER INNER DIAMETER**	
EQUIPMENT	CME 75	**ROTARY BIT DIAMETER**	3.88 in
DRILLING FOREMAN	John	**HELPER**	Steve
LOGGED BY	L. Mann	**CHECKED BY**	
LATITUDE	41.159573	**LONGITUDE**	-73.866889

GROUND ELEVATION 16.0±
OUTER DIAMETER
CASING DIAMETER 4.00 in
CASING DEPTH 20.0 ft
FINAL DEPTH 25.0± ft

GROUNDWATER LEVELS:
AT TIME OF DRILLING Not Encountered
AT END OF DRILLING
AFTER DRILLING

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		Fill: Dark gray coarse to fine Sand, some coarse to fine Gravel, trace Silt		S1		18	16-16-20-20 (36)		Wood from 1-1.5 feet PID = 0 ppm
	11		5						Possible cobble
	6	Black coarse to fine Sand, some Silt, little medium to fine Gravel	10	S2		6	8-5-10-17 (15)		PID = 482 ppm Black coal tar-like material
	1		15						Heavy grinding
	-4	Gray-brown coarse to fine Sand, and medium to fine Gravel, little Silt	20	S3		8	6-16-8-13 (24)		Weathered Rock PID = 0 ppm W.C. = 15.1% (-200) = 12.1%
	-9	BORING COMPLETED AT 25± FEET DUE TO ROTARY BIT AND SPLIT SPOON REFUSAL	25	S4		0	50/0"		Boring completed due to rotary bit and split spoon refusal on Rock
	-14		30						

Figure No. 7

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-7
Originally B-9

PROJECT NAME	Proposed Development	**PROJECT LOCATION**	30 Water Street, Ossining, New York
PROJECT NO.	11498	**ELEVATION DATUM**	NAVD-88
DATE STARTED	10-13-2023	**COMPLETED**	10-13-2023
DRILLING CONTRACTOR	Craig Geotechnical Drilling Co., Inc.	**SAMPLE HAMMER**	Auto
SAMPLER	SPT	**AUGER INNER DIAMETER**	
EQUIPMENT	CME 75	**ROTARY BIT DIAMETER**	3.88 in
DRILLING FOREMAN	John	**HELPER**	Steve
LOGGED BY	L. Mann	**CHECKED BY**	
LATITUDE	41.159546	**LONGITUDE**	-73.867865

GROUND ELEVATION 15.0±
OUTER DIAMETER
CASING DIAMETER 4.00 in
CASING DEPTH 15.0 ft
FINAL DEPTH 40.0± ft
GROUNDWATER LEVELS:
AT TIME OF DRILLING 5.00± ft
AT END OF DRILLING Not Measured
AFTER DRILLING

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
	15	Fill: Dark gray coarse to fine GRAVEL, some coarse to fine Sand, trace Silt	0	S1		16	25-25-50 (75)		PID = 0
	10	Fill: Dark gray coarse to fine SAND, little Silt, trace fine Gravel, with wood	5	S2		8	15-7-7-6 (14)		Heavy grinding Wet Wood from 6.5-7 PID = 49 ppm
	5	Black coarse to fine GRAVEL, some coarse to fine Sand, trace Silt	10	S3		6	4-13-15-15 (28)		PID = 119 ppm Wet; strong odor Black coal tar-like material
	0	Black coarse to fine Gravel, some coarse to fine Sand, some Silt	15	S4		12	15-14-8-12 (22)		Drill refusal PID = 62 ppm moist; strong odor Black coal-tar like material Possible boulder from 17-19 feet Heavy grinding
	-5		20						Auger to refusal
	-10	Gray-brown coarse to fine Sand, little medium to fine Gravel, trace Silt	25						
	-15		30						Slight grinding

Figure No. 8

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-7
Originally B-9

PROJECT NAME Proposed Development
PROJECT LOCATION 30 Water Street, Ossining, New York
PROJECT NO. 11498
ELEVATION DATUM NAVD-88 **GROUND ELEVATION** 15.0 ft ±

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		Gray-brown coarse to fine Sand, little medium to fine Gravel, trace Silt							slight grinding
	-25	BORING COMPLETED AT 40± FEET DUE TO ROTARY BIT REFUSAL	40						Drill refusal on Rock
	-30		45						
	-35		50						
	-40		55						
	-45		60						
	-50		65						
	-55		70						

Figure No. 8

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-8
Originally B-10

PROJECT NAME	Proposed Development	**PROJECT LOCATION**	30 Water Street, Ossining, New York
PROJECT NO.	11498	**ELEVATION DATUM**	NAVD-88
DATE STARTED	10-12-2023	**COMPLETED**	10-12-2023
DRILLING CONTRACTOR	Craig Geotechnical Drilling Co., Inc.	**SAMPLE HAMMER**	Auto
SAMPLER	SPT	**AUGER INNER DIAMETER**	
EQUIPMENT	CME 75	**ROTARY BIT DIAMETER**	3.88 in
DRILLING FOREMAN	John	**HELPER**	Steve
LOGGED BY	L. Mann	**CHECKED BY**	
LATITUDE	41.159366	**LONGITUDE**	-73.868429

GROUND ELEVATION	15.0±		
OUTER DIAMETER			
CASING DIAMETER	4.00 in	**GROUNDWATER LEVELS:**	
CASING DEPTH	34.0 ft	**AT TIME OF DRILLING**	6.00± ft
FINAL DEPTH	40.0± ft	**AT END OF DRILLING**	Not Measured
		AFTER DRILLING	

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		Fill: Gray coarse to fine Sand, some Silt, little coarse to fine Gravel		S1		12	35-30-35-60 (65)		PID = 0 ppm
		Fill: Dark gray coarse to fine GRAVEL, some coarse to fine Sand, trace Silt, with bricks		S2		18	12-18-25-30 (43)		PID = 0 ppm
	10	Black SILT, little coarse to fine Sand, trace Gravel	5	S3		9	2-1-1-1 (2)		Heavy chatter PID = 83 ppm; strong odor Wet Black coal tar-like material
		Black SILT, little coarse to fine Sand , trace Gravel		S4		10	WOH-1-1-1 (2)		PID = 66 ppm; strong odor Wet Black coal tar-like material
	5	Black SILT, some coarse to fine Gravel, little coarse to fine Sand	10	S5		10	1-4-2-5 (6)		PID = 423 ppm; strong odor Wet Chatter
	0	Black coarse to fine GRAVEL, some coarse to fine Sand, trace Silt	15	S6		12	7-14-12-10 (26)		Moist Black coal tar-like material PID = 50 ppm; strong odor Chatter
	-5	Black coarse to fine GRAVEL, some coarse to fine Sand, trace Silt	20	S7		12	24-16-21-19 (37)		PID = 3 ppm
	-10	Gray-brown coarse to fine Sand, and medium to fine Gravel, little Silt	25	S8		12	18-14-17-17 (31)		PID = 0 ppm Weathered Rock Heavy Chatter from 26-28 W.C. = 15.1% (-200) = 11.4%
	-15	Gray-brown coarse to fine GRAVEL, some coarse to fine Sand, little Silt	30	S9		2	12-14-16-17 (30)		PID = 0 ppm Weathered Rock Heavy Grinding

Figure No. 9

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-8
Originally B-10

PROJECT NAME Proposed Development
PROJECT LOCATION 30 Water Street, Ossining, New York
PROJECT NO. 11498
ELEVATION DATUM NAVD-88 **GROUND ELEVATION** 15.0 ft ±

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		(Very Poor Rock Quality) 35-40 feet: Banded schist, medium to fine grained, moderately weathered, very close to close fracture spacing, wide separation, stained fractures, near vertical to shallow dipping, medium weak.		RC-1		REC = 40%; RQD = 21%	01:40 00:30 01:32 01:22 00:40		
	-25	BORING COMPLETED AT 40± FEET	40						Boring complete on Rock
	-30		45						
	-35		50						
	-40		55						
	-45		60						
	-50		65						
	-55		70						

Figure No. 9

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-9
Originally B-5

PROJECT NAME	Proposed Development	**PROJECT LOCATION**	30 Water Street, Ossining, New York
PROJECT NO.	11498	**ELEVATION DATUM**	NAVD-88
DATE STARTED	10-12-2023	**COMPLETED**	10-12-2023
DRILLING CONTRACTOR	Craig Geotechnical Drilling Co., Inc.	**SAMPLE HAMMER**	Auto
SAMPLER	SPT	**AUGER INNER DIAMETER**	
EQUIPMENT	CME 75	**ROTARY BIT DIAMETER**	3.88 in
DRILLING FOREMAN	John	**HELPER**	Steve
LOGGED BY	L. Mann	**CHECKED BY**	
LATITUDE	41.159215	**LONGITUDE**	-73.868048
CASING DIAMETER	4.00 in	**CASING DEPTH**	25.0 ft
FINAL DEPTH	40.0± ft		

GROUND ELEVATION 14.0±
OUTER DIAMETER
GROUNDWATER LEVELS:
AT TIME OF DRILLING 8.00± ft
AT END OF DRILLING Not Measured
AFTER DRILLING

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
	14	Fill: Black coarse to fine Sand, some Silt, little coarse to fine Gravel	0	S1		18	14-8-10-11 (18)		PID = 0 ppm
		Fill: Black coarse to fine Sand, some Silt, little coarse to fine Gravel		S2		12	6-3-2-1 (5)		PID = 10 ppm
	9	Black SILT, some coarse to fine Sand, trace fine Gravel	5	S3		3	1-1-1-1 (2)		Moist Black coal tar-like material PID = 2.7 ppm
		Black SILT, some coarse to fine Sand, trace fine Gravel		S4		4	1-WOH-1-WOH (2)		Wet Black coal tar-like material PID = 22 ppm
	4	No Recovery	10	S5		0	1-1-WOH-WOH (2)		
	-1	Dark gray coarse to fine SAND, little Silt, trace coarse to fine Gravel	15	S6		10	7-4-4-6 (8)		Moist PID = 58 ppm Black coal tar-like material
	-6	Dark gray coarse to fine GRAVEL, some coarse to fine Sand, trace Silt	20	S7		2	10-8-8-7 (16)		PID = 5.3 ppm
	-11	Gray-brown coarse to fine GRAVEL, some Silt, little coarse to fine Sand	25	S8		2	11-9-17-24 (26)		Chatter Weathered Rock PID = 3.8 ppm
	-16	Gray-brown coarse to fine Gravel, some Silt, some coarse to fine Sand	30	S9		7	32-50/1"		Weathered Rock PID = 3 ppm

Figure No. 10

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-9
Originally B-5

PROJECT NAME Proposed Development
PROJECT LOCATION 30 Water Street, Ossining, New York
PROJECT NO. 11498
ELEVATION DATUM NAVD-88 **GROUND ELEVATION** 14.0 ft ±

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		No Recovery		S10		0	50/0"		
		(Good Rock Quality)					02:00		
		35-40 feet: Banded schist, medium to fine grained, slightly weathered, very close to wide fracture spacing, very narrow to narrow fracture separation, stained, near vertical to moderate dipping, strong				REC = 98%; RQD = 88%	02:26		
				RC1			01:26		
							01:28		
							01:37		
	-26	BORING COMPLETED AT 40± FEET	40						Boring complete on Rock
	-31		45						
	-36		50						
	-41		55						
	-46		60						
	-51		65						
	-56		70						

Figure No. 10

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: BB-10
Originally B-7

PROJECT NAME	Proposed Development	**PROJECT LOCATION**	30 Water Street, Ossining, New York
PROJECT NO.	11498	**ELEVATION DATUM**	NAVD-88 **GROUND ELEVATION** 15.0±
DATE STARTED	10-12-2023 **COMPLETED** 10-12-2023	**DRILLING METHOD**	Borehole
DRILLING CONTRACTOR	Craig Geotechnical Drilling Co., Inc.	**SAMPLE HAMMER**	Auto
SAMPLER	SPT	**AUGER INNER DIAMETER**	**OUTER DIAMETER**
EQUIPMENT	CME 75	**ROTARY BIT DIAMETER**	3.88 in **GROUNDWATER LEVELS:**
DRILLING FOREMAN	John **HELPER** Steve	**CASING DIAMETER**	▽ **AT TIME OF DRILLING**
LOGGED BY	L. Mann **CHECKED BY**	**CASING DEPTH**	▼ **AT END OF DRILLING** Not Measured
LATITUDE	41.159128 **LONGITUDE** -73.867991	**FINAL DEPTH**	5.1± ft ▼ **AFTER DRILLING**

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		Light gray coarse to fine GRAVEL, and Silt, little coarse to fine Sand		S1		16	6-14-39-25 (53)	•	Weathered Rock
		Light gray coarse to fine SAND, little Silt, little medium to fine Gravel		S2		9	24-50/4"		Weathered Rock 25-75/3" (-200) = 19.3% W. C. = 6.7%
	10	BORING COMPLETED AT 5.1± FEET DUE TO ROTARY BIT REFUSAL	5						Drill refusal on Rock
	5		10						
	0		15						
	-5		20						
	-10		25						
	-15		30						

Figure No. 11

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: PB-1
Originally P-3

PROJECT NAME	Proposed Development	**PROJECT LOCATION**	30 Water Street, Ossining, New York
PROJECT NO.	11498	**ELEVATION DATUM**	NAVD-88
GROUND ELEVATION	20.0±		
DATE STARTED	10-13-2023	**COMPLETED**	10-13-2023
DRILLING METHOD	Borehole		
DRILLING CONTRACTOR	Craig Geotechnical Drilling Co., Inc.	**SAMPLE HAMMER**	Auto
SAMPLER	SPT	**AUGER INNER DIAMETER**	
OUTER DIAMETER			
EQUIPMENT	CME 75	**ROTARY BIT DIAMETER**	3.88 in
GROUNDWATER LEVELS:			
DRILLING FOREMAN	John	**HELPER**	Steve
CASING DIAMETER	4.00 in	**AT TIME OF DRILLING**	5.00± ft
LOGGED BY	L. Mann	**CHECKED BY**	
CASING DEPTH	23.0 ft	**AT END OF DRILLING**	Not Measured
LATITUDE	41.159998	**LONGITUDE**	-73.866862
FINAL DEPTH	40.0± ft	**AFTER DRILLING**	

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		Fill: Gray-brown coarse to fine SAND, trace fine Gravel, trace Silt		S1		18	15-24-16-10 (40)		
		Fill: Gray-brown coarse to fine SAND, some coarse to fine Gravel, trace Silt, with bricks		S2		4	11-8-6-6 (14)		
	15		5						Wet
		Gray-brown coarse to fine GRAVEL, some coarse to fine Sand, little Silt		S3		5	1-1-1-1 (2)		
		Gray-brown coarse to fine GRAVEL, some coarse to fine Sand, trace Silt		S4		10	5-3-8-4 (11)		
	10	Gray coarse to fine SAND, some Silt, little fine Gravel	10	S5		7	8-5-4-3 (9)		
	5	Gray coarse to fine Gravel, some Silt, little coarse to fine Sand	15	S6		5	3-2-3-3 (5)		Moist
	0	Gray-brown coarse to fine SAND, some medium to fine Gravel, trace Silt	20	S7		10	4-8-11-15 (19)		
	-5	Gray-brown-white SILT, some coarse to fine Sand, trace Gravel	25	S8		9	50-50/4"		Weathered Rock
	-10	(Good Rock Quality) 30-35 feet: Light gray banded schist, medium to fine grained, slightly weathered, very close to moderate fracture spacing, tight to wide fracture separation, stained fractures, fractures near vertical to moderate dipping, weak to strong	30	RC1	REC = 88%; RQD = 78%		02:00 01:03 01:08 01:00 01:00		

Figure No. 12

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

BOREHOLE NUMBER: PB-1
Originally P-3

PROJECT NAME Proposed Development
PROJECT LOCATION 30 Water Street, Ossining, New York
PROJECT NO. 11498
ELEVATION DATUM NAVD-88 **GROUND ELEVATION** 20.0 ft ±

Material Symbol	EL (ft)	Sample Description	Depth (ft)	Sample Data: Number	Type	Rec. (in)	Blows/6-in Core time/ft	N-Value (Blows/ft) 20 40 60 80	Remarks
		(Good Rock Quality) 30-35 feet: Light gray banded schist, medium to fine grained, slightly weathered, very close to moderate fracture spacing, tight to wide fracture separation, stained fractures, fractures near vertical to moderate dipping, weak to strong		RC2		REC = 97%; RQD = 78%	01:49 01:18		
		(Good Rock Quality) 35-40 feet: Light gray banded schist, medium to fine grained, slightly weathered, close to moderate fracture spacing, narrow to wide fracture separation, stained to filled fractures, shallow to moderately dipping, medium weak to strong					01:09 01:21 01:28		
	-20	BORING COMPLETED AT 40± FEET	40						Boring completed on Rock
	-25		45						
	-30		50						
	-35		55						
	-40		60						
	-45		65						
	-50		70						

Figure No. 12

Attachment B:

Community Air Monitoring Plan

SESI
CONSULTING ENGINEERS

COMMUNITY AIR MONITORING PLAN

FOR

Portion of Former Ossining Works Site, Operable Unit 1
30 Water Street
Ossining, New York
BCP# C360172

Prepared For:

WB 30 Water Street, LLC
480 Bedford Road
Chappaqua, New 10514

Prepared By:

SESI CONSULTING ENGINEERS

959 Route 46E, Floor 3, Suite 300

Parsippany, New Jersey 07054

Project No. 11498

May 2023

Table of Contents

LIST OF ACRONYMS

Acronym	Definition
CAMP	Community Air Monitoring Plan
mcg/m^3	micrograms per cubic meter
MGP	Manufactured Gas Plant
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PID	Photoionization Detector
PM-10	Less than 10 micrometers
ppm	Parts Per Million
RAWP	Remedial Action Work Plan
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This document presents a Community Air Monitoring Plan (CAMP) for the Remedial Action Work Plan (RAWP) for the proposed development at 30 Water Street, Ossining, New York (the "Site").

The Site, which is the subject of this RAWP, is approximately 2.815 acres. The Site is identified by the Westchester County Clerk as Section 89.19, Block 6, Lots 26, 27, 28, and 29. The Site has been developed since 1855 and historically has been a Manufactured Gas Plant (MGP) that initially included the production of coal gas, later replaced by the production of carbureted water gas using the Lowe carbureted gas method. MGP operations continued until 1929, the plant was placed in standby status in 1930, and the MGP was retired from service in 1943. From 1970 until the present day, the Ossining Department of Public Works has used the Site as a storage facility and parking lot. The Department of Public Works had a petroleum bulk storage facility on the northern portion of the Site. That facility was closed in 2005. The Site is located in a residential, commercial and industrial area in Ossining and is bounded by Central Avenue to the north, Main Street to the south, and North Water Street to the west.

2.0 OBJECTIVES

The objective of the CAMP is to provide a measure of protection for the downwind community from potential airborne contaminant releases that may arise during all ground intrusive activities, and potentially contaminated soil and material handling and staging. In addition, the CAMP is intended to ensure that dust and contaminants are not leaving the work zone**.**

3.0 METHODS

The CAMP will include continuous monitoring for particulate matter (e.g. airborne "dust") and volatile organic compounds (VOCs) during the planned remedial excavation and construction activities. Any CAMP exceedances will be reported to the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) on the same business day and as soon as possible. Notification of the exceedance will be sent via email along with the reason for the exceedance, the measure(s) taken to address the exceedance, and if the exceedance was resolved.

3.1. CONTINUOUS MONITORING

Continuous monitoring for particulates and VOCs will be conducted during all ground intrusive activities including soil borings, monitoring well installations, and archaeological excavations.

3.2. PERIODIC MONITORING

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

4.0 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

VOCs must be monitored at the downwind perimeter of the immediate work area (i.e. the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using a photoionization detector (PID) equipped with a 10.6 ev lamp. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume

provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down.
- All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

5.0 PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS

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

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/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 must be employed. Work may continue with dust-suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/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 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust-suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

6.0 SPECIAL REQUIREMENTS FOR WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUAL STRUCTURES

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed one (1) ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m^3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Attachment C:

Health and Safety Plan

SESI
CONSULTING ENGINEERS

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Portion of Former Ossining Works Site, Operable Unit 1
30 Water Street
Ossining, New York
BCP# C360172

Prepared For:

WB 30 Water Street, LLC
480 Bedford Road
Chappaqua, NY 10514

Prepared By:

SESI CONSULTING ENGINEERS
959 Route 46E
Parsippany, NJ 07054

Project No.: 11498

May 2023

Disclaimer: *This Health and Safety Plan (HASP) is based upon information provided [and, if applicable, conditions discovered during a site visit], and is limited by the project scope.*

The HASP should be periodically reviewed and updated based on a number of factors, including but not limited to: (1) changes in applicable governmental requirements; (2) changes in procedures at the site; and (3) site conditions which were unknown to SESI Consulting Engineers (SESI) as of the time the HASP was prepared.

This HASP has been prepared for the sole and exclusive use of Wilder Balter Partners, Inc. and may not be relied upon by any other person without the express written consent and authorization of SESI.

SITE-SPECIFIC HEALTH AND SAFETY PLAN

For

Portion of Former Ossining Works Site, Operable Unit 1
30 Water Street
Ossining, New York

Prepared by: _____ Date:

_____

Steven Gustems
SESI- Project Manager

Approved by: _____ Date:

_____

Fuad Dahan
SESI-Principal

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LIST OF ACRONYMS

Acronym	Definition
ACGIH	American Conference of Governmental Industrial Hygienists
COC	Contaminants(s) of Concern
CRZ	Contamination Reduction Zone
EMS	Emergency Medical Services
EZ	Exclusion Zone
FS	Field Supervisor
GFCI	Ground Fault Circuit Interrupter
HASP	Health and Safety Plan
HSM	Health and Safety Manager
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
NIOSH	National Institute for Occupational Safety and Health
NRR	Noise Reduction Rating
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
PEL	Permissible Exposure Limit
PFD	Personal Flotation Device
PID	Photoionization Detector
PM	Project Manager
PO	Project Officer
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
SESI	SESI Consulting Engineers
SSO	Site Safety Officer
SVOC	Semi-Volatile Organic Compound
SZ	Support Zone
TLV	Threshold Limit Value
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound

HEALTH AND SAFETY PLAN SUMMARY

The chemical hazards associated with site operations are related to inhalation, ingestion, and skin exposure to site Chemicals of Concern (COCs). COCs at the site include VOCs, SVOCs, metals, and PFOA and PFOS. Concentrations of airborne COCs during site tasks may be measurable and will require air monitoring during certain operations.

The potential for inhalation of site COCs is low. The potential for dermal contact with soils containing site COCs during remedial operations is moderate.

The following table summarizes airborne contaminant action levels that will be used to determine the procedures and protective equipment necessary based on conditions as measured at the site.

Parameter	Reading	Action
Dust	0 to .5 mg/m3	Normal operations
	0.5 to 1 mg/m3	Begin soil wetting procedure (Level C protection would be needed beyond this point)
	> 1 mg/m3	Stop work, fully implement dust control plan
Oxygen	≤ 19.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
	> 19.5% to < 23.5%	Normal operations
	≥ 23.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Carbon Monoxide	0 ppm to ≤ 20 ppm	Normal operations
	> 20 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area

The level of personal protection selected will be based on air monitoring of the work environment and an assessment by the Field Supervisor and Site Safety Officer. The following table presents a selection matrix to determine appropriate Personal Protective Equipment.

Task	Anticipated Level of Protection
Mobilization	Level D
Subsurface Intrusive Activities (Mass Excavation, Drilling, In Situ Stabilization Soil Grouting)	Modified Level D/Level C
Earthwork/Grading	Level D
Additional Chemical Sampling / Delineation	Modified Level D/Level C
Decontamination	Modified Level D
Demobilization	Level D

1.0 INTRODUCTION

1.1 Objective

The objective of this Health and Safety Plan (HASP) is to provide a mechanism for establishing safe working conditions during remedial action activities. The safety organization, procedures, and protective equipment have been established based on an analysis of potential physical, chemical, and biological hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential of injury, illness, or other hazardous incident.

The HASP was written to meet the requirements of all applicable Federal, State, and local health and safety regulations, including 29 CFR 1910.120. The HASP is based on current knowledge regarding the specific chemical and physical hazards that are known or anticipated at the Site. This HASP is a dynamic document, for which changes and/or revisions may be realized as changes in scope and/or site conditions are encountered. Should revised documents be produced, said revised documents will refer to the specific changes and why they were made.

1.2 Site and Facility Description

This document presents the health and safety plan (HASP) for the environmental investigation and report for the property located at 30 Water Street, Ossining, New York. The Site is an approximately 2.815 -acre acre area bordered by Central Avenue to the north, Main Street to the south, and North Water Street to the west. This parcel identified on the Town of Ossining NY GIS Viewer as Part 89.19 – Block 6 – Lots No. 26, 27, 28, and 29. The Site is located in the Village of Ossining.

Historically, from circa 1855 to circa 1929, The Site was utilized as a manufactured gas plant (MGP). The MGP operations on-site reportedly produced 9 million to 140 million cubic feet of manufactured gas per year during its operation. The operations were placed on a standby status until 1943 when the units were retired from service. By 1971 the site was mainly used for parking and was eventually left vacant.

Surface elevations on-site rand from 15 to 50 feet above mean sea level along main street in the northern direction. The Kill Brook flows at approximately 5’ below the surrounding topography and run through the site. The majority of the Site is covered in asphalt and/or gravel cover aside from the eastern portion of the property which is mostly wooded.

1.3 Policy Statement

The policy of SESI Consulting Engineers (SESI) is to provide a safe and healthful work environment. No aspect of operations is of greater importance than injury and illness prevention. A fundamental principle of safety management is that all injuries, illnesses, and incidents are preventable. SESI will take every reasonable step to eliminate or control hazards in order to minimize the possibility of injury, illness, or incident.

This HASP prescribes the procedures that must be followed by SESI personnel during activities at the site. Operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the Project Manager (PM) and the Health and Safety Manager (HSM). This document will be reviewed periodically by the HSM to ensure that it is current and technically correct. Any

changes in site conditions and/or the scope of work will require a review and modification to this HASP. Such changes will be completed in the form of an addendum or a revision to the plan.

The provisions of this plan are mandatory for all SESI personnel and are advisory for all contractors, and subcontractors assigned to the project***. Subcontractors will be responsible for preparing their own site-specific HASPs that meet the basic requirements outlined in this HASP.*** All visitors to SESI work areas at the site must abide by the requirements of this plan.

1.4 References

This HASP complies with applicable Occupational Safety and Health Administration (OSHA) regulations, United States Environmental Protection Agency (USEPA) regulations, and SESI health and safety policies and procedures. This plan follows the guidelines established in the following:

- *Standard Operating Safety Guides*, USEPA (Publication 9285.1-03, June 1992).
- *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, NIOSH, OSHA, USCG, USEPA (86116, October 1985).
- *Title 29 of the Code of Federal Regulations* (CFR), Part 1910.
- *Title 29 of the Code of Federal Regulations* (CFR), Part 1926.
- *Pocket Guide to Chemical Hazards*, DHHS, PHS, CDC, NIOSH (2004).
- *Threshold Limit Values*, ACGIH (2005).
- *Guide to Occupational Exposure Values*, ACGIH (2005).
- *Quick Selection Guide to Chemical Protective Clothing*, Forsberg, K. and S.Z. Mansdorf, 2nd Ed. (1993).

1.5 Definitions

The following definitions (listed alphabetically) are applicable to this HASP:

- *Contamination Reduction Zone (CRZ)* - Area between the exclusion zone and support zone that provides a transition between contaminated and clean areas. Decontamination stations are located in this zone.
- *Exclusion Zone (EZ)* - Any portions of the site where hazardous substances are, or are reasonably suspected to be present, and pose an exposure hazard to on-site personnel.
- *Incident* - All losses, including first aid cases, injuries, illnesses, spills/leaks, equipment and property damage, motor vehicle accidents, regulatory violations, fires, and business interruptions.
- *On-Site Personnel* - All SESI and subcontractors involved with the project.
- *Project* - All on-site work performed under the scope of work.
- *Site* - The area described in Section 1.2, Site and Facility Description, where the work is to be performed by SESI personnel and subcontractors.
- *Support Zone (SZ)* - All areas of the site except the EZ and CRZ. The SZ surrounds the CRZ and EZ. Support equipment and break areas are located in this zone.
- *Subcontractor* - Includes contractor personnel hired by SESI.
- *Visitor* - All other personnel, except the on-site personnel.

- *Work Area* - The portion of the site where work activities are actively being performed. This area may change daily as work progresses and includes the SZ, CRZ, and EZ. If the work area is located in an area on the site that is not contaminated, or suspected of being contaminated, the entire work area may be a SZ.

2.0 PROJECT SCOPE OF WORK

This HASP contains information for the following tasks specified in the Remedial Action Work PlaN (RAWP) that are anticipated to conduct at the Site. Should additional and/or different tasks be identified, amendments to this HASP will be required to address these changed items.

- Demolition of the existing Site structures and removal of any areas of concern such as hydraulic lifts, tanks, etc.
- Excavation of material as required for in-situ solidification stabilization (ISS) treatment, including pre-ISS 5-ft excavation, the estimated volumes of which will be determined after the pre-design investigation (PDI), and as required to remove non-MGP contamination. as preparation for the proposed development:
- Transport and off-site disposal of material as follows, the estimated volumes of which will be determined after the PDI:
    - 120 tons of construction and demolition debris
    - Hazardous waste soils as result of the non-aqueous phase liquid (NAPL)_ excavation for treatment/disposal via low-temperature thermal desorption.
    - Non-hazardous waste disposal soil from ISS preparation and jet grout
    - Contaminated non-hazardous MGP contaminated soils pre-ISS excavation as described above.
- Conducting ISS treatment of subsurface soil containing significant quantities of NAPL to depths of up to 34 ft. bgs, the estimated volume of which will be determined after the PDI.
- Backfilling the 5 foot cut ISS areas with appropriate backfill as described in this RAWP in the ISS area outside of the building footprint on the southern portion of the Site.

- Installation of NAPL recovery wells in the downgradient portion of the Site and establishing a long-term monitoring and recovery program to remove NAPL from the wells and limit the potential for future migration of NAPL downgradient of the Site.
- Installation of additional groundwater monitoring wells to establish a new groundwater monitoring well network.
- A Site-wide combined cover system (CCS) consisting of hard surfaces (buildings and paving) resulting from the proposed development. In the areas where no hard surfaces are proposed, twenty-four (24) inches of soil that complies with the Restricted Residential Soil Cleanup Objectives with the top six (6) inches amenable for vegetation will be added. The northeastern area of the Site, which is currently covered with a wooded area and where no development is proposed and may be open to the public, a pre-design surface soil sampling is proposed to determine if a surface soil cover system remediation is required.
- Installation of precautionary sub slab depressurization system (SSDS) piping and a soil vapor barrier in the proposed residential building and performing a soil vapor evaluation after implementation of the main components of the remedy to determine if the SSDS needs to become activated.
- Conducting annual groundwater monitoring to document the extent and concentrations of dissolved and potential trends in contaminant of concern concentrations.
- Preparing an annual report to summarize annual groundwater monitoring activities.
- Establishing institutional controls in the form of an environmental easement to limit the future development and use of the Site to restricted residential or commercial use (i.e. the Site will be redeveloped to house retail and multifamily dwellings), limit the potential future use of Site groundwater as a source of potable or process water without necessary water quality treatment, limit the permissible subsurface activities that could result in potential exposures to subsurface soils and groundwater containing residual

impacts and to require maintenance of the CCS and recovery well engineering controls.

- Preparation of a Site Management Plan to document the institutional/engineering controls as well as protocols (including health and safety requirements) for conducting subsurface activities and for management of potentially impacted material encountered during these activities.

3.0 ROLES AND RESPONSIBILITIES

3.1 All Personnel

All SESI project personnel must adhere to the procedures outlined in this HASP during the performance of their work. Each person is responsible for completing tasks safely and reporting any unsafe acts or conditions to their supervisor. No person may work in a manner that conflicts with these procedures. After due warnings, the PM will dismiss from the site any SESI employee or subcontractor who violates safety procedures.

All SESI project personnel will receive training in accordance with applicable regulations and be familiar with the requirements and procedures contained in this HASP prior to initiating site activities. In addition, all SESI personnel will attend an initial hazard briefing prior to beginning work at the site.

The roles of key safety personnel and subcontractors are outlined in the following sections. Key project personnel and contacts are summarized in **Table 3.1**.

3.2 Key Safety Personnel

3.2.1 Project Officer (PO)

The PO is responsible for providing resources to assure project activities are completed in accordance with this HASP, and for meeting all regulatory and contractual requirements.

3.2.2 Project Manager (PM)

The PM is responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The PM is responsible for confirming that the Field Supervisor (FS) has the equipment, materials, and qualified personnel to fully implement the safety requirements of this HASP, and/or that subcontractors assigned to this project meet the requirements established by SESI. It is also the responsibility of the PM to:

- Consult with the HSM on site health and safety issues;
- Verify that subcontractors meet health and safety requirements prior to commencing work;
- Verify that all incidents are thoroughly investigated;
- Approve, in writing, addenda or modifications of this HASP; and

- Suspend work or modify work practices, as necessary, for personal safety, protection of property, and regulatory compliance.

3.2.3 Health and Safety Manager (HSM)

The HSM or his designee, the health and safety manager (HSM), has overall responsibility for the technical health and safety aspects of the project, including review and approval of this HASP. Inquiries regarding health and safety procedures, project procedures, and other technical or regulatory issues should be addressed to this individual. The HSM or his designee must approve changes or addenda to this HASP.

3.2.4 Site Safety Officer (SSO)

The SSO is responsible for field health and safety issues, including the execution of this HASP. Questions in the field regarding health and safety procedures, project procedures, and other technical or regulatory issues should be addressed to this individual. The SSO will advise the PM on health and safety issues and will establish and coordinate the project air-monitoring program if one is deemed necessary (see Section 5.1, Air Monitoring). The SSO is the primary site contact on health and safety matters. It is the responsibility of the SSO to:

- Provide on-site technical assistance, if necessary;
- Participate in all accident/incident reports and ensure that they are reported to the HSM, client, and PM within 24 hours;
- Coordinate site and personal air monitoring as required, including equipment maintenance and calibration;
- Conduct site safety orientation training and safety meetings;
- Verify that project personnel have received the required physical examinations and medical certifications;
- Review site activities with respect to compliance with this HASP;
- Maintain required health and safety documents and records; and
- Assist the FS in instructing field personnel on project hazards and protective procedures.

3.2.5 Field Supervisor (FS)

The FS is responsible for implementing this HASP, including communicating requirements to on-site personnel and subcontractors. The FS will be responsible for informing the PM of changes in the work plan, procedures, or site conditions so that those changes may be addressed in this HASP. Other responsibilities are to:

- Consult with the SSO on site health and safety issues;
- Stop work, as necessary, for personal safety, protection of property, and regulatory compliance;
- Obtain a site map and determine and post routes to medical facilities and emergency telephone numbers;
- Notify local public emergency representatives (as appropriate) of the nature of the site operations, and post their telephone numbers (i.e., local fire department personnel who would respond for a confined space rescue);
- Observe on-site project personnel for signs of ill health effects;
- Investigate and report any incidents to the SSO;

- Verify that all on-site personnel have had applicable training;
- Verify that on-site personnel are informed of the physical, chemical, and biological hazards associated with the site activities, and the procedures and protective equipment necessary to control the hazards; and
- Issue/obtain any required work permits (hot work, confined space, etc.).

3.2.6 Field Personnel (FP)

All SESI field personnel are responsible for following the Health and Safety procedures specified in this HASP and work practices specified in applicable operation procedures. Some specific responsibilities include, but are not limited to:

- Reading and understanding the HASP;
- Reporting all accidents, incidents, injuries, or illnesses to the FS;
- Complying with the requests of the SSO;
- Immediately communicating newly identified hazards or noncompliance issues to the FS or SSO; and
- Stopping work in cases of immediate danger.

3.3 Subcontractors

Subcontractors and their personnel must understand and comply with applicable regulations and site requirements established in this HASP. Subcontractors will prepare their own site-specific HASP that must be consistent with the requirements of this HASP.

All subcontractor personnel will receive training in accordance with applicable regulations and be familiar with the requirements and procedures contained in this HASP prior to initiating site activities. All subcontractor personnel will attend an initial hazard briefing prior to beginning work at the site. Additionally, on-site subcontractor personnel must conduct daily site safety meetings.

Subcontractors must designate individuals to function as the PM, HSM, SSO, and FS. In some firms the HSM to be carried out by the PM. This is acceptable provided the PM has the required knowledge, training, and experience to properly address all hazards associated with the work, and to prepare, approve, and oversee the execution of the site-specific HASP. A subcontractor may designate the same person to perform the duties of both the SSO and the FS. However, depending on the level of complexity of a contractor's scope of work, it may be infeasible for one person to perform both functions satisfactorily.

3.4 Stop Work Authority

Every SESI employee and subcontractor is empowered, expected, and has the responsibility to stop the work of another co-worker if the working conditions or behaviors are considered unsafe.

3.5 All On-Site Personnel

All on-site SESI personnel (including SESI subcontractors) must read and acknowledge their understanding of their respective HASPs before commencing work and abide by the requirements of the plans. All on-site SESI personnel shall sign their HASP Acknowledgement Form following their review of their HASP.

All SESI project personnel will receive training in accordance with applicable regulations and be familiar with the requirements and procedures contained in this HASP prior to initiating site activities. In addition, all on-site personnel will attend an initial hazard briefing provided by the SSO prior to beginning work at the site and conduct daily safety meetings thereafter.

On-site personnel will immediately report the following to the FS or SSO:

- Personal injuries and illnesses no matter how minor;
- Unexpected or uncontrolled release of chemical substances;
- Symptoms of chemical exposure;
- Unsafe or hazardous situations;
- Unsafe or malfunctioning equipment;
- Changes in site conditions that may affect the health and safety of project personnel;
- Damage to equipment or property; and
- Situations or activities for which they are not properly trained.

3.6 Visitors

All SESI personnel and subcontractors visiting the Site must check in with the FS. Visitors will be cautioned to avoid skin contact with surfaces, soils, groundwater, or other materials that may impacted or be suspected to be impacted by constituents of concern (COCs).

Visitors requesting to observe work at the site must use appropriate personal protective equipment (PPE) prior to entry to the work area and must have the appropriate training and medical clearances to do so. If respiratory protective devices are necessary, visitors who wish to enter the work area must have been respirator-trained and fit tested for a respirator within the past 12 months.

Table 3.1 – Key Safety Personnel

SESI Personnel		
Role	**Name**	**Address/Telephone No.**
Project Officer (PO)	Fuad Dahan	Parsippany, NJ/973-808-9050
Project Manager (PM)	Steven Gustems	Parsippany, NJ/973-808-9050
Senior Project Engineer (SPE)	Fuad Dahan	Parsippany, NJ/973-808-9050
Health and Safety Manager (HSM)	Todd Kelly	Parsippany, NJ/973-808-9050
Site Safety Officer (SSO)	Jon Stuart	Parsippany, NJ/973-808-9050
Field Supervisor (FS)	TBD	Parsippany, NJ/973-808-9050
Field Personnel	TBD	Parsippany, NJ/973-808-9050
Field Personnel	TBD	
Subcontractors		
Company/Role	**Name**	**Address/Telephone No.**
General Borings/Driller	TBD	
Coastal/Driller	TBD	

4.0 PERSONAL PROTECTIVE EQUIPMENT

4.1 Levels of Protection

PPE is required to safeguard site personnel from various hazards. Varying levels of protection may be required depending on the levels of COCs and the degree of physical hazard. This section presents the various levels of protection and defines the conditions of use for each level. A summary of the levels is presented in **Table 3.2**.

4.1.1 Level D Protection

The minimum level of protection that will be required of project personnel at the site will be Level D, which will be worn when site conditions or air monitoring indicates no inhalation hazard exists. The following equipment will be used:

- Work clothing as prescribed by weather;
- Steel toe work boots, meeting American National Standards Institute (ANSI) Z41;
- Safety glasses or goggles, meeting ANSI Z87;
- Leather work gloves and/or nitrile surgical gloves;
- Hard hat, meeting ANSI Z89, when falling object hazards are present;
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used); and
- PFD if working on or near the water.

4.1.2 Modified Level D Protection

Modified Level D will be used when airborne contaminants are not present at levels of concern, but site activities present an increased potential for skin contact with contaminated materials. Modified Level D consists of:

- Nitrile gloves worn over nitrile surgical gloves;
- Latex/polyvinyl chloride (PVC) overboots when contact with COC-impacted media is anticipated;
- Steel toe work boots, meeting ANSI Z41;
- Safety glasses or goggles, meeting ANSI Z87;
- Face shield in addition to safety glasses or goggles when projectiles or splash hazards exist (e.g. during Power Washing activities);
- Hard hat, meeting ANSI Z89, when falling object hazards are present;
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used);
- Tyvek® suit (polyethylene coated Tyvek® suits for handling liquids) when body contact with COC-impacted media is anticipated; and
- PFD if working on or near the water.

4.1.3 Level C Protection

Level C protection will be required when the airborne concentration of COC reaches one-half of the OSHA Permissible Exposure Limit or ACGIH TLV. The following equipment will be used for Level C protection:

- Full-face, air-purifying respirator with combination organic vapor/HEPA cartridges;
- Polyethylene-coated Tyvek® suit, with ankles and cuffs taped to boots and gloves;

- Nitrile gloves worn over nitrile surgical gloves;
- Steel toe work boots, meeting ANSI Z41;
- Chemical-resistant boots with steel toes or latex/PVC overboots over steel toe boots;
- Hard hat, meeting ANSI Z89;
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used); and
- PFD if working on or near the water.

4.2 Selection of PPE

Equipment for personal protection will be selected based on the potential for contact, site conditions, ambient air quality, and the judgment of supervising site personnel and health and safety professionals. The PPE used will be chosen to be effective against the COCs present on the site.

4.3 Site Respiratory Protection Program

Respiratory protection is an integral part of employee health and safety at the site due to potentially hazardous concentrations of airborne COCs. The site respiratory protection program will consist of the following (as a minimum):

- All on-site personnel who may use respiratory protection will have an assigned respirator.
- All on-site personnel who may use respiratory protection will have been fit tested and trained in the use of a full-face air-purifying respirator within the past 12 months. Documentation of the fit test must be provided to the SSO prior to commencement of work.
- All on-site personnel who may use respiratory protection must within the past year have been medically certified as being capable of wearing a respirator. Documentation of the medical certification must be provided to the SSO, prior to commencement of site work.
- Only cleaned, maintained, NIOSH-approved respirators will be used.
- If respirators are used, the respirator cartridge is to be properly disposed of at the end of each work shift, or when load-up or breakthrough occurs.
- Contact lenses are not to be worn when a respirator is worn.
- All on-site personnel who may use respiratory protection must be clean-shaven. Mustaches and sideburns are permitted, but they must not touch the sealing surface of the respirator.
- Respirators will be inspected, and a negative pressure test performed prior to each use.
- After each use, the respirator will be wiped with a disinfectant, cleansing wipe. When used, the respirator will be thoroughly cleaned at the end of the work shift. The respirator will be stored in a clean plastic bag, away from direct sunlight in a clean, dry location, in a manner that will not distort the face piece.

4.4 Using PPE

Depending upon the level of protection selected, specific donning and doffing procedures may be required. The procedures presented in this section are mandatory if Modified Level D or Level C PPE is used. All personnel entering the EZ must put on the required PPE in

accordance with the requirements of this HASP. When leaving the EZ, PPE will be removed in accordance with the procedures listed, to minimize the spread of COCs.

4.4.1 Donning Procedures

These procedures are mandatory only if Modified Level D or Level C PPE is used on the site:

- Remove bulky outerwear. Remove street clothes and store in clean location;
- Put on work clothes or coveralls;
- Put on the required chemical protective coveralls;
- Put on the required chemical protective boots or boot covers;
- Tape the legs of the coveralls to the boots with duct tape;
- Put on the required chemical protective gloves;
- Tape the wrists of the protective coveralls to the gloves;
- Don the required respirator and perform appropriate fit check (Level C);
- Put hood or head covering over-head and respirator straps and tape hood to facepiece (Level C); and
- Don remaining PPE, such as safety glasses or goggles and hard hat.

When these procedures are instituted, one person must remain outside the work area to ensure that each person entering has the proper protective equipment.

4.4.2 Doffing Procedures

The following procedures are only mandatory if Modified Level D or Level C PPE is required for the site. Whenever a person leaves the work area, the following decontamination sequence will be followed:

- Upon entering the CRZ, rinse contaminated materials from the boots or remove contaminated boot covers;
- Clean reusable protective equipment;
- Remove protective garments, equipment, and respirator (Level C). All disposable clothing should be placed in plastic bags, which are labeled with contaminated waste labels;
- Wash hands, face, and neck (or shower if necessary);
- Proceed to clean area and dress in clean clothing; and
- Clean and disinfect respirator for next use.

All disposable equipment, garments, and PPE must be bagged in plastic bags, labeled for disposal. See Section 7, Decontamination, for detailed information on decontamination stations.

4.5 Selection Matrix

The level of personal protection selected will be based on air monitoring of the work environment and an assessment by the FS and SSO of the potential for skin contact with COCs. The PPE selection matrix is presented in **Table 4.1** below. This matrix is based on information available at the time this plan was written. The Airborne Contaminant Action Levels in **Table 5.1**, Airborne Contaminant Action Levels, should be used to verify that the PPE prescribed in these matrices is appropriate.

Table 4.1 – PPE Selection Matrix

Task	Anticipated Level of Protection
Mobilization	Level D
Subsurface Intrusive Activities (Excavation, Drilling)	Modified Level D/Level C
Earthwork/Grading	Level D
Chemical Sampling / Delineation	Modified Level D/Level C
Decontamination	Modified Level D
Demobilization	Level D

5.0 AIR AND NOISE MONITORING

5.1 Air Monitoring

Air monitoring, sampling, and testing will be conducted to determine employee exposure to airborne constituents. The monitoring results will dictate work procedures and the selection of PPE. The SESI SSO will be responsible for defining appropriate air monitoring procedures and for utilizing the air monitoring results to determine appropriate procedures and PPE for project personnel. Air monitoring results should be recorded in field notebooks or on an air monitoring log (see Attachment 1 for a copy of the Air Monitoring Log). Any deviations from the procedures listed here should be documented and explained in the Air Monitoring Log.

The monitoring devices to be used are a PDR1000 particulate monitor (or equivalent) and a Rae Systems MultiRAE detector (PID with a 11.7 eV lamp/oxygen/LEL/hydrogen sulfide sensors). Colorimetric detector tubes may be utilized to estimate airborne concentrations of benzene and should be onsite during any activities that may result in elevated PID readings including drilling, excavating, and groundwater sampling.

Air monitoring will be conducted continuously with the LEL/Oxygen meter during drilling in areas where flammable vapors or gases are suspect. All work activity must stop where tests indicate the concentration of flammable vapors exceeds 10% of the LEL at a location with a potential ignition source. Such an area must be ventilated to reduce the concentration to an acceptable level.

5.2 Noise Monitoring

Noise monitoring may be conducted as required. Hearing protection is mandatory for all employees in noise hazardous areas, such as around heavy equipment. As a general rule, sound levels that cause speech interference at normal conversation distance should require the use of hearing protection.

5.3 Monitoring Equipment Maintenance and Calibration

All direct-reading instrumentation calibrations should be conducted under the approximate environmental conditions the instrument will be used. Instruments must be calibrated before and after use, noting the reading(s) and any adjustments that are necessary. All air monitoring equipment calibrations, including the standard used for calibration, must be documented on a calibration log or in the field notebook. All completed health and safety

documentation/forms must be reviewed by the SSO and maintained by the FS.

All air monitoring equipment will be maintained and calibrated in accordance with the specific manufacturer's procedures. Preventive maintenance and repairs will be conducted in accordance with the respective manufacturer's procedures. When applicable, only manufacturer-trained and/or authorized personnel will be allowed to perform instrument repairs or preventive maintenance.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the SSO must be responsible for immediately removing the instrument from service and obtaining a replacement unit. If the instrument is essential for safe operation during a specific activity, that activity must cease until an appropriate replacement unit is obtained. The SSO will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

5.4 Action Levels

Table 5.1 below presents airborne contaminant action levels that will be used to determine the procedures and protective equipment necessary based on conditions as measured at the site.

Table 5.1 – Airborne Contaminant Action Levels

Parameter	Reading	Action
Total Hydrocarbons	0 ppm to ≤ 1 ppm	Normal operations; continue hourly breathing zone monitoring
	> 1 ppm to 5 ppm	Increase monitoring frequency to every 15 minutes and use benzene detector tube to screen for the presence of benzene
	≥ 5 ppm to ≤ 50 ppm	Upgrade to Level C PPE; continue screening for benzene
	> 50 ppm	Stop work; investigate cause of reading
	At any reading > 5 ppm	Monitor perimeter per CAMP
Benzene	≥ 1 ppm to 5 ppm	Upgrade to Level C PPE
	> 5 ppm	Stop work; investigate cause of reading
Dust	0 to .05 mg/m3	Normal operations
	0.05 to 0.1 mg/m3	Begin soil wetting procedure (Level C protection would be needed beyond this point)
	> 0.15 mg/m3	Stop work, fully implement dust control plan
Oxygen	≤ 19.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
	> 19.5% to < 23.5%	Normal operations
	≥ 23.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Carbon Monoxide	0 ppm to ≤ 20 ppm	Normal operations
	> 20 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area

Parameter	Reading	Action
Hydrogen Sulfide	0 ppm to ≤ 5 ppm	Normal operations
	> 5 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Flammable Vapors (LEL)	< 10% LEL	Normal operations
	≥ 10% LEL	Stop work, ventilate area, investigate source of vapors

6.0 WORK ZONES AND DECONTAMINATION

6.1 Work Zones

6.1.1 Authorization to Enter

Only personnel with the appropriate training and medical certifications (if respirators are required) will be allowed to work at the project site. The FS will maintain a list of authorized persons; only personnel on the authorized persons list will be allowed to enter the site work areas.

6.1.2 Site Orientation and Hazard Briefing

No person will be allowed in the work area during site operations without first being given a site orientation and hazard briefing. This orientation will be presented by the FS or SSO and will consist of a review of this HASP. This review must cover the chemical, physical, and biological hazards, protective equipment, safe work procedures, and emergency procedures for the project. Following this initial meeting, daily safety meetings will be held each day before work begins.

All people entering the site work areas, including visitors, must document their attendance at this briefing, as well as the daily safety meetings on the forms included with this plan.

6.1.3 Certification Documents

A training and medical file may be established for the project and kept on site during all site operations. Specialty training, such as first aid/cardiopulmonary resuscitation (CPR) certificates, as well as current medical clearances for all project field personnel required to wear respirators, will be maintained within that file. All project personnel must provide their training and medical documentation to the SSO prior to starting work.

6.1.4 Entry Log

A log-in/log-out sheet will be maintained at the site by the FS. Personnel must sign in and out on a log sheet as they enter and leave the work area, and the FS may document entry and exit in the field notebook.

6.1.5 Entry Requirements

In addition to the authorization, hazard briefing, and certification requirements listed above, no person will be allowed in any SESI work area unless they are wearing the minimum PPE as described in Section 4.0.

6.1.6 Emergency Entry and Exit

People who must enter the work area on an emergency basis will be briefed of the hazards by the FS or SSO. All activities will cease in the event of an emergency. People exiting the

work area because of an emergency will gather in a designated safe area for a head count. The FS is responsible for ensuring that all people who entered the work area have exited in the event of an emergency.

6.1.7 Contamination Control Zones

Contamination control zones are maintained to prevent the spread of contamination and to prevent unauthorized people from entering hazardous areas.

6.1.8 Exclusion Zone (EZ)

An EZ may consist of a specific work area or may be the entire area of potential contamination. All employees entering an EZ must use the required PPE and must have the appropriate training and medical clearance for hazardous waste work. The EZ is the defined area where there is a possible respiratory and/or contact health hazard. Cones, caution tape, or a posted site diagram will identify the location of each EZ.

6.1.9 Contamination Reduction Zone

The CRZ or transition area will be established, if necessary, to perform decontamination of personnel and equipment. All personnel entering or leaving the EZ will pass through this area to prevent any cross-contamination. Tools, equipment, and machinery will be decontaminated in a specific location. The decontamination of all personnel will be performed on site adjacent to the EZ. Personal protective outer garments and respiratory protection will be removed in the CRZ and prepared for cleaning or disposal. This zone is the only appropriate corridor between the EZ and the support zone (SZ) discussed below.

6.1.10 Support Zone (SZ)

The SZ is a clean area outside the CRZ located to prevent employee exposure to hazardous substances. Eating and drinking will be permitted in the support area only after proper decontamination. Smoking may be permitted in the SZ, subject to site requirements.

6.1.11 Posting

Work areas will be prominently marked and delineated using cones, caution tape, or a posted site diagram.

6.1.12 Site Inspections

The FS will conduct a daily inspection of site activities, equipment, and procedures to verify that the required elements are in place.

6.2 Decontamination

6.2.1 Personnel Decontamination

All personnel wearing Modified Level D or Level C protective equipment in the EZ must undergo personal decontamination prior to entering the SZ. The personnel decontamination area will consist of the following stations at a minimum:

- *Station 1*: Personnel leaving the contaminated zone will remove the gross contamination from their outer clothing and boots.
- *Station 2*: Personnel will remove their outer garment and gloves and dispose of it in properly labeled containers. Personnel will then decontaminate their hard hats,

and boots with an aqueous solution of detergent or other appropriate cleaning solution. These items are then hand carried to the next station.

- *Station 3*: Personnel will thoroughly wash their hands and face before leaving the CRZ. Respirators will be sanitized and then placed in a clean plastic bag.

6.2.2 Equipment Decontamination

All vehicles that have entered the EZ will be decontaminated at the decontamination pad prior to leaving the zone. If the level of vehicle contamination is low, decontamination may be limited to rinsing of tires and wheel wells with water. If the vehicle is significantly contaminated, steam cleaning or pressure washing of vehicles and equipment may be required.

6.2.3 Personal Protective Equipment Decontamination

Where and whenever possible, single-use, external protective clothing must be used for work within the EZ or CRZ. This protective clothing must be disposed of in properly labeled containers. Reusable protective clothing will be rinsed at the site with detergent and water. The rinsate will be collected for disposal.

When removed from the CRZ, the respirator will be thoroughly cleaned with soap and water. The respirator face piece, straps, valves, and covers must be thoroughly cleaned at the end of each work shift, and ready for use prior to the next shift. Respirator parts may be disinfected with a solution of bleach and water (mixed at 2% bleach by volume), or by using a spray disinfectant

7.0 TRAINING AND MEDICAL SURVEILLANCE

7.1 Training

7.1.1 General

All on-site project personnel who work in areas where they may be exposed to site contaminants must be trained as required by OSHA Regulation 29 CFR 1910.120 (HAZWOPER). Field employees also must receive a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. Personnel who completed their initial training more than 12 months prior to the start of the project must have completed an eight-hour refresher course within the past 12 months. The FS must have completed an additional eight hours of supervisory training and must have a current first-aid/CPR certificate (See Attachment 2).

7.1.2 Basic 40-Hour Course

The following is a list of the topics typically covered in a 40-hour HAZWOPER training course:

- General safety procedures;
- Physical hazards (fall protection, noise, heat stress, cold stress);
- Names and job descriptions of key personnel responsible for site health and safety;
- Safety, health, and other hazards typically present at hazardous waste sites;
- Use, application, and limitations of PPE;
- Work practices by which employees can minimize risks from hazards;
- Safe use of engineering controls and equipment on site;

- Medical surveillance requirements;
- Recognition of symptoms and signs which might indicate overexposure to hazards;
- Worker right-to-know (Hazard Communication OSHA 1910.1200);
- Routes of exposure to contaminants;
- Engineering controls and safe work practices;
- Components of a health and safety program and a site-specific HASP;
- Decontamination practices for personnel and equipment;
- Confined-space entry procedures; and
- General emergency response procedures.

7.1.3 Supervisor Course

Management and supervisors must receive an additional eight hours of training, which typically includes:

- General site safety and health procedures;
- PPE programs; and
- Air monitoring techniques.

7.1.4 Site-Specific Training

Site-specific training will be accomplished by on-site personnel reading this HASP, and through a thorough site briefing by the PM, FS, or SSO on the contents of this HASP before work begins. The review must include a discussion of the chemical, physical, and biological hazards; the protective equipment and safety procedures; and emergency procedures.

7.1.5 Daily Safety Meetings

Daily safety meetings will be held to cover the work to be accomplished, the hazards anticipated, the PPE and procedures required to minimize site hazards, and emergency procedures. The FS or SSO should present these meetings prior to beginning the day's fieldwork. No work will be performed in an EZ before a daily safety meeting has been held. An additional safety meeting must also be held prior to new tasks, or if new hazards are encountered. The daily safety meetings will be logged in the field notebook.

7.1.6 First Aid and CPR

At least one employee current in first aid/CPR will be assigned to the work crew and will be on the site during operations. Site records will document the presence of this individual. Refresher training in first aid (triennially) and CPR (annually) is required to keep the certificate current. These individuals must also receive training regarding the precautions and protective equipment necessary to protect against exposure to blood-borne pathogens.

7.2 Medical Surveillance

7.2.1 Medical Examination

All personnel who are potentially exposed to site contaminants must participate in a medical surveillance program as defined by OSHA at 29 CFR 1910.120 (f).

7.2.2 Pre-placement Medical Examination

All potentially exposed personnel must have completed a comprehensive medical examination prior to assignment, and periodically thereafter as defined by applicable

regulations. The pre-placement and periodic medical examinations typically include the following elements:

- Medical and occupational history questionnaire;
- Physical examination;
- Complete blood count, with differential;
- Liver enzyme profile;
- Chest X-ray, at a frequency determined by the physician;
- Pulmonary function test;
- Audiogram;
- Electrocardiogram for persons older than 45 years of age, or if indicated during the physical examination;
- Drug and alcohol screening, as required by job assignment;
- Visual acuity; and
- Follow-up examinations, at the discretion of the examining physician or the corporate medical director.

The examining physician provides the employee with a letter summarizing his findings and recommendations, confirming the worker's fitness for work and ability to wear a respirator. Documentation of medical clearance will be available for each employee during all project site work.

Subcontractors will certify that all their employees have successfully completed a physical examination by a qualified physician. The physical examinations must meet the requirements of 29 CFR 1910.120 and 29 CFR 1910.134. Subcontractors will supply copies of the medical examination certificate for each on-site employee.

7.2.3 Other Medical Examinations

In addition to pre-employment, annual, and exit physicals, personnel may be examined:

- At employee request after known or suspected exposure to toxic or hazardous materials; and
- At the discretion of the SSO, HSM, or occupational physician in anticipation of, or after known or suspected exposure to toxic or hazardous materials.

7.2.4 Periodic Exam

Following the placement examination, all employees must undergo a periodic examination, similar in scope to the placement examination. For employees potentially exposed over 30 days per year, the frequency of periodic examinations will be annual. For employees potentially exposed less than 30 days per year, the frequency for periodic examinations will be 24 months.

7.2.5 Medical Restriction

When the examining physician identifies a need to restrict work activity, the employee's supervisor must communicate the restriction to the employee and the SSO. The terms of the restriction will be discussed with the employee and the supervisor.

8.0 GENERAL SAFETY PRACTICES

8.1 General Safety Rules

General safety rules for site activities include, but are not limited to, the following:

- At least one copy of this HASP must be in a location at the site that is readily available to personnel, and all project personnel shall review the plan prior to starting work.
- Consume or use food, beverages, chewing gum, and tobacco products only in the SZ or other designated area outside the EZ and CRZ. Cosmetics shall not be applied in the EZ or CRZ.
- Wash hands before eating, drinking, smoking, or using toilet facilities.
- Wear all PPE as required and stop work and replace damaged PPE immediately.
- Secure disposable coveralls, boots, and gloves at the wrists and legs and ensure closure of the suit around the neck.
- Upon skin contact with materials that may be impacted by COCs, remove contaminated clothing and wash the affected area immediately. Contaminated clothing must be changed. Any skin contact with materials potentially impacted by COCs must be reported to the FS or SSO immediately. If needed, medical attention should be sought.
- Practice contamination avoidance. Avoid contact with surfaces either suspected or known to be impacted by COCs, such as standing water, mud, or discolored soil. Equipment must be stored on elevated or protected surfaces to reduce the potential for incidental contamination.
- Remove PPE as required in the CRZ to limit the spread of COC-containing materials.
- At the end of each shift or as required, dispose of all single-use coveralls, soiled gloves, and respirator cartridges in designated receptacles designated for this purpose.
- Removing soil containing site COCs from protective clothing or equipment with compressed air, shaking, or any other means that disperses contaminants into the air is prohibited.
- Inspect all non-disposable PPE for contamination in the CRZ. Any PPE found to be contaminated must be decontaminated or disposed of appropriately.
- Recognize emergency signals used for evacuation, injury, fire, etc.
- Report all injuries, illnesses, and unsafe conditions or work practices to the FS or SSO.
- Use the “buddy system” during all operations requiring Level C PPE, and when appropriate, during Modified Level D operations.
- Obey all warning signs, tags, and barriers. Do not remove any warnings unless authorized to do so.
- Use, adjust, alter, and repair equipment only if trained and authorized to do so, and in accordance with the manufacturer’s directions.
- Personnel are to perform only tasks for which they have been properly trained and will advise their supervisor if they have been assigned a task for which they are not trained.
- The presence or consumption of alcoholic beverages or illicit drugs during the workday, including breaks, is strictly prohibited. Notify your supervisor if you must

take prescription or over-the-counter drugs that indicate they may cause drowsiness or, that you should not operate heavy equipment.
- Remain upwind during site activities whenever possible.

8.2 Buddy System

On-site personnel must use the buddy system as required by operations. Use of the "buddy system" is required during all operations requiring Level C to Level A PPE, and when appropriate, during Level D operations. Crewmembers must observe each other for signs of chemical exposure, and heat or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration;
- Changes in coordination;
- Changes in demeanor;
- Excessive salivation and pupillary response; and
- Changes in speech pattern.

Crewmembers must also be aware of the potential exposure to possible safety hazards, unsafe acts, or non-compliance with safety procedures.

Field personnel must inform their partners or fellow crewmembers of non-visible effects of exposure to toxic materials that they may be experiencing. The symptoms of such exposure may include, but are not limited to:

- Headaches;
- Dizziness;
- Nausea;
- Blurred vision;
- Cramps; and
- Irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

8.3 Heat Stress

Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, etc., as well as the physical and conditioning characteristics of the individual. Since heat stress is one of the most common illnesses associated with heavy outdoor work conducted with direct solar load and, in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Personnel must be aware of the types and causes of heat-related illnesses and be able to recognize the signs and symptoms of these illnesses in both themselves and their co-workers.

Heat rashes are one of the most common problems in hot work environments. Commonly known as prickly heat, a heat rash is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated

sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

Heat cramps are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused both by too much or too little salt.

Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (plus or minus 0.3% NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Drinking commercially available carbohydrate electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

Heat exhaustion occurs from increased stress on various body organs due to inadequate blood circulation, cardiovascular insufficiency, or dehydration. Signs and symptoms include pale, cool, moist skin; heavy sweating; dizziness; nausea; headache, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment.

Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, which is a medical emergency.

Workers suffering from heat exhaustion should be removed from the hot environment, be given fluid replacement, and be encouraged to get adequate rest.

Heat stroke is the most serious form of heat stress. Heat stroke occurs when the body's system of temperature regulation fails and the body's temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41°C (105.8°F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of workload and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady area and the outer clothing should be removed. The worker's skin should be wetted and air movement around the worker should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the worker's protestations, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or exhaustion, that person may be predisposed to additional heat injuries.

8.4 Heat Stress Safety Precautions

Heat stress monitoring and work rest cycle implementation should commence when the ambient adjusted temperature exceeds 72°F. A minimum work rest regimen and procedures for calculating ambient adjusted temperature are described in **Table 8.1** below.

Table 8.1– Work/Rest Schedule

Adjusted Temperature[b]	Work/Rest Regimen Normal Work Ensemble[c]	Work/Rest Regimen Impermeable Ensemble
90ºF (32.2ºC) or above	After each 45 minutes of work	After each 15 minutes of work
87.5º - 90ºF (30.8º-32.2ºC)	After each 60 minutes of work	After each 30 minutes of work
82.5º - 87.5ºF (28.1º - 30.8ºC)	After each 90 minutes of work	After each 60 minutes of work
77.5º - 82.5ºF (25.3º - 28.1ºC)	After each 120 minutes of work	After each 90 minutes of work
72.5º - 77.5ºF (30.8º - 32.2ºC)	After each 150 minutes of work	After each 120 minutes of work

a. For work levels of 250 kilocalories/hour (Light-Moderate Type of Work)
b. Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F = ta °F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)
c. A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.
d. The information presented above was generated using the information provided in the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) Handbook.

In order to determine if the work rest cycles are adequate for the personnel and specific site conditions, additional monitoring of individual heart rates will be conducted during the rest cycle. To check the heart rate, count the radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one third and maintain the same rest period.

Additionally, one or more of the following control measures can be used to help control heat stress and are mandatory if any site worker has a heart rate (measure immediately prior to rest period) exceeding 115 beats per minute:

- Site workers will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day.
- On-site drinking water will be kept cool (50 to 60°F).
- A work regimen that will provide adequate rest periods for cooling down will be established, as required.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.
- Cooling devices, such as vortex tubes or cooling vests, should be used when personnel must wear impermeable clothing in conditions of extreme heat.

- Employees should be instructed to monitor themselves and co-workers for signs of heat stress and to take additional breaks as necessary.
- A shaded rest area must be provided. All breaks should take place in the shaded rest area.
- Employees must not be assigned to other tasks during breaks.
- Employees must remove impermeable garments during rest periods. This includes white Tyvek-type garments.

All employees must be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

8.5 Cold Stress

Cold stress normally occurs in temperatures at or below freezing, or under certain circumstances, in temperatures of 40°F. Extreme cold for a short time may cause severe injury to exposed body surfaces or result in profound generalized cooling, causing death. Areas of the body that have high surface area-to-volume ratio, such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold weather injury: ambient temperature and the velocity of the wind. For instance, 10°F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at 18°F. An equivalent chill temperature chart relating the actual dry bulb temperature and wind velocity is presented in **Table 8.2** below.

Table 8.2 – Wind Chill Temperature Chart

Estimated Wind Speed (in mph)	**Actual Temperature Reading (ºF)**											
	50	**40**	**30**	**20**	**10**	**0**	**-10**	**-20**	**-30**	**-40**	**-50**	**-60**
	Equivalent Chill Temperature (ºF)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	**LITTLE DANGER Maximum danger of false sense of security.**				**INCREASING DANGER Danger from freezing of exposed flesh within one minute.**			**GREAT DANGER Flesh may freeze within 30 seconds.**				
	Trench foot and immersion foot may occur at any point on this chart.											

[This chart was developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA (Source: ACGIH Threshold Limit Values for Chemical Substances and Physical Agents)].

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of tissue damage associated with frostbite. Frostbite of the extremities can be categorized into:

- *Frost Nip or Incipient Frostbite* - characterized by sudden blanching or whitening of skin.

- *Superficial Frostbite* - skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- *Deep Frostbite* - tissues are cold, pale, and solid; extremely serious injury.

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. It can be fatal. Its symptoms are usually exhibited in five stages: 1) shivering; 2) apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95°F; 3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; 4) freezing of the extremities; and 5) death. Trauma sustained in freezing or sub-zero conditions requires special attention because an injured worker is predisposed to secondary cold injury. Special provisions must be made to prevent hypothermia and secondary freezing of damaged tissues in addition to providing for first aid treatment. To avoid cold stress, site personnel must wear protective clothing appropriate for the level of cold and physical activity. In addition to protective clothing, preventive safe work practices, additional training, and warming regimens may be utilized to prevent cold stress.

8.6 Safety Precautions for Cold Stress Prevention

For air temperature of 0°F or less, mittens should be used to protect the hands. For exposed skin, continuous exposure should not be permitted when air speed and temperature results in a wind chill temperature of -25°F.

At air temperatures of 36°F or less, field personnel who become immersed in water or whose clothing becomes wet must be immediately provided with a change of clothing and be treated for hypothermia.

If work is done at normal temperature or in a hot environment before entering the cold, the field personnel must ensure that their clothing is not wet as a consequence of sweating. Wet field personnel must change into dry clothes prior to entering the cold area.

If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work must be modified or suspended until adequate clothing is made available or until weather conditions improve.

Field personnel handling evaporative liquid (e.g., gasoline, alcohol, or cleaning fluids) at air temperatures below 40°F must take special precaution to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling.

8.7 Safe Work Practices

Direct contact between bare skin and cold surfaces (< 20°F) should be avoided. Metal tool handles and/or equipment controls should be covered by thermal insulating material.

For work performed in a wind chill temperature at or below 10°F, workers should be under constant protective observation (buddy system). The work rate should be established to prevent heavy sweating that will result in wet clothing. For heavy work, rest periods must be taken in heated shelters and workers should be provided with an opportunity to change into dry clothing if needed.

Field personnel should be provided the opportunity to become accustomed to cold-weather working conditions and required protective clothing. Work should be arranged in such a way that sitting or standing still for long periods is minimized.

During the warming regimen (rest period), field personnel should be encouraged to remove outer clothing to permit sweat evaporation or to change into dry work clothing. Dehydration, or loss of body fluids, occurs insidiously in the cold environment and may increase susceptibility to cold injury due to a significant change in blood flow to the extremities. Fluid replacement with warm, sweet drinks and soups is recommended. The intake of coffee should be limited because of diuretic and circulatory effects.

8.8 Biological Hazards

Biological hazards may include poison ivy, snakes, thorny bushes and trees, ticks, mosquitoes, spiders, and other pests.

8.8.1 Tick Borne Diseases

Lyme Disease - The disease commonly occurs in summer and is transmitted by the bite of infected ticks. "Hot spots" in the United States include New York, New Jersey, Pennsylvania, Massachusetts, Connecticut, Rhode Island, Minnesota, and Wisconsin.

Erlichiosis - The disease also commonly occurs in summer and is transmitted by the bite of infected ticks. "Hot spots" in the United States include New York, Massachusetts, Connecticut, Rhode Island, Minnesota, and Wisconsin.

These diseases are transmitted primarily by the deer tick, which is smaller and redder than the common wood tick. The disease may be transmitted by immature ticks, which are small and hard to see. The tick may be as small as a period on this page.

Symptoms of Lyme disease include a rash or a peculiar red spot, like a bull's eye, which expands outward in a circular manner. The victim may have headache, weakness, fever, a stiff neck, and swelling and pain in the joints, and eventually, arthritis. Symptoms of erlichiosis include muscle and joint aches, flu-like symptoms, but there is typically no skin rash.

Rocky Mountain Spotted Fever (RMSF) - This disease is transmitted via the bite of an infected tick. The tick must be attached 4 to 6 hours before the disease-causing organism (Rickettsia rickettsii) becomes reactivated and can infect humans. The primary symptom of RMSF is the sudden appearance of a moderate-to-high fever. The fever may persist for two to three weeks. The victim may also have a headache, deep muscle pain, and chills. A rash appears on the hands and feet on about the third day and eventually spreads to all parts of the body. For this reason, RMSF may be confused with measles or meningitis. The disease may cause death, if untreated, but if identified and treated promptly, death is uncommon.

Control - Tick repellant containing diethyltoluamide (DEET) should be used when working in tick-infested areas, and pant legs should be tucked into boots. In addition, workers should search the entire body every three or four hours for attached ticks. Ticks should be removed promptly and carefully without crushing, since crushing can squeeze the disease-causing organism into the skin. A gentle and steady pulling action should be used to avoid

leaving the head or mouth parts in the skin. Hands should be protected with surgical gloves when removing ticks.

8.8.2 Poisonous Plants

Poisonous plants may be present in the work area. Personnel should be alerted to its presence and instructed on methods to prevent exposure.

Control - The main control is to avoid contact with the plant, cover arms and hands, and frequently wash potentially exposed skin. Particular attention must be given to avoiding skin contact with objects or protective clothing that have touched the plants. Treat every surface that may have touched the plant as contaminated, and practice contamination avoidance. If skin contact is made, the area should be washed immediately with soap and water and observed for signs of reddening.

8.8.3 Snakes

The possibility of encountering snakes exists, specifically for personnel working in wooded/vegetated areas. Snake venoms are complex and include proteins, some of which have enzymatic activity. The effects produced by venoms include neurotoxic effects with sensory, motor, cardiac, and respiratory difficulties; cytotoxic effects on red blood cells, blood vessels, heart muscle, kidneys, and lungs; defects in coagulation; and effects from local release of substances by enzymatic actions. Other noticeable effects of venomous snakebites include swelling, edema, and pain around the bite, and the development of ecchymosis (the escape of blood into tissues from ruptured blood vessels).

Control - To minimize the threat of snakebites, all personnel walking through vegetated areas must be aware of the potential for encountering snakes, and the need to avoid actions potentiating encounters, such as turning over logs, etc. If a snakebite occurs, an attempt should be made to safely identify the snake via size and markings. The victim must be transported to the nearest hospital within 30 minutes; first aid consists of applying a constriction band and washing the area around the wound to remove any unabsorbed venom.

8.8.4 Spiders

Personnel may encounter spiders during work activities.

Two spiders are of concern, the black widow and the brown recluse. Both prefer dark sheltered areas such as basements, equipment sheds and enclosures, and around woodpiles or other scattered debris. The black widow is shiny black, approximately one inch long, and found throughout the United States. There is a distinctive red hourglass marking on the underside of the black widows body. The bite of a black widow is seldom fatal to healthy adults, but effects include respiratory distress, nausea, vomiting, and muscle spasms. The brown recluse is smaller than the black widow and gets its name from its brown coloring and behavior. The brown recluse is more prevalent in the southern United States. The brown recluse has a distinctive violin shape on the top of its body. The bite of the brown recluse is painful and the bite site ulcerates and takes many weeks to heal completely.

Control - To minimize the threat of spider bites, all personnel walking through vegetated areas must be aware of the potential for encountering these arachnids. Personnel need to

avoid actions that may result in encounters, such as turning over logs, and placing hands in dark places such as behind equipment or in corners of equipment sheds or enclosures. If a spider bite occurs, the victim must be transported to the nearest hospital as soon as possible; first aid consists of applying ice packs and washing the area around the wound to remove any unabsorbed venom.

8.9 Noise

Exposure to noise over the OSHA action level can cause temporary impairment of hearing; prolonged and repeated exposure can cause permanent damage to hearing. The risk and severity of hearing loss increases with the intensity and duration of exposure to noise. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of accidents on site.

Control - All personnel must wear hearing protection, with a Noise Reduction Rating (NRR) of at least 20, when noise levels exceed 85 dBA. When it is difficult to hear a co-worker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All site personnel who may be exposed to noise must also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss. Noise monitoring is discussed in Section 5.2, Noise Monitoring.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, barriers or increased distance will be used to minimize worker exposure to noise, if feasible.

8.10 Spill Control

All personnel must take every precaution to minimize the potential for spills during site operations. All on-site personnel shall immediately report any discharge, no matter how small, to the FS.

Spill control equipment and materials will be located on the site at locations that present the potential for discharge. All sorbent materials used for the cleanup of spills will be containerized and labeled appropriately. In the event of a spill, the FS will follow the provisions in Section 10.0, Emergency Procedures, to contain and control released materials and to prevent their spread to off-site areas.

8.11 Sanitation

Site sanitation will be maintained according to OSHA requirements.

8.11.1 Break Area

Breaks must be taken in the SZ, away from the active work area after site personnel go through decontamination procedures. There will be no smoking, eating, drinking, or chewing gum or tobacco in any area other than the SZ.

8.11.2 Potable Water

The following rules apply to all field operations:

- An adequate supply of potable water will be provided at each project site. Potable water must be kept away from hazardous materials or media, and contaminated clothing or equipment.

- Portable containers used to dispense drinking water must be capable of being tightly closed and must be equipped with a tap dispenser. Water must not be consumed directly from the container (drinking from the tap is prohibited) nor may it be removed from the container by dipping.
- Containers used for drinking water must be clearly marked and shall not be used for any other purpose.
- Disposable drinking cups must be provided. A sanitary container for dispensing cups and a receptacle for disposing of used cups is required.

8.11.3 Sanitary Facilities

Access to facilities for washing before eating, drinking, or smoking, or alternate methods such as waterless hand-cleaner and paper towels will be provided.

8.11.4 Lavatory

If permanent toilet facilities are not available, an appropriate number of portable chemical toilets will be provided. This requirement does not apply to mobile crews or to normally unattended site locations so long as employees at these locations have transportation immediately available to nearby toilet facilities.

8.12 Emergency Equipment

Adequate emergency equipment for the activities being conducted on site and as required by applicable sections of 29 CFR 1910 and 29 CFR 1926 will be on site prior to the commencement of project activities. Personnel will be provided with access to emergency equipment, including, but not limited to, the following:

- Fire extinguishers of adequate size, class, number, and location as required by applicable sections of 29 CFR 1910 and 1926;
- Industrial first aid kits of adequate size for the number of personnel on site; and
- Emergency eyewash and/or shower if required by operations being conducted on site.

8.13 Lockout/Tagout Procedures

Only fully qualified and trained personnel will perform maintenance procedures. Before maintenance begins, lockout/tagout procedures per OSHA 29 CFR 1910.147 will be followed.

Lockout is the placement of a device that uses a positive means, such as lock, to hold an energy or material-isolating device such that the equipment cannot be operated until the lockout device is removed. If a device cannot be locked out, a tagout system shall be used. Tagout is the placement of a warning tag on an energy or material isolating device indicating that the equipment controls may not be operated until the personnel who attached the tag remove the tag.

8.14 Electrical Safety

Electricity may pose a particular hazard to site workers due to the use of portable electrical equipment. If wiring or other electrical work is needed, a qualified electrician must perform it.

General electrical safety requirements include:

- All electrical wiring and equipment must be a type listed by Underwriters Laboratories (UL), Factory Mutual Engineering Corporation (FM), or other recognized testing or listing agency.
- All installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or USCG regulations.
- Portable and semi-portable tools and equipment must be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.
- Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double insulated tools must be distinctly marked and listed by UL or FM.
- Live parts of wiring or equipment must be guarded to prevent persons or objects from touching them.
- Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
- All circuits must be protected from overload.
- Temporary power lines, switchboxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.
- Plugs and receptacles must be kept out of water unless of an approved submersible construction.
- All extension cord outlets must be equipped with ground fault circuit interrupters (GFCI).
- Attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.
- Extension cords or cables must be inspected prior to each use and replaced if worn or damaged. Cords and cables must not be fastened with staples, hung from nails, or suspended by bare wire.
- Flexible cords must be used only in continuous lengths without splice, with the exception of molded or vulcanized splices made by a qualified electrician.

8.15 Lifting Safety

Using proper lifting techniques may prevent back strain or injury. The fundamentals of proper lifting include:

- Consider the size, shape, and weight of the object to be lifted. A mechanical lifting device or additional persons must be used to lift an object if it cannot be lifted safely alone.
- The hands and the object should be free of dirt or grease that could prevent a firm grip.
- Gloves must be used, and the object inspected for metal slivers, jagged edges, burrs, or rough or slippery surfaces.
- Fingers must be kept away from points that could crush or pinch them, especially when putting an object down.

- Feet must be placed far enough apart for balance. The footing should be solid and the intended pathway should be clear.
- The load should be kept as low as possible, close to the body with the knees bent.
- To lift the load, grip firmly and lift with the legs, keeping the back as straight as possible.
- A worker should not carry a load that he or she cannot see around or over.
- When putting an object down, the stance and position are identical to that for lifting; the legs are bent at the knees, and the back is straight as the object is lowered.

8.16 Ladder Safety

When portable ladders are used for access to an upper landing surface, the ladder side rails shall extend at least 3 feet (9 m) above the upper landing surface to which the ladder is used to gain access; or, when such an extension is not possible because of the ladder's length, then the ladder shall be secured at its top to a rigid support that will not deflect, and a grasping device, such as a grabrail, shall be provided to assist employees in mounting and dismounting the ladder. In no case shall the extension be such that ladder deflection under a load would, by itself, cause the ladder to slip off its support.

- Ladders shall be maintained free of oil, grease, and other slipping hazards.
- Ladders shall not be loaded beyond the maximum intended load for which they were built, or beyond their manufacturer's rated capacity.
- Ladders shall be used only for the purpose for which they were designed.
- Non-self-supporting ladders shall be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).
- Wood job-made ladders with spliced side rails shall be used at an angle such that the horizontal distance is one-eighth the working length of the ladder.
- Fixed ladders shall be used at a pitch no greater than 90 degrees from the horizontal, as measured to the back side of the ladder.
- Ladders shall be used only on stable and level surfaces unless secured to prevent accidental displacement.
- Ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip-resistant feet shall not be used as a substitute for care in placing, lashing, or holding a ladder that is used upon slippery surfaces, including, but not limited to, flat metal or concrete surfaces that are constructed so they cannot be prevented from becoming slippery.
- Ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways, doorways, or driveways, shall be secured to prevent accidental displacement, or a barricade shall be used to keep the activities or traffic away from the ladder.
- The area around the top and bottom of ladders shall be kept clear.
- The top of a non-self-supporting ladder shall be placed with the two rails supported equally unless it is equipped with a single support attachment.
- Ladders shall not be moved, shifted, or extended while occupied.
- Ladders shall have non-conductive side rails if they are used where the employee or the ladder could contact exposed energized electrical equipment.

- The top, top step, or the step labeled that it or any step above it should not be used as a step.
- Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.
- Ladders shall be inspected by the HSM for visible defects on a daily basis and after any occurrence that could affect their safe use.
- Portable ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps; broken or split rails; corroded components; or other faulty or defective components shall either be immediately marked in a manner that readily identifies them as defective or be tagged with “Do Not Use” or similar language and shall be withdrawn from service.
- Fixed ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps; broken or split rails; or corroded components; shall be withdrawn from service.
- Ladder repairs shall restore the ladder to a condition meeting its original design criteria, before the ladder is returned to use.
- Single-rail ladders shall not be used.
- When ascending or descending a ladder, the user shall face the ladder.
- Each employee shall use at least one hand to grasp the ladder when progressing up and/or down the ladder.
- An employee shall not carry any object or load that could cause the employee to lose balance and fall.

8.17 Traffic Safety

The project site may be located adjacent to a public roadway where exposure to vehicular traffic is likely. Traffic may also be encountered as vehicles enter and exit the area. To minimize the likelihood of project personnel and activities being affected by traffic, the following procedures will be implemented.

Cones must be placed along the shoulder of the roadway starting 100 feet from the work area to alert passing motorists to the presence of personnel and equipment. A “Slow” or “Men Working” sign must be placed at the first cone. Barricades with flashing lights should be placed between the roadway and the work area.

During activities along a roadway, equipment will be aligned parallel to the roadway to the extent feasible, facing into the oncoming traffic so as to place a barrier between the work crew and the oncoming traffic. All crewmembers must remain behind the equipment and the traffic barrier.

All site personnel who are potentially exposed to vehicular traffic must wear an outer layer of orange warning garments, such as vests, jackets, or shirts. If work is performed in hours of dusk or darkness, workers will be outfitted with reflective garments either orange, white (including silver-coated reflective coatings or elements that reflect white light), yellow, fluorescent red-orange, or fluorescent yellow-orange.

The flow of traffic into and out of the adjacent business must be assessed, and precautions taken to warn motorists of the presence of workers and equipment. Where possible, vehicles should be aligned to provide physical protection of people and equipment.

9.0 SITE-SPECIFIC HAZARDS AND CONTROL MEASURES

9.1 Evaluation of Hazards

The evaluation of hazards is provided as a quick reference as to the known conditions for the Site, wherein the level of detail for each of the subsections is identified.

9.1.1 Hazard Characteristics

Existing information for Site:
__X__ Detailed _____ Preliminary _____ None

Hazardous/Contaminated Material Form(s):
__X__ Solid __X__ Liquid _____ Sludge ___ Gas X Vapor

Containment Type(s):
_____ Drum __X__ Tank _____ Pit _____ Debris
_____ Pond _____ Lagoon Other:

Hazardous Material Characteristics:
__X__ Volatile _____ Corrosive _____ Reactive _____ Radioactive
_____ Ignitable __X__ Toxic _____ Unknown

Routes of Exposure:
__X__ Oral __X__ Dermal __X__ Eye __X__ Respiratory

9.1.2 Potential Health and Safety Hazards

__X__ Heat
__X__ Cold
_____ Confined space entry
_____ Oxygen depletion
_____ Asphyxiation
__X__ Excavation
__X__ Cave-ins
__X__ Falls, slippage
__X__ Heavy equipment
_____ Other: Potential Ignition Hazard.

_____ Congested areas
__X__ General Construction
__X__ Physical injury
__X__ Electrical hazards
__X__ Handling and product transfer
__X__ Fire
__X__ Explosion
__X__ Biological Hazards
- __X__ Plants – Poison Ivy, Poison Oak
- __X__ Insects – Ticks
- __X__ Insects – Mosquitoes
- __X__ Insects – Bees and Wasps
- __X__ Rats and Mice

_____ Non-ionizing Radiation (i.e. UV, IR, etc.)

9.2 Field Activities, Hazards, and Control Procedures

The following task-specific safety analyses identify potential health, safety, and environmental hazards associated with each type of field activity. Because of the complex and changing nature of field projects, supervisors must continually inspect the site to identify hazards that may affect on-site personnel, the community, or the environment. The FS must be aware of these changing conditions and discuss them with the PM whenever

these changes impact employee health, safety, the environment, or performance of the project. The FS will keep on-site personnel informed of the changing conditions, and the PM will write and/or approve addenda or revisions to this HASP as necessary.

9.2.1 Mobilization/Construction Stakeout

Description of Tasks

Site mobilization will include establishing excavation locations, determining the location of utilities and other installations, and establishing work areas. Mobilization will also include setting up equipment and establishing a temporary site office. A break area will be set up outside of regulated work areas. Mobilization may involve clearing areas for the SZ and CRZ. During this initial phase, project personnel will walk the site to confirm the existence of anticipated hazards and identify safety and health issues that may have arisen since the writing of this plan.

Hazard Identification

The hazards of this phase of activity are associated with heavy equipment operation, manual materials handling, installation of temporary on-site facilities, and manual site preparation.

Manual materials handling and manual site preparation may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion, and laceration hazards. Installation of temporary field office and support facilities may expose personnel to electrical hazards, underground and overhead utilities, and physical injury due to the manual lifting and moving of materials. The work area presents slip, trip, and fall hazards from scattered debris and irregular walking surfaces. Rainy weather may cause wet, muddy, slick walking surfaces, and unstable soil. Freezing weather hazards include frozen, slick, and irregular walking surfaces.

Environmental hazards include plants, such as poison ivy and poison oak; aggressive fauna, such as ticks, fleas, mosquitoes, wasps, spiders, and snakes; weather, such as sunburn, lightning, rain, and heat- or cold-related illnesses; and pathogens, such as rabies, Lyme disease, and blood-borne pathogens.

Controls

Control procedures for these hazards are discussed in Section 8.0, General Safety Practices.

9.2.2 Demolition/Site Clearing

Description of Tasks

Site clearance will involve manual or mechanical removal of objects impeding access to the construction footprint. These obstructions are both natural and man-made items and will include, but not be limited to, fabricated metal and concrete structures, trees, vegetation, rubble, and miscellaneous trash/debris.

Hazard Identification

Hazards associated with demolition and site clearance include personnel working in and around potentially unstable structures, or locations of potential contact with hazardous chemicals, utilities, and/or falling objects. This task will involve manual, as well as mechanical demolition/clearance efforts so exertion and equipment hazards exist.

Controls
PPE – Personnel shall be protected from hazards of irritant and toxic plants and suitably instructed in the first aid treatment available.

Preparatory Operations – Prior to permitting employees to start demolition operations, an engineering survey shall be made, by a licensed Professional Engineer, of the structure to determine the stability of the structure. Any adjacent structure shall where personnel may be exposed shall also be similarly checked. The PO shall have in writing evidence that such a survey has been performed. All structural instabilities shall be shored or braced, under the supervision of a licensed Professional Engineer, prior to access by an FP.

Utilities – All electric, gas, water, steam, sewer, and other service lines shall be shut off, caped, or otherwise controlled, outside the building line before demolition work is started. In each case, any utility company that is involved shall be notified in advance. If it is necessary to maintain any power, water or other utilities during demolition, such lines shall be temporarily relocated, as necessary.

Hazardous Substances – It shall also be determined if any type of hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.

Falling Debris/Objects – No material shall be dropped to any point lying outside the exterior walls of the structure unless the area is effective protected. Access to the area where falling objects/debris may be encountered must be gated and controlled.

Structural Collapse – Structural or load supporting members on any floor shall not be cut or removed until all stories above such a floor have been demolished and removed. Walls, which are to serve as retaining walls against which debris will be piled, shall not be so used unless capable of safely supporting the imposed load. Mechanical equipment shall not be used on floors or working surfaces unless such floors or surfaces are not of sufficient strength to support the imposed load.

Rollover Guards – All equipment used in site clearing operations shall be equipped with rollover guards meeting the applicable requirements. In addition, rider-operated equipment shall be equipped with an overhead and rear canopy guard meeting the applicable requirements.

Inspections – During demolition, continuing inspections by a licensed Professional Engineer shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, walls, or loosened material. No FP shall be permitted to work where such hazards exist until they are corrected by shoring, bracing, or other effective means.

9.2.3 Excavation and Cut/Fill Operations

9.2.3.1 Excavation/Trenching

Description of Tasks

This task includes the excavation of contaminated soils and superficial debris. Excavation depths vary across the site.

Hazard Identification

The hazards of this activity are associated with heavy equipment operation, subsurface intrusion, manual materials handling, stockpiling, and disposal. Subsurface intrusion presents hazards associated with negotiating buried utilities, cave-ins of the excavated areas, and regress methods for personnel working inside the excavated areas. Disruption of contaminated soil also presents a health hazard.

Controls

Underground Utilities – The estimated locations of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during the excavation work, shall be determined prior to opening an excavation. Utility companies or owners shall be contacted ("Call Before You Dig") within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation.

When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by save and acceptable means. While the excavation is open, underground installations shall be protected, supported, or removed, as necessary, to safeguard site personnel.

Cave-Ins – Project personnel in an excavation shall be protected from cave-ins by an adequate protective system, except when:

- Excavations are made entirely in stable rock or excavations are less than five feet in depth and examination of the ground by the SSO provides no indication of a potential cave-in.
- Protective systems shall have the capacity to resist, without failure, all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

Project personnel shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least two feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by the SSO for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the SSO prior to the start of work and as needed throughout operations. Inspections shall also be made after every rainstorm or other hazard-increasing occurrence. These inspections are only required when project personnel exposure can be reasonably anticipated.

Where the SSO finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous

conditions, exposed personnel shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

Excavation Egress – A stairway, ladder, ramp, or other safe means of egress shall be located in trench excavations that are four feet or more in depth so as to require no more than 25 feet or lateral travel for project personnel.

9.2.3.2 Heavy Equipment Operation

Description of Tasks
Heavy equipment to be used for this task include, but are not limited to, excavators, dozers, dump trucks, and water sprayers (if required).

Hazard Identification
The most common type of accident that occurs in material handling operations is the "caught between" situation when a load is being handled and an object gets caught between two moving parts of the equipment. Operation of the heavy construction equipment may produce harmful noise.

Controls
Equipment Inspection – All vehicles in use shall be checked prior to operation to ensure that all parts, equipment, and accessories that affect safe operations are in proper operating condition and free from defects. All defects shall be corrected before the vehicle is placed in service.

Ground Guides – No personnel shall use any motor vehicle, earthmoving, or compacting equipment having an obstructed view to the rear, unless:

- The vehicle has a reverse signal alarm distinguishable from the surrounding noise level; or
- The vehicle is backed up only when an observer signals that it is safe to do so.

Blocking – Heavy machinery, equipment, or parts thereof that are suspended or held aloft shall be substantially blocked to prevent falling or shifting before employees are permitted to work under or between them.

Noise – Control measures for noise are addressed in Section 4.9.

Traffic – Control measures for traffic are addressed in Section 8.17.

9.2.3.3 Disturbance/Handling of Contaminated Material

Description of Tasks
After the contaminated soil is excavated from below the Site's surface, the material will be stockpiled, dried, and either transported offsite or relocated and backfilled on site.

Hazard Identification
The hazards associated with materials handling include contact of the contaminated material with project personnel, or cross contamination with other site soil.

Controls
Cross Contamination – Following excavation, contaminated soil stockpiles will be placed on a structure constructed to separate the material from the site soil and collect any groundwater leachate. The material shall be covered to prevent storm water erosion or migration of contaminants through storm water.

Air Monitoring – Air and particulate monitoring will be conducted during soil excavation activities to assess the potential for exposure to airborne COCs. If the results of air monitoring indicate the presence of organic vapors or particulates in a concentration causing concern, personnel will upgrade to Level C protection. Refer to Section 5.1, Air Monitoring, for a description of air monitoring requirements and action levels. A description of each level of personal protection is included in Section 4.0, Personal Protective Equipment.

Traffic – Control measures for traffic are addressed in Section 8.17.

9.2.4 Drilling/Subsurface Intrusion Activities

Description of Tasks
Site mobilization will include establishing excavation locations, determining the location of utilities and other installations, and establishing work areas. Mobilization will also include setting up equipment and establishing a temporary site office. A break area will be set up outside of regulated work areas. Mobilization may involve clearing areas for the SZ and CRZ. During this initial phase, project personnel will walk the site to confirm the existence of anticipated hazards and identify safety and health issues that may have arisen since the writing of this plan.

Hazard Identification
The primary physical hazards for this activity are associated with the use of soil boring and grouting equipment. The equipment is hydraulically powered and uses static force and dynamic percussion force to advance sampling and penetrating tubes.

Accidents can occur as a result of improperly placing the equipment on uneven or unstable terrain or failing to adequately secure the equipment prior to the start of operations.
Overhead utility lines can create hazardous conditions if contacted by the equipment.
Underground installations such as electrical lines, conduit, and product lines pose a significant hazard if contacted.

Controls
Geoprobe and Drill Rig Safety Procedures - The operator of the equipment must possess required state or local licenses to perform such work. All members of the crew shall receive site-specific training prior to beginning work.

The operator is responsible for the safe operation of the rig, as well as the crew's adherence to the requirements of this HASP. The operator must ensure that all safety equipment is in proper condition and is properly used. The members of the crew must follow all instructions of the operator, wear all personal protective equipment, and be aware of all hazards and control procedures. The operator and crew must participate in the Daily Safety Meetings and be aware of all emergency procedures.

Equipment Inspection - Each day, prior to the start of work, the rig and associated equipment must be inspected by the operator. The following items must be inspected:

- Vehicle condition;
- Proper storage of equipment;
- Condition of all hydraulic lines;
- Fire extinguisher; and
- First aid kit.

Equipment Set Up - The drill rig must be properly blocked and leveled prior to raising the derrick. The wheels which remain on the ground must be chocked. The leveling jacks shall not be raised until the derrick is lowered. The rig shall be moved only after the derrick has been lowered.

All well sites will be inspected by the driller prior to the location of the rig to verify a stable surface exists. This is especially important in areas where soft, unstable terrain is common.

The drill rig must be properly blocked and leveled prior to raising the derrick. Blocking provides a more stable drilling structure by evenly distributing the weight of the rig. Proper blocking ensures that differential settling of the rig does not occur.

When the ground surface is soft or otherwise unstable, wooden blocks, at least 24" by 24" and 4" to 8" thick shall be placed between the jack swivels and the ground. The emergency brake shall be engaged, and the wheels that are on the ground shall be chocked.

Rules for Intrusive Activity - Before beginning any intrusive activity, the existence and location of underground pipe, conduit, electrical equipment, and other installations will be determined. This will be done, if possible, by contacting the appropriate client representative to mark the location of the lines. “Call Before You Dig” will verify the potential for encountering subsurface utilities. If the client’s knowledge of the area is incomplete, an appropriate device, such as a magnetometer, will be used to locate the line.

Combustible gas readings of the general work area will be made regularly in areas where and/or during operations when the presence of flammable vapors or gases is suspected, such as during intrusive activities (see Section 5.1). Operations must be suspended and corrective action taken if the airborne flammable concentration reaches 10% of the LEL in the immediate area (a one-foot radius) of the point of drilling, or near any other ignition sources.

Overhead Electrical Clearances - If equipment is operated in the vicinity of overhead power lines, the power to the lines must be shut off or the equipment must be positioned and blocked such that no part, including cables, can come within the minimum clearances as follows:

Nominal System Voltage	**Minimum Required Clearance**
0-50kV	10 feet
51-100kV	12 feet

101-200kV	15 feet
201-300kV	20 feet
301-500kV	25 feet
501-750kV	35 feet
751-1,000kV	45 feet

When the drill rig is in transit, with the boom lowered and no load, the equipment clearance must be at least 4 feet for voltages less than 50kV, 10 feet for voltages of 50 kV to 345 kV, and 16 feet for voltages above 345 kV.

Hoisting Operations - Drillers should never engage the rotary clutch without watching the rotary table, and ensuring it is clear of personnel and equipment.

Unless the drawworks is equipped with an automatic feed control, the brake should not be left unattended without first being tied down.

Drill pipe, auger strings or casing should be picked up slowly. Drill pipe should not be hoisted until the driller is sure that the pipe is latched in the elevator, or the derrickman has signaled that he may safely hoist the pipe.

During instances of unusual loading of the derrick or mast, such as when making an unusually hard pull, only the driller should be on the rig floor; no one else should be on the rig or derrick.

The brakes on the drawworks of the drill rig should be tested by the driller each day. The brakes should be thoroughly inspected by a competent individual each week.

A hoisting line with a load imposed should not be permitted to be in direct contact with any derrick member or stationary equipment, unless it has been specifically designed for line contact.

Workers should never stand near the borehole whenever any wire line device is being run.

Hoisting control stations should be kept clean and controls labeled as to their functions.

Catline Operations - Only experienced workers will be allowed to operate the cathead controls. The kill switch must be clearly labeled and operational prior to operation of the catline. The cathead area must be kept free of obstructions and entanglements.

The operator should not use more wraps than necessary to pick up the load. More than one layer of wrapping is not permitted.

Personnel should not stand near, step over, or go under a cable or catline which is under tension.

Employees rigging loads on catlines shall:

- Keep out from under the load;
- Keep fingers and feet where they will not be crushed;

- Be sure to signal clearly when the load is being picked;
- Use standard visual signals only and not depend on shouting to coworkers; and
- Make sure the load is properly rigged, since a sudden jerk in the catline will shift or drop the load.

Wire Rope - When two wires are broken or rust or corrosion is found adjacent to a socket or end fitting, the wire rope shall be removed from service or re-socketed. Special attention shall be given to the inspection of end fittings on boom support, pendants, and guy ropes.

Wire rope removed from service due to defects shall be cut up or plainly marked as being unfit for further use as rigging.

Wire rope clips attached with U-bolts shall have the U-bolts on the dead or short end of the rope; the clip nuts shall be re-tightened immediately after initial load carrying use and at frequent intervals thereafter.

When a wedge socket fastening is used, the dead or short end of the wire rope shall have a clip attached to it or looped back and secured to itself by a clip; the clip shall not be attached directly to the live end.

Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

Except for eye splices in the ends of wires and for endless wire rope slings, wire rope used in hoisting, lowering, or pulling loads, shall consist of one continuous piece without knot or splice.

An eye splice made in any wire rope shall have not less that five full tucks.

Wire rope shall not be secured by knots. Wire rope clips shall not be used to splice rope.

Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire clips or knots.

Pipe/Auger Handling - Pipe and auger sections shall be transported by cart or carried by two persons. Individuals should not carry auger or pipe sections without assistance.

Workers should not be permitted on top of the load during loading, unloading, or transferring of pipe or rolling stock.

Employees should be instructed never to try to stop rolling pipe or casing; they should be instructed to stand clear of rolling pipe.

Slip handles should be used to lift and move slips. Employees are not permitted to kick slips into position.

When pipe is being hoisted, personnel should not stand where the bottom end of the pipe could whip and strike them.

Pipe and augers stored in racks, catwalks or on flatbed trucks should be secured to prevent rolling.

9.2.5 Subsurface Chemical Sample Collection/Analysis

Description of Tasks
This sub-task consists of the collection of soil samples for subsequent field and laboratory analysis. The physical hazards of soil sampling are primarily associated with the sample collection methods, procedures utilized, and the environment itself.

Hazard Identification
Incidental contact with COCs is the primary hazard associated with sampling the stabilized material. This contact may occur through the manipulation of sample media and equipment, manual transfer of media into sample containers, and proximity of operations to the breathing zone. The primary hazards associated with these sampling procedures are not potentially serious; however, other operations in the area, or the conditions under which samples must be collected, may present chemical and physical hazards. The hazards directly associated with sampling procedures are generally limited to strains/sprains and potential eye hazards. Potential chemical hazards may include contact with media containing site COCs and potential contact with chemicals used for equipment decontamination.

Controls
PPE – To control dermal exposure during sampling activities, a minimum of Level D protection will be worn. If necessary, based on field observations and site conditions, air monitoring may be conducted during sediment sampling activities. If the results of air monitoring indicate the presence of airborne contaminants in a concentration causing concern, personnel will upgrade to Level C protection. Refer to Section 5.1, Air Monitoring, for a description of air monitoring requirements and action levels. A description of each level of personal protection is included in Section 4.0, Personal Protective Equipment.

9.2.6 UST Closure

9.2.6.1 Working in Confined Spaces

Description of Tasks
The project will involve the closure of several USTs.

Hazard Identification
Closure activities may require the entrance into confined spaces to facilitate cleaning and removal of the USTs.

Controls
All personnel required to enter into confined or enclosed spaces must be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of required protective and emergency equipment. The PO shall comply with all specific regulations that apply to work in dangerous or potentially dangerous areas.

9.2.6.2 Working with Compressed Air

Description of Tasks
The proposed method of purging the USTs includes the injection of compressed gas into the tank and attached piping network.

Hazard Identification
Uncontrolled release of the highly pressured air can cause injury to FP during this task. Cylinders must also be properly managed to ensure they are not compromised during storage and/or use.

Controls
Pressure Regulation – Compressed air used for cleaning purposes shall be reduced to less than 30 pounds per square inch and then only with effective chip guarding and personal protective equipment.

Cylinder Storage – Valve protection caps shall be in place and secured when compressed gas cylinders are transported, moved, or stored. Cylinder valves shall be closed when work is finished and when cylinders are empty or are moved. Compressed gas cylinders shall be secured in an upright position at all times, except if necessary for short periods of time when cylinders are actually being hoisted or carried. Cylinders shall be placed in a location where they cannot become part of an electrical circuit.

9.2.7 Decontamination

All equipment will be decontaminated before leaving the site. Personnel involved in decontamination activities may be inadvertently exposed to skin contact with contaminated materials and chemicals brought from the EZ. Personnel involved in decontamination activities must wear PPE that is, at a minimum, one level below the level worn by personnel working in the EZ.

9.2.8 Demobilization

Demobilization involves the removal of all tools, equipment, supplies, and vehicles brought to the site. The hazards of this phase of activity are associated with heavy equipment operation and manual materials handling.

Manual materials handling may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion, and laceration hazards. Heavy equipment operation presents noise and vibration hazards, and hot surfaces, to operators. Personnel in the vicinity of heavy equipment operation may be exposed to physical hazards resulting in fractures, contusions, and lacerations and may be exposed to high noise levels. The work area presents slip, trip, and fall hazards from scattered debris and irregular walking surfaces. Rainy weather may cause wet, muddy, slick walking surfaces, and unstable soil. Freezing weather hazards include frozen, slick, and irregular walking surfaces.

Environmental hazards include plants, such as poison ivy and poison oak; aggressive fauna, such as ticks, fleas, mosquitoes, wasps, spiders, and snakes; weather, such as sunburn, lightning, rain, and heat-or cold-related illnesses; and pathogens, such as rabies, Lyme disease, and blood-borne pathogens.

Control procedures for these hazards are discussed in Section 8.0, General Safety Practices.

9.3 Chemical Hazards

The chemical hazards associated with site operations are related to inhalation, ingestion, and skin exposure to site COCs. Concentrations of airborne COCs during site tasks may

be measurable and will require air monitoring during certain operations. Air monitoring requirements for site tasks are outlined in Section 5.1. COCs at the site include VOCs, SVOCs, metals, and pesticides.

The potential for inhalation of site COCs is low. The potential for dermal contact with soils containing site COCs during remedial operations is moderate. Table 6 lists the primary contaminants that have been identified at the Site and the media in which they are present.

Table 9.1 – List of Primary Contaminants

Media: Soil		
VOCs	**Maximum Concentration (mg/kg)**	**Applicable Monitoring Instrument**
Benzene	190	PID
Toluene	450	PID
Ethylbenzene	260	PID
Xylenes	570	PID
Naphthalene	1600	PID
1,3,5-Trimethylbenzene	61	PID
1,2,4-Trimethylbenzene	190	PID
SVOCs	**Maximum Concentration (mg/kg)**	**Applicable Monitoring Instrument**
Benzo(a)anthracene	65	PID
Benzo(a)pyrene	42	PID
Benzo(b)fluoranthene	60	PID
Benzo(k)fluoranthene	57	PID
Chrysene	300	PID
Dibenzo(a,h)anthracene	7	PID
Indeno(1,2,3-cd)pyrene	36	PID
Metals	**Maximum Concentration (mg/kg)**	**Applicable Monitoring Instrument**
Mercury	2.3	Not Applicable
Chromium	49.8	Not Applicable
Selenium	54.7	Not Applicable
Pesticides	**Maximum Concentration (mg/kg)**	**Applicable Monitoring Instrument**
4,4-DDE	0.00465	PID
4,4-DDD	0.0145	PID
4,4-DDT	0.088	PID

Media: Groundwater		
VOC	**Maximum Concentration (ug/L)**	**Applicable Monitoring Instrument**
Benzene	7	PID
Ethylbenzene	100	PID
Isopropylbenzene	7.3	PID
Naphthalene	1200	PID
1,3,5 trimethylbenzene	9.9	PID
1,2,4 trimethylbenzene s	36	PID
SVOCs	**Maximum Concentration (ug/L)**	**Applicable Monitoring Instrument**
Acenaphthene	140	PID
Benzo(a)anthracene	22	PID
Benzo(a)pyrene	16	PID
Benzo(b)fluoranthene	11	PID
Benzo(k)fluoranthene	4.7	PID
Chrysene	18	PID
Fluorene	66	PID
Indeno(1,2,3-cd)pyrene	7.2	PID
Phenanthrene	150	PID
Phenol	4.6	PID
Pyrene	68	PID
Metals	**Maximum Concentration (ug/L)**	**Applicable Monitoring Instrument**
Cyanide	435	Not Applicable
Iron	23800	Not Applicable
Lead	81.58	Not Applicable
Magnesium	105000	Not Applicable
Sodium	487000	Not Applicable

Emerging Contaminants	Maximum Concentration (ng/L)	Applicable Monitoring Instrument
Perfluorooctanoic Acid	104	Not Applicable
Perfluorooctanesulfonic Acid	83.9	Not Applicable

Media: Soil Vapor		
Tetrachloroethene	116	Not Applicable
Trichloroethene	12.7	Not Applicable
Cis-1,2 dichloroethene	99.5	Not Applicable
Vinyl chloride	246	Not Applicable

10.0 EMERGENCY PROCEDURES

10.1 General

Prior to the start of operations, the work area will be evaluated for the potential for fire, contaminant release, or other catastrophic event. Unusual conditions or events, activities, chemicals, and conditions will be reported to the FS/SSO immediately.

The FS/SSO will establish evacuation routes and assembly areas for the site. All personnel entering the site will be informed of this route and the assembly area.

10.2 Emergency Response

If an incident occurs, the following steps will be taken:

- The FS/SSO will evaluate the incident and assess the need for assistance and/or evacuation;
- The FS/SSO will call for outside assistance as needed;
- The FS/SSO will ensure the PM is notified promptly of the incident; and
- The FS/SSO will take appropriate measures to stabilize the incident scene.

10.2.1 Fire

In the case of a fire at the site, the FS/SSO will assess the situation and direct fire-fighting activities. The FS/SSO will ensure that the PM is immediately notified of any fires. Site personnel will attempt to extinguish the fire with available extinguishers, if safe to do so. In the event of a fire that site personnel are unable to safely extinguish with one fire extinguisher, the local fire department will be summoned.

10.2.2 Contaminant Release

In the event of a contaminant release, the following steps will be taken:

- Notify FS/SSO immediately;
- Evacuate immediate area of release;
- Conduct air monitoring to determine needed level of PPE; and
- Don required level of PPE and prepare to implement control procedures.

The FS/SSO has the authority to commit resources as needed to contain and control released material and to prevent its spread to off-site areas.

10.3 Medical Emergency

All employee injuries must be promptly reported to the SSO/FS, who will:

- Ensure that the injured employee receives prompt first aid and medical attention;
- In emergency situations, the worker is to be transported by appropriate means to the nearest urgent care facility (normally a hospital emergency room); and
- If the injured person is a SESI employee, notify SESI at 973-808-9050.

10.3.1 Emergency Care Steps

Survey the scene. Determine if it is safe to proceed. Try to determine if the conditions that caused the incident are still a threat. Protect yourself from exposure before attempting to rescue the victim.

- Do a primary survey of the victim. Check for airway obstruction, breathing, and pulse. Assess likely routes of chemical exposure by examining the eyes, mouth, nose, and skin of the victim for symptoms.
- Phone Emergency Medical Services (EMS). Give the location, telephone number used, caller's name, what happened, number of victims, victim's condition, and help being given.
- Maintain airway and perform rescue breathing as necessary.
- Perform CPR as necessary.
- Do a secondary survey of the victim. Check vital signs and do a head-to-toe exam.

Treat other conditions as necessary. If the victim can be moved, take him/her to a location away from the work area where EMS can gain access.

10.4 First Aid - General

All persons must report any injury or illness to their immediate supervisor or the FS. Trained personnel will provide first aid. Injuries and illnesses requiring medical treatment must be documented. The FS and SSO must fill out an accident/incident report as soon as emergency conditions no longer exist and first aid and/or medical treatment has been ensured. The report must be completed and submitted to the PM within 24 hours after the incident.

If first-aid treatment is required, first aid kits are kept at the CRZ. If treatment beyond first aid is required, the injured person(s) should be transported to the medical facility. If the injured person is not ambulatory or shows any sign of not being in a comfortable and stable condition for transport, then an ambulance/paramedics should be summoned. If there is any doubt as to the injured worker's condition, it is best to let the local paramedic or ambulance service examine and transport the worker.

10.4.1 First Aid - Inhalation

Any employee complaining of symptoms of chemical overexposure as described in Section 4, General Site Safety Procedures, will be removed from the work area and transported to the designated medical facility for examination and treatment.

10.4.2 First Aid - Ingestion

Call EMS and consult a poison control center for advice. If available, refer to the MSDS for treatment information. If the victim is unconscious, keep them on their side and clear the airway if vomiting occurs.

10.4.3 First Aid - Skin Contact

Project personnel who have had skin contact with contaminants will, unless the contact is severe, proceed through the CRZ, to the wash area. Personnel will remove any contaminated clothing, and then flush the affected area with water for at least 15 minutes.

The worker should be transported to the medical facility if he/she shows any sign of skin reddening, irritation, or if he/she requests a medical examination.

10.4.4 First Aid - Eye Contact

Project personnel who have had contaminants splashed in their eyes or who have experienced eye irritation while in the EZ, must immediately proceed to the eyewash station in the CRZ. Do not decontaminate prior to using the eyewash. Remove whatever protective clothing is necessary to use the eyewash. Flush the eye with clean running water for at least 15 minutes. Arrange prompt transport to the designated medical facility.

10.5 Reporting Injuries, Illnesses, and Safety Incidents

Injuries and illnesses, however minor, will be reported to the FS immediately. The FS will complete an injury report and submit it to the HSM, and the PM by end of shift.

10.6 Emergency Information

The means to summon local public response agencies such as police, fire, and ambulance will be reviewed in the daily safety meeting. These agencies are identified in **Table 7** below.

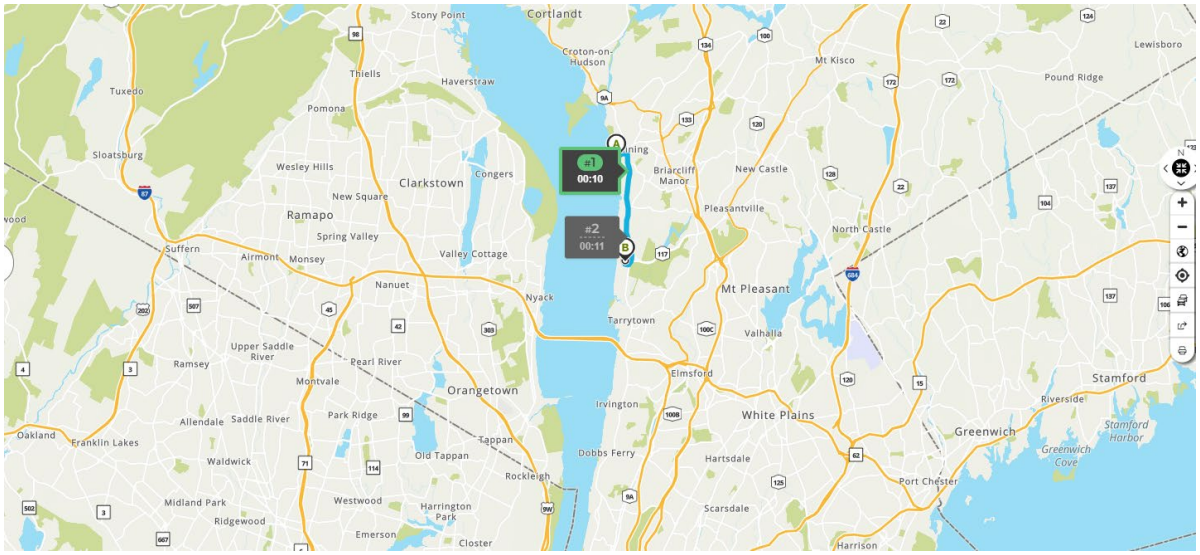
Table 10.1 – Emergency Contacts

Local Emergency Contacts	**Telephone No.**
EMERGENCY	911
Phelps Memorial Hospital	(914) 366-3000
Police Emergency	911
Fire Emergency	911
Rescue Squad	911
Ambulance	911
Miscellaneous Contacts	**Telephone No.**
N.Y. Poison Control Center	(800) 222-1222
National Response Center and Terrorist Hotline	(800) 424-8802
Center for Disease Control	(800) 311-3435
Utility Mark-Out	(800) 962-7962

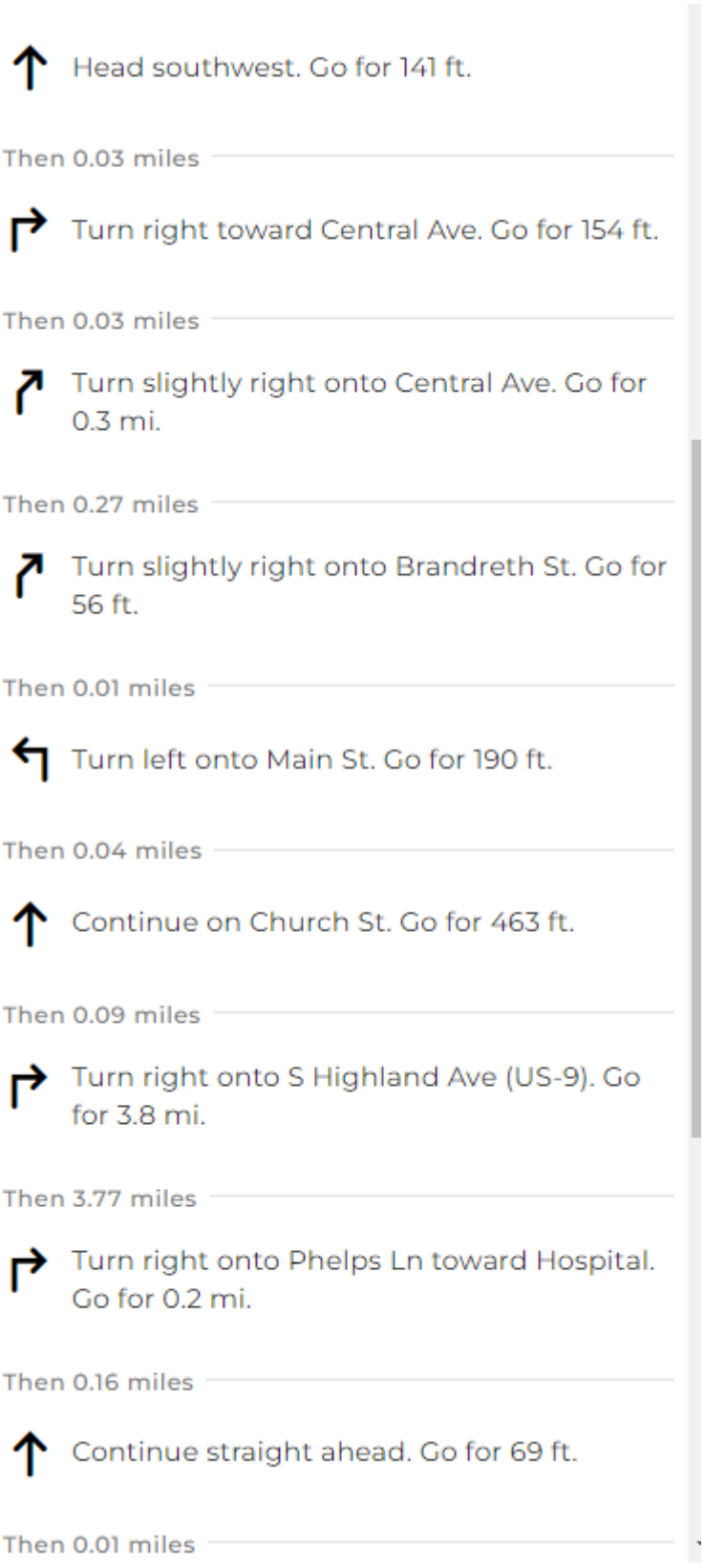
10.6.1 Directions to Hospital

Phelps Memorial Hospital Center
701 North Broadway, Sleepy Hollow, NY
(914) 366-3000

Fig-10.1: Direction to Hospital from 30 Water Street



Directions to Hospital from 30 Water Street Ossining, NY :



Head southwest. Go for 141 ft.

Then 0.03 miles

Turn right toward Central Ave. Go for 154 ft.

Then 0.03 miles

Turn slightly right onto Central Ave. Go for 0.3 mi.

Then 0.27 miles

Turn slightly right onto Brandreth St. Go for 56 ft.

Then 0.01 miles

Turn left onto Main St. Go for 190 ft.

Then 0.04 miles

Continue on Church St. Go for 463 ft.

Then 0.09 miles

Turn right onto S Highland Ave (US-9). Go for 3.8 mi.

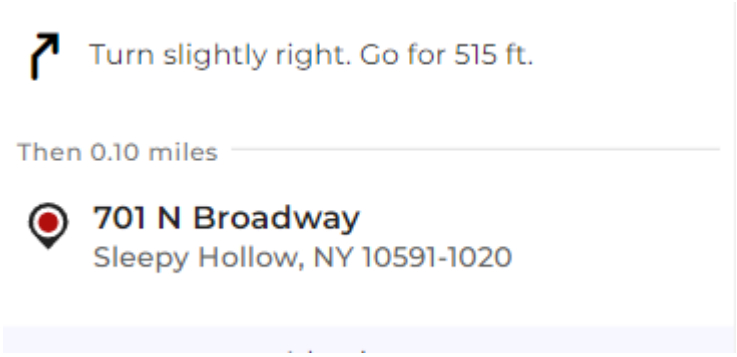
Then 3.77 miles

Turn right onto Phelps Ln toward Hospital. Go for 0.2 mi.

Then 0.16 miles

Continue straight ahead. Go for 69 ft.

Then 0.01 miles



11.0 LOGS, REPORTS, AND RECORD KEEPING

The following is a summary of required health and safety logs, reports, and record keeping for the operations at the subject site.

11.1 HASP Field Change Request

To be completed for initiating a change to the HASP. PM approval is required. The original will be kept in the project file (See Attachment 3).

11.2 Medical and Training Records

The HSM must obtain and keep a log of personnel meeting appropriate training and medical qualifications for the site work. The log will be kept in the project file. Each company's Human Resources Department will maintain medical records, in accordance with 29 CFR 1910.1020.

11.3 Exposure Records

Any personnel monitoring results, laboratory reports, calculations, and air sampling data sheets are part of an employee exposure record. These records will be kept in accordance with 29 CFR 1910.1020. For SESI employees, the originals will be sent to the Human Resources Manager. For subcontractor employees, the original file will be sent to the subcontractor employer with a copy maintained in the SESI project file.

11.4 Accident/Incident Report

Any accident/incident reports must be completed following procedures given in Section 10.5 of this HASP. The originals will be sent to the HSM for maintenance. A copy of the forms will be kept in the project file. (See Attachment 4)

11.5 OSHA Form 200

An OSHA Form 200 (Log of Occupational Injuries and Illnesses) will be kept at the project site. All recordable injuries or illnesses will be recorded on this form. At the end of the project, the original will be sent to the Human Resources Manager for maintenance. Subcontractor employees must also meet the requirements of maintaining an OSHA 200 Form. The accident/incident report meets the requirements of the OSHA Form 101 (Supplemental Record), which must be maintained with the OSHA Form 200 for all recordable injuries or illnesses.

11.6 On-Site Health and Safety Field Logbooks

The HSM or designee will maintain an on-site health and safety log book in which daily Site conditions, activities, personnel, and significant events will be recorded. Calibration records and personnel monitoring results, if available, will also be recorded in the field logbook. The original logbook will be kept in the project file.

Whenever any personnel monitoring is conducted onsite, the monitoring results will be noted in the filed logbook. These will become part of the exposure records file and will be maintained by the HSM.

A signatory page is included (See Attachment 5) and is to be signed by those working on and/or visiting the site.

11.7 Material Safety Data Sheets

Material Safety Data Sheets (MSDS) will be obtained and kept on file at the project site for each hazardous chemical brought to, use, or stored at the Site (See Attachment 6).