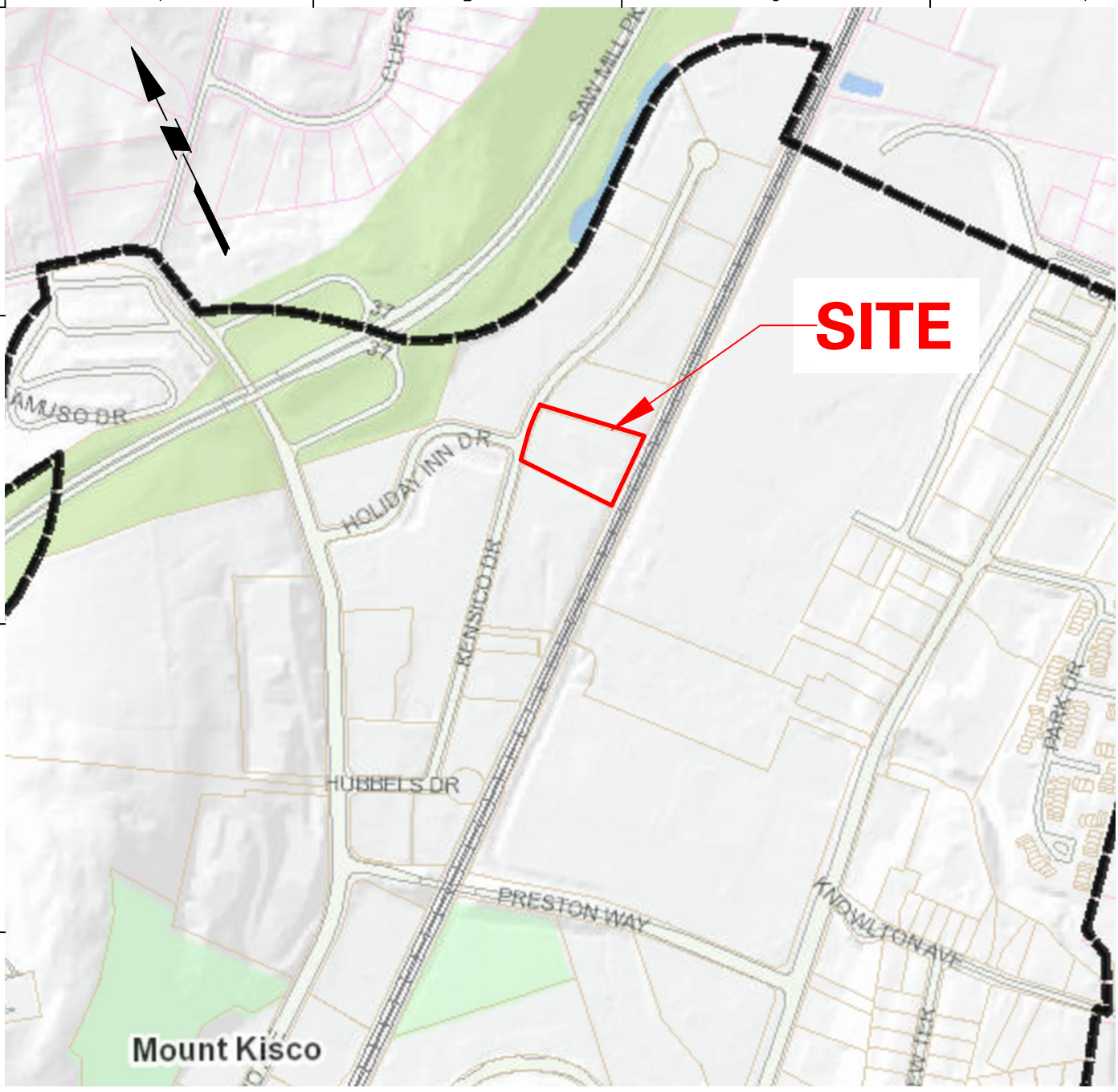
FIGURES



NOTES:

1. BASE MAP IS REFERENCED FROM WESTCHESTER COUNTY 2-FOOT TOPOGRAPHIC MAP, ACCESSED FROM WESTCHESTER COUNTY GEOGRAPHIC INFORMATION SYSTEMS ON OCTOBER 23, 2018.

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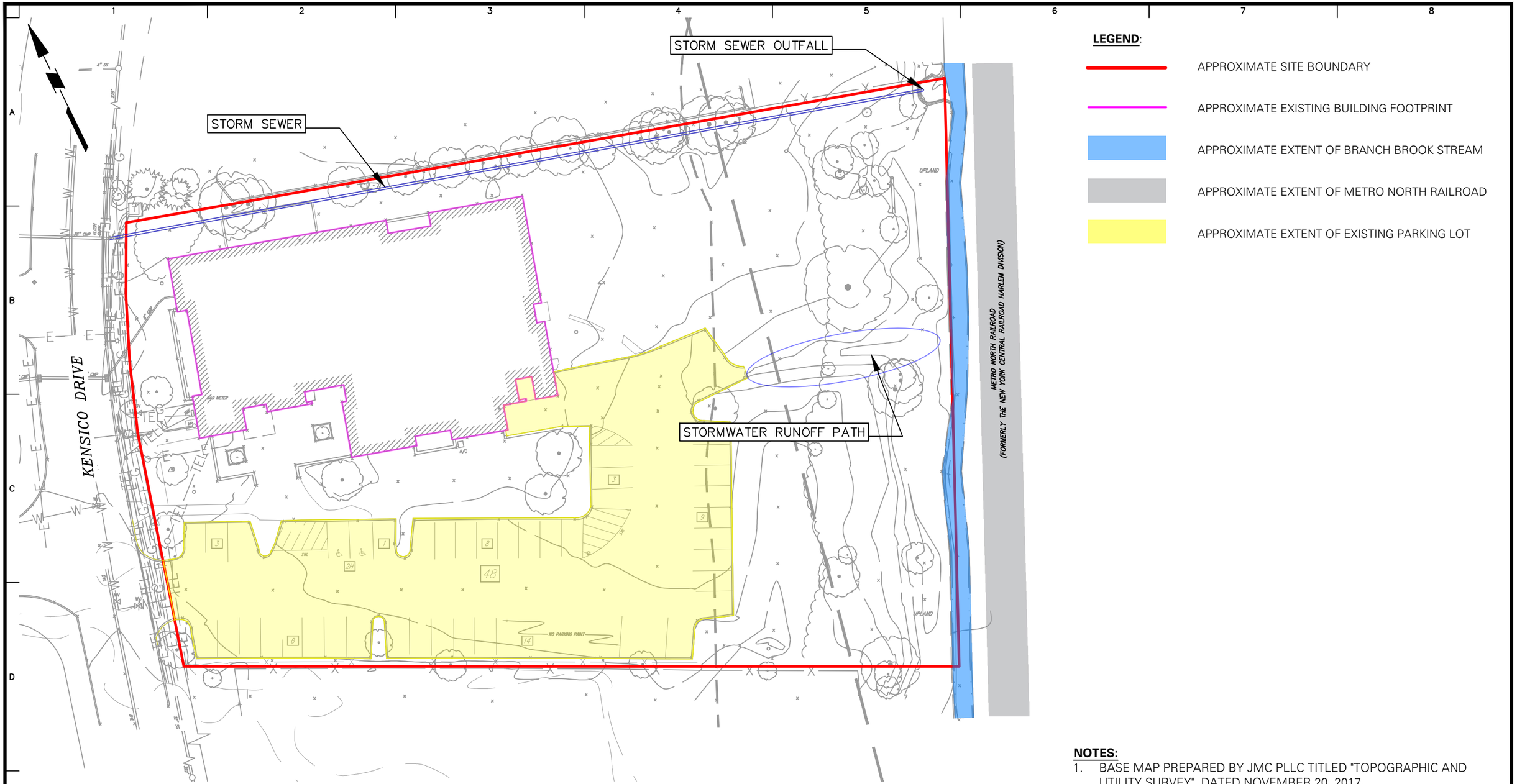
Project
41 KENSICO DRIVE
SECTION 69.50, PARCEL No. 1-2
TOWN OF MOUNT KISCO
WESTCHESTER COUNTY NEW YORK

Figure Title
SITE LOCATION MAP

Project No.	190046301
Date	11/09/2020
Drawn By	ERA
Checked By	TC

Figure No. **1**

Filename: \\langan.com\data\WPW\data3\190046301\Project Data\CAD\01\SheetFiles\Environmental\RAWP\2019 Update\Figure 1 - Site Location Map.dwg Date: 11/12/2020 Time: 08:25 User: eburgess Style Table: Langan.stb Layout: ANSIA-BP



LEGEND:

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE EXISTING BUILDING FOOTPRINT
- APPROXIMATE EXTENT OF BRANCH BROOK STREAM
- APPROXIMATE EXTENT OF METRO NORTH RAILROAD
- APPROXIMATE EXTENT OF EXISTING PARKING LOT

NOTES:

1. BASE MAP PREPARED BY JMC PLLC TITLED "TOPOGRAPHIC AND UTILITY SURVEY", DATED NOVEMBER 20, 2017.

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Project
41 KENSICO DRIVE
SECTION 69.50, PARCEL No.1-2
TOWN OF MOUNT KISCO
WESTCHESTER COUNTY NEW YORK

Figure Title
SITE PLAN - CURRENT CONDITIONS

Project No.	190046301
Date	11/09/2020
Drawn By	EB
Checked By	GCW

Figure No. 2

Filename: \\langan.com\data\WPW\data3\190046301\Project Data\CAD\01\SheetFiles\Environmental\RAWP\2019 Update\Figure 2 - Site Plan.dwg Date: 11/12/2020 Time: 08:29 User: eburgess Style Table: Langan.stb Layout: 2A - Current Conditions

Sample ID	LB23_4-5	SBDUP02_081318	LB23_12-13	LB23_0-2	SBDUP06_050619	LB23_2-4	LB23_6-8	LB23_8-10
Sample Date	8/13/2018	8/13/2018	8/13/2018	5/6/2019	5/6/2019	5/6/2019	5/6/2019	5/6/2019
Sample Depth (feet bgs)	4-5	4-5	12-13	0-2	0-2	2-4	6-8	8-10
VOCs (mg/kg)	ND	ND	NE	NA	NA	NA	NA	NA
SVOCs (mg/kg)	NE	NE	ND	NA	NA	NA	NA	NA
Pesticides (mg/kg)	NE	ND	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)	ND	ND	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)								
Copper	121 J	NE	NA	NA	NA	NA	NA	NA
Lead	2880 J	3690 J	NA	95.5	97.4	201	525	NE
PFAS (µg/kg)	NA	NA	NA	NA	NA	NA	ND	NA

Sample ID	SS3_0-2IN	SS3_10-12IN
Sample Date	5/3/2019	5/3/2019
Sample Depth (inches bgs)	0-2	10-12
VOCs (mg/kg)	NE	NE
SVOCs (mg/kg)	NE	NE
Pesticides (mg/kg)	ND	ND
PCBs (mg/kg)	ND	ND
Inorganics (mg/kg)		
Lead	144	245
PFAS (µg/kg)	2.6	0.8

Sample ID	LB20_5-6	LB20_32.5-33.5	LB20_47-48
Sample Date	8/20/2018	8/20/2018	8/20/2018
Sample Depth (feet bgs)	5-6	32.5-33.5	47-48
VOCs (mg/kg)			
Trichloroethene (TCE)	NE	0.89 D	NE
SVOCs (mg/kg)	NE	ND	ND
Pesticides (mg/kg)			
4,4'-DDT	0.00555 D	NA	NA
PCBs (mg/kg)	ND	NA	NA
Inorganics (mg/kg)			
Lead	710	NA	NA
Mercury	0.204	NA	NA

Sample ID	LB21_5-6	LB21_18-19
Sample Date	8/10/2018	8/10/2018
Sample Depth (feet bgs)	5-6	18-19
VOCs (mg/kg)		
Trichloroethene (TCE)	ND	2.5 D
SVOCs (mg/kg)	NE	ND
Pesticides (mg/kg)		
4,4'-DDD	0.00655 J	NA
4,4'-DDE	0.00493 J	NA
4,4'-DDT	0.00577 J	NA
PCBs (mg/kg)	ND	NA
Inorganics (mg/kg)		
Lead	838	NA
Zinc	197	NA

Sample ID	LB17_22-24	LB17_43-44	LB17_49-50
Sample Date	8/10/2018	8/10/2018	8/10/2018
Sample Depth (feet bgs)	22-24	43-44	49-50
VOCs (mg/kg)			
Trichloroethene (TCE)	10 D	5.5 D	0.74 D
SVOCs (mg/kg)	ND	ND	ND

Sample ID	SS4_0-2IN	SS4_10-12IN
Sample Date	5/3/2019	5/3/2019
Sample Depth (inches bgs)	0-2	10-12
VOCs (mg/kg)	ND	NE
SVOCs (mg/kg)	NE	NE
Pesticides (mg/kg)	ND	ND
PCBs (mg/kg)	ND	ND
Inorganics (mg/kg)		
Lead	65.2	NE

Sample ID	LB19_5-6	LB19_34.5-35.5	LB19_44-45
Sample Date	8/14/2018	8/14/2018	8/14/2018
Sample Depth (feet bgs)	5-6	34.5-35.5	44-45
VOCs (mg/kg)			
Acetone	NE	NE	0.051
Trichloroethene (TCE)	ND	2 D	NE
SVOCs (mg/kg)	ND	ND	ND
Pesticides (mg/kg)	ND	NA	NA
PCBs (mg/kg)	ND	NA	NA
Inorganics (mg/kg)			
Chromium, Trivalent	34.9	NA	NA
Copper	83.2	NA	NA
Lead	183	NA	NA

Sample ID	LB07_7-8	LB07_18-19
Sample Date	8/8/2018	8/8/2018
Sample Depth (feet bgs)	7-8	18-19
VOCs (mg/kg)		
Acetone	0.053	NE
SVOCs (mg/kg)	ND	ND
Pesticides (mg/kg)	ND	ND
PCBs (mg/kg)	ND	ND
Inorganics (mg/kg)		
Chromium, Trivalent	44.2	NE
Mercury	0.251	ND

Sample ID	LB25_7-8	LB25_15-16	SBDUP01_080818
Sample Date	8/8/2018	8/8/2018	8/8/2018
Sample Depth (feet bgs)	7-8	15-16	15-16
VOCs (mg/kg)			
Acetone	0.15	NE	NE
SVOCs (mg/kg)	ND	ND	ND
Pesticides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Chromium, Trivalent	47.6	31.4 J	NE
Lead	350	ND	NE
Mercury	0.181	ND	ND
Zinc	116	NE	NE

Sample ID	SS2_0-2IN	SS2_10-12IN
Sample Date	5/3/2019	5/3/2019
Sample Depth (inches bgs)	0-2	10-12
VOCs (mg/kg)	NE	NE
SVOCs (mg/kg)	NE	NE
Pesticides (mg/kg)	ND	ND
PCBs (mg/kg)	ND	ND
Inorganics (mg/kg)		
Lead	113	102
Mercury	0.214	0.395

Sample ID	SS5_0-2IN	SS5_10-12IN
Sample Date	5/3/2019	5/3/2019
Sample Depth (inches bgs)	0-2	10-12
VOCs (mg/kg)	NE	NE
SVOCs (mg/kg)	NE	NE
Pesticides (mg/kg)	ND	ND
PCBs (mg/kg)	ND	ND
Inorganics (mg/kg)		
Lead	69.9	63.9
Mercury	0.217	0.192
PFAS (µg/kg)	1.7	1.7

Sample ID	LB28_3-4
Sample Date	5/2/2019
Sample Depth (feet bgs)	3-4
VOCs (mg/kg)	
Acetone	0.065
SVOCs (mg/kg)	
Benzo(a)Anthracene	3.29 D
Benzo(a)Pyrene	3.06 D
Benzo(b)Fluoranthene	2.81 D
Benzo(k)Fluoranthene	2.13 D
Chrysene	2.88 D
Dibenz(a,h)Anthracene	0.466 D
Indeno(1,2,3-c,d)Pyrene	2.15 D
PFAS (µg/kg)	ND

Sample ID	LB08_4-5	LB08_15.5-16.5	LB08_51-52	LB08_62-63	LB08_69-70
Sample Date	8/7/2018	8/7/2018	8/7/2018	8/8/2018	8/8/2018
Sample Depth (feet bgs)	4-5	15.5-16.5	51-52	62-63	69-70
VOCs (mg/kg)					
Trichloroethene (TCE)	ND	ND	0.82 D	0.57 D	NE
SVOCs (mg/kg)	NE	ND	ND	ND	ND
Pesticides (mg/kg)	ND	ND	ND	NA	NA
PCBs (mg/kg)	ND	ND	ND	NA	NA
Inorganics (mg/kg)					
Chromium, Trivalent	47.4	NE	NE	NA	NA
Copper	132	NE	NE	NA	NA
Lead	666	NE	NE	NA	NA
Nickel	34.1	NE	NE	NA	NA
Zinc	116	NE	NE	NA	NA

Sample ID	LB13_5-6	LB13_23-24	LB13_29-30
Sample Date	8/13/2018	8/13/2018	8/13/2018
Sample Depth (feet bgs)	5-6	23-24	29-30
VOCs (mg/kg)			
Acetone	0.065	NE	ND
Trichloroethene (TCE)	NE	3.7 D	1 D
SVOCs (mg/kg)	ND	ND	ND
Pesticides (mg/kg)	ND	NA	NA
PCBs (mg/kg)	ND	NA	NA
Inorganics (mg/kg)	NE	NA	NA

Sample ID	LB01_4-5	LB01_29-30	LB01_35-37	LB01_48.5-49.5	LB01_54-55
Sample Date	8/9/2018	8/9/2018	8/9/2018	8/9/2018	8/9/2018
Sample Depth (feet bgs)	4-5	29-30	35-37	48.5-49.5	54-55
VOCs (mg/kg)					
Trichloroethene (TCE)	NE	8.8 D	4.6 D	2.9 D	1.2 D
SVOCs (mg/kg)	ND	ND	ND	ND	ND
Pesticides (mg/kg)	ND	NA	NA	NA	NA
PCBs (mg/kg)	ND	NA	NA	NA	NA
Inorganics (mg/kg)					
Lead	92.1	NA	NA	NA	NA

Sample ID	SS1_0-2IN	SS1_10-12IN	SBDUP04_050319
Sample Date	5/3/2019	5/3/2019	5/3/2019
Sample Depth (inches bgs)	0-2	10-12	10-12
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)	NE	DNC	ND
Pesticides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Lead	119	NE	NE
PFAS (µg/kg)	1.6	ND	ND

Sample ID	SS6_0-2IN	SS6_10-12IN
Sample Date	5/3/2019	5/3/2019
Sample Depth (inches bgs)	0-2	10-12
VOCs (mg/kg)	NE	NE
SVOCs (mg/kg)	NE	ND
Pesticides (mg/kg)	ND	ND
PCBs (mg/kg)	ND	ND
Inorganics (mg/kg)		
Chromium, Trivalent	NE	35.4
Lead	101	NE

Sample ID	LB14_4-5	LB14_13-14	LB14_29-30
Sample Date	8/13/2018	8/13/2018	8/13/2018
Sample Depth (feet bgs)	4-5	13-14	29-30
VOCs (mg/kg)			
Trichloroethene (TCE)	NE	9.8 D	2.6 D
SVOCs (mg/kg)	ND	ND	ND
Pesticides (mg/kg)	ND	NA	NA
PCBs (mg/kg)	ND	NA	NA
Inorganics (mg/kg)	NE	NA	NA

Sample ID	LB24_1-2	LB24_13-14
Sample Date	8/10/2018	8/10/2018
Sample Depth (feet bgs)	1-2	13-14
VOCs (mg/kg)		
Trichloroethene (TCE)	ND	2.4 D
SVOCs (mg/kg)	ND	ND
Pesticides (mg/kg)	ND	NA
PCBs (mg/kg)	ND	NA
Inorganics (mg/kg)	NE	NA

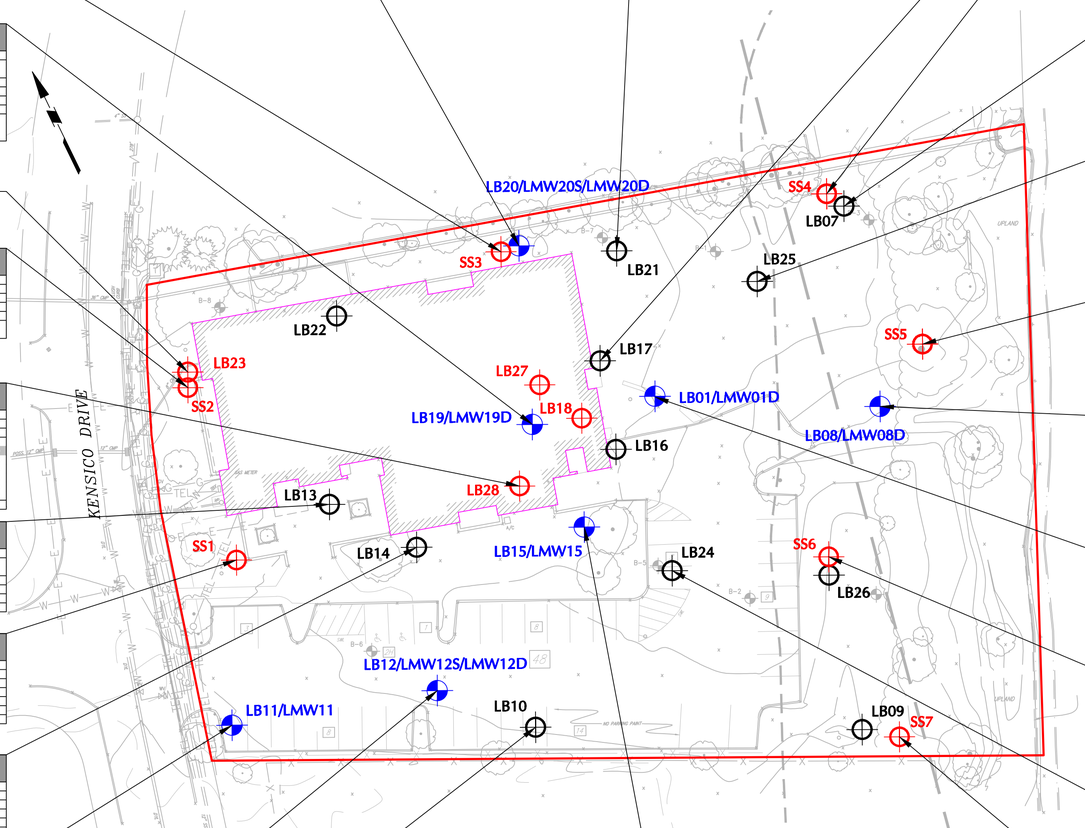
Sample ID	LB11_4.5-5.5	LB11_11-12	LB11_23-24
Sample Date	8/13/2018	8/13/2018	8/13/2018
Sample Depth (feet bgs)	4.5-5.5	11-12	23-24
VOCs (mg/kg)			
Trichloroethene (TCE)	NE	8.3 D	NE
SVOCs (mg/kg)	ND	ND	ND
Pesticides (mg/kg)	ND	NA	NA
PCBs (mg/kg)	ND	NA	NA
Inorganics (mg/kg)	NE	NA	NA

Sample ID	SS7_0-2IN	SS7_10-12IN
Sample Date	5/3/2019	5/3/2019
Sample Depth (inches bgs)	0-2	10-12
VOCs (mg/kg)	NE	NE
SVOCs (mg/kg)	NE	ND
Pesticides (mg/kg)		
4,4'-DDT	0.00408 D	ND
PCBs (mg/kg)	ND	ND
Inorganics (mg/kg)		
Chromium, Trivalent	30.4	NE
Lead	132	NE
Zinc	477	NE
PFAS (µg/kg)	2.9	ND

Sample ID	LB12_0.5-2	LB12_2-3	LB12_19-20	LB12_29-30	LB12_42-43
Sample Date	8/15/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018
Sample Depth (feet bgs)	0.5-2	2-3	19-20	29-30	42-43
VOCs (mg/kg)					
Acetone	0.063	NE	NE	NE	0.067
Trichloroethene (TCE)	ND	ND	7.6 D	2.8 D	NE
SVOCs (mg/kg)	ND	ND	ND	ND	ND
Pesticides (mg/kg)					
4,4'-DDT	0.00413 D	ND	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND	ND	ND
Inorganics (mg/kg)					
Lead	155	NE	NE	NE	NE

Sample ID	LB10_2-3	SBDUP03_082018	LB10_31-32	LB10_45-46
Sample Date	8/20/2018	8/20/2018	8/20/2018	8/20/2018
Sample Depth (feet bgs)	2-3	2-3	31-32	45-46
VOCs (mg/kg)				
Acetone	NE	0.1 J	ND	ND
Trichloroethene (TCE)	ND	ND	1.7 D	NE
SVOCs (mg/kg)	ND	ND	ND	ND
Pesticides (mg/kg)	ND	NA	NA	NA
PCBs (mg/kg)	ND	NA	NA	NA
Inorganics (mg/kg)	NE	NA	NA	NA

Sample ID	LB15_5-6	LB15_33-34	LB15_44-45	LB15_53-54
Sample Date	8/14/2018	8/14/2018	8/14/2018	8/14/2018
Sample Depth (feet bgs)	5-6	33-34	44-45	53-54
VOCs (mg/kg)				
Trichloroethene (TCE)	ND	3.5 D	0.85 D	13 D
SVOCs (mg/kg)	ND	ND	ND	ND
Pesticides (mg/kg)	ND	NA	NA	NA
PCBs (mg/kg)	ND	NA	NA	NA
Inorganics (mg/kg)	NE	NA	NA	NA



LEGEND:

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE EXTENT OF EXISTING BUILDING
- LB23 — RI SOIL BORING LOCATION
- LB12/LMW12D — RI SOIL BORING AND MONITORING WELL LOCATION
- SS1 — SRI SOIL SAMPLE LOCATION

NOTES:

1. BASE MAP PREPARED BY JMC PLLC TITLED "TOPOGRAPHIC AND UTILITY SURVEY", DATED NOVEMBER 20, 2017.
2. SOIL BORINGS, MONITORING WELLS, AND SOIL VAPOR LOCATIONS WERE ARE APPROXIMATE
3. RI = REMEDIAL INVESTIGATION
4. SRI = SUPPLEMENTAL REMEDIAL INVESTIGATION
5. SOIL ANALYTICAL RESULTS ARE COMPARED TO TITLE 6 OF THE OFFICIAL COMPILATION OF NEW YORK CODES, RULES, AND REGULATIONS (NYCRR) PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES (SCO) AND RESTRICTED USE COMMERCIAL SCO.
6. CONCENTRATIONS ABOVE THE UNRESTRICTED USE SCO ARE BOLDED.
7. CONCENTRATIONS ABOVE THE COMMERCIAL USE SCO ARE SHADED AND BOLDED.
8. RESULTS ARE NOT SHOWN FOR SAMPLE LOCATIONS THAT DID NOT EXCEED PART 375 SCO.
9. ANALYTICAL RESULTS ARE ONLY SHOWN FOR BORINGS CONTAINING CONCENTRATIONS ABOVE THE COMPARISON CRITERIA.
10. PFAS CONCENTRATIONS SHOWN ARE TOTAL CONCENTRATIONS OF ALL DETECTED PFAS COMPOUNDS.
11. BGS = BELOW GRADE SURFACE.
12. mg/kg = MILLIGRAM PER KILOGRAM
13. µg/kg = MICROGRAM PER KILOGRAM
14. ND = THE ANALYTE WAS NOT DETECTED AT A LEVEL GREATER THAN OR EQUAL TO THE REPORTING LIMIT (RL)
15. NE = THE ANALYTE DID NOT EXCEED COMPARISON CRITERIA.
16. DNC = ONE OR MORE COMPOUNDS DETECTED WITH NO APPLICABLE CRITERIA.
17. NA = NOT ANALYZED
18. J = THE ANALYTE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT (MDL), BUT BELOW THE RL; THEREFORE, THE RESULT IS AN ESTIMATED CONCENTRATION.
19. D = THE CONCENTRATION REPORTED IS A RESULT OF A DILUTED SAMPLE.
20. PCB = POLYCHLORINATED BIPHENYL
21. SVOC = SEMIVOLATILE ORGANIC COMPOUND
22. VOC = VOLATILE ORGANIC COMPOUND
23. PFAS = PER- AND POLYFLUOROALKYL SUBSTANCES

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use - Commercial SCOs
VOCs (mg/kg)			
Acetone	67-64-1	0.05	500
Trichloroethene (TCE)	79-01-6	0.47	200
SVOCs (mg/kg)			
Benzo(a)Anthracene	56-55-3	1	5.6
Benzo(a)Pyrene	50-32-8	1	1
Benzo(b)Fluoranthene	205-99-2	1	5.6
Benzo(k)Fluoranthene	207-08-9	0.8	56
Chrysene	218-01-9	1	56
Dibenz(a,h)Anthracene	53-70-3	0.33	0.56
Indeno(1,2,3-c,d)Pyrene	193-39-5	0.5	5.6
Pesticides (mg/kg)			
4,4'-DDD	72-54-8	0.0033	92
4,4'-DDE	72-55-9	0.0033	62
4,4'-DDT	50-29-3	0.0033	47
Inorganics (mg/kg)			
Chromium, Trivalent	16065-83-1	30	1,500
Copper	7440-50-8	50	270
Lead	7439-92-1	63	1,000
Mercury	7439-97-6	0.18	2.8
Nickel	7440-02-0	30	310
Zinc	7440-66-6	109	10,000

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Project
41 KENSICO DRIVE
SECTION No. 69.50, PARCEL No. 1-2
TOWN OF MOUNT KISCO
WESTCHESTER COUNTY NEW YORK

Figure Title
SOIL SAMPLE ANALYTICAL RESULTS MAP

Project No. 190046301
Date 11/09/2020
Drawn By EB
Checked By GCW

Figure No. 3A

LANGAN
PROJECT NO. 190046301

Filename: \\langan.com\data\WPW\data3\190046301\Project Data\CAD\01\SheetFiles\Environmental\RAWP\2019 Update\Figure 3A - Soil Sample Analytical Results Map_with SRI.dwg Date: 11/12/2020 Time: 08:45 User: eburgess Style Table: Langan.stb Layout: ANSID-BL

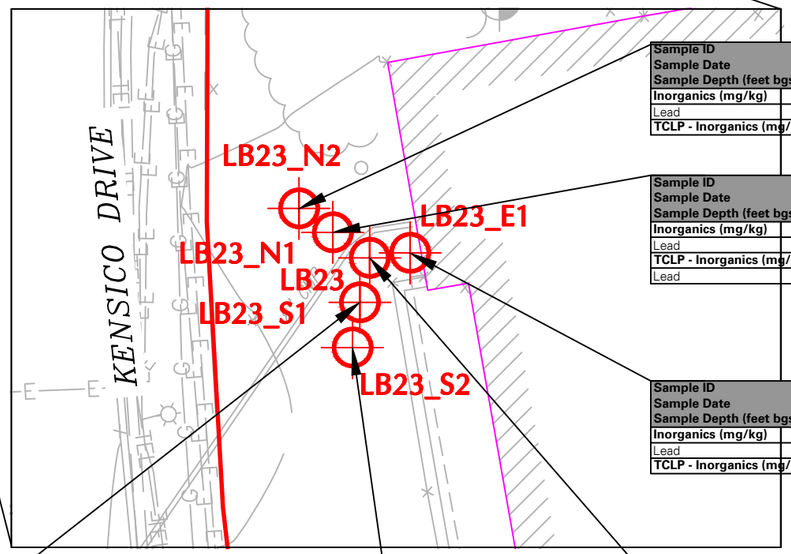
Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use - Commercial SCOs	USEPA RCRA TCLP
Inorganics (mg/kg)				
Lead	7439-92-1	63	1,000	~
TCLP - Inorganics (mg/L)				
Lead	7439-92-1	~	~	5

LEGEND:

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE EXTENT OF EXISTING BUILDING
- LB23 — LEAD DELINEATION SOIL BORING LOCATION

NOTES:

1. BASE MAP PREPARED BY JMC PLLC TITLED "TOPOGRAPHIC AND UTILITY SURVEY", DATED NOVEMBER 20, 2017.
2. ALL LOCATIONS APPROXIMATE.
3. SOIL ANALYTICAL RESULTS ARE COMPARED TO TITLE 6 OF THE OFFICIAL COMPILATION OF NEW YORK CODES, RULES, AND REGULATIONS (NYCRR) PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES (SCO), RESTRICTED USE COMMERCIAL SCO, AND TO TITLE 40 OF THE CODE OF FEDERAL REGULATIONS RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) REGULATIONS MAXIMUM CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC.
4. CONCENTRATIONS ABOVE THE UNRESTRICTED USE SCO ARE BOLDED.
5. CONCENTRATIONS ABOVE THE COMMERCIAL USE SCO ARE SHADED AND BOLDED.
6. CONCENTRATIONS ABOVE THE RCRA MAXIMUM CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC REGULATORY LEVEL ARE RED.
7. BGS= BELOW GRADE SURFACE
8. mg/kg = MILLIGRAMS PER KILOGRAM
9. mg/L = MILLIGRAMS PER LITER
10. J = THE ANALYTE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT (MDL), BUT BELOW THE RL; THEREFORE, THE RESULT IS AN ESTIMATED CONCENTRATION.
11. NE = THE ANALYTE WAS DETECTED BUT DID NOT EXCEED COMPARISON CRITERIA
12. ND = THE ANALYTE WAS NOT DETECTED AT A LEVEL GREATER THAN OR EQUAL TO THE REPORTING LIMIT (RL)
13. NA = NOT ANALYZED



Sample ID	LB23_N2_0-2	LB23_N2_2-4	LB23_N2_4-6
Sample Date	5/6/2019	5/6/2019	5/6/2019
Sample Depth (feet bgs)	0-2	2-4	4-6
Inorganics (mg/kg)			
Lead	**102**	**521**	**103**
TCLP - Inorganics (mg/L)	ND	NE	NE

Sample ID	LB23_N1_0-2	LB23_N1_2-4	LB23_N1_4-6	LB23_N1_6-8
Sample Date	5/6/2019	5/6/2019	5/6/2019	5/6/2019
Sample Depth (feet bgs)	0-2	2-4	4-6	6-8
Inorganics (mg/kg)				
Lead	**3380**	**208**	**1600**	**86.4**
TCLP - Inorganics (mg/L)				
Lead	5.79	12.6	20.7	ND

Sample ID	LB23_E1_0-2	LB23_E1_2-4	LB23_E1_4-6	LB23_E1_6-8
Sample Date	5/6/2019	5/6/2019	5/6/2019	5/6/2019
Sample Depth (feet bgs)	0-2	2-4	4-6	6-8
Inorganics (mg/kg)				
Lead	**204**	**208**	**202**	**874**
TCLP - Inorganics (mg/L)	NE	NE	NE	NE

Sample ID	LB23_4-5	SBDUP02_081318	LB23_12-13	LB23_0-2	SBDUP06_050619	LB23_2-4	LB23_6-8	LB23_8-10
Sample Date	8/13/2018	8/13/2018	8/13/2018	5/6/2019	5/6/2019	5/6/2019	5/6/2019	5/6/2019
Sample Depth (feet bgs)	4-5	4-5	12-13	0-2	0-2	2-4	6-8	8-10
Inorganics (mg/kg)								
Lead	**2880 J**	**3690 J**	NA	**95.5**	**97.4**	**201**	**525**	NE
TCLP - Inorganics (mg/L)								
Lead	NA	NA	NA	ND	ND	ND	29.1	NE

Sample ID	LB23_S1_0-2	LB23_S1_2-4	LB23_S1_4-6	LB23_S1_6-8
Sample Date	5/6/2019	5/6/2019	5/6/2019	5/6/2019
Sample Depth (feet bgs)	0-2	2-4	4-6	6-8
Inorganics (mg/kg)				
Lead	**65**	**915**	NE	NE
TCLP - Inorganics (mg/L)				
Lead	NE	13.7	64.2	NE

Sample ID	LB23_S2_0-2	LB23_S2_2-4	LB23_S2_4-6
Sample Date	5/6/2019	5/6/2019	5/6/2019
Sample Depth (feet bgs)	0-2	2-4	4-6
Inorganics (mg/kg)			
Lead	**120**	**832**	**678**
TCLP - Inorganics (mg/L)			
Lead	NE	50.7	NE

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15 0 5 10 15
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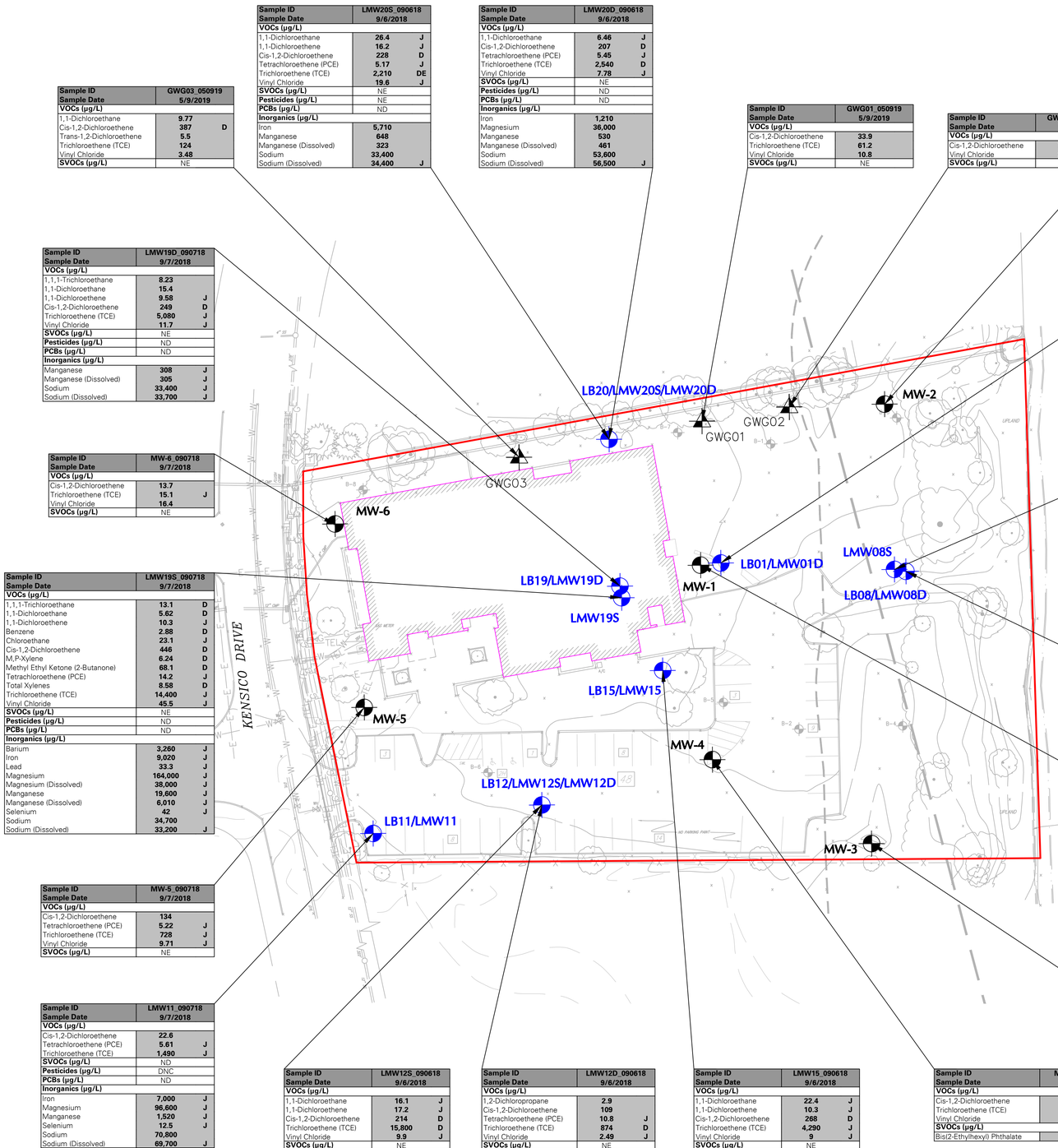
Project
41 KENSICO DRIVE
SECTION 69.50, PARCEL No. 1–2
TOWN OF MOUNT KISCO
WESTCHESTER COUNTY NEW YORK

Figure Title
SOIL ANALYTICAL RESULTS MAP - HAZARDOUS LEAD SOIL AREA

Project No. 190046301
Date 11/09/2020
Drawn By EB
Checked By GCW

Figure No. **3B**

Filename: \\langan.com\data\WPW\data3\190046301\Project Data\CAD\01\SheetFiles\Environmental\RAWP\2019 Update\Figure 3b - Soil Sample Analytical Results Map- haz lead.dwg Date: 11/12/2020 Time: 08:39 User: eburgess Style Table: Langan.stb Layout: ANSIB-BL



Sample ID	GWG03_050919	
Sample Date	5/9/2019	
VOCs (µg/L)		
1,1-Dichloroethane	9.77	
Cis-1,2-Dichloroethene	387	D
Trans-1,2-Dichloroethene	5.5	
Trichloroethene (TCE)	124	
Vinyl Chloride	3.48	
SVOCs (µg/L)	NE	

Sample ID	LMW20S_090618	
Sample Date	9/6/2018	
VOCs (µg/L)		
1,1-Dichloroethane	26.4	J
1,1-Dichloroethene	16.2	J
Cis-1,2-Dichloroethene	228	D
Tetrachloroethene (PCE)	5.17	J
Trichloroethene (TCE)	2,210	DE
Vinyl Chloride	19.6	J
SVOCs (µg/L)	NE	
Pesticides (µg/L)	NE	
PCBs (µg/L)	ND	
Inorganics (µg/L)		
Iron	5,710	
Manganese	648	
Manganese (Dissolved)	323	
Sodium	33,400	
Sodium (Dissolved)	34,400	J

Sample ID	LMW20D_090618	
Sample Date	9/6/2018	
VOCs (µg/L)		
1,1-Dichloroethane	6.46	J
1,1-Dichloroethene	207	D
Cis-1,2-Dichloroethene	5.45	J
Tetrachloroethene (PCE)	2,540	D
Trichloroethene (TCE)	7.78	J
Vinyl Chloride	NE	
SVOCs (µg/L)	ND	
Pesticides (µg/L)	ND	
PCBs (µg/L)	ND	
Inorganics (µg/L)		
Iron	1,210	
Magnesium	36,000	
Manganese	530	
Manganese (Dissolved)	461	
Sodium	53,600	
Sodium (Dissolved)	56,500	J

Sample ID	GWG01_050919	
Sample Date	5/9/2019	
VOCs (µg/L)		
Cis-1,2-Dichloroethene	33.9	
Trichloroethene (TCE)	61.2	
Vinyl Chloride	10.8	
SVOCs (µg/L)	NE	

Sample ID	GWG02_050919	
Sample Date	5/9/2019	
VOCs (µg/L)		
Cis-1,2-Dichloroethene	7.92	
Vinyl Chloride	22.2	
SVOCs (µg/L)	NE	

Sample ID	MW-2_090518	
Sample Date	9/5/2018	
VOCs (µg/L)		
1,1,1-Trichloroethane	8.48	
Benzene	7.17	
Cis-1,2-Dichloroethene	273	D
Vinyl Chloride	40.4	J
SVOCs (µg/L)	NE	

Sample ID	LMW19D_090718	
Sample Date	9/7/2018	
VOCs (µg/L)		
1,1,1-Trichloroethane	8.23	
1,1-Dichloroethane	15.4	
1,1-Dichloroethene	9.58	J
Cis-1,2-Dichloroethene	249	D
Trichloroethene (TCE)	5,080	J
Vinyl Chloride	11.7	J
SVOCs (µg/L)	NE	
Pesticides (µg/L)	ND	
PCBs (µg/L)	ND	
Inorganics (µg/L)		
Manganese	308	J
Manganese (Dissolved)	305	J
Sodium	33,400	J
Sodium (Dissolved)	33,700	J

Sample ID	LMW01D_090518	
Sample Date	9/5/2018	
VOCs (µg/L)		
1,1-Dichloroethane	27.4	
1,1-Dichloroethene	10.2	J
Cis-1,2-Dichloroethene	1,100	D
Trans-1,2-Dichloroethene	10.8	
Trichloroethene (TCE)	3,190	J
Vinyl Chloride	8.35	J
SVOCs (µg/L)	ND	
Pesticides (µg/L)	DNC	
PCBs (µg/L)	ND	
Inorganics (µg/L)		
Iron	1,280	

Sample ID	MW-6_090718	
Sample Date	9/7/2018	
VOCs (µg/L)		
Cis-1,2-Dichloroethene	13.7	
Trichloroethene (TCE)	15.1	J
Vinyl Chloride	16.4	
SVOCs (µg/L)	NE	

Sample ID	LMW08S_090518	
Sample Date	9/5/2018	
VOCs (µg/L)		
Cis-1,2-Dichloroethene	149	D
SVOCs (µg/L)	NE	
Pesticides (µg/L)	ND	
PCBs (µg/L)	ND	
Inorganics (µg/L)		
Iron	2,640	
Iron (Dissolved)	2,430	B
Manganese	560	J
Manganese (Dissolved)	535	
Sodium	22,900	J
Sodium (Dissolved)	22,000	
PFAS (ng/L)	NE	

Sample ID	LMW19S_090718	
Sample Date	9/7/2018	
VOCs (µg/L)		
1,1,1-Trichloroethane	13.1	D
1,1-Dichloroethane	5.62	D
1,1-Dichloroethene	10.3	J
Benzene	2.88	D
Chloroethane	23.1	J
Cis-1,2-Dichloroethene	446	D
M,P-Xylene	6.24	D
Methyl Ethyl Ketone (2-Butanone)	68.1	D
Tetrachloroethene (PCE)	14.2	J
Total Xylenes	8.58	D
Trichloroethene (TCE)	14,400	J
Vinyl Chloride	45.5	J
SVOCs (µg/L)	NE	
Pesticides (µg/L)	ND	
PCBs (µg/L)	ND	
Inorganics (µg/L)		
Barium	3,260	J
Iron	9,020	J
Lead	33.3	J
Magnesium	164,000	J
Magnesium (Dissolved)	38,000	J
Manganese	19,600	J
Manganese (Dissolved)	6,010	J
Selenium	42	J
Sodium	34,700	
Sodium (Dissolved)	33,200	J

Sample ID	LMW08D_090518	
Sample Date	9/5/2018	
VOCs (µg/L)		
Trichloroethene (TCE)	118	
SVOCs (µg/L)	NE	
Pesticides (µg/L)	NE	
PCBs (µg/L)	ND	
Inorganics (µg/L)		
Iron	382	

Sample ID	MW-1_090518		GWDUP01_090518	
Sample Date	9/5/2018		9/5/2018	
VOCs (µg/L)				
1,1-Dichloroethane	13.6	J	14.5	J
1,1-Dichloroethene	7.96	J	7.52	J
Cis-1,2-Dichloroethene	474	D	432	D
Trichloroethene (TCE)	3,820	J	2,240	J
Vinyl Chloride	15.2	J	15.3	J
SVOCs (µg/L)	DNC		DNC	
Pesticides (µg/L)	ND		ND	
PCBs (µg/L)	ND		ND	
Inorganics (µg/L)				
Iron	322	J	324	
Iron (Dissolved)	351	B	345	B
Manganese	1,580	J	1,560	J
Manganese (Dissolved)	1,450		1,480	
Sodium	50,900	J	50,700	J
Sodium (Dissolved)	48,600		48,000	
PFAS (ng/L)	NE		NE	

Sample ID	MW-5_090718	
Sample Date	9/7/2018	
VOCs (µg/L)		
Cis-1,2-Dichloroethene	134	
Tetrachloroethene (PCE)	5.22	J
Trichloroethene (TCE)	728	J
Vinyl Chloride	9.71	J
SVOCs (µg/L)	NE	

Sample ID	MW-3_090618	
Sample Date	9/6/2018	
VOCs (µg/L)		
Trichloroethene (TCE)	21.7	J
SVOCs (µg/L)	NE	

Sample ID	LMW11_090718	
Sample Date	9/7/2018	
VOCs (µg/L)		
Cis-1,2-Dichloroethene	22.6	
Tetrachloroethene (PCE)	5.61	J
Trichloroethene (TCE)	1,490	J
SVOCs (µg/L)	ND	
Pesticides (µg/L)	DNC	
PCBs (µg/L)	ND	
Inorganics (µg/L)		
Iron	7,000	J
Magnesium	96,600	J
Manganese	1,520	J
Selenium	12.5	J
Sodium	70,800	
Sodium (Dissolved)	69,700	J

Sample ID	LMW12S_090618	
Sample Date	9/6/2018	
VOCs (µg/L)		
1,1-Dichloroethane	16.1	J
1,1-Dichloroethene	17.2	J
Cis-1,2-Dichloroethene	214	D
Trichloroethene (TCE)	15,800	D
Vinyl Chloride	9.9	J
SVOCs (µg/L)	NE	
Pesticides (µg/L)	NE	
PCBs (µg/L)	ND	
Inorganics (µg/L)		
Barium	1,450	
Iron	6,330	
Magnesium	158,000	
Manganese	6,360	
Selenium	33	
Sodium	20,800	
PFAS (ng/L)	ND	

Sample ID	LMW12D_090618	
Sample Date	9/6/2018	
VOCs (µg/L)		
1,2-Dichloropropane	2.9	
Cis-1,2-Dichloroethene	109	
Tetrachloroethene (PCE)	10.8	J
Trichloroethene (TCE)	874	D
Vinyl Chloride	2.49	J
SVOCs (µg/L)	NE	
Pesticides (µg/L)	NE	
PCBs (µg/L)	ND	
Inorganics (µg/L)		
Iron	1,320	
Magnesium	36,400	
Sodium	56,900	
Sodium (Dissolved)	59,000	J
Thallium	1.83	J

Sample ID	LMW15_090618	
Sample Date	9/6/2018	
VOCs (µg/L)		
1,1-Dichloroethane	22.4	J
1,1-Dichloroethene	10.3	J
Cis-1,2-Dichloroethene	268	D
Trichloroethene (TCE)	4,290	J
Vinyl Chloride	9	J
SVOCs (µg/L)	NE	
Pesticides (µg/L)	ND	
PCBs (µg/L)	ND	
Inorganics (µg/L)		
Iron	15,800	
Magnesium	142,000	
Manganese	4,240	
Selenium	22.3	
Sodium	27,700	
Sodium (Dissolved)	25,700	J

Sample ID	MW-4_090618	
Sample Date	9/6/2018	
VOCs (µg/L)		
Cis-1,2-Dichloroethene	7.9	
Trichloroethene (TCE)	265	D
Vinyl Chloride	2.35	J
SVOCs (µg/L)		
Bis(2-Ethylhexyl) Phthalate	5.07	J

LEGEND:

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE EXTENT OF EXISTING BUILDING
- MW-6 — EXISTING MONITORING WELL (INSTALLED BY AECOM)
- LB12/LMW12D — RI MONITORING WELL LOCATION
- GWG01 — SRI MONITORING WELL LOCATION

NOTES:

1. BASE MAP PREPARED BY JMC PLLC TITLED "TOPOGRAPHIC AND UTILITY SURVEY", DATED NOVEMBER 20, 2017.
2. ALL LOCATIONS ARE APPROXIMATE.
3. RI = REMEDIAL INVESTIGATION
4. SRI = SUPPLEMENTAL REMEDIAL INVESTIGATION
5. GROUNDWATER ANALYTICAL RESULTS ARE COMPARED TO THE 6 NYCRR PART 703.5 WATER QUALITY STANDARDS FOR CLASS GA WATERS AND THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) DIVISION OF WATER TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES (SGVs) FOR CLASS GA WATER (COLLECTIVELY REFERRED TO AS SGVs).
6. PFAS CONCENTRATIONS SHOWN ARE TOTAL CONCENTRATIONS OF ALL DETECTED PFAS COMPOUNDS.
7. CONCENTRATIONS EXCEEDING THE NYSDEC TOGS AWQS ARE SHADED AND BOLD.
8. PFAS = PER- AND POLYFLUOROALKYL SUBSTANCES
9. µg/L = MICROGRAMS PER LITER
10. ng/L - NANOGRAMS PER LITER
11. ND = THE ANALYTE WAS NOT DETECTED AT A LEVEL GREATER THAN OR EQUAL TO THE REPORTING LIMIT (RL)
12. NE = THE ANALYTE DID NOT EXCEED COMPARISON CRITERIA
13. DNC = ONE OR MORE COMPOUNDS DETECTED WITH NO APPLICABLE CRITERIA
14. B = THE ANALYTE WAS FOUND IN THE ASSOCIATED ANALYSIS BATCH BLANK.
12. D = THE CONCENTRATION REPORTED IS A RESULT OF A DILUTED SAMPLE.
13. J = THE ANALYTE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT (MDL), BUT BELOW THE RL; THEREFORE, THE RESULT IS AN ESTIMATED CONCENTRATION.
14. E = THE RESULT IS ESTIMATED AND CANNOT BE ACCURATELY REPORTED DUE TO LEVELS ENCOUNTERED OR INTERFERENCES.
15. BGS = BELOW GRADE SURFACE

Analyte	CAS Number	NYSDEC SGVs	USEPA HA
VOCs (µg/L)			
1,1,1-Trichloroethane	71-55-6	5	~
1,1-Dichloroethane	75-34-3	5	~
1,1-Dichloroethene	75-35-4	5	~
1,2-Dichloropropane	78-87-5	1	~
Benzene	71-43-2	1	~
Chloroethane	75-00-3	5	~
Cis-1,2-Dichloroethene	156-59-2	5	~
M,P-Xylene	179601-23-1	5	~
Methyl Ethyl Ketone (2-Butanone)	78-93-3	50	~
Tetrachloroethene (PCE)	127-18-4	5	~
Total Xylenes	1330-20-7	5	~
Trans-1,2-Dichloroethene	156-60-5	5	~
Trichloroethene (TCE)	79-01-6	5	~
Vinyl Chloride	75-01-4	2	~
SVOCs (µg/L)			
Bis(2-Ethylhexyl) Phthalate	117-81-7	5	~
Inorganics (µg/L)			
Barium	7440-39-3	1,000	~
Iron	7439-89-6	300	~
Lead	7439-92-1	25	~
Magnesium	7439-95-4	35,000	~
Manganese	7439-96-5	300	~
Selenium	7782-49-2	10	~
Sodium	7440-23-5	20,000	~
Thallium	7440-28-0	0.5	~
PFAS (ng/L)			
Total PFOS and PFOA	-	~	70

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Project
41 KENSICO DRIVE
SECTION No. 69.50, PARCEL No. 1-2
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Figure Title
GROUNDWATER ANALYTICAL RESULTS MAP

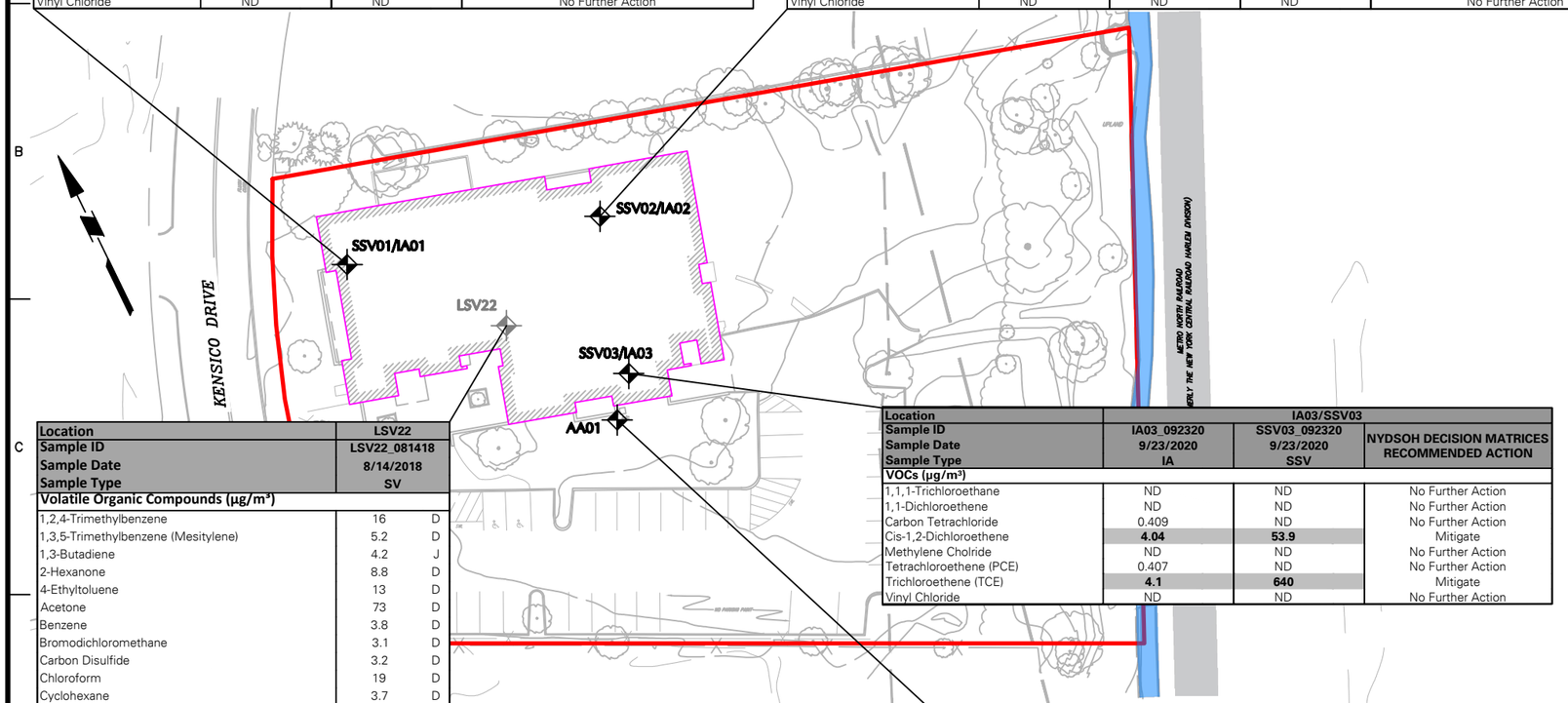
Project No. 190046301
Date 11/09/2020
Drawn By EB
Checked By GCW
Figure No. 4

PROJECT NO. 190046301

Filename: \\langan.com\data\WPWdata3\190046301\Project Data\CAD\01\SheetFiles\Environmental\RAWP\2019 Update\Figure 4 - Groundwater Sample Analytical Results Map_with SRI.dwg Date: 11/12/2020 Time: 08:33 User: eburgess Style Table: Langan.stb Layout: ANSID-BL

Location	IA01/SSV01		
Sample ID	IA01_092320	SSV01_092320	NYDSOH DECISION MATRICES RECOMMENDED ACTION
Sample Date	9/23/2020	9/23/2020	
Sample Type	IA	SSV	
VOCs (µg/m³)			
1,1,1-Trichloroethane	ND	ND	No Further Action
1,1-Dichloroethene	ND	ND	No Further Action
Carbon Tetrachloride	0.365	ND	No Further Action
Cis-1,2-Dichloroethene	4.68	ND	Identify Sources and Resample or Mitigate
Methylene Chloride	ND	ND	No Further Action
Tetrachloroethene (PCE)	0.468	ND	No Further Action
Trichloroethene (TCE)	4.44	3.12	Identify Sources and Resample or Mitigate
Vinyl Chloride	ND	ND	No Further Action

Location	IA02/SSV02			
Sample ID	IA02_092320	SSV02_092320	SSV_DUP01	NYDSOH DECISION MATRICES RECOMMENDED ACTION
Sample Date	9/23/2020	9/23/2020	9/23/2020	
Sample Type	IA	SSV	SSV	
VOCs (µg/m³)				
1,1,1-Trichloroethane	ND	ND	ND	No Further Action
1,1-Dichloroethene	ND	ND	ND	No Further Action
Carbon Tetrachloride	0.371	ND	ND	No Further Action
Cis-1,2-Dichloroethene	4.4	ND	1.03	Identify Sources and Resample or Mitigate
Methylene Chloride	ND	ND	ND	No Further Action
Tetrachloroethene (PCE)	0.38	ND	ND	No Further Action
Trichloroethene (TCE)	**4.36**	4.2 J	**6.5** J	Mitigate
Vinyl Chloride	ND	ND	ND	No Further Action



Location	LSV22	
Sample ID	LSV22_081418	
Sample Date	8/14/2018	
Sample Type	SV	
Volatile Organic Compounds (µg/m³)		
1,2,4-Trimethylbenzene	16	D
1,3,5-Trimethylbenzene (Mesitylene)	5.2	D
1,3-Butadiene	4.2	J
2-Hexanone	8.8	D
4-Ethyltoluene	13	D
Acetone	73	D
Benzene	3.8	D
Bromodichloromethane	3.1	D
Carbon Disulfide	3.2	D
Chloroform	19	D
Cyclohexane	3.7	D
Dichlorodifluoromethane	310	D
Ethylbenzene	5.4	D
Isopropanol	4.7	D
M,P-Xylene	21	D
Methyl Ethyl Ketone (2-Butanone)	23	D
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	3.6	D
Methylene Chloride	6.7	D
n-Heptane	2.9	D
n-Hexane	6.2	D
o-Xylene (1,2-Dimethylbenzene)	8.8	D
Propylene	26	D
Styrene	4	D
Tetrachloroethylene (PCE)	14	D
Tetrahydrofuran	3.4	D
Toluene	15	D
Trichloroethylene (TCE)	3.7	D
Trichlorofluoromethane	1.5	D

Location	IA03/SSV03		
Sample ID	IA03_092320	SSV03_092320	NYDSOH DECISION MATRICES RECOMMENDED ACTION
Sample Date	9/23/2020	9/23/2020	
Sample Type	IA	SSV	
VOCs (µg/m³)			
1,1,1-Trichloroethane	ND	ND	No Further Action
1,1-Dichloroethene	ND	ND	No Further Action
Carbon Tetrachloride	0.409	ND	No Further Action
Cis-1,2-Dichloroethene	**4.04**	**53.9**	Mitigate
Methylene Cholride	ND	ND	No Further Action
Tetrachloroethene (PCE)	0.407	ND	No Further Action
Trichloroethene (TCE)	**4.1**	**640**	Mitigate
Vinyl Chloride	ND	ND	No Further Action

Location	AA01
Sample ID	AA01_092320
Sample Date	9/23/2020
Sample Type	AA
VOCs (µg/m³)	
1,1,1-Trichloroethane	ND
1,1-Dichloroethene	ND
Carbon Tetrachloride	0.39
Cis-1,2-Dichloroethene	0.682
Methylene Chloride	8.03
Tetrachloroethene (PCE)	0.156
Trichloroethene (TCE)	0.715
Vinyl Chloride	ND

LEGEND:

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE EXTENT OF EXISTING BUILDING
- APPROXIMATE EXTENT OF BRANCH BROOK STREAM
- APPROXIMATE EXTENT OF METRO NORTH RAILROAD
- LSV22 — SOIL VAPOR SAMPLING LOCATION (RI 2018)
- SSV01/IA01 — CO-LOCATED SUB-SLAB VAPOR AND INDOOR AIR SAMPLING LOCATION (RDI 2020)
- AA01 — AMBIENT AIR SAMPLING LOCATION (RDI 2020)

	NYSDOH INDOOR AIR GUIDANCE VALUES
VOCs (µg/m³)	
1,1,1-Trichloroethane	~
1,1-Dichloroethene	~
Carbon Tetrachloride	~
Cis-1,2-Dichloroethene	~
Methylene Chloride	60
Tetrachloroethene (PCE)	30
Trichloroethene (TCE)	2
Vinyl Chloride	~

NOTES:

1. BASE MAP PREPARED BY JMC PLLC TITLED "TOPOGRAPHIC AND UTILITY SURVEY", DATED NOVEMBER 20, 2017.
2. THE REMEDIAL INVESTIGATION WAS PERFORMED BY LANGAN BETWEEN AUGUST AND SEPTEMBER OF 2018.
3. CO-LOCATED SUB-SLAB AND INDOOR AIR SAMPLE ANALYTICAL RESULTS ARE EVALUATED USING THE NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH) OCTOBER 2006 GUIDANCE FOR EVALUATING SOIL VAPOR INTRUSION IN THE STATE OF NEW YORK DECISION MATRICES FOR SUB-SLAB VAPOR AND INDOOR AIR AND SUBSEQUENT UPDATES (2017).
4. AMBIENT AIR ANALYTICAL RESULTS ARE SHOWN FOR REFERENCE ONLY.
5. NYSDOH AIR GUIDANCE VALUES (AGVs) AS SET FORTH IN THE NYSDOH OCTOBER 2006 GUIDANCE FOR EVLAUTING SOIL VAPOR INTRUSION IN THE STATE OF NEW YORK AND SUBSEQUENT UPDATES (2013, 2015) ARE SHOWN AS REFERENCE ONLY.
6. DETECTED ANALYTICAL RESULTS FOR WHICH IDENTIFICATION OF SOURCE(S) AND RESAMPLING OR MITIGATION IS RECOMMENDED BY THE NYSDOH DECISION MATRICES ARE SHADED.
7. DETECTED ANALYTICAL RESULTS FOR WHICH MITIGATION IS RECOMMENDED BY THE NYSDOH DECISION MATRICES ARE BOLDED AND SHADED.
8. SAMPLE SSV_DUP01 IS A DUPLICATE OF SAMPLE SSV02_092320.
9. RI = REMEDIAL INVESTIGATION
10. RDI = REMEDIAL DESIGN INVESTIGATION
11. VOC = VOLATILE ORGANIC COMPOUND
12. µg/m3 = MICROGRAMS PER CUBIC METER
13. AA = AMBIENT AIR
14. IA = INDOOR AIR
15. SSV = SUB-SLAB VAPOR
16. SV = SOIL VAPOR
17. ND = NOT DETECTED
18. J = THE ANALYTE WAS POSITIVELY IDENTIFIED AND THE ASSOCIATED NUMERICAL VALUE IS THE APPROXIMATE CONCENTRATION OF THE ANALYTE IN THE SAMPLE.
19. D = THE CONCENTRATION REPORTED IS A RESULT OF A DILUTED SAMPLE.

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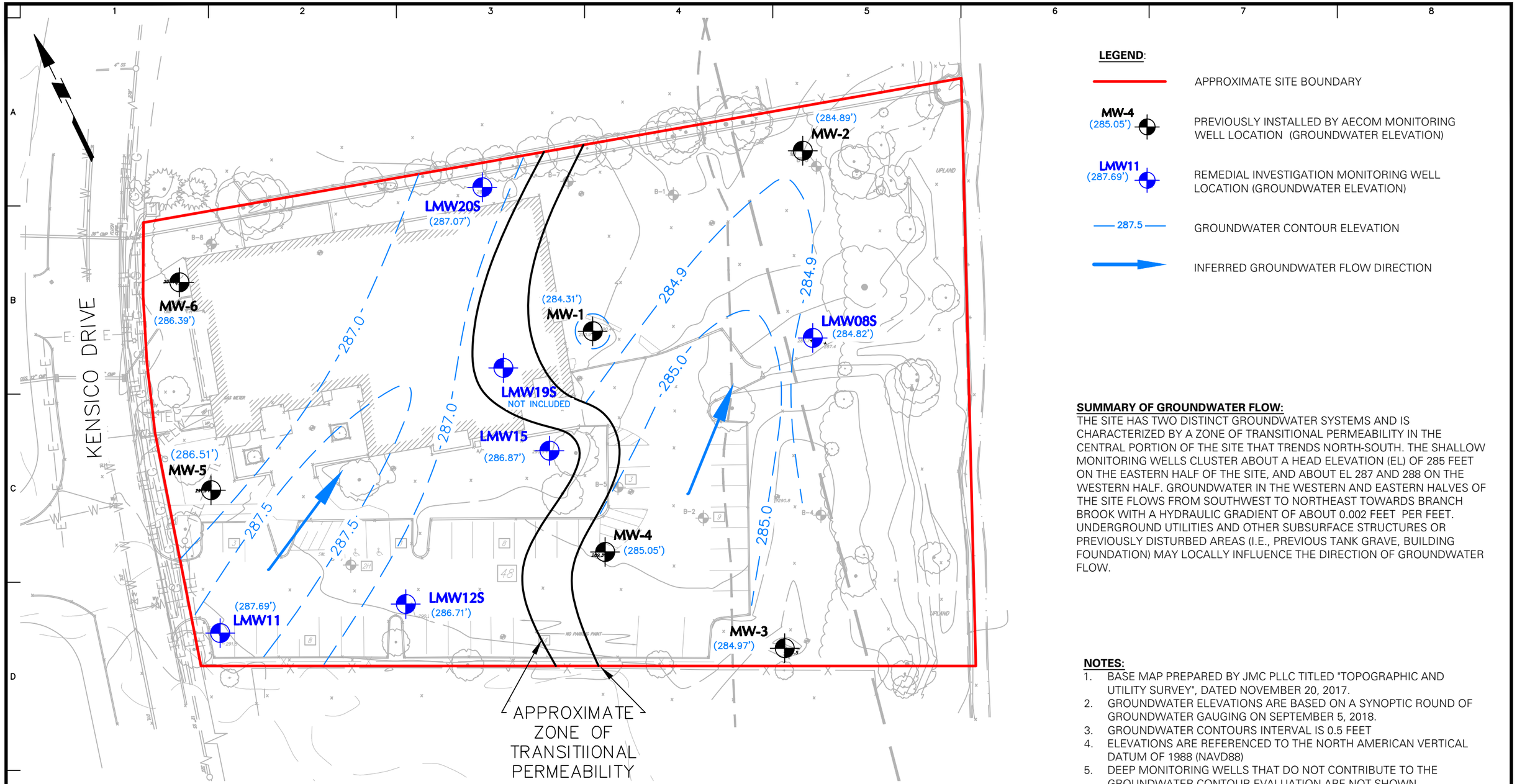
Project: 41 KENSICO DRIVE
SECTION 69.50, PARCEL No. 1-2
TOWN OF MOUNT KISCO
WESTCHESTER COUNTY NEW YORK

Figure Title: SUB-SLAB/INDOOR AIR SOIL VAPOR ANALYTICAL RESULTS MAP

Project No. 190046301
Date 11/12/2020
Drawn By KW
Checked By GCW

Figure No. 5

Filename: \\langan.com\data\WPW\data3\190046301\Project Data\CAD\01\SheetFiles\Environmental\RDI\Figure 5 - Sub-Slab, Indoor Air, and Soil Vapor Analytical Results Map.dwg Date: 12/16/2020 Time: 14:29 User: eburgess Style Table: Langan.stb Layout: Layout1



LEGEND:

- APPROXIMATE SITE BOUNDARY
- MW-4 (285.05') — PREVIOUSLY INSTALLED BY AECOM MONITORING WELL LOCATION (GROUNDWATER ELEVATION)
- LMW11 (287.69') — REMEDIAL INVESTIGATION MONITORING WELL LOCATION (GROUNDWATER ELEVATION)
- 287.5 — GROUNDWATER CONTOUR ELEVATION
- INFERRED GROUNDWATER FLOW DIRECTION

SUMMARY OF GROUNDWATER FLOW:

THE SITE HAS TWO DISTINCT GROUNDWATER SYSTEMS AND IS CHARACTERIZED BY A ZONE OF TRANSITIONAL PERMEABILITY IN THE CENTRAL PORTION OF THE SITE THAT TRENDS NORTH-SOUTH. THE SHALLOW MONITORING WELLS CLUSTER ABOUT A HEAD ELEVATION (EL) OF 285 FEET ON THE EASTERN HALF OF THE SITE, AND ABOUT EL 287 AND 288 ON THE WESTERN HALF. GROUNDWATER IN THE WESTERN AND EASTERN HALVES OF THE SITE FLOWS FROM SOUTHWEST TO NORTHEAST TOWARDS BRANCH BROOK WITH A HYDRAULIC GRADIENT OF ABOUT 0.002 FEET PER FEET. UNDERGROUND UTILITIES AND OTHER SUBSURFACE STRUCTURES OR PREVIOUSLY DISTURBED AREAS (I.E., PREVIOUS TANK GRAVE, BUILDING FOUNDATION) MAY LOCALLY INFLUENCE THE DIRECTION OF GROUNDWATER FLOW.

NOTES:

1. BASE MAP PREPARED BY JMC PLLC TITLED "TOPOGRAPHIC AND UTILITY SURVEY", DATED NOVEMBER 20, 2017.
2. GROUNDWATER ELEVATIONS ARE BASED ON A SYNOPTIC ROUND OF GROUNDWATER GAUGING ON SEPTEMBER 5, 2018.
3. GROUNDWATER CONTOURS INTERVAL IS 0.5 FEET
4. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
5. DEEP MONITORING WELLS THAT DO NOT CONTRIBUTE TO THE GROUNDWATER CONTOUR EVALUATION ARE NOT SHOWN.
6. GWG01 THROUGH GWG03 INSTALLED IN MAY 2019 ARE NOT INCLUDED ON THIS MAP OR INCLUDED IN GROUNDWATER CONTOUR CALCULATIONS

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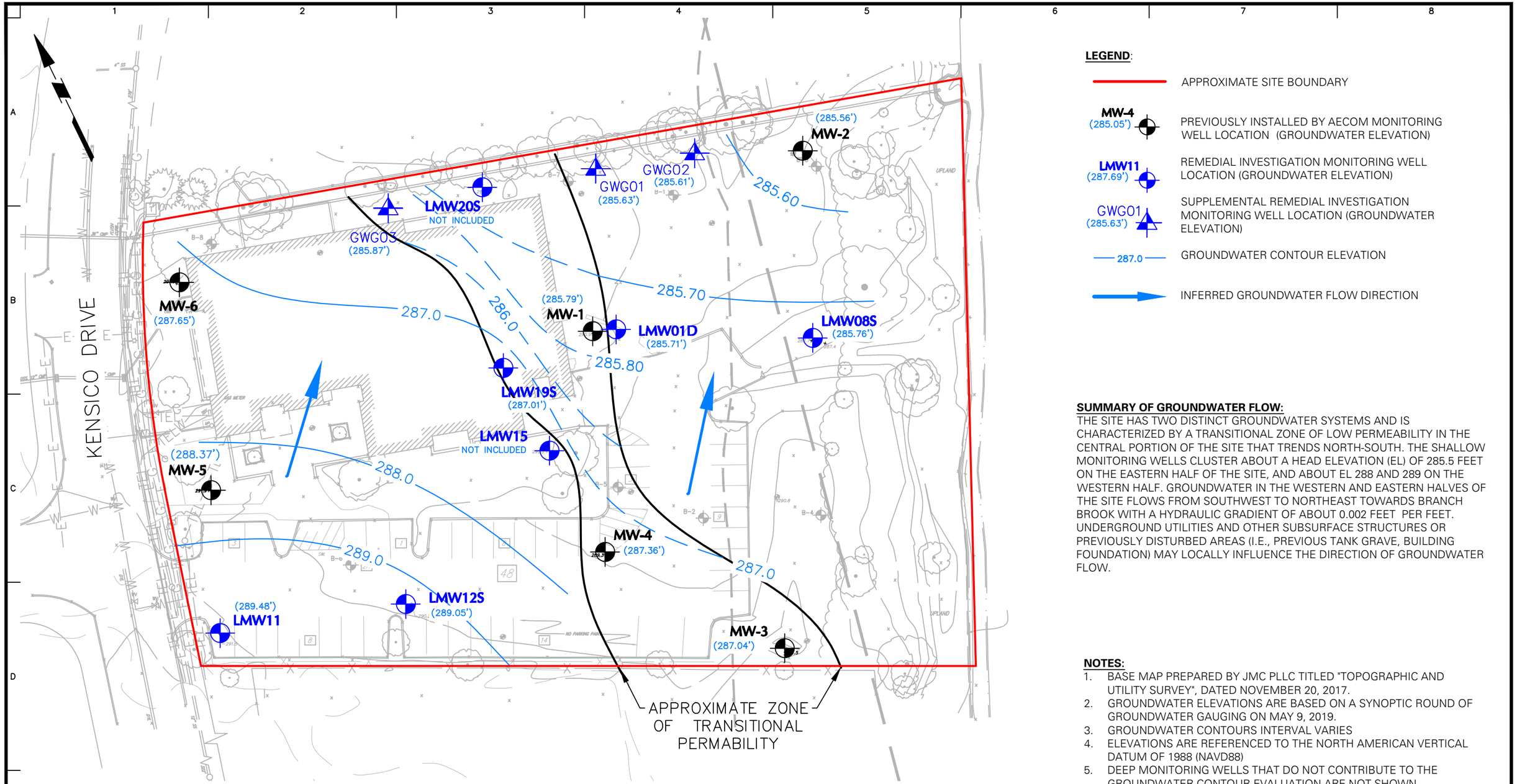
Project	Figure Title	Project No.	Figure No.
41 KENSICO DRIVE BLOCK No. 1, LOT No.2 TOWN OF MOUNT KISCO WESTCHESTER COUNTY NEW YORK	GROUNDWATER CONTOUR MAP 2018	190046301	6A
		Date 11/09/2020	
		Drawn By JFY	
		Checked By TC	

Filename: \\langan.com\data\WPW\data3\190046301\Project Data\CAD\01\SheetFiles\Environmental\RAWP\2019 Update\Figure 6A - Groundwater Contour Map - Shallow - 2018.dwg Date: 11/12/2020 Time: 08:49 User: eburgess Style Table: Langan.stb Layout: ANSIB-BL



LEGEND:

- APPROXIMATE SITE BOUNDARY
- MW-4 (285.05') — PREVIOUSLY INSTALLED BY AECOM MONITORING WELL LOCATION (GROUNDWATER ELEVATION)
- LMW11 (287.69') — REMEDIAL INVESTIGATION MONITORING WELL LOCATION (GROUNDWATER ELEVATION)
- GWG01 (285.63') — SUPPLEMENTAL REMEDIAL INVESTIGATION MONITORING WELL LOCATION (GROUNDWATER ELEVATION)
- 287.0 — GROUNDWATER CONTOUR ELEVATION
- INFERRED GROUNDWATER FLOW DIRECTION

SUMMARY OF GROUNDWATER FLOW:

THE SITE HAS TWO DISTINCT GROUNDWATER SYSTEMS AND IS CHARACTERIZED BY A TRANSITIONAL ZONE OF LOW PERMEABILITY IN THE CENTRAL PORTION OF THE SITE THAT TRENDS NORTH-SOUTH. THE SHALLOW MONITORING WELLS CLUSTER ABOUT A HEAD ELEVATION (EL) OF 285.5 FEET ON THE EASTERN HALF OF THE SITE, AND ABOUT EL 288 AND 289 ON THE WESTERN HALF. GROUNDWATER IN THE WESTERN AND EASTERN HALVES OF THE SITE FLOWS FROM SOUTHWEST TO NORTHEAST TOWARDS BRANCH BROOK WITH A HYDRAULIC GRADIENT OF ABOUT 0.002 FEET PER FEET. UNDERGROUND UTILITIES AND OTHER SUBSURFACE STRUCTURES OR PREVIOUSLY DISTURBED AREAS (I.E., PREVIOUS TANK GRAVE, BUILDING FOUNDATION) MAY LOCALLY INFLUENCE THE DIRECTION OF GROUNDWATER FLOW.

NOTES:

1. BASE MAP PREPARED BY JMC PLLC TITLED "TOPOGRAPHIC AND UTILITY SURVEY", DATED NOVEMBER 20, 2017.
2. GROUNDWATER ELEVATIONS ARE BASED ON A SYNOPTIC ROUND OF GROUNDWATER GAUGING ON MAY 9, 2019.
3. GROUNDWATER CONTOURS INTERVAL VARIES
4. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
5. DEEP MONITORING WELLS THAT DO NOT CONTRIBUTE TO THE GROUNDWATER CONTOUR EVALUATION ARE NOT SHOWN.
6. LMW20S AND LMW15 ARE NOT INCLUDED IN GROUNDWATER CONTOUR CALCULATIONS BECAUSE THEIR SCREENS DO NOT INTERSECT THE WATER TABLE.

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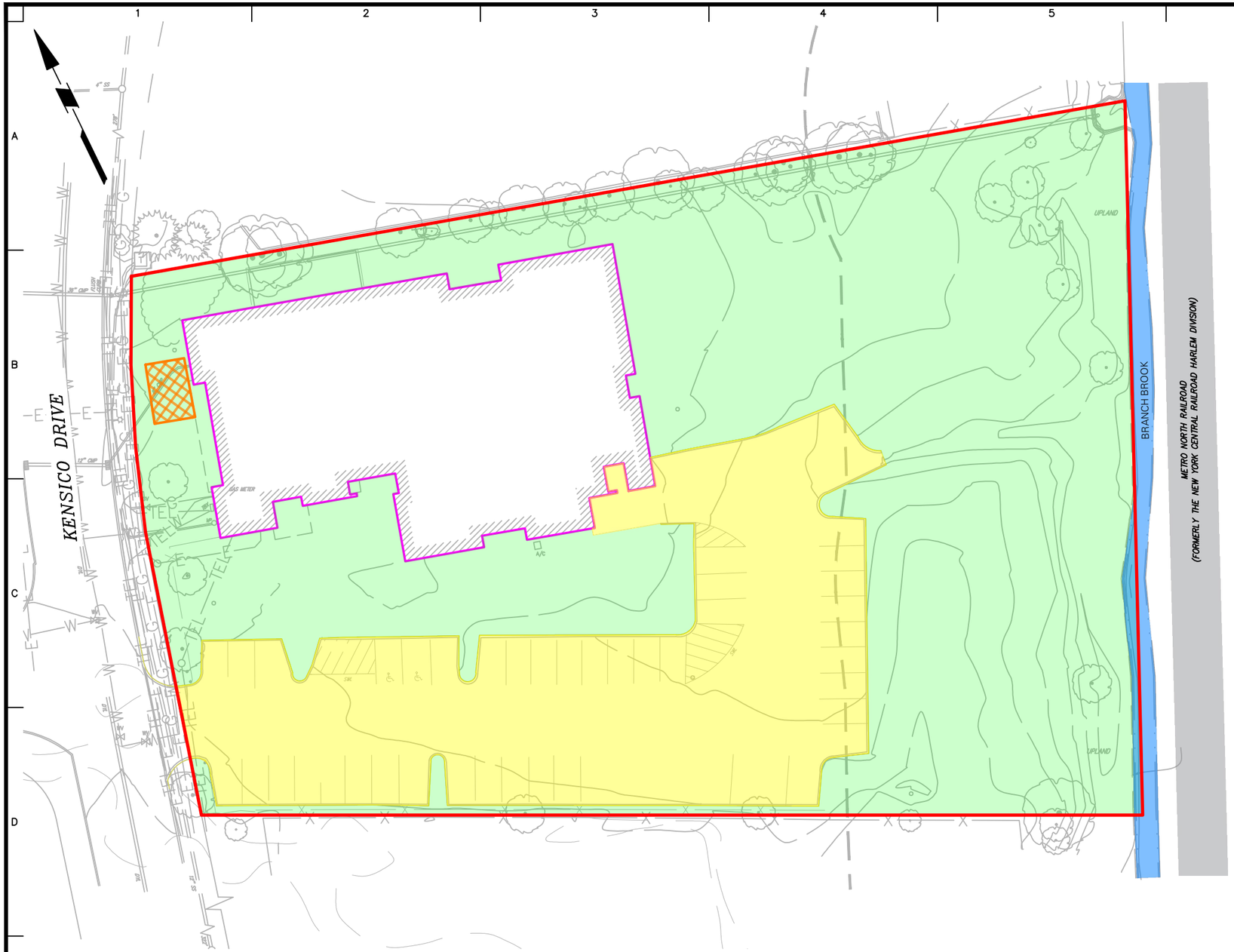
Project	41 KENSICO DRIVE BLOCK No. 1, LOT No.2 TOWN OF MOUNT KISCO WESTCHESTER COUNTY NEW YORK
Figure Title	GROUNDWATER CONTOUR MAP 2019
Project No.	190046301
Date	11/09/2020
Drawn By	EB
Checked By	GCW
Figure No.	6B

Filename: \\langan.com\data\WPW\data3\190046301\Project Data\CAD\01\SheetFiles\Environmental\RAWP\2019 Update\Figure 6B - Groundwater Contour Map - Shallow - 2019.dwg Date: 11/12/2020 Time: 08:53 User: eburgess Style Table: Langan.stb Layout: ANSIB-BL



LEGEND:

- APPROXIMATE SITE BOUNDARY
- EXISTING STRUCTURE TO BE RENOVATED AND EXTENT OF VAPOR BARRIER INSTALLATION AREA (RETROCOAT™)
- APPROXIMATE EXTENT OF IMPERVIOUS ASPHALT PAVEMENT (VEHICLE PARKING LOT) TO REMAIN AS IS (NO PROJECTIONS FOR DISTURBANCE OR IMPROVEMENTS)
- APPROXIMATE EXTENT OF LANDSCAPED AREA WITH COVER SOIL MEETING PART 375 COMMERCIAL USE SCOs (NO PROJECTIONS FOR DISTURBANCE OR IMPROVEMENTS)
- APPROXIMATE HAZARDOUS LEAD SOIL EXCAVATION AREA (BORING LB23) TO BE DELINEATED, EXCAVATED, AND BACKFILLED

NOTES:

1. BASE MAP PREPARED BY JMC PLLC TITLED "TOPOGRAPHIC AND
2. UTILITY SURVEY", DATED NOVEMBER 20, 2017.
3. HAZARDOUS LEAD SOIL WILL BE EXCAVATED AND REMOVED OFFSITE AS PART OF THE TRACK 2 REMEDY.
4. SOIL EXCEEDING THE PART 375 OF THE NEW YORK CODES, RULES AND REGULATIONS COMMERCIAL USE (CU) SOIL CLEANUP OBJECTIVES (SCOs) WILL BE MANAGED IN PLACE BENEATH THE BUILDING SLAB AS PART OF THE TRACK 2 REMEDY.
5. DOCUMENTATION SAMPLES MAY BE COLLECTED FROM THE BASE AND/OR SIDEWALLS OF THE HAZARDOUS LEAD SOIL AREA IN ACCORDANCE WITH THE RAWP.

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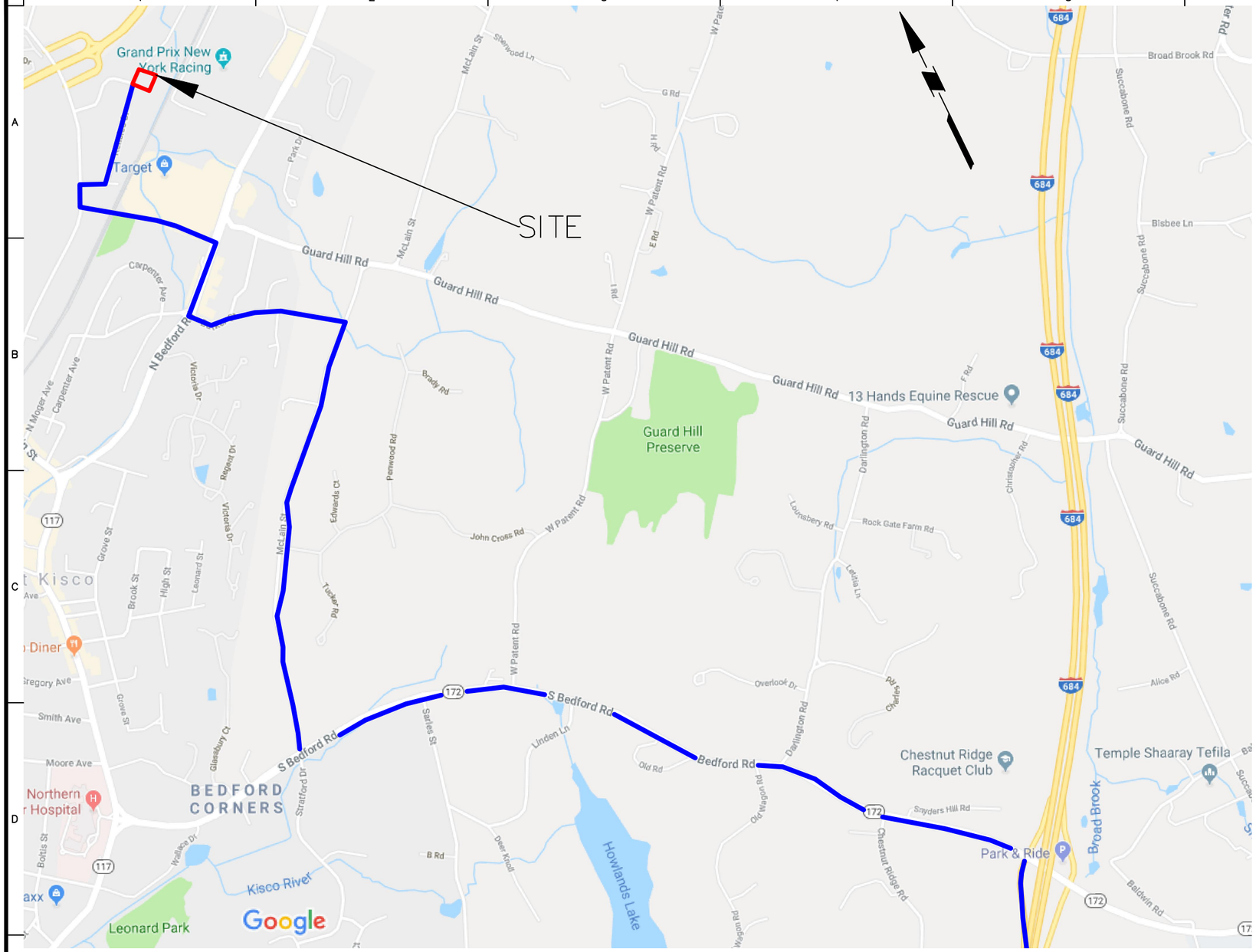
Project
41 KENSICO DRIVE
SECTION 69.50, PARCEL No.1-2
TOWN OF MOUNT KISCO
WESTCHESTER COUNTY NEW YORK

Figure Title
TRACK 2 CLEANUP PLAN

Project No.	190046301
Date	11/09/2020
Drawn By	EB
Checked By	GCW

Figure No. **7**

Filename: \\langan.com\data\WPW\data3\190046301\Project Data\CAD\01\SheetFiles\Environmental\RAWP\2019 Update\Figure 7 - Track 4 Cleanup-renovation.dwg Date: 11/12/2020 Time: 08:15 User: eburgess Style Table: Langan.stb Layout: Track 4 Cleanup



LEGEND:

APPROXIMATE SITE BOUNDARY

APPROXIMATE TRUCK ROUTE

NOTES:

1. TRUCK ROUTE MAP ADAPTED FROM GOOGLE MAPS WITH GUIDANCE FROM TRUCK ROUTE SOFTWARE (TRUCKROUTER BETA)
2. FIGURE IS NOT TO SCALE.

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Project
41 KENSICO DRIVE
SECTION 69.50, PARCEL No.1-2
TOWN OF MOUNT KISCO
WESTCHESTER COUNTY NEW YORK

Figure Title
TRUCK ROUTE MAP

Project No.	190046301
Date	11/09/2020
Drawn By	KT
Checked By	TC

Figure No. 8

Filename: \\langan.com\data\WPW\data3\190046301\Project Data\CAD\01\SheetFiles\Environmental\RAWP\2019 Update\Figure 9 - Truck Route Map.dwg Date: 11/12/2020 Time: 08:55 User: eburgess Style Table: Langan.stb Layout: Truck Route Map

TABLES

Table 1
Remedial Action Work Plan
Track 2 Commerical Use SCOs

Former Design For Leisure
41 Kensico Drive, Mount Kisco, NY
Langan Project No. 190046301
BCP ID No. C360163

VOCs (mg/kg)	
1,1,1-Trichloroethane	500
1,1-Dichloroethane	240
1,1-Dichloroethylene	500
1,2,4-Trimethylbenzene	190
1,2-Dichlorobenzene	500
1,2-Dichloroethane	30
1,3,5-Trimethylbenzene	190
1,3-Dichlorobenzene	280
1,4-Dichlorobenzene	130
1,4-Dioxane	130
2-Butanone	500
Acetone	500
Benzene	44
Carbon tetrachloride	22
Chlorobenzene	500
Chloroform	350
cis-1,2-Dichloroethylene	500
Ethyl Benzene	390
Methyl tert-butyl ether (MTBE)	500
Methylene chloride	500
n-Butylbenzene	500
n-Propylbenzene	500
sec-Butylbenzene	500
tert-Butylbenzene	500
Tetrachloroethylene	150
Toluene	500
trans-1,2-Dichloroethylene	500
Trichloroethylene	200
Vinyl Chloride	13
Xylenes, Total	500

Metals (mg/kg)	
Arsenic	16
Barium	400
Beryllium	590
Cadmium	9.3
Chromium, hexavalent	400
Chromium, trivalent	1,500
Copper	270
Cyanide	27
Lead	1000
Manganese	10,000
Mercury	2.80
Nickel	310
Selenium	1500
Silver	1500
Zinc	10000

SVOCs (mg/kg)	
Acenaphthene	500
Acenaphthylene	500
Anthracene	500
Benzo(a)anthracene	5.6
Benzo(a)pyrene	1
Benzo(b)fluoranthene	5.6
Benzo(g,h,i)perylene	500
Benzo(k)fluoranthene	56
Chrysene	56
Dibenzo(a,h)anthracene	0.56
Fluoranthene	500
Fluorene	500
Indeno(1,2,3-cd)pyrene	5.6
m-Cresol	500
Naphthalene	500
o-Cresol	500
p-Cresol	500
Pentachlorophenol	6.7
Phenanthrene	500
Phenol	500
Pyrene	500

PCBs/Pesticides (mg/kg)	
2,4,5-TP Acid (Silvex)	500
4,4'-DDE	62
4,4'-DDT	47
4,4'-DDD	92
Aldrin	0.68
alpha-BHC	3.4
beta-BHC	3
Chlordane (alpha)	24
delta-BHC	500
Dibenzofuran	350
Dieldrin	1.4
Endosulfan I	200
Endosulfan II	200
Endosulfan sulfate	200
Endrin	89
Heptachlor	15
Lindane	9.2
Polychlorinated biphenyls	1

Notes:
1. The above criteria are the Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375 Restricted Use Commerial Soil Cleanup Objectives (i.e., the Track 2 soil cleanup objectives).
2. VOC: volatile organic compound
3. SVOC: semivolatile organic compound
4. PCBs: polychlorinated biphenyls
5. mg/kg: milligram per kilogram

Table 2
Remedial Action Work Plan
Track 2 Cost Estimate

Former Design For Leisure
41 Kensico Drive, Mount Kisco, NY
Langan Project No. 190046301
BCP ID No. C360163

Item No.	Description of Environmental Item	Quantity		Environmental Incremental Unit		Estimated Premium
REMEDIAL ACTION CONTRACTOR FEES						
1	Remediation Facilities/Equipment, Mobilization/Demobilization, Fencing, Temporary Electric, Truck Wash Stations	--		Allowance		$50,000
2	Monitoring Well Decomissioning	19	Well	$365	per well	$7,000
3	Excavation of Hazardous Soil - Accounts for excavation of hazardous lead soil area	120	CY	$25	per CY	$3,000
4	Transport and Disposal of Hazardous Soil - Includes transport and disposal of hazardous lead contaminated soil at a permitted facility.	170	tons	$200	per ton	$34,000
5	Dust, Odor and Vapor Control - Includes odor, dust, and organic vapor control during excavation activity.	1	Months	20,000	per Month	$20,000
6	Backfill for Hazardous Soil Excavation - Import and placement of acceptable materials to backfill hazardous lead excavation. An additional 10% of material is included to account for compaction.	132	CY	$35	CY	$5,000
7	Waterproofing/Vapor Barrier - The vapor barrier will be a minimum 20 mil thickness and installed as a retro-active coat to foundation slabs and subsurface walls.	12,600	SF	$ 8.70	per SF	$110,000
8	Underground Storage Tank (UST) Removal- Registration, cleaning, removal and disposal of any encountered USTs.	--		Allowance		$20,000
				REMEDIAL ACTION CONTRACTOR FEES SUBTOTAL		**$249,000**
ENGINEERING FEES						
1	Construction Administration - Submittal and RFI reviews and site meetings/calls with the contractor and owner during construction	--		Lump Sum		$10,000
2	Remediation Oversight - This cost includes full time field oversight and office support	1	Months	$40,000	per Month	$40,000
3	Expenses - Includes waste characterization and post-excavation confirmation endpoint samples, CAMP equipment rental, field equipment rental, and travel.	--		Allowance		$15,000
4	BCP Reporting and Closure - Includes data validation, Final Engineering Report, Site Management Plan, and, agency/team coordination	--		Lump Sum		$80,000
5	Site Management - Management of long-term EC/IC, which includes site visits, annual reporting fees, and operations and maintenance costs.	10	Years	$7,500	per Year	$75,000
				ENGINEERING FEES SUBTOTAL		**$220,000**
				Remediation Contingency (10% of Contractor Fee Subtotal)		**$25,000**
				Total Estimated Cost		**$494,000**
				ESTIMATED REMEDIATION COST		**$500,000**

General Assumptions and Conditions:

1. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. Langan is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability services.
2. The density used for conversion from cubic yards to tons was 1.5 tons per cubic yard.
3. Excavation depths were calculated using remedial investigation soil sample results.
4. We assume a 4-week construction period for the hazardous soil excavation/backfilling activity and vapor barrier installation.
5. Remediation budget costs (soft and hard) are preliminary and are subject to adjustment following NYSDEC ad NYSDOH review and final approval of the draft Remedial Action Work Plan (RAWP)
6. The hazardous soil excavation area is assumed to be a 300 square feet area extending to about 10 feet below grade surface based on remedial investigation.

Contractor Cost Assumptions:

Item No. 3 - The unit rates provided reflect construction labor to be OSHA-certified and the typical cost for the transport and disposal of hazardous soil.
Item No. 6 - Backfill placement and compaction assumes soil handling and management costs for the import of virgin or recycled aggregates or structural fill meeting 6 NYCRR Part 375 Commercial Use (CU) Soil Cleanup Objectives (SCOs). The quantity of fill material was increased by 10% to account for compaction.
Item No. 7 - The estimate provided herein is based on the cost to install Land Science Technologies' RetroCoat™ surface-applied vapor barrier to the existing builing slab and is subject to change based on field conditions.

Engineering Cost Assumptions:

Item No. 3 - The cost includes the analysis of 6 post-excavation confirmation samples (for the hazardous soil excavation area) and 1 waste characterization sample by a NYSDOH ELAP-certified laboratory. Post-excavation samples will be analyzed for total/TCLP lead only. The assumed duration of the community air monitoring program (CAMP) is 1 month. CAMP costs include full-time equipment rental to facilitate perimeter dust and VOC monitoring.
Item No. 5 - The cost include annual site visits/inspections and reporting efforts only; no sampling or lab analysis is included.

Table 3
Remedial Action Work Plan
Track 1 Cost Estimate

Former Design For Leisure
41 Kensico Drive, Mount Kisco, NY
Langan Project No. 190046301
BCP ID No. C360163

Item No.	Description of Environmental Item	Quantity		Environmental Incremental Unit		Estimated Premium
REMEDIAL ACTION CONTRACTOR FEES						
1	Remediation Facilities, Equipment, Mobilization, Demobilization, Permits, and Site Maintenance - Remediation and decontamination facilities include trailer, truck cleaning facilities, etc.	–		Allowance		$150,000
2	Excavation of Material - Accounts for excavation of material containing concentrations exceeding Commercial Use Soil Cleanup Objectives and/or to depth of the terminus of historic fill.	19,509	CY	$25	per CY	$487,731
3	Transport and Disposal of Historic Fill - Includes transport vehicles and disposal of soil exceeding Commercial Use Soil Cleanup Objectives at a permitted facility.	28,881	Tons	$40	per Ton	$1,155,250
4	Transport and Disposal of Hazardous Material - Includes transport vehicles and disposal of hazardous lead contaminated soil at a permitted facility.	383	Tons	$200	per Ton	$76,528
5	Dewatering Pre-treatment System - Installation and operating cost up to 24,000 Gallons Per Day (GPD)	–		Allowance		$400,000
6	Cutoff Wall/Hydraulic Barrier - Installation of a cutoff wall/hydraulic barrier along the southern and western permimeter of the site to a depth of about 50 feet below grade surface.	–		Allowance		$1,500,000
7	In-situ Treatment of Groundwater - Chemical injections into the groundwater table to treat TCE contaminated groundwater.	–		Allowance		$750,000
8	Waterproofing/Vapor Barrier - The waterproofing/vapor barrier will be a minimum 20 mil thickness and installed as a continuous subslab membrane under slabs and outside subsurface walls.	2,500	SF	$6	per SF	$15,000
9	Underground Storage Tank (UST) Removal - Registration, cleaning, removal and disposal of any encountered USTs.	–		Allowance		$24,000
10	Dust, Odor and Vapor Control - Includes odor, dust, and organic vapor control during remediation of the site. Assumes control measures will include, but not be limited to application of odor suppressant, foam or water.	8	Months	20,000	per Month	$160,000
11	Backfill - Import and placement of clean material for stormwater planter.	28	CY	$35	CY	$1,000
12	Backfill - Import and placement of clean gravel material to bring site to development grade. An additional 10% of material is included to account for compaction.	21,460	CY	$35	CY	$752,000
13	Site Cap - Consisting of building slab, asphalt and concrete pavement, gravel layer and stormwater planter.	75,500	SF	$25	per SF	$1,888,000
				REMEDIAL ACTION CONTRACTOR FEES SUBTOTAL		**$7,360,000**
ENGINEERING FEES						
1	Confirmation Sampling - To confirm source material removal (assumes analysis for VOCs, SVOCs, PCBs, pesticides and metals for each sample).	159	Samples	$1,200	per Sample	$190,800
2	Dewatering Pretreatment Design - Includes engineering, system monitoring, and air permiting (if required)	–		Allowance		$90,000
3	Cutoff Wall/Hydraulic Barrier - Installation of a cutoff wall/hydraulic barrier along the southern, southwestern and northwestern permimeter of the site to a depth of about 50 feet below grade surface.	–		Allowance		$100,000
4	In-situ Treatment of Groundwater - Chemical injections into the groundwater table to treat TCE contaminated groundwater.	–		Allowance		$220,000
5	Remediation Oversight - This cost includes full time field oversight and office support	8	Months	$40,000	per Month	$320,000
6	Community Air Monitoring - This cost includes equipment rental fees associated with implementation of CAMP, which will be performed during excavation, backfill, and concrete slab restoration.	8	Months	$3,500	per Month	$28,000
7	BCP Engineering Services - Remedial design, FER, data validation, SMP, Environmental Easement support, agency/team coordination	–		Allowance		$250,000
				ENGINEERING FEES SUBTOTAL		**$1,199,000**
				Remediation Contingency (10% of Contractor Fee Subtotal)		**$736,000**
				Total Estimated Cost		**$9,295,000**
				ESTIMATED REMEDIATION COST - ALTERNATIVE II		**$9.3 MM**

General Assumptions and Conditions:

1. The density used for conversion from cubic yards to tons was 1.5 tons per cubic yard.
2. Excavation depths were calculated using remedial investigation soil sample results, field observations, and observed fill depths.
3. If contamination could not be delineated vertically based on soil sample results, it was assumed that contamination extended to the terminus of historic fill.
4. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site
5. A 8 month period is assumed for remediation and soil handling.
6. VOC = volatile organic compound; SVOC = semivolatile organic compound; PCBs = polychlorinated biphenyls

Contractor Cost Assumptions:

Item No. 2 - The unit rate provided reflects construction labor to be OSHA-certified.

Item No. 8 - Include cost of materials and installation of a vapor barrier membrane system under the entire building fountation including elevator pits and all horizontal and vertical surfaces.

Item No. 9 - The fee accounts for decommissioning and removal of any encountered underground storage tanks (USTs) during excavation.

Item No. 11 and 12 - Backfill placement and compaction assumes soil handling and management costs for the import of structural fill meeting Track 4 Commercial Use (CU) Soil Cleanup Objectives (SCOs) (6NYCRR-Part 375-6.8(b)) except for areas not covered by an impervious layer (stormwater planter, gravel parking area, and any landscaped areas), where Track 1 Unrestricted Use SCOs (6NYCRR-Part 375-6.8(a)) will be required. The quantity of soil has been increased by 10% to account for compaction.

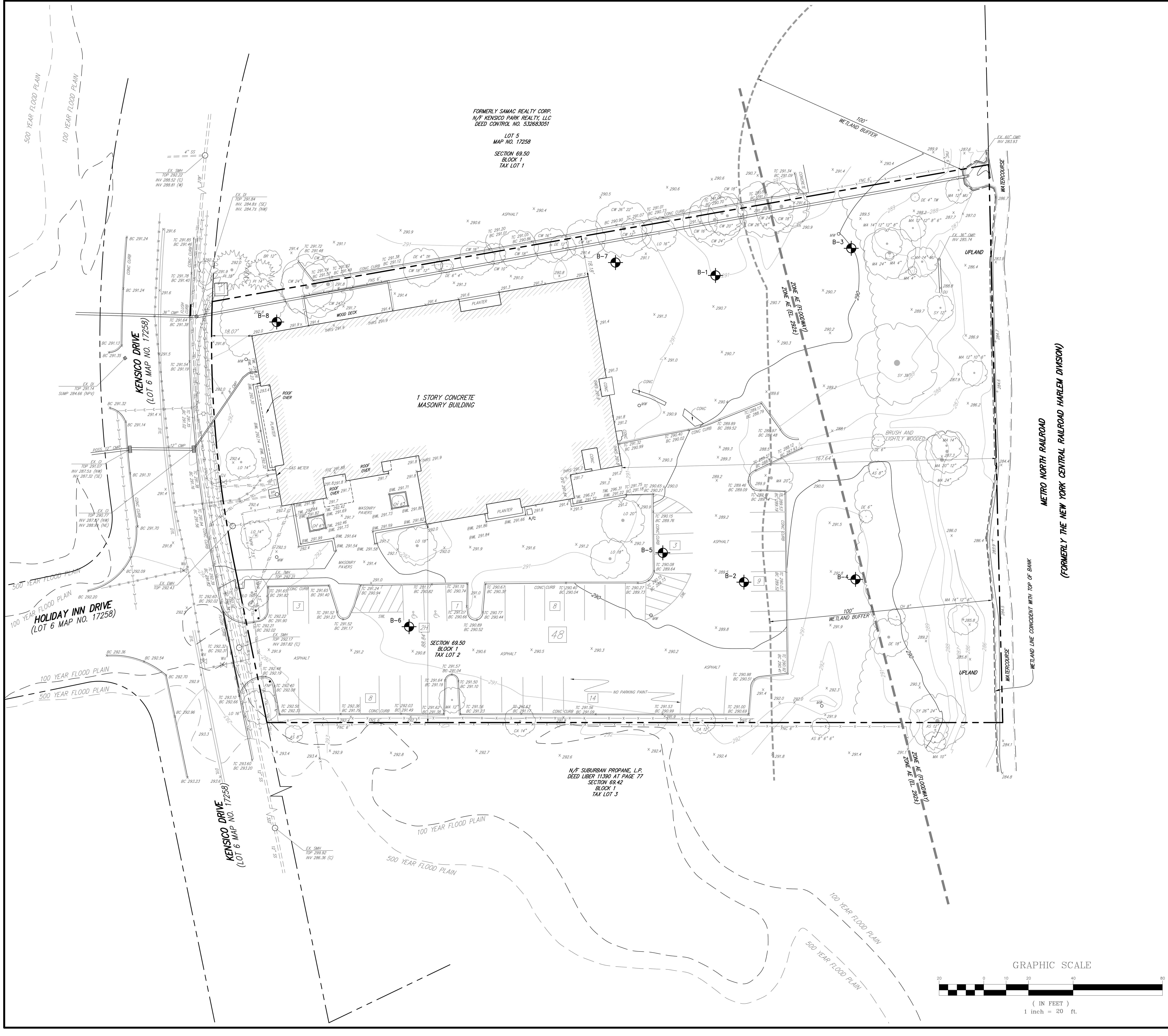
Engineering Cost Assumptions:

Item No. 1 - The cost includes the analysis of 99 samples plus quality assurance/quality control samples by a NYSDOH ELAP-certified laboratory. Sample analysis will be for full 6 NYCRR Part 375 parameters.

Item No. 2 - The assumed duration of the community air monitoring program (CAMP) is 8 months. CAMP costs include full-time equipment rental to facilitate perimeter dust and VOC

APPENDIX A

Site Existing Conditions Map



LEGEND

- EXISTING PROPERTY LINE
- ADJACENT PROPERTY LINE
- EXISTING WETLAND LINE AND DELINEATION
- EXISTING WETLAND BUFFER
- EXISTING BUILDING OVERHANG
- EXISTING BUILDING LINE
- EXISTING PAVEMENT EDGE
- EXISTING CURB LINE
- EXISTING CONTOUR
- EXISTING INDEX CONTOUR
- EXISTING RETAINING WALL
- EXISTING FENCE
- EXISTING TREE AND DESIGNATION
- EXISTING TREE LINE
- EXISTING DIRECTIONAL ARROWS
- EXISTING PAINT
- EXISTING PARKING WITH NUMBER OF SPACES
- EXISTING HANDICAP PARKING WITH NUMBER OF SPACES
- EXISTING PEDESTRIAN CROSSING
- EXISTING STORM DRAIN LINE AND SIZE
- EXISTING SANITARY LINE AND SIZE
- EXISTING WATER LINE
- EXISTING GAS LINE
- EXISTING DRAIN INLET
- EXISTING MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING GAS VALVE
- EXISTING WATER VALVE
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING SIGN
- BORING LOCATION AND DESIGNATION

NOTES:

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN HAVE BEEN TAKEN FROM SURVEY TITLED, "TOPOGRAPHIC AND UTILITY SURVEY," PREPARED BY JMC PLLC, DATED 11/20/2017.
2. THE WETLANDS WERE DELINEATED BY ECOLOGICAL SOLUTIONS, LLC ON NOVEMBER 6, 2017. THE LOCATION OF THE WETLAND LINE SHOWN HEREON REFLECTS A REPORT WRITTEN BY ECOLOGICAL SOLUTIONS, LLC DATED NOVEMBER 6, 2017.
3. BORING LOCATIONS DEPICTED ON THIS PLAN HAVE BEEN TAKEN FROM DRAWING TITLED, "BORING LOCATION PLAN," PREPARED BY CARLIN-SIMPSON AND ASSOCIATES, DATED 04/03/2018.

OWNER/APPLICANT:
NY LUXURY MOTORS OF MOUNT KISCO, INC
200 SW 1ST AVENUE
FORT LAUDERDALE, FL 33301

ARCHITECT:
STUART ROMM ARCHITECT DPC
100 PEACHTREE ST NW, SUITE 1450
ATLANTA, GA 30303

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SITE EXISTING CONDITIONS MAP

JAGUAR LAND ROVER MOUNT KISCO
SERVICE FACILITY - AUTONATION
41 KENSICO DRIVE
VILLAGE OF MOUNT KISCO, NEW YORK

STATE OF NEW YORK
DIEGO A. VILLAREALE
LICENSED PROFESSIONAL ENGINEER

No.	Revision	Date	By
1.	PLANNING BOARD SUBMISSION: FORMAL SITE PLAN	04/17/2018	NC
	Previous Editions Obsolete		

Drawn: BD	Approved: DV	
Scale: 1" = 20'		
Date: 04/17/2018		
Project No: 17174		
17174-EXISTING	EXIST	EXIST.scr
Drawing No: C-010		

APPENDIX B

Previous Environmental Reports

APPENDIX C

Construction Health and Safety Plan (CHASP)

CONSTRUCTION HEALTH AND SAFETY PLAN

FOR

41 KENSICO DRIVE
MOUNT KISCO, NEW YORK
Village/Township Tax Map
Block 1, Parcel 2

Prepared For

AutoNation Inc.
200 SW 1st Avenue
14th Floor
Fort Lauderdale, Florida

Prepared By:

Langan Engineering, Environmental, Surveying
Landscape Architecture and Geology D.P.C.
21 Penn Plaza
360 West 31st Street, 8th Floor
New York, New York 10001

LANGAN

November 2019
Langan Project No. 190046301

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***** Items to be posted prominently on site, or made readily available to personnel.

1.0 INTRODUCTION

1.1 General

This CONSTRUCTION HEALTH AND SAFETY PLAN (CHASP) was developed to address disturbance of known and reasonably anticipated subsurface contaminants and comply with Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1910.120(b)(4), *Hazardous Waste Operations and Emergency Response* during anticipated site work at 41 Kensico Drive, Mount Kisco, New York (Village/Township Tax Map Block 1 Parcel 2).

This CHASP provides the minimum requirements for implementing site operations during future remedial measure activities. All contractors performing work on this site shall implement their own CHASP that, at a minimum, adheres to this CHASP. The contractor is responsible for their own health and safety and that of their subcontractors. Langan personnel will implement this CHASP while onsite. The content of this CHASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the work plan.

1.2 Site Location and Background

The site is located at 41 Kensico Drive in Mt. Kisco, Westchester County, New York. The property is located on the east side of Kensico Drive near the intersection with Holiday Inn Drive (Village/Township Tax Map Block 1, Parcel 2). The site consists of a rectangular shaped parcel that is occupied by an existing commercial building. There is an existing one-story masonry building encompassing the northwest quadrant of the site. The remainder of the property consists of asphalt parking areas, landscaped areas, and lightly wooded areas. The existing surface grades generally slope down gently from west to east except in the eastern portion of the property where they also slope down from the north and from the south. A site location map is included as Figure 1.

1.3 Summary of Work Tasks

1.3.1 Excavation and Soil Screening

Langan personnel will screen excavated material for visual, olfactory, and instrumental indicators suggestive of a potential chemical or petroleum release. Instrument screening for the presence of volatile organic compounds (VOCs) may be performed with a duly calibrated Photoionization detector (PID). Contractors will excavate for utilities, foundation components and potential grading using heavy equipment and hand tools. Contractors will notify Langan personnel if they identify indications suggestive of a potential chemical or petroleum release. Contaminated

material shall be handled and property disposed in accordance with federal, state and city regulations, criteria and guidelines.

1.3.2 Soil Screening

As part of future excavation activities, the Langan personnel will report when they have observed visual and olfactory indications of possible soil impact. Langan personnel will also report concentrations of VOCs above background when using a properly calibrated hand held PID, or equivalent.

1.3.3 Soil Sampling

Soil samples (waste characterization, excavation endpoint, delineation, or quality assurance/quality control [QA/QC]) may be collected during construction, as required. Langan personnel will coordinate with the contractor in sampling soil (in accordance with the SMP, where applicable). If stockpile soil sampling is required from above ground level, suitable excavation equipment (i.e., excavator, front end loader) should be used to collect the sample.

Soil samples excavation endpoint or delineation sampling (along with QA/QC samples) may be collected and subsequently submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory and analyzed in accordance with work plan specifications.

1.3.4 Stockpiling

As part of future excavation activities, potentially impacted soil may be stockpiled pending laboratory analysis and determining proper off-site disposal. Visibly contaminated soil, if encountered, shall be segregated and stockpiled on at least 10 millimeters of plastic sheeting; reusable soil and fill shall be segregated and stockpiled separately from unusable fill, concrete and other debris; the stockpiles shall be kept covered with 6 millimeters thick plastic sheeting; the plastic sheeting covering the stockpiles shall be anchored firmly in place by weights, stakes, or both; the Contractor shall maintain the plastic sheeting.

1.3.5 Characterization of Excavated Material

When required by the work plan, Langan personnel will characterize excavated soil or clean backfill in accordance with Langan standards.

1.3.6 Lead Delineation

Langan may retain a drilling contractor to advance soil borings to a depth bgs specified in the

work plan. Borings locations will be based on the results of site inspection and document review. The drilling contractor will contact the appropriate utility mark-out authority and make available to their drilling staff the verification number and effective dates. The borings may be filled with clean soil cuttings after samples are collected.

Langan will screen soil for visual, olfactory, and instrumental indicators suggestive of a potential petroleum release. Instrument screening for the presence of VOCs may be performed with a PID. Langan will collect soil samples as specified in the lead delineation portion of the work plan. Soil samples will be submitted to a NYSDOH ELAP-certified laboratory and analyzed in accordance with work plan specifications.

1.3.7 Lead Hot Spot Soil Excavation and Disposal

Langan personnel will observe activities associated with the excavation and disposal of hazardous lead hot spot impacted soil. Langan personnel will coordinate with the excavator contractor so that the boundaries of the hazardous hot spot excavation correspond to with the approved disposal facilities instructions. Langan personnel are not to sign the hazardous waste manifests unless instructed by the Project Manager.

1.3.8 Excavation Backfill

Areas of the site that were over-excavated may be backfilled to development grade (i.e., the grade required to complete construction of the foundation and sidewalk extension). Imported material will consist of clean fill that meets the 6 New York Codes, Rules and Regulations (NYCRR) Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives (UU SCOs) or other acceptable fill material such as virgin stone from a permitted mine or quarry or recycled concrete aggregate (RCA), from a New York State Department of Environmental Conservation (NYSDEC)-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. Imported RCA must be derived from recognizable and uncontaminated concrete. RCA is not acceptable for, and will not be used as, site cover or drainage material.

1.3.9 Decommissioning and Removal of Underground Storage Tank

If an underground storage tank (UST) is encountered, a UST decommissioning and removal contractor shall furnish all labor and materials, equipment and incidentals required for the proper decontamination, removal and closure of any UST in accordance with federal, state and local regulations. Langan personnel will monitor VOCs with a calibrated PID downwind from the UST excavation and record the PID readings.

1.3.10 Construction Dewatering

Construction dewatering may be required, the dewatering contractor shall be responsible for handling contaminated dewatering fluids in accordance with federal, state and local regulations. Dewatering fluids are likely to be discharged to the local sanitary sewer system after treatment and under approved regulatory permit. Alternatively, the contractor may provide containerized storage to allow for testing of groundwater prior to, and after, treatment and before disposal. If required, Langan field personnel may sample dewatering treatment system liquids from either a discharge standpipe or a storage tank. Dewatering samples will be submitted to an ELAP-certified laboratory for analysis.

1.3.11 Installation of Waterproofing and Vapor Barrier

A properly licensed contractor will install the waterproofing membrane and vapor barrier system in accordance with specifications outlined in the work plan. Langan or other authorized personnel, as specified in the contract documents, will inspect the waterproofing and vapor barrier installation and in accordance with the specification outlined in the work plan.

1.3.12 Installation of a Composite or Concrete Cap System

The contractor shall furnish all labor and materials, equipment and incidentals required for the proper installation of the composite or concrete cap system, if installed, Langan personnel may document the cap installation.

1.3.13 Inspection/Repairing of Composite Cover System

Langan will inspect and when necessary observe the repairing of the composite cover system as performed by a properly licensed contractor and in accordance with specifications outlined in the site management plan (SMP).

1.3.14 Inspecting/Repairing of Waterproofing and Vapor Barrier

Langan will inspect and when necessary observe the repairing of the waterproofing membrane and vapor barrier as performed by a properly licensed contractor and in accordance with specifications outlined in the SMP.

1.3.15 Equipment Decontamination

Before the start of the day's sampling and after sampling each run, sampling equipment will be decontaminated by the decontamination process outlined Attachment B - Decontamination Procedures. Decontamination wastes and purge water will be temporarily stored on site pending

analytical results.

1.3.16 Management of Investigative-Derived Waste

The investigative-derived waste (IDW) generated during this investigation may stockpiled as defined under section **1.3.4** or contained in DOT-approved 55-gallon drums. The drums will be temporarily stored on the site or as directed by the client representative. All drums will be filled between to two-thirds full to allow easy maneuvering during drum pickup and disposal. Drum labels are to be provided by Langan (Environmental Closet). All drums will be labeled as "IDW Pending Analysis" until sample data are reported from the laboratory. Drum labels will include date filled and locations where waste was generated along with the standard information required by the labels in accordance with the Langan SOP09, Drum Labeling..

Closed top drums are to be used to store liquids. Debris, including plastic sheeting, polyethylene tubing, personal protection equipment (PPE), decontamination debris, etc. will be segregated from and disposed in large heavy duty garbage bags and disposed of at the site. Excess unused glassware should be returned to the lab along with the last day of collection samples.

1.3.17 Drum Sampling

Excess or impacted soil and water that is drummed during the remedial action activities must be labeled in accordance with the Langan Drum Labeling Standard Operating Procedure (SOP-#9). Langan personnel will collect drum samples, as required, prior to off-site drum disposal. Samples will be placed into laboratory-supplied batch-certified clean glassware and submitted to a NYSDOH ELAP-certified laboratory.

2.0 IDENTIFICATION OF KEY PERSONNEL/HEALTH AND SAFETY PERSONNEL

The following briefly describes the health and safety (H&S) designations and general responsibilities that may be employed for this site. The titles have been established to accommodate the project needs and requirements and ensure the safe conduct of site activities. The H&S personnel requirements for a given work location are based upon the proposed site activities.

2.1 Langan Project Manager

The Langan Environmental Project Manager (PM) is Greg Wyka, his responsibilities include:

- Ensuring that this CHASP is developed, current, and approved prior to on-site activities.
- Ensuring that all the tasks in the project are performed in a manner consistent with Langan's comprehensive *Health and Safety Program for Hazardous Waste Operations*

and this CHASP.

2.2 Langan Corporate Health and Safety Manager

The Langan Corporate Health and Safety Manager (HSM) is Tony Moffa their responsibilities include:

- Updating the *Construction Health and Safety Program for Hazardous Waste Operations*.
- Assisting the site Health and Safety Officer (HSO) with development of the CHASP, updating CHASP as dictated by changing conditions, jobsite inspection results, etc. and approving changes to this CHASP.
- Assisting the HSO in the implementation of this CHASP and conducting Jobsite Safety Inspections and assisting with communication of results and correction of shortcomings found.
- Maintaining records on personnel (medical evaluation results, training and certifications, accident investigation results, etc.).

2.3 Langan Site Health & Safety Officer

The Langan site HSO is William Bohrer. His responsibilities include:

- Participating in the development and implementation of this CHASP.
- When on-site, assisting the Langan Field Team Leader in conducting Tailgate Safety Meetings and Jobsite Safety Inspections and correcting any shortcomings in a timely manner.
- Ensuring that proper PPE is available, worn by employees, and properly stored and maintained.
- Controlling entry into and exit from the site contaminated areas or zones.
- Monitoring employees for signs of stress, such as heat stress, fatigue, and cold exposure.
- Monitoring site hazards and conditions.
- Knowing (and ensuring that all site personnel also know) emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Resolving conflicts that may arise concerning safety requirements and working conditions.
- Reporting all incidents, injuries and near misses to the Langan Incident/Injury Hotline immediately and the client representative.

2.4 Langan Field Team Leader Responsibilities

The Langan Field Team Leader (FTL) is to be determined prior to the start of the start of field activities. The Field Team Leader's responsibilities include:

- The management of the day-to-day site activities and implementation of this CHASP in the field.
- Participating in and/or conducting Tailgate Safety Meetings and Jobsite Safety Inspections and correcting any shortcomings in a timely manner.
- When a Community Air Monitoring Operating Program (CAMP) is part of the scope, the FTL will set up and maintaining community air monitoring activities and instructing the responsible contractor to implement organic vapor or dust mitigation when necessary.
- Overseeing the implementation of activities specified in the work plan.

2.5 Contractor Responsibilities

The contractor shall develop and implement their own CHASP for their employees, lower-tier subcontractors, and consultants. The contractor is responsible for their own health and safety and that of their subcontractors. Contractors operating on the site shall designate their own FTL, HSO and HSM. The contractor's CHASP will be at least as stringent as this Langan CHASP. The contractor must be familiar with and abide by the requirements outlined in their own CHASP. A contractor may elect to adopt Langan's CHASP as its own provided that it has given written notification to Langan, but where Langan's CHASP excludes provisions pertinent to the contractor's work (i.e., confined space entry); the contractor must provide written addendums to this CHASP. Additionally, the contractor must:

- Ensure their employees are trained in the use of all appropriate personal protection equipment (PPE) for the tasks involved;
- Notify Langan of any hazardous material brought onto the job site or site related area, the hazards associated with the material, and must provide a material safety data sheet (MSDS) or safety data sheet (SDS) for the material;
- Have knowledge of, understand, and abide by all current federal, state, and local health and safety regulations pertinent to the work;
- Ensure their employees handling hazardous materials, if identified at the Site, have received current training in the appropriate levels of 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response* (HAZWOPER) if hazardous waste is identified at the Site;
- Ensure their employees handling hazardous materials, if identified at the Site, have been fit-tested within the year on the type respirator they will wear; and
- Ensure all air monitoring is in place pertaining to the health and safety of their employees as required by OSHA 1910.120; and
- All contractors must adherer to all federal, state, and local regulatory requirements.

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSES

A Task-Hazard Analysis (Table 1) was completed for general construction hazards that may be encountered at the Site. The potential contaminants that might be encountered during the field activities and the exposure limits are listed in Table 2 complete inventory of MSDS/SDS for chemical products used on site is included as Attachment E.

3.1 Specific Task Safety Analysis

3.1.1 Soil Screening and Sampling

Sampling the soil requires the donning of chemical resistant gloves in addition to the standard PPE. Langan personnel are not to operate drilling or excavation equipment nor open sampling devices (acetate liners, sonic sample bags, etc.). These tasks are to be completed by the driller or excavation contractor.

3.1.2 Stockpile Sampling

The Langan personnel are not to scale or otherwise climb stockpiles. If the soil sampling plan requires sampling from the stockpile above ground level, samples are to be obtained using suitable excavation equipment operated by the contractor (i.e. front end loader).

3.1.3 Indoor Drilling and Excavation

The work scope may require indoor work or work in locations where there may not be adequate ventilation sufficient to safely operate any rig or excavation equipment powered by an internal combustion engine. Where possible, all such work should be done by equipment powered by electricity. If such equipment is used and must be directly wired to the buildings electrical system or to an independent system, this work must be completed by a licensed electrician in accordance with all electrical codes applicable to the work.

Indoor work which is to be completed with equipment powered by an internal combustion engine must incorporate air monitoring of carbon monoxide (CO) using calibrated air monitoring equipment (MultiRAE or equivalent). In addition, the work plan should incorporate mitigation for venting engine exhaust fumes directly to the outdoors and for circulating fresh air into the work area.

The OSHA Time Weighted Average (TWA) Permissible Exposure Limit (PEL) for CO from 50 to 35 parts per million (ppm). Langan will monitor CO with a suitable monitoring device. If CO levels exceed 5 ppm, Langan will instruct contractors to begin mitigation measures. These measures are at a minimum:

- Increase air circulation using industrial size fans to bring additional fresh air into the building or vent exhaust to the outside;
- Modify the passive exhaust method being used to increase venting circulation by using wider diameter tubing or sealing tubing connections; or
- Modify the work schedule where the rig is turned off to allow time for CO levels to fall back to background

All work must cease if CO levels reach 35 ppm. The Langan engineer is to report to the PM and H&S officer when an action level is reached.

3.1.4 Stockpile Sampling

The Langan personnel are not to scale or otherwise climb stockpiles. If the soil sampling plan requires sampling from the stockpile above ground level, samples are to be obtained using suitable excavation equipment operated by the contractor (i.e. front end loader).

3.1.5 Construction Dewatering

If required, Langan may sample dewatering treatment system liquids from either the direct discharge standpipe or from a sample port or valve built into the storage tank, Langan will don the necessary PPE including nitrile gloves and if necessary, facial splash guard. Sample ports and valves may only be sampled if they are accessible at ground level. Sampling from heights over 6 feet is prohibited unless Langan field personnel are fully accredited in fall protection and is wearing approved fall protection safety apparatus. The discharge samples will be submitted to an ELAP-certified laboratory for analysis in accordance with the work plan.

3.1.6 Removal of Underground Storage Tank

If UST excavation and removal activity is initiated, Langan personnel will conduct air monitoring for lower explosion limit (LEL) conditions within the UST excavation itself. This task is to be performed using calibrated air monitoring equipment designed to sound an audio alarm when atmospheric concentrations of VOC are within 10% of the LEL. In normal atmospheric oxygen concentrations, the LEL monitoring may be done with a Wheatstone bridge/catalytic bead type sensor (i.e. MultiRAE). However in oxygen depleted atmospheres (confined space), only an LEL designed to work in low oxygen environments may be used. Best practices require that the LEL monitoring unit be equipped with a long sniffer tube to allow the LEL unit to remain outside the UST excavation. Langan personnel are not to enter the UST excavation nor enter an excavated UST.

In addition to monitoring LEL, Langan personnel will monitor atmospheric VOC concentrations directly downwind of the UST excavation in accordance with standard CAMP procedures using

calibrated air monitoring equipment.

3.1.7 Lead Delineation

Lead delineation sampling requires additional precautions to mitigate lead exposure. Langan will monitor indoor dust using air-dust monitoring equipment (DustTrak™ 2 or equivalent). The dust monitoring equipment should be equipped with an alarm. The primary alarm should be set for 5 milligrams per cubic meter (mg/m^3) above the 15 minute average background. The secondary alarm may be set for 24 mg/m^3.

If the primary alarm activates during work, the PM notified, and dust control measures should be implemented and all workers should don half face respirator with HEPA dust filters to continue to work. Dust control measures include applying a fine water spray wet all surfaces in the work area to dampen dust and activating ventilation. Workers can remove half respirators when air borne dust concentrations return to background. If dust mitigation does not lower dust concentrations and dust levels continue to climb, all work should cease when dust concentrations exceed 24 mg/m^3 and the PM should be notified.

3.1.8 Backfilling of Excavated Areas to Development Grade

The backfilling contractor will provide their employees with equivalent PPE to protect them from the specific hazards likely to be encountered on-site. Selection of the appropriate PPE must take into consideration: (1) identification of the hazards or suspected hazards; (2) potential exposure routes; and, (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards. Langan personnel may survey backfilling material with a calibrated PID; however, as they are not permitted to climb the material delivery truck, the contractor must provide samples from each truck as required.

3.1.9 Installation of Waterproofing and Vapor Barrier System

Specifically trained contractors are to install the waterproofing membrane and vapor barrier system. Langan personnel will inspect in accordance with specification in the work plan and record the data the work plan requires. Installation and assemblage of the waterproofing membrane and vapor barrier system are to be done exclusively by the contractor following their own health and safety specifications outlined in their CHASPs.

3.1.10 Installation of Composite or Concrete Cap System

The composite or concrete cap contractor will provide their employees with equivalent PPE to protect them from the specific hazards likely to be encountered on-site. Selection of the appropriate PPE must take into consideration: (1) identification of the hazards or suspected

hazards; (2) potential exposure routes; and, (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards. Langan personnel are not to assist in the physical installation of the composite cover system.

3.1.11 Construction Activity Inspection

The contractor will operate equipment used to install the composite cover. Langan personnel will inspect in accordance with specification in the work plan and record the data the work plan requires. The installation of the composite cover is to be done exclusively by the contractor following their own health and safety specifications outlined in their CHASPs. Other activities assigned to Langan as part of construction activities are limited to inspection and observations as specified in the work pan. Langan personnel are not to operate or assist in the operation of equipment used in construction activities unless defined as part of an inspection or observation in the work plan.

3.1.12 Long-Term Management of Engineering and Institutional Controls

Langan personnel will conduct inspections and observe repairs to the Engineering and Institutional Controls installed as the site at part of the remedy. Inspect work will be conducted in accordance with specification in the SMP. Repairs will be conducted in accordance with work plans drawn to address the repairs. Langan may record the data the work plan requires. All future repair work to the engineering controls will be done exclusively by the contractor following their own health and safety specifications outlined in their HASPs. Other activities assigned to Langan as part of work activities are limited to inspection and observations as specified in the SMP or future work pans. Langan personnel are not to operate or assist in the operation of equipment used in construction activities unless defined as part of an inspection or observation in the work plan.

3.1.13 Drum Sampling

Drilling fluid, rinse water, grossly-contaminated soils samples and cuttings may be containerized in 55-gallon drums for transport and disposal off site. Each drum must be labeled in accordance with the Langan Drum Labeling Standard Operating Procedure (SOP-#9). Langan may collect drum samples, as required, prior to off-site drum disposal. Samples will be placed into laboratory-supplied batch-certified clean glassware and submitted to a NYSDOH ELAP-certified laboratory.

Langan employees and contractors are not to move or open any orphaned (unlabeled) drum found on the site without approval of the project manager.

3.2 Radiation Hazards

No radiation hazards are known or expected at the site.

3.3 Physical Hazards

Physical hazards, which may be encountered during site operations for this project, are detailed in Table 1.

3.3.1 Explosion

No explosion hazards are expected for the scope of work at this site.

3.3.2 Heat Stress

The use of Level C protective equipment, or greater, may create heat stress. Monitoring of personnel wearing personal protective clothing should commence when the ambient temperature is 72^{O}F or above. Table 6 presents the suggested frequency for such monitoring. Monitoring frequency should increase as ambient temperature increases or as slow recovery rates are observed. Refer to the Table 7 to assist in assessing when the risk for heat related illness is likely. To use this table, the ambient temperature and relative humidity must be obtained (a regional weather report should suffice). Heat stress monitoring should be performed by the HSO or the FTL, who shall be able to recognize symptoms related to heat stress.

To monitor the workers, be familiar with the following heat-related disorders and their symptoms:

- **Heat Cramps:** Painful spasm of arm, leg or abdominal muscles, during or after work
- **Heat Exhaustion:** Headache, nausea, dizziness; cool, clammy, moist skin; heavy sweating; weak, fast pulse; shallow respiration, normal temperature
- **Heat Stroke**: Headache, nausea, weakness, hot dry skin, fever, rapid strong pulse, rapid deep respirations, loss of consciousness, convulsions, coma. *This is a life threatening condition***.**

Do not permit a worker to wear a semi-permeable or impermeable garment when they are showing signs or symptoms of heat-related illness.

To monitor the worker, measure:

- **Heart rate:** Count the radial pulse during a 30-second period as early as possible in the rest period. If the heart rate exceeds 100 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same. If

the heart rate still exceeds 100 beats per minute at the next rest period, shorten the following work cycle by one-third. A worker cannot return to work after a rest period until their heart rate is below 100 beats per minute.

- **Oral temperature:** Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking). If oral temperature exceeds 99.6^{O}F (37.6^{O}C), shorten the next work cycle by one-third without changing the rest period. A worker cannot return to work after a rest period until their oral temperature is below 99.6^{O}F. If oral temperature still exceeds 99.6^{O}F (37.6^{O}C) at the beginning of the next rest period, shorten the following cycle by one-third. Do <u>not</u> permit a worker to wear a semi-permeable or impermeable garment when oral temperature exceeds 100.6^{O}F (38.1^{O}C).

<u>Prevention</u> <u>of</u> <u>Heat</u> <u>Stress</u> - Proper training and preventative measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress the following steps should be taken:

- Adjust work schedules.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, id., eight fluid ounces (0.23 liters) of water must be ingested for approximately every eight ounces (0.23 kg) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:
    - Maintain water temperature 50^{O} to 60^{O}F (10^{O} to 16.6^{O}C).
    - Provide small disposal cups that hold about four ounces (0.1 liter).
    - Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.
    - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
    - Train workers to recognize the symptoms of heat related illness.

3.3.3 Cold-Related Illness

If work on this project begins in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally called frostbite.

- **Hypothermia -** Hypothermia is defined as a decrease in the patient core temperature below 96^{O}F. The body temperature is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interference with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered a "cold" ambient temperature. Symptoms of hypothermia include: shivering, apathy, listlessness, sleepiness, and unconsciousness.
- **Frostbite -** Frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 20^{O}F. Symptoms of frostbite are: a sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

Prevention of Cold-Related Illness - To prevent cold-related illness:

- Educate workers to recognize the symptoms of frostbite and hypothermia
- Identify and limit known risk factors:
- Assure the availability of enclosed, heated environment on or adjacent to the site.
- Assure the availability of dry changes of clothing.
- Assure the availability of warm drinks.
- Start (oral) temperature recording at the job site:
- At the FSO or Field Team Leader's discretion when suspicion is based on changes in a worker's performance or mental status.
- At a worker's request.
- As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind-chill less than 20^{O}F, or wind-chill less than 30^{O}F with precipitation).
- As a screening measure whenever anyone worker on the site develops hypothermia.

Any person developing moderate hypothermia (a core temperature of 92^{O}F) cannot return to work for 48 hours.

3.3.4 Noise

Work activities during the proposed activities may be conducted at locations with high noise levels from the operation of equipment. Hearing protection will be used as necessary.

3.3.5 Hand and Power Tools

The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. All hand and power tools should be inspected for health and safety hazards prior to use. If deemed unserviceable/un-operable, notify supervisor and tag equipment out of service. Ground Fault Circuit Interrupters (GFCIs) are required for all power tools requiring direct electrical service.

3.3.6 Slips, Trips and Fall Hazards

Care should be exercised when walking at the site, especially when carrying equipment. The presence of surface debris, uneven surfaces, pits, facility equipment, and soil piles contribute to tripping hazards and fall hazards. To the extent possible, all hazards should be identified and marked on the site, with hazards communicated to all workers in the area.

3.3.7 Utilities (Electrocution and Fire Hazards)

3.3.7.1 Utility Clearance

The possibility of encountering underground utilities poses fire, explosion, and electrocution hazards. All excavation work will be preceded by review of available utility drawings and by notification of the subsurface work to the N.Y. One –Call--Center.

3.3.7.2 Lockout-Tagout

The potential adverse effects of electrical hazards include burns and electrocution, which could result in death. Therefore, there is a procedure that establishes the requirements for the lockout/tagout (LOTO) of energy isolating devices in accordance with the OSHA electrical lockout and tagging requirements as specified in 29 CFR 1926.417. This procedure will be used to ensure that all machines and equipment are isolated from potentially hazardous energy. If possible, equipment that could cause injury due to unexpected energizing, start-up, or release of stored energy will be locked/tagged, before field personnel perform work activities.

Depending upon the specific work task involved, Langan's SSC or FTL will serve as the authorized lockout/tagout coordinator, implement the lockout/tagout procedure and will be responsible to locate, lock and tag valves, switches, etc.

SPECIAL NOTE: Project personnel will assume that all electrical equipment at surface, subsurface and overhead locations is energized, until equipment has been designated and confirmed as de-energized by a utility company representative. Langan will notify the designated utility representative prior to working adjacent to this equipment and will verify that the

equipment is energized or de-energized in the vicinity of the work location.

No project work shall be performed by Langan personnel or subcontractors on or near energized electrical lines or equipment unless hazard assessments are completed in writing, reviewed by Langan's SSHO, and clearly communicated to the field personnel.

The FTL shall conduct a survey to locate and identify all energy isolating devices. They shall be certain which switches, valves or other isolating devices apply to the equipment. The lockout/tagout procedure involves, but is not limited to, electricity, motors, steam, natural gas, compressed air, hydraulic systems, digesters, sewers, etc.

3.3.8 Physical Hazard Considerations for Material Handling

There are moderate to severe risks associated with moving heavy objects at the Site. The following physical hazards should be considered when handling materials at the Site:

- Heavy objects will be lifted and moved by mechanical devices rather than manual effort whenever possible.
- The mechanical devices will be appropriate for the lifting of moving task and will be operated only by trained and authorized personnel.
- Objects that require special handling or rigging will only be moved under the guidance of a person who has been specifically trained to move such objects.
- Lifting devices will be inspected, certified, and labeled to confirm their weight capacities. Defective equipment will be taken out of service immediately and repaired or destroyed.
- The wheels of any trucks being loaded or unloaded will be chocked to prevent movement. Outriggers will be fully extended on a flat, firm surface during operation.
- Personnel will not pass under a raised load, nor will a suspended load be left unattended.
- Personnel will not be carried on lifting equipment, unless it is specifically designed to carry passengers.
- All reciprocating, rotating, or other moving parts will be guarded at all times.
- Accessible fire extinguishers, currently (monthly) inspected, will be available in all mechanical lifting devices.
- Verify all loads/materials are secure before transportation.

Material handling tasks that are unusual or require specific guidance will need a written addendum to this CHASP. The addendum must identify the lifting protocols before the tasks are performed. Upon approval, the plan must be reviewed with all affected employees and documented. Any deviation from a written plan will require approval by the Langan HSM.

3.3.9 Hearing Conservation

Under the construction industry standard, the maximum permissible occupational noise exposure is 90 dbA (8-hour TWA), and noise levels in excess of 90 dbA must be reduced through feasible administrative and engineering controls. (20 CFR 1926.52). Hearing protection is required when working within 15 feet of vacuum extraction equipment and drill rigs.

3.3.9 Open Water

Employees working over or near water, where the danger of drowning exists, shall be provided with U.S. Coast Guard-approved life jackets or buoyant work vests. Prior to and after each use, the buoyant work vests or life preservers shall be inspected for defects which would alter their strength or buoyancy. Defective units shall not be used.

And should a worker fall into the water, OSHA requires (29 CFR 1926.106(c)) that ring buoys with at least 90 feet of line shall be provided and readily available for emergency rescue operations. The distance between ring buoys shall not exceed 200 feet. Another remedial action required by OSHA (29 CFR 1926.106(d)) is the use of lifesaving skiffs.

OSHA requires that at least one lifesaving skiff shall be immediately available at locations where employees are working over or adjacent to water and must include the following provisions.

- The skiff must be in the water or capable of being quickly launched by one person.
- At least one person must be present and specifically designated to respond to water emergencies and operate the skiff at all times when there are employees above water.
- When the operator is on break another operator must be designated to provide requisite coverage when there are employees above water.
- The designated operator must either have the skiff staffed at all times or have someone remain in the immediate area such that the operator can quickly reach the skiff and perform rescue services.
- The skiff operator maybe assigned other tasks provided the tasks do not interfere with the operator's ability to quickly reach the skiff.
- A communication system, such as a walkie-talkie, must be used to inform the skiff operator of an emergency and to inform the skiff operator where the skiff is needed.
- The skiff must be equipped with both a motor and oars.

With regard to the number of skiffs required and the appropriate maximum response time, the following factors must be evaluated:

- The number of work locations where there is a danger of falling into water;
- The distance to each of those locations;

- Water temperature and currents;
- Other hazards such as, but not limited to, rapids, dams, and water intakes;

Other regulations that present S&H practices and PPE for work on or near water include: 29 CFR 1910, Subpart T (401 – 440)

3.4 Biological Hazards

3.4.1 Animals

There is a possibility of encountering wildlife including reptiles, rodents and other small and medium size mammals. The Langan personnel is to avoid interacting with any wildlife.

3.4.2 Insects

Ticks and other biting or stinging insects may to be encountered during site operations. Langan personnel should take necessary precautions including donning long sleeve shirts and insecticide to prevent bites and stings. After field work, Langan personnel should perform a complete visual inspection of their clothing to insure they are not inadvertently harboring ticks. If they do observe a tick bite, they are to contact the HSM or HSO and report the event.

3.4.3 Plants

Poisonous plants may to be encountered during site operations. Langan personnel should take necessary precautions including donning long sleeve shirts and applying preventative poison Ivy/Sumac lotion to prevent or limit effects of exposure. If after field work, Langan employees do observe a reaction to poisonous plant exposure, they are to contact the HSM or HSO and report the event.

3.5 Additional Safety Analysis

3.5.1 Presence of Non-Aqueous Phase Liquids (NAPL)

There is potential for exposure to NAPL at this site. Special care and PPE should be considered when NAPL is observed as NAPL is a typically flammable fluid and releases VOCs known to be toxic and/or carcinogenic. If NAPL is present in a monitoring well, vapors from the well casing may contaminate the work area breathing zone with concentrations of VOCs potentially exceeding health and safety action levels. In addition, all equipment used to monitor or sample NAPL (or ground water from wells containing NAPL) must be intrinsically safe. Equipment that directly contacts NAPL must also be resistant to organic solvents.

At a minimum, a PID should be used to monitor for VOCs when NAPL is observed. If NAPL is expected to be observed in an excavation or enclosed area, air monitoring must be started using calibrated air monitoring equipment designed to sound an audio alarm when atmospheric concentrations of VOC are within 10% of the LEL. In normal atmospheric oxygen concentrations, the LEL monitoring may be done with a Wheatstone bridge/catalytic bead type sensor (i.e. MultiRAE). However in oxygen depleted atmospheres (confined space), only an LEL designed to work in low oxygen environments may be used. Best practices require that the LEL monitoring unit be equipped with a long sniffer tube to allow the LEL unit to remain outside the UST excavation.

When NAPL is present, Langan personnel are required to use disposable nitrile gloves at all times to prevent skin contact with contaminated materials. They should also consider having available a respirator and protective clothing (Tyvek® overalls), especially if NAPL is in abundance and there are high concentrations of VOCs.

All contaminated disposables including PPE and sampling equipment must be properly disposed of in labeled 55-gallong drums

3.6 Job Safety Analysis

A Job Safety Analysis (JSA) is a process to identify existing and potential hazards associated with each job or task so these hazards can be eliminated, controlled or minimized. A JSA will be performed at the beginning of each work day, and additionally whenever an employee begins a new task or moves to a new location. All JSAs must be developed and reviewed by all parties involved. A blank JSA form and documentation of completed JSAs are in Attachment G.

4.0 PERSONNEL TRAINING

4.1 Basic Training

Completion of an initial 40-hour HAZWOPER training program as detailed in OSHA's 29 CFR 1910.120(e) is required for all employees working on a site engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances, health hazards, or safety hazards as defined by 29 CFR 1910.120(a). Annual 8-hour refresher training is also required to maintain competencies to ensure a safe work environment. In addition to these training requirements, all employees must complete the OSHA 10 hour Construction Safety and Health training and supervisory personnel must also receive eight additional hours of specialized management training. Training records are maintained by the HSM.

4.2 Initial Site-Specific Training

Training will be provided to specifically address the activities, procedures, monitoring, and equipment for site operations at the beginning of each field mobilization and the beginning of each discrete phase of work. The training will include the site and facility layout, hazards, and emergency services at the site, and will detail all the provisions contained within this CHASP. For a HAZWOPER operation, training on the site must be for a minimum of 3 days. Specific issues that will be addressed include the hazards described in Section 3.0.

4.3 Tailgate Safety Briefings

Before starting work each day or as needed, the Langan HSO will conduct a brief tailgate safety meeting to assist site personnel in conducting their activities safely. Tailgate meetings will be documented in Attachment H. Briefings will include the following:

- Work plan for the day;
- Review of safety information relevant to planned tasks and environmental conditions;
- New activities/task being conducted;
- Results of Jobsite Safety Inspection Checklist;
- Changes in work practices;
- Safe work practices; and
- Discussion and remedies for noted or observed deficiencies.

5.0 MEDICAL SURVEILLANCE

All personnel who will be performing field work involving potential exposure to toxic and hazardous substances (defined by 29 CFR 1910.120(a)) will be required to have passed an initial baseline medical examination, with follow-up medical exams thereafter, consistent with 29 CFR 1910.120(f). Medical evaluations will be performed by, or under the direction of, a physician board-certified in occupational medicine.

Additionally, personnel who may be required to perform work while wearing a respirator must receive medical clearance as required under CFR 1910.134(e), *Respiratory Protection*. Medical evaluations will be performed by, or under the direction of, a physician board-certified in occupational medicine. Results of medical evaluations are maintained by the HSM.

5.1 Mercury Monitoring

Langan includes medical monitoring for mercury during the initial baseline and annual physical.

6.0 PERSONAL PROTECTIVE EQUIPMENT

6.1 Levels of Protection

Langan will provide PPE to Langan employees to protect them from the specific hazards they are likely to encounter on-site. Direct hired contractors will provide their employees with equivalent PPE to protect them from the specific hazards likely to be encountered on-site. Selection of the appropriate PPE must take into consideration: (1) identification of the hazards or suspected hazards; (2) potential exposure routes; and, (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards.

Based on anticipated site conditions and the proposed work activities to be performed at the site, Level D protection will be used. The upgrading/downgrading of the level of protection will be based on continuous air monitoring results as described in Section 6.0 (when applicable). The decision to modify standard PPE will be made by the site HSO or FTL after conferring with the PM. The levels of protection are described below.

Level D Protection (as needed)

- Safety glasses with side shields or chemical splash goggles
- Safety boots/shoes
- Coveralls (Tyvek® or equivalent)
- Hard hat
- Long sleeve work shirt and work pants
- Nitrile gloves
- Hearing protection
- Reflective safety vest

Level D Protection (Modified, as needed)

- Safety glasses with sideshields or chemical splash goggles
- Safety boots/shoes (toe-protected)
- Disposable chemical-resistant boot covers
- Coveralls (polycoated Tyvek or equivalent to be worn when contact with wet contaminated soil, groundwater, or non-aqueous phase liquids is anticipated)
- Hard hat
- Long sleeve work shirt and work pants
- Nitrile gloves
- Hearing protection (as needed)
- Personal floatation device (for work within 5 ft of the water)

- Reflective traffic vest

Level C Protection (as needed)

- Full or Half face, air-purifying respirator, with NIOSH approved HEPA filter
- Inner (latex) and outer (nitrile) chemical-resistant gloves
- Safety glasses with side shields or chemical splash goggles
- Chemical-resistant safety boots/shoes
- Hard hat
- Long sleeve work shirt and work pants
- Coveralls (Tyvek® or equivalent)
- Hearing protection (as needed)
- Reflective safety vest

The action levels used in determining the necessary levels of respiratory protection and upgrading to Level C are summarized in Table 4. The written Respiratory Protection Program is maintained by the HSM and is available if needed. The monitoring procedures and equipment are outlined in Section 6.0 (when applicable).

6.2 Respirator Fit-Test

All Langan employees who may be exposed to hazardous substances at the work site are in possession of a full or half face-piece, air-purifying respirator and have been successfully fit-tested within the past year. Fit-test records are maintained by the HSM.

6.3 Respirator Cartridge Change-Out Schedule

Respiratory protection is required to be worn when certain action levels (table 2) are reached. A respirator cartridge change-out schedule has been developed in order to comply with 29 CFR 1910.134. The respirator cartridge change-out schedule for this project is as follows:

- Cartridges shall be removed and disposed of at the end of each shift, when cartridges become wet or wearer experiences breakthrough, whichever occurs first.
- If the humidity exceeds 85%, then cartridges shall be removed and disposed of after 4 hours of use.

Respirators shall not be stored at the end of the shift with contaminated cartridges left on. Cartridges shall not be worn on the second day, no matter how short the time period was the previous day they were used.

7.0 AIR QUALITY MONITORING AND ACTIONS LEVELS

7.1 Monitoring During Site Operations

Atmospheric air monitoring results may be collected and used to provide data to determine when exclusion zones need to be established and when certain levels of personal protective equipment are required. For all instruments there are Site-specific action level criteria which are used in making field health and safety determinations. Other data, such as the visible presence of contamination or the steady state nature of air contaminant concentration, are also used in making field health and safety decisions. Therefore, the HSO may establish an exclusion zone or require a person to wear a respirator even though atmospheric air contaminant concentrations are below established CHASP action levels.

During site work involving disturbance of petroleum-impacted or fill material, real time air monitoring may be conducted for volatile organic compounds (VOCs). A photoionization detector (PID) and/or flame ionization detector (FID) will be used to monitor concentrations of VOCs at personnel breathing-zone height. Air monitoring will be the responsibility of the HSO or designee. Air monitoring may be conducted during intrusive activities associated with the completion of excavation, debris removal, and soil grading. All manufacturers' instructions for instrumentation and calibration will be available onsite.

Subcontractors' air monitoring plans must be equal or more stringent as the Langan plan.

An air monitoring calibration log is provided in Attachment D of this CHASP.

7.1.1 Volatile Organic Compounds

Monitoring with a PID, such as a MiniRAE 2000 (10.6v) or equivalent may occur during intrusive work in the AOCs. Colormetric Indicator Tubes for benzene may be used as backup for the PID, if measurements remain above background monitor every 2 hours. The HSO will monitor the employee breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (odors, visible gases, etc.) since the last measurement. If VOC levels are observed above 5 ppm for longer than 5 minutes or if the site PPE is upgraded to Level C, the HSO will begin monitoring the site perimeter at a location downwind of the AOC every 30 minutes in addition to the employee breathing zone. Instrument action levels for monitored gases are provided in Table 4.

7.1.2 Metals

Based upon the site historical fill, there is a potential for the soils to contain PAHs and metals. During invasive procedures which have the potential for creating airborne dust, such as excavation of dry soils, a real time airborne dust monitor such as a Mini-Ram may be used to monitor for air particulates. The HSO will monitor the employee breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (appearance of visible dust) since the last measurement. If dust levels are observed to be greater than 0.100 mg/m^3 or visible dust is observed for longer than 15 minutes or if the site PPE is upgraded to Level C, the HSO will begin monitoring the site perimeter at a location downwind of the AOC every 30 minutes in addition to the employee breathing zone. Instrument action levels for dust monitoring are provided in Table 4.

7.2 Monitoring Equipment Calibration and Maintenance

Instrument calibration shall be documented and included in a dedicated safety and health logbook or on separate calibration pages of the field book. All instruments shall be calibrated before and after each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

All instruments shall be operated in accordance with the manufacturers' specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on site by the HSO for reference.

7.3 Determination of Background Levels

Background (BKD) levels for VOCs and dust will be established prior to intrusive activities within the AOC at an upwind location. A notation of BKD levels will be referenced in the daily monitoring log. BKD levels are a function of prevailing conditions. BKD levels will be taken in an appropriate upwind location as determined by the HSO.

Table 4 lists the instrument action levels.

8.0 COMMUNITY AIR MONITORING PROGRAM

Community air monitoring may be conducted in compliance with the NYSDOH Generic CAMP outlined below:

Monitoring for dust and odors will be conducted during all ground intrusive activities by the FTL. Continuous monitoring on the perimeter of the work zones for odor, VOCs, and dust may be required for all ground intrusive activities such as soil excavation and handling activities. The

work zone is defined as the general area in which machinery is operating in support of remediation activities. A portable PID will be used to monitor the work zone and for periodic monitoring for VOCs during activities such as soil and groundwater sampling and .soil excavation. The site perimeter will be monitored for fugitive dust emissions by visual observations as well as instrumentation measurements (if required). When required, particulate or dust will be monitored continuously with real-time field instrumentation that will meet, at a minimum, the performance standards from DER-10 Appendix 1B.

If VOC monitoring is required, the following actions will be taken based on VOC levels measured:

- If total VOC levels exceed 5 ppm above background for the 15-minute average at the perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the hot zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps work activities will resume provided that the total organic vapor level 200 feet downwind of the hot 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 above background for the 15-minute average.
- If the total VOC level is above 25 ppm at the perimeter of the hot zone, activities will be shut down.

If dust monitoring with field instrumentation is required, the following actions will be taken based on instrumentation measurements:

- If the downwind particulate level is 100 micrograms per cubic meter (µg/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 must be employed. Work may continue with dust suppression techniques provided that downwind PM10 levels do not exceed 150 µg/m^3 above the background level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150 µg/m^3 above the background 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 PM10 concentration to within 150 µg/m^3 of the upwind level and in preventing visible dust migration.

8.1 Vapor Emission Response Plan

This section applies if VOC monitoring is required. If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the hot zone, boring and well installation, and excavation activities will be halted or odor controls will be employed, and monitoring continued. When work shut-down occurs, downwind air monitoring as directed by the HSO or FTL will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

If the organic vapor level decreases below 5 ppm above background, sampling and boring and well installation can resume, provided:

- The organic vapor level 200 feet downwind of the hot zone or half the distance to the nearest residential or commercial structure, whichever is less, is below 1 ppm over background, and
- More frequent intervals of monitoring, as directed by the HSO or FTL, are conducted.

8.2 Major Vapor Emission

This section applies if VOC monitoring is required. If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work site, or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted or odor controls must be implemented.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the hot zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If either of the following criteria is exceeded in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented.

- Sustained organic vapor levels approaching 5 ppm above background for a period of more than 30 minutes, or
- Organic vapor levels greater than 5 ppm above background for any time period.

8.3 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

- The local police authorities will immediately be contacted by the HSO or FTL and advised of the situation;
- Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the HSO or FTL; and
- All Emergency contacts will go into effect as appropriate.

8.4 Dust Suppression Techniques

Preventative measures for dust generation may include wetting site fill and soil, construction of an engineered construction entrance with gravel pad, a truck wash area, covering soils with tarps, and limiting vehicle speeds to five miles per hour.

Work practices to minimize odors and vapors include limiting the time that the excavations remain open, minimizing stockpiling of contaminated-source soil, and minimizing the handling of contaminated material. Offending odor and organic vapor controls may include the application of foam suppressants or tarps over the odor or VOC source areas. Foam suppressants may include biodegradable foams applied over the source material for short-term control of the odor and VOCs.

If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: direct load-out of soils to trucks for off-site disposal; use of chemical odorants in spray or misting systems; and, use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

9.0 WORK ZONES AND DECONTAMINATION

9.1 Site Control

Work zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas.

Any person working in an area where the potential for exposure to site contaminants exists will only be allowed access after providing the HSO with proper training and medical documentation.

Exclusion Zone (EZ) - All activities which may involve exposure to site contaminants, hazardous materials and/or conditions should be considered an EZ. Decontamination of field equipment will also be conducted in the Contaminant Reduction Zone (CRZ) which will be located on the perimeter of the EZ. The EZ and the CRZ will be clearly delineated by cones, tapes or other means. The HSO may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be determined by the HSO allowing adequate space for the activity to be completed, field members and emergency equipment.

9.2 Contamination Zone

9.2.1 Personnel Decontamination Station

Personal hygiene, coupled with diligent decontamination, will significantly reduce the potential for exposure.

9.2.2 Minimization of Contact with Contaminants

During completion of all site activities, personnel should attempt to minimize the chance of contact with contaminated materials. This involves a conscientious effort to keep "clean" during site activities. All personnel should minimize kneeling, splash generation, and other physical contact with contamination as PPE is intended to minimize accidental contact. This may ultimately minimize the degree of decontamination required and the generation of waste materials from site operations.

Field procedures will be developed to control over spray and runoff and to ensure that unprotected personnel working nearby are not affected.

9.2.3 Personnel Decontamination Sequence

Decontamination may be performed by removing all PPE used in EZ and placing it in drums/trash cans at the CRZ. Baby wipes should be available for wiping hands and face. Drums/trash cans will be labeled by the field crews in accordance with all local, state, and federal requirements. Management plans for contaminated PPE, and tools are provided below.

9.2.4 Emergency Decontamination

If circumstances dictate that contaminated clothing cannot be readily removed, then remove gross contamination and wrap injured personnel with clean garments/blankets to avoid contaminating other personnel or transporting equipment. If the injured person can be moved, he/she will be decontaminated by site personnel as described above before emergency responders handle the victim. If the person cannot be moved because of the extent of the injury

(a back or neck injury), provisions shall be made to ensure that emergency response personnel will be able to respond to the victim without being exposed to potentially hazardous atmospheric conditions. If the potential for inhalation hazards exist, such as with open excavation, this area will be covered with polyethylene sheeting to eliminate any potential inhalation hazards. All emergency personnel are to be immediately informed of the injured person's condition, potential contaminants, and provided with all pertinent data.

9.2.5 Hand-Held Equipment Decontamination

Hand-held equipment includes all monitoring instruments as stated earlier, samples, hand tools, and notebooks. The hand-held equipment is dropped at the first decontamination station to be decontaminated by one of the decontamination team members. These items must be decontaminated or discarded as waste prior to removal from the CRZ.

To aid in decontamination, monitoring instruments can be sealed in plastic bags or wrapped in polyethylene. This will also protect the instruments against contaminants. The instruments will be wiped clean using wipes or paper towels if contamination is visually evident. Sampling equipment, hand tools, etc. will be cleaned with non-phosphorous soap to remove any potentially contaminated soil, and rinsed with deionized water. All decontamination fluids will be containerized and stored on-site pending waste characterization sampling and appropriate off-site disposal.

9.2.6 Heavy Equipment Decontamination

All heavy equipment and vehicles arriving at the work site will be free from contamination from offsite sources. Any vehicles arriving to work that are suspected of being impacted will not be permitted on the work site. Potentially contaminated heavy equipment will not be permitted to leave the EZ unless it has been thoroughly decontaminated and visually inspected by the HSO or his designee.

9.3 Support Zone

The support zone or cold zone will include the remaining areas of the job site. Break areas and support facilities (include equipment storage and maintenance areas) will be located in this zone. No equipment or personnel will be permitted to enter the cold zone from the hot zone without passing through the decontamination station in the warm zone (if necessitated). Eating, smoking, and drinking will be allowed only in this area.

9.4 Communications

The following communications equipment will be utilized as appropriate.

- Telephones - A cellular telephone will be located with the HSO for communication with the HSM and emergency support services/facilities.
- Hand Signals - Hand signals shall be used by field teams, along with the buddy system. The entire field team shall know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

Hand Signal	Meaning
Hand gripping throat	Out of air; cannot breathe
Grip partners wrists or place both hands around waist	Leave immediately without debate
Hands on top of head	Need assistance
Thumbs up	OK; I'm alright; I understand
Thumbs down	No; negative
Simulated "stick" break with fists	Take a break; stop work

9.5 The Buddy System

When working in teams of two or more, workers will use the "buddy system" for all work activities to ensure that rapid assistance can be provided in the event of an emergency. This requires work groups to be organized such that workers can remain close together and maintain visual contact with one another. Workers using the "buddy system" have the following responsibilities:

- Provide his/her partner with assistance.
- Observe his/her partner for signs of chemical or heat exposure.
- Periodically check the integrity of his/her partner's PPE.
- Notify the HSO or other site personnel if emergency service is needed.

10.0 NEAREST MEDICAL ASSISTANCE

The address and telephone number of the nearest hospital:

North Westchester Hospital
400 East Main Street
Mount Kisco, New York
914-666-1200

Map with directions to the hospital are shown in Figure 2. This information will either be posted prominently at the site or will be available to all personnel all of the time. Further, all field

personnel, including the HSO & FTL, will know the directions to the hospital.

11.0 STANDING ORDERS/SAFE WORK PRACTICES

The standing orders, which consist of a description of safe work practices that must always be followed while on-site by Langan employees and contractors, are shown in Attachment A. The site HSO and FTL each have the responsibility for enforcing these practices. The standing orders will be posted prominently at the site, or are made available to all personnel at all times. Those who do not abide by these safe work practices will be removed from the site.

12.0 SITE SECURITY

No unauthorized personnel shall be permitted access to the work areas.

13.0 UNDERGROUND UTILITIES

As provided in Langan's Underground Utility Clearance Guidelines, the following safe work practices should be followed by Langan personnel and the contractor before and during subsurface work in accordance with federal, state and local regulations:

- Obtain available utility drawings from the property owner/client or operator.
- Provide utility drawings to the project team.
- In the field, mark the proposed area of subsurface disturbance (when possible).
- Ensure that the utility clearance system has been notified.
- Ensure that utilities are marked before beginning subsurface work.
- Discuss subsurface work locations with the owner/client and contractors.
- Obtain approval from the owner/client and operators for proposed subsurface work locations.
- Use safe digging procedures when applicable.
- Stay at least 10 feet from all equipment performing subsurface work.

14.0 SITE SAFETY INSPECTION

The Langan HSO or alternate will check the work area daily, at the beginning and end of each work shift or more frequently to ensure safe work conditions. The HSO or alternate must complete the Jobsite Safety Inspection Checklist, found in Attachment F. Any deficiencies shall be shared with the FTL, HSM and PM and will be discussed at the daily tailgate meeting.

15.0 HAND AND POWER TOOLS

All hand- and electric-power tools and similar equipment shall be maintained in a safe operating

condition. All electric-power tools must be inspected before initial use. Damaged tools shall be removed immediately from service or repaired. Tools shall be used only for the purpose for which they were designed. All users must be properly trained in their safe operation.

16.0 EMERGENCY RESPONSE

16.1 General

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures that are addressed in the following subsections include communications, local emergency support units, and preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures. In case of emergency, in addition to 911, call *Incident Intervention®* at 1-888-479-7787 to report their injuries. For all other communications, contact the Langan Incident Hotline at **(800) 9-LANGAN** (800-952-6426) extension 4699 as soon as possible.

Should outside assistance be needed for accidents, fire, or release of hazardous substances, the emergency numbers will be available and posted at the site (Table 5) where a readily accessible telephone is made available for emergency use.

Also, in the event of an incident where a team member becomes exposed or suffers from an acute symptom from contact with site materials and has to be taken to a hospital, a short medical data sheet (Attachment T) for that individual will be made available to the attending physician. The medical data sheet will include the following:

- Name, address, home phone
- Age, height, weight
- Name of person to be notified in case of an accident
- Allergies
- Particular sensitivities
- Does he/she wear contact lenses
- Short checklist of previous illness
- Name of personal physician and phone
- Name of company physician and phone
- Prescription and non-prescription medications currently used.

A sample medical data sheet is included in Attachment T.

16.2 Responsibilities

16.2.1 Health and Safety Officer (HSO)

The HSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The HSO is responsible for ensuring the HSM are notified of all incidents, all injuries, near misses, fires, spills, releases or equipment damage. The HSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can notify OSHA within the required time frame.

16.2.2 Emergency Coordinator

The HSO or their designated alternate will serve as the Emergency Coordinator. The Emergency Coordinator is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. They are also responsible for ensuring the HSM are notified of all incidents, all injuries, near misses, fires, spills, releases or equipment damage. The Emergency Coordinator is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized.

The Emergency Coordinator shall locate emergency phone numbers and identify hospital routes prior to beginning work on the sites. The Emergency Coordinator shall make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator is responsible for implementing the Emergency Response Plan.

16.2.3 Site Personnel

Project site personnel are responsible for knowing the Emergency Response Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency. Project site personnel, including all subcontractors will be trained in the Emergency Response Plan.

16.3 Communications

Once an emergency situation has been stabilized, or as soon as practically, the injured Langan personnel should contact *Incident Intervention®* at 1-888-479-7787 to report their injuries. For all other communications, contact the Langan Incident Hotline at **(800) 9-LANGAN** (800-952-6426) extension 4699 as soon as possible.

16.4 Local Emergency Support Units

In order to be able to deal with any emergency that might occur during investigative activities at the site, the Emergency Notification Numbers (Table 5) will be posted and provided to all personnel conducting work within the EZ.

Figure 2 shows the hospital route map. Outside emergency number 911 and local ambulance should be relied on for response to medical emergencies and transport to emergency rooms. Always contact first responders when there are serious or life threatening emergencies on the site. Project personnel are instructed not to drive injured personnel to the Hospital. In the event of an injury, provide first aid and keep the injured party calm and protected from the elements and treat for shock when necessary.

16.5 Pre-Emergency Planning

Langan will communicate directly with administrative personnel from the emergency room at the hospital in order to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and in each site vehicle.

16.6 Emergency Medical Treatment

The procedures and rules in this CHASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the HSO immediately. First-aid equipment will be available on site at the following locations:

- First Aid Kit: Contractor Vehicles
- Emergency Eye Wash: Contractor Vehicles

During the site safety briefing, project personnel will be informed of the location of the first aid station(s) that has been set up. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

16.7 Personnel with current first aid and CPR certification will be identified.

Only in non-emergency situations may an injured person be transported to an urgent care facility. Due to hazards that may be present at the site and the conditions under which operations are conducted, it is possible that an emergency situation may develop. Emergency situations can be characterized as injury or acute chemical exposure to personnel, fire or explosion, environmental release, or hazardous weather conditions.

16.8 Emergency Site Evacuation Routes and Procedures

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs as a result of the site investigation activities, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, the Langan Project Manager will be verbally notified immediately. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the nearest intersection to be accounted for and to receive further instructions.

In the event that an emergency situation arises, the FTL will implement an immediate evacuation of all project personnel due to immediate or impending danger. The FTL will also immediately communicate with the contractor to coordinate any needed evacuation of the property.

The FTL or Site Supervisor will give necessary instructions until the Designated Incident Commander (IC) assumes control. After the emergency has been resolved, the FTL or Site Supervisor will coordinate with the IC and indicate when staff should resume their normal duties. If dangers are present for those at the designated assembly point, another designated location of assembly will be established.

It will be the responsibility of the FTL or Site Supervisor to report a fire or emergency, assess the seriousness of the situation, and initiate emergency measures until the arrival of the local fire fighters or other first responders, should they be necessary. The FTL, working with emergency responders, may also order the closure of the Site for an indefinite period as long as it is deemed necessary.

Under no circumstances will incoming visitors be allowed to proceed to the area of concern, once an emergency evacuation has been implemented. Visitors or other persons present in the area of the emergency shall be instructed to evacuate the area. The FTL will ensure that access roads are not obstructed and will remain on-site to provide stand-by assistance upon arrival of emergency personnel.

If it is necessary to temporarily control traffic in the event of an emergency, those persons controlling traffic will wear proper reflection warning vests until the arrival of police or fire personnel.

16.8.1 Designated Assembly Locations

All personnel will evacuate the site and assemble at a designated assembly location. The assembly location will be designated by Langan personnel and discussed during each shift's pre-

job safety briefing.

16.8.2 Accounting for Personnel

All contractor and subcontractor supervisors are responsible for the accounting of all personnel assembled at the designed assembly area. The Designated Incident Commander shall be notified if personnel are not found.

16.9 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site and notification of the Langan Project Manager of the investigation activities. Portable fire extinguishers will be provided at the work zone. The extinguishers located in the various locations should also be identified prior to the start of work. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

16.9.1 Fire Prevention

Fires will be prevented by adhering to the following precautions:

- Good housekeeping and storage of materials.
- Storage of flammable liquids and gases away from oxidizers.
- Shutting off engines to refuel.
- Grounding and bonding metal containers during transfer of flammable liquids.
- Use of UL approved flammable storage cans.
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities.

The person responsible for the control of fuel source hazards and the maintenance of fire prevention and/or control equipment is the HSO.

16.10 Significant Vapor Release

Based on the proposed tasks, the potential for a significant vapor release is low. However, if a release occurs, the following steps will be taken:

- Move all personnel to an upwind location. All non-essential personnel shall evacuate.
- Upgrade to Level C Respiratory Protection.
- Downwind perimeter locations shall be monitored for volatile organics.
- If the release poses a potential threat to human health or the environment in the community, the Emergency Coordinator shall notify the Langan Project Manager.
- Local emergency response coordinators will be notified.

16.11 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet (MSDS) will be followed, when necessary.

SKIN AND EYE: Use copious amounts of soap and water from eye-wash kits and portable hand wash stations.

CONTACT: Wash/rinse affected areas thoroughly, then provide appropriate medical attention. Skin shall also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs. Affected items of clothing shall also be removed from contact with skin.

Providing wash water and soap will be the responsibility of each individual contractor or subcontractor on-site.

16.12 Decontamination during Medical Emergencies

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or omitted. The HSO or designee will accompany contaminated victims to the medical facility to advice on matters involving decontamination when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

16.13 Adverse Weather Conditions

In the event of adverse weather conditions, the HSO will determine if work will continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds).
- Limited visibility (fog).
- Potential for electrical storms.

- Earthquakes.
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The HSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

16.14 Spill Control and Response

All small spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining proper waste characterization and the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. All spill containment materials will be properly disposed. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill.

All contractor vehicles shall have spill kits on them with enough material to contain and absorb the worst-case spill from that vehicle. All vehicles and equipment shall be inspected prior to be admitted on site. Any vehicle or piece of equipment that develops a leak will be taken out of service and removed from the job site.

The following seven steps shall be taken by the Emergency Coordinator:

1. Determine the nature, identity and amounts of major spills.
2. Make sure all unnecessary persons are removed from the spill area.
3. Notify the HSO immediately.
4. Use proper PPE in consultation with the HSO.
5. If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosion-proof equipment to contain or clean up the spill (diesel-only vehicles, air-operated pumps, etc.)
6. If possible, try to stop the leak with appropriate material.
7. Remove all surrounding materials that can react or compound with the spill.

In addition to the spill control and response procedures described in this CHASP, Langan personnel will coordinate with the designated project manager relative to spill response and control actions. Notification to the Project Manager must be immediate and, to the extent possible, include the following information:

- Time and location of the spill.
- Type and nature of the material spilled.
- Amount spilled.
- Whether the spill has affected or has a potential to affect a waterway or sewer.
- A brief description of affected areas/equipment.
- Whether the spill has been contained.
- Expected time of cleanup completion. If spill cleanup cannot be handled by Langan's on-site personnel alone, such fact must be conveyed to the Project Manager immediately.

Langan shall not make any notification of spills to outside agencies. The client will notify regulatory agencies as per their reporting procedures.

16.15 Emergency Equipment

The following minimum emergency equipment shall be kept and maintained on site:

- Industrial first aid kit.
- Fire extinguishers (one per site).

16.16 Restoration and Salvage

After an emergency, prompt restoration of utilities, fire protection equipment, medical supplies and other equipment will reduce the possibility of further losses. Some of the items that may need to be addressed are:

- Refilling fire extinguishers.
- Refilling medical supplies.
- Recharging eyewashes and/or showers.
- Replenishing spill control supplies.

16.17 Documentation

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan Incident/Injury Hotline at 1-(800)-9-LANGAN (ext. #4699) and the client representative to report the incident or near miss. For emergencies involving personnel injury and/or exposure, the HSO and affected employee will complete and submit an Employee Exposure/Injury Incident Report (Attachment C) to the Langan Corporate Health and Safety Manager as soon as possible following the incident.

17.0 SPECIAL CONDITIONS

This guideline contains information and requirements for special conditions that may not be routinely encountered.

17.1 Scope

The guideline applies to the specific projects identified within this document. Additional provisions will be addressed in each Site-Specific Construction Health and Safety Plan (CHASP), as needed.

17.2 Responsibilities

Site Personnel - All site personnel must be alert to safety hazards on work sites and take action to minimize such hazards. Personnel must utilize the buddy system, watch for inappropriate behavior, and be alert to changes in site conditions.

Health and Safety Officer (HSO) - The HSO is responsible for considering these procedures in the development of site specific CHASPs. The HSO shall schedule frequent "tail gate" safety briefings to enhance safety awareness and discuss potential problems.

17.3 Procedures

The procedures outlined below shall be followed when such conditions are encountered.

17.3.1 Ladders

Langan safety procedures shall be used to ensure employee safety when using ladders in the office or work sites. All ladders shall be coated or repaired to prevent injury to the employee from punctures or lacerations and to prevent snagging or clothing. Any wood ladders used must have an opaque covering except for identification or warning labels, which may be placed on one face only of a side rail.

17.3.1.1 Ladder Use

Employees shall only use ladders for the purposes, which they were designed and shall not be used as scaffolding. Ladders will be maintained and inspected prior to use for slip hazards including oil and grease. Employees shall use ladders only on stable and level surfaces unless the ladder is secured to prevent possible displacement. Ladders should not be used on slippery surfaces unless secured or provided with slip resistant feet to prevent accidental displacement. Ladders should not be used in locations where they could be displaced by workplace activities or traffic. Ladder rungs, cleats and steps shall be parallel, level and uniformly spaced when the ladder is in the use position.

Employees should not be carrying anything including equipment that could cause injury if there was a fall while utilizing the ladder. The top and bottom of the ladder area must remain clear while in use. When ascending and descending the ladder, employees must face the ladder.

Ladders shall not be loaded beyond the maximum intended load for which they were built or the manufacturer's rated capacity.

17.3.1.2 Portable Ladders

Rungs, cleats and steps for portable ladders and fixed ladders shall be spaced not less than 10 inches apart, nor more than 14 inches apart, as measured between center lines of the rungs, cleats and steps. When used to access an upper landing surface, the ladder side rails must extend at least three feet above the upper landing surface to which the ladder is used to gain access. If this is not possible, due to the ladders length, then the top of the ladder shall be secured at its top to a rigid support.

17.3.1.3 Step Stools

Rungs, cleats and steps of step stools shall not be less than 8 inches apart, nor more than 12 inches apart, as measured between center lines of the rungs, cleats and steps.

17.3.1.4 Extension Ladders

Rungs, cleats and steps of the base section of extension trestle ladders shall be spaced not less than 8 inches apart, nor more than 18 inches apart, as measured between center lines of the rungs, cleats and steps. The rung spacing on the extension section of the extension trestle ladder shall not be less than 6 inches nor more than 12 inches, as measured between center lines of the rungs, cleats and steps. 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).

17.3.1.5 Inspection

Ladders will be inspected for visible detects periodically, prior to utilization or after any occurrence that could have negatively affected the ladder. Portable ladders with defects including broken or missing rungs, cleats, or steps, broken or split rails, corroded components or other faulty or defective components shall not be used. The ladder will be immediately marked as defective, tagged as "Do Not Use" or blocked from being used and removed from service until repaired.

17.3.2 First Aid/Cardiopulmonary Resuscitation (CPR)

Langan field and office personnel will be encouraged to be trained in First Aid and Cardiopulmonary Resuscitation (CPR). Training will be provided free of charge by Langan to all employees. Employees will receive a training certificate that will be kept on file with the Health & Safety Coordinator (HSC). Training and certification will be provided by a credited provider such

as American Red Cross or equivalent.

17.3.2.1 Emergency Procedures

Prior to work at sites the Langan employees certified in first aid and CPR will be identified in the site specific CHASP. Langan will endear to have at least one employee at a job site trained and able to render first aid and CPR. The site specific CHASP will contain first aid information on both potential chemical and physical hazards. Emergency procedures to be followed are in case of injury or illnesses are provided in the CHASP. The CHASP will include emergency contact information including local police and fire departments, hospital emergency rooms, ambulance services, on-site medical personnel and physicians. The CHASP will also include directions and contact information to the nearest emergency facility in case immediate medical attention is required. The emergency contact information will be conspicuously posted at the worksite. Employees that are injured and require immediate medical attention shall call either 911 or the local posted emergency contacts. Employees should use ambulatory services to transport injured workers to the nearest facility for emergency medical care. In areas where 911 is not available, the telephone numbers of the physicians, hospitals, or ambulances shall be conspicuously posted.

17.3.2.2 First Aid Supplies

First aid supplies are readily available to all Langan employees when required. First aid kits are located in each Langan office. Portable first aid kits are available for employees to use at work sites. First aid kits should consist of items needed to treat employees for potential chemical and physical injuries. At a minimum, first aid kits should contain items to allow basic first aid to be rendered. Where the eyes or body of an employee may be exposed to corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use including eye wash.

First aid kits will be weatherproof with individual sealed packages of each item. All portable first aid kits shall be inspected by Langan employees before and after use to ensure all used items are replaced. When out in the field, employees shall check first aid kits weekly to ensure used items are replaced.

17.3.3 Hydrogen Sulfide

Langan employees with the potential to be exposed to hydrogen sulfide while at work sites shall have training in hydrogen sulfide awareness. The training will include identification of areas where employees could be exposed to hydrogen sulfide, health effects, permissible exposure limits, first aid procedures and personnel protective equipment. Langan employees could be

exposed to hydrogen sulfide while at job sites including petroleum refineries, hazardous waste treatment, storage and disposal facilities, uncontrolled hazardous waste sites and remediation projects.

17.3.3.1 Characteristics

Hydrogen sulfide is a colorless gas with a strong odor of rotten eggs that is soluble in water. Hydrogen sulfide is used to test and make other chemicals. It is also found as a by-product of chemical reactions, such as in sewer treatment. It is a highly flammable gas and a dangerous fire hazard. Poisonous gases are produced in fires including sulfur oxides. Hydrogen sulfide is not listed as a carcinogen.

17.3.3.2 Health Effects

Hydrogen Sulfide can affect employees if inhaled or through contact with skin or eyes. Acute (or short term) health effects of hydrogen sulfide exposure include irritation of the nose and throat, dizziness, confusion, headache and trouble sleeping. Inhalation of hydrogen sulfide can irritate the lungs causing coughing and/or shortness of breath. Higher levels of exposure can cause build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.

Chronic (or long term) health effects of low levels of exposure to hydrogen sulfide can cause pain and redness of the eyes with blurred vision. Repeated exposure may cause bronchitis with cough, phlegm and shortness of breath.

17.3.3.3 Protective Clothing and Equipment

Respirators are required for those operations in which employees will be exposed to hydrogen sulfide above OSHA permissible exposure level. The maximum OSHA permissible exposure limit (PEL) for hydrogen sulfide is 20 parts of hydrogen sulfide vapor per million parts of air (20 ppm) for an 8-hour workday and the maximum short-term exposure limit (STEL) is 10 ppm for any 10-minute period.

Where employees are exposed to levels up to 100 parts of hydrogen sulfide vapor per million parts of air (100 ppm), the following types of respiratory protection are allowed:

- Any powered, air purifying respirator with cartridge(s);
- Any air purifying, full-facepiece respirator (gas mask) with a chin style, front- or back-mounted canister;
- Any supplied air system with escape self-contained breathing apparatus, if applicable;

and,

- Any self-contained breathing apparatus with a full facepiece.

Respirators used by employees must have joint Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (NIOSH) seal of approval. Cartridges or canisters must be replaced before the end of their service life, or the end of the shift, whichever occurs first. Langan employees that have the potential to be exposed to hydrogen sulfide will be trained in the proper use of respirators. Respirator training is discussed under– Langan's Respiratory Protection Program.

Employees with potential exposure to hydrogen sulfide, or when required by the client, will wear a portable hydrogen sulfide gas detector. The detector should have an audible, visual and vibrating alarm. The detector may also provide detection for carbon monoxide, sulfur dioxide and oxygen deficient atmospheres. The hydrogen sulfide monitor will, at a minimum, be calibrated to detect hydrogen sulfide at a level of 20 parts of hydrogen sulfide vapor per million parts of air (20 ppm). Many portable gas detectors will have factory defaults with a low level alarm at 10 ppm and a high level alarm at 15 ppm. Langan employees shall consult clients to determine if any site specific threshold levels exist.

If the hydrogen sulfide gas detector sounds and employees are not wearing appropriate respiratory protection, employees must immediately vacate the area and meet at the assigned emergency location. Langan employees may not re- enter the site without proper respiratory protection and approval from the client or property owner, if needed.

Employees shall wear PPE to prevent eye and skin contact with hydrogen sulfide. Employees must wear appropriate protective clothing including boots, gloves, sleeves and aprons, over any parts of their body that could be exposed to hydrogen sulfide. Non-vented, impact resistant goggles should be worn when working with or exposed to hydrogen sulfide.

17.3.3.4 Emergency and First Aid Procedures

Eye and Face Exposure

If hydrogen sulfide comes in contact with eyes, it should be washed out immediately with large amounts of water for 30 minutes, occasionally lifting the lower and upper eye lids. Seek medical attention immediately.

Skin Exposure

If hydrogen sulfide contaminates clothing or skin, remove the contaminated clothing immediately

and wash the exposed skin with large amounts of water and soap. Seek medical attention immediately. Contaminated clothing should either be disposed of or washed before wearing again.

Breathing

If a Langan employee or other personnel breathe in hydrogen sulfide, immediately get the exposed person to fresh air. If breathing has stopped, artificial respiration should be started. Call for medical assistance or a doctor as soon as possible.

Safety Precautions

Hydrogen sulfide is a highly flammable gas and a dangerous fire hazard. Containers of hydrogen sulfide may explode in a fire situation. Poisonous gases are produced during fires.

Langan employees should contact property owners and operators prior to conducting work onsite to be aware of any site specific contingency plans, identify where hydrogen sulfide is used at the facility and be informed about additional safety rules or procedures.

19.3.4 Fire Protection/Extinguishers

Langan field personnel that have been provided with portable fire extinguishers for use at worksites will be trained to familiarize employees with general principles of fire extinguisher use and hazards associated with the incipient stage of firefighting. Training will be provided prior to initial assignment for field work and annually thereafter.

Portable fire extinguishers shall be visually inspected monthly and subjected to an annual maintenance check. Langan shall retain records of the annual maintenance date.

17.3.5 Overhead lines

When field work is performed near overhead lines, the lines shall be deenergized and grounded, or other protective measures shall be provided before the work shall commence. If overhead lines are to be deenergized, arrangements shall be made with the client, property owner or organization that operates or controls the electric circuits involved to deenergize and ground them. If protective measures, such as guarding, isolating, or insulating, are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

When unqualified Langan personnel are working in an elevated position near overhead lines, the location shall be such that the person and the longest conductive object they may contact cannot

come closer to any unguarded, energized overhead line than the following distances:

1. For voltages to ground 50kV or below - 10 feet; and
2. For voltages to ground over 50kV - 10 feet, plus 4 inches for every 10kV over 50kV.

As previously indicated, Langan does not retain qualified employees to perform work on energized equipment.

17.3.5.1 Vehicle and Equipment Clearance

Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 feet is maintained. If the voltage of the overhead lines is higher than 50kV, the clearance shall be increased 4 inches for every 10kV over that voltage.

If any of the following discussed conditions occur, the clearance may be reduced.

- If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. If the voltage is higher than 50kV, the clearance shall be increased 4 in. for every 10 kV over that voltage.
- If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments, unless the employee is using protective equipment rated for the voltage; or the equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the overhead line than permitted.

If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

17.3.6 Trade Secret

Langan employees could potentially be provided trade secret information by the client or property owner when site specific information is provided about highly hazardous chemicals. Trade secret means any confidential formula, pattern, process, device, information or compilation of information that is used in an employer's business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it. Langan employees understand that this information should be kept confident and if required, may enter into a confidentially agreement with the client.

17.3.7 Bloodborne Pathogens

Langan employees that can reasonably anticipate exposure to blood or other potentially infectious material while at work sites shall have training in bloodborne pathogens. Applicable employees would include those trained in first aid and serving a designated role as an emergency medical care provider. Bloodborne pathogens are pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus and human immunodeficiency virus.

17.3.7.1 Training

Langan employees with potential occupational exposure to blood or other potentially infectious material must participate in a training program. Training must be conducted prior to initial assignment where there would be potential for exposure and annually thereafter within one year of previous training. The training program will be provided to Langan employees at no cost to them and during working hours.

Langan will ensure the training program shall consist of the following:

- An accessible copy of the regulatory text of 29 CFR 1910.1030 and an explanation of its contents;
- A general explanation of the epidemiology and symptoms of bloodborne diseases;
- An explanation of the modes of transmission of bloodborne pathogens;
- An explanation of Langan's exposure control plan and the means by which the employee can obtain a copy of the written plan;
- An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials;
- An explanation of the use and limitations of personal protective
    - equipment (PPE) to prevent and reduce exposure;
    - Information on the types, proper use, location, removal, handling and disposal of PPE;

- An explanation of the basis for selection of PPE;
- Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge;
- Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials;
- An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available;
- Information on the post-exposure evaluation and follow-up that the
- employer is required to provide for the employee following an exposure incident;
- An explanation of the signs and labels and/or color coding required by paragraph 29 CFR 1910.1030(g)(1); and
- An opportunity for interactive questions and answers with the person conducting the training session.

Langan will develop and implement a written Exposure Control Plan, which will be designed to eliminate or minimize employee exposure to bloodborne pathogens. The Exposure Control Plan will contain the following elements:

- An exposure determination for employees;
- The schedule and method of implementation for Methods of Compliance (29 CFR 191.1030(d)), Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up (29 CFR 1910.1030(f)), Communication of Hazards to Employees (29 CFR 1910.1030(g)) and (h) Recordkeeping (29 CFR 1910.1030(h));
- The procedure for the evaluation of circumstances surrounding exposure incidents;
- Ensure a copy of the Exposure Control Plan will be accessible to employees; and,
- The Exposure Control Plan shall be reviewed and updated at least annually.

Langan employees with occupational exposure to bloodborne pathogens include any employees trained in first aid that would be expected to provide emergency medical care. This determination is made without regards to the use of PPE, which could eliminate or minimize exposure.

Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for bloodborne pathogens. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials.

Work practice controls shall be used to eliminate or minimize employee exposure, if applicable. Since Langan employees will have occupational exposure only during rendering of first aid,

personnel protective equipment will be utilized to reduce or minimize exposure. PPE that could be available to Langan personnel when administering first aid includes safety glasses, gloves, and Tyvek suits or sleeves. PPE and first aid kits will be provided to employees at no cost to them.

Langan employees that render first aid in office areas will have access to hand washing facilities or restrooms. For first aid rendered at field locations, first aid kits will contain an appropriate antiseptic hand cleanser and clean cloth/paper towels or antiseptic towelettes. After using antiseptic hand cleansers or towelettes, employees shall wash their hands with soap and running water as soon as feasible.

After administering first aid, potentially infectious materials, including towels, personnel protective equipment, clothes and bandages, shall be placed in a container, which prevents leakage during collection, handling, processing, storage, transport, or shipping. All PPE will be dispose of after use. Any equipment or working surfaces which was been exposed to blood or potentially infectious materials due to an injury, will be decontaminated prior to reuse.

Langan will make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident. These services will be available to the employee at no cost to them through a medical provider.

17.3.7.2 Recordkeeping

Langan will maintain training and medical records for each employee with occupational exposure to blood or potentially infectious materials. Medical and training records will be maintained by Langan's H&S Department.

Training records will include the following:

- Dates of the training sessions;
- Contents or a summary of the training sessions;
- Names and qualifications of persons conducting the training; and
- Names and job titles of all persons attending the training sessions.

Training records shall be maintained for 3 years from the date on which the training occurred. Medical records will be will be preserved and maintained for the duration of employment plus 30 years.

All records will be made available upon request to employees, the Assistant Secretary of Labor

for Occupational Safety and Health, and Director of National Institute for Occupational Safety and Health Director of OSHA for examination and copying. Medical records must have written consent from employee before releasing.

If Langan ceases to do business, all records shall be transferred to the successor employer. The successor employer shall receive and maintain these records.

If there will not be a successor, Langan will notify current employees of their rights to access records at least three months prior to the cessation of business.

18.0 RECORDKEEPING

The following is a summary of required health and safety logs, reports and recordkeeping.

18.1 Field Change Authorization Request

Any changes to the work to be performed that is not included in the CHASP will require an addendum that is approved by the Langan project manager and Langan HSM to be prepared. Approved changes will be reviewed with all field personnel at a safety briefing.

18.2 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training, documentation of three-day OJT, and respirator fit-test records) and medical clearance for site work and respirator use will be maintained in the office and available upon request. Records for all subcontractor employees must also be available upon request. All employee medical records will be maintained by the HSM.

18.3 Onsite Log

A log of personnel on site each day will be kept by the HSO or designee.

18.4 Daily Safety Meetings ("Tailgate Talks")

Completed safety briefing forms will be maintained by the HSO.

18.5 Exposure Records

All personal monitoring results, laboratory reports, calculations and air sampling data sheets are part of an employee exposure record. These records will be maintained by the HSO during site work. At the end of the project they will be maintained according to 29 CFR 1910.1020.

18.6 Hazard Communication Program/MSDS-SDS

Material safety data sheets (MSDS) of Safety Data Sheets (SDS) have been obtained for applicable substances and are included in this CHASP (Attachment D). Langan's written hazard communication program, in compliance with 29 CFR 1910.1200, is maintained by the HSM.

18.7 Documentation

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan incident/injury hotline at 1-800-952-6426, extension 4699 and the Project Manager to report the incident or near miss. The Project Manager will contact the client or client representative. A written report must be completed and submitted HSM within 24 hours of the incident. For emergencies involving personnel injury and/or exposure, employee will complete and submit the Langan incident/injury report to the Langan corporate health and safety manager as soon as possible following the incident. Accidents will be investigated in-depth to identify all causes and to recommend hazard control measures.

18.7.1 Accident and Injury Report Forms

18.7.1.1 Accident/Incident Report

All injuries, no matter how slight, shall be reported to the FTL and the PM immediately. The accident/incident report forms, attached in Attachment U and Attachment V will be filled out on all accidents by the applicable contractor supervision personnel, the FTL, or the HSO. Copies of all accident/incident reports shall be kept on-site and available for review. Project personnel will be instructed on the location of the first aid station, hospital, and doctor and ambulance service near the job. The emergency telephone numbers will be conspicuously posted in site vehicles near the work zone. First aid supplies will be centrally located and conspicuously posted between restricted and non-restricted areas to be readily accessible to all on the site.

18.7.1.2 First Aid Treatment Record

The forms in will be used for recording all non-lost time injuries treated by the project first-aid attendant, the local physician or hospital will be entered in detail on this record. "Minor" treatment of scratches, cuts, etc. will receive the same recording attention as treatment of more severe injuries.

18.7.1.3 OSHA Form 300

An OSHA Form 300 will be kept at the Langan Corporate Office in Parsippany, New Jersey. All

recordable injuries or illnesses will be recorded on this form. Subcontractor employers must also meet the requirements of maintaining an OSHA 300 form. The Incident Report form used to capture the details of work-related injuries/illnesses meets the requirements of the OSHA Form 301 (supplemental record) and must be maintained with the OSHA Form 300 for all recordable injuries or illnesses. Forms for recording OSHA work-related injuries and illnesses are included in Attachment U and Attachment V.

19.0 CONFINED SPACE ENTRY

Confined spaces are not anticipated at the Site during planned construction activities. If confined spaces are identified, the contractor must implement their own confined space program that all applicable federal, state and local regulations. Confined spaces **will not** be entered by Langan personnel.

20.0 CHASP ACKNOWLEDGEMENT FORM

All Langan personnel and contractors will sign this CHASP Compliance Agreement indicating that they have become familiar with this CHASP and that they understand it and agree to abide by it.

Printed Name	Signature	Company	Date

Printed Name	Signature	Company	Date

Printed Name	Signature	Company	Date

Printed Name	Signature	Company	Date

Printed Name	Signature	Company	Date

Printed Name	Signature	Company	Date

TABLES

TABLE 1
TASK HAZARD ANALYSES

Task	Hazard	Description	Control Measures	First Aid
1.3.1 – 1.3.17	Contaminated Soil or Groundwater-Dermal Contact	Contaminated water spills on skin, splashes in eyes; contact with contaminated soil/fill during construction activities or sampling.	Wear proper PPE; follow safe practices, maintain safe distance from construction activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.17	Lacerations, abrasions, punctures	Cutting bailer twine, pump tubing, acetate liners, etc. with knife; cuts from sharp site objects or previously cut piles, tanks, etc.; Using tools in tight spaces	Wear proper PPE; follow safe practices	Clean wound, apply pressure and/or bandages; seek medical attention as required.
1.3.1 – 1.3.17	Contaminated Media Inhalation	Opening drums, tanks, wells; vapors for non-aqueous phase liquids or other contaminated site media; dust inhalation during excavation; vapor accumulation in excavation	Follow air monitoring plan; have quick access to respirator, do not move or open unlabeled drums found at the site, maintain safe distance from construction activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.17	Lifting	Improper lifting/carrying of equipment and materials causing strains	Follow safe lifting techniques; Langan employees are not to carry contractor equipment or materials	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.17	Slips, trips, and falls	Slips, trips and falls due to uneven surfaces, cords, steep slopes, debris and equipment in work areas	Good housekeeping at site; constant awareness and focus on the task; avoid climbing on stockpiles; maintain safe distance from construction activities and excavations; avoid elevated areas over six feet unless fully accredited in fall protection and wearing an approved fall protection safety apparatus	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.17	Noise	Excavation equipment, hand tools, drilling equipment.	Wear hearing protection; maintain safe distance from construction activities	Seek medical attention as required
1.3.1 – 1.3.17	Falling objects	Soil material, tools, etc. dropping from drill rigs, front-end loaders, etc.	Hard hats to be worn at all times while in work zones; maintain safe distance from construction activities and excavations	Seek medical attention as required
1.3.1 – 1.3.17	Underground/ overhead utilities	Excavation equipment, drill rig auger makes contact with underground object; boom touches overhead utility	"One Call" before dig; follow safe practices; confirm utility locations with contractor; wear proper PPE; maintain safe distance from construction activities and excavations	Seek medical attention as required
1.3.1 – 1.3.17	Insects (bees, wasps, hornet, mosquitoes, and spider)	Sings, bites	Insect Repellent; wear proper protective clothing (work boots, socks and light colored pants);field personnel who may have insect allergies (e.g., bee sting) should provide this information to the HSO or FSO prior to commencing work, and will have allergy medication on site.	Seek medical attention as required
1.3.1 – 1.3.17	Vehicle traffic / Heavy Equipment Operation	Vehicles unable to see workers on site, operation of heavy equipment in tight spaces, equipment failure, malfunctioning alarms	Wear proper PPE, especially visibility vest; use a buddy system to look for traffic; rope off area of work with cones and caution tape or devices at points of hazard, maintain safe distance from construction activities and equipment	Seek medical attention as required

TABLE 2
CONTAMINANT HAZARDS OF CONCERN

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	1,1,2-Trichloroethane 1,1,2-TCA Ethane trichloride β-Trichloroethane Vinyl trichloride	79-00-5	PID	10 ppm 100 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, nose; central nervous system depression; liver, kidney damage; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention
1.3.1 – 1.3.17	1,1-Dichloroethane Asymmetrical dichloroethane Ethylidene chloride 1,1-Ethylidene dichloride 1,1-DCA	75-34-3	PID	100 ppm 3000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the skin; central nervous system depression; liver, kidney, lung damage	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	1,2,4-Trimethylbenzene	95-63-6	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	1,2-Dichloroethane Ethylene dichloride 1,2-DCA DCE[1] Ethane dichloride Dutch liquid, Dutch oil Freon 150 Glycol dichloride	107-06-2	PID	1 ppm 50 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin absorption, skin and/or eye contact	irritation to the eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	1,3,5-Trimethylbenzene Mesitylene sym-Trimethylbenzene	108-67-8	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	1,3-Butadiene Biethylene Bivinyl Butadiene Divinyl Erythrene Vinylethylene	106-99-0	PID	1 ppm 2000 ppm	Vapor	inhalation, skin and/or eye contact (liquid)	irritation to the eyes, nose, throat; drowsiness, dizziness; liquid: frostbite; teratogenic, reproductive effects; [potential occupational carcinogen]	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.17	1,4-Dioxane 1,4-Dioxacyclohexane [1,4]Dioxane p-Dioxane [6]-crown-2 Diethylene dioxide Diethylene ether Dioxan Dioxane 1,4-Dioxane	123-91-1	PID	100 ppm 500 ppm	Groundwater Soil Vapor	Inhalation, ingestion, skin and/or eye contact	Irritant to eyes, skin, mucous membranes and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	2-Butanone Ethyl methyl ketone MEK Methyl acetone Methyl ethyl ketone	78-93-3	PID	200 ppm 3000 ppm	Soil Groundwater Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose; headache; dizziness; vomiting; dermatitis	Eye: Irrigate immediately Skin: Water wash immediately Breathing: Fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.17	2-Hexanone Butyl methyl ketone MBK Methyl butyl ketone Methyl n-butyl ketone	591-78-6	PID	100 ppm 1600 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose; peripheral neuropathy: lassitude (weakness, exhaustion), paresthesia; dermatitis; headache, drowsiness	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	2-Methylnaphthalene β-methylnaphthalene	91-57-6	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion or skin absorption, eye contact	irritation to the skin, eyes, mucous membranes and upper respiratory tract. It may also cause headaches, nausea, vomiting, diarrhea, anemia, jaundice, euphoria, dermatitis, visual disturbances, convulsions and comatose	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	4,4′-DDD Dichlorodiphenyldichloroethane 1,1'-(2,2-Dichloroethylidene)bis (4-chlorobenzene)	72-54-8	None	NA NA	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	4-Methyl-2-pentanone Hexone Isobutyl methyl ketone Methyl isobutyl ketone MIBK	108-10-1	PID	100 ppm 500 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Acenaphthene 1,2-Dihydroacenaphthylene 1,8-Ethylenenaphthalene peri-Ethylenenaphthalene Naphthyleneethylene Tricyclododecapentaene	83-32-9	PID	NA NA	Soil	inhalation, ingestion, skin and/or eye contact,	irritation to the skin, eyes, mucous membranes and upper respiratory tract; If ingested, it can cause vomiting	Eye: Irrigate immediately Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Acenaphthylene Cycopental(de)naphthalene, Acenaphthalene	208-96-8	PID	NA NA	Soil	inhalation, ingestion, skin and/or eye contact	irritation to the skin, eyes, mucous membranes and upper respiratory tract	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately
1.3.1 – 1.3.17	Acetone Dimethyl ketone Ketone propane 2-Propanone	67-64-1	PID	1000 ppm 2500 ppm	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Aluminum	7429-90-5	None	0.5 mg/m3 50 mg/m3	Soil	inhalation, skin and/or eye contact	irritation to the eyes, skin, respiratory system	Eye: Irrigate immediately Breathing: Fresh air

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Anthracene	120-12-7	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to the skin, eyes, mucous membranes and upper respiratory tract, abdominal pain if ingested.	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, Breathing: Move to fresh air, refer to medical attention; Swallow: refer to medical attention
1.3.1 – 1.3.17	Arsenic	NA	None	0.5 mg/m^3 NA	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation skin, possible dermatitis; resp distress; diarrhea; muscle tremor, convulsions; possible gastrointestinal tract	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Barium	10022-31-8	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Benzene Benzol Phenyl hydride	71-43-2	PID	3.19 mg/m^3 1,595 mg/mg^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; lassitude (weakness, exhaustion) [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Benzo(a)anthracene Benzanthracene Benzanthrene 1,2-Benzanthracene Benzo[b]phenanthrene Tetraphene	56-55-3	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Benzo(a)pyrene	50-32-8	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately, seek medical attention Skin: Soap wash immediately; Breathing: move to fresh air; Swallow: Induce vomiting if conscious, seek medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Benzo(b)fluoranthene	205-99-2	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.17	Benzo(g,h,i)perylene Benzo(ghi)perylene	191-24-2	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	NA	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.17	Benzo(k)fluoranthene	207-08-9	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.17	Benzoic acid Carboxybenzene E210 Dracylic acid Phenylmethanoic acid Benzenecarboxylic acid	65-85-0	None	NA NA	Groundwater Soil Vapor	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Benzyl butyl phthalate Butyl benzyl phthalate Butylbenzylphthalate	86-66-7	None	NA NA	Groundwater Soil Vapor	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.17	Beryllium	7440-41-7	None	0.002 mg/m^3 4 mg/m^3	Soil	inhalation, skin and/or eye contact	berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation to the eyes; dermatitis; [potential occupational carcinogen]	Eye: Irrigate immediately Breathing: Fresh air
1.3.1 – 1.3.17	Beta BHC Beta Hexachlorocyclohexane 1-alpha,2-beta,3-alpha,4-beta,5-alpha,6-beta-Hexachlorocyclohexane beta-1,2,3,4,5,6-Hexachlorocyclohexane Beta-BHC	319-85-7	None	NA NA	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid	
1.3.1 – 1.3.17	Beta-Endosulfan Beta Endosulfan Endosulfan II (beta) Endosulfan II	33213-65-9	None	None	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation skin; nausea, confusion, agitation, flushing, dry mouth, tremor, convulsions, headache; in animals: kidney, liver injury; decreased testis weight	Eye: imme Skin: imme Breat Resp supp Swal atten imme
1.3.1 – 1.3.17	Bis(2-ethylhexyl)phthalate Bis(2-Ethylhexyl) Phthalate Di-sec octyl phthalate DEHP Di(2-ethylhexyl)phthalate Octyl phthalate bis(2-ethylexyl)phthalate Bis(2-Ethylhexyl) Phthalate	117-81-7	None	5 mg/m^3 5000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately	
1.3.1 – 1.3.17	Bromochloromethane Halon 1011 Methyl Chlorobromide Chlorobromoethane Fluorocarbon	74-97-5		200 ppm 2000 ppm	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation eyes, skin, throat; confusion, dizziness, central nervous system depression; pulmonary edema	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Bromodichloromethane dichlorobromomethane	75-27-4	None	NA NA	Groundwater Soil Vapor	inhalation, skin or eye contact, ingestion	irritation of the skin, eyes, mucous membranes and respiratory tract, narcosis, nausea, dizziness and headache	Eye: Irrigate immediately (liquid) Skin: Water flush immediately (liquid) Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Cadmium	7440-43-9	None	0.005 mg/m^3 9 mg/m^3	Soil	inhalation, ingestion	pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Calcium	7440-70-2	None	NA	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, upper resp tract; ulcer, perforation nasal septum; pneumonitis; dermatitis	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Carbazole 9-azafluorene Dibenzopyrrole Diphenylenimine diphenyleneimide	86-74-8	None	NA NA	Soil	inhalation, skin absorption (liquid), skin and/or eye contact	irritation to eyes and skin, respiratory irritation	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.17	Carbon disulfide	75-15-0	PID	20 ppm 500 ppm	Soil Groundwater Vapor	inhalation, skin or eye contact, ingestion	irritation to the eyes, skin, respiratory system	Eye: Irrigate immediately (liquid) Skin: Water flush immediately (liquid) Breathing: Respiratory support
1.3.1 – 1.3.17	Chloroform Methane trichloride Trichloromethane Chloro-3-methyl phenol	67-66-3	None	50 ppm 500 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Chromium Total Chromium Chromium, Total	7440-47-3	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Chrysene Benzo[a]phenanthrene 1,2-Benzphenanthrene	218-01-9	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eye, skin, and respiratory, gastrointestinal irritation nausea, vomit, diarrhea [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	cis-1,2-Dichloroethene	156-59-2	PID	200 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, respiratory system; central nervous system depression	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Cis-Chlordane Cic-Chlordane a-Chlordane alpha Chlordane alpha-chlordane cis-Chlordan CIS-CHLORDANE Chlordane cis-;Chlordane cis;ALPHA-CHLORDAN Chlordan, cis-ALPHA-CHLORDANE alpha(cis)-chlordane α-chlordane solution	5102-71-9	None	0.5 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Cobalt	7440-48-4	None	0.1mg/m^3 20 mg/m^3	Soil	inhalation, ingestion, skin and/or eye contact	Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; resp hypersensitivity, asthma	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Copper	7440-50-8	None	1.0 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, nose, metallic taste; dermatitis; anemia	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Cyanide	57-12-5	None	5 mg/m^3 25 mg/m^3	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	Exposure to cyanide can cause weakness, headaches, confusion, dizziness, fatigue, anxiety, sleepiness, nausea and vomiting. Breathing can speed up then become slow and gasping. Coma and convulsions also occur. If large amounts of cyanide have been absorbed by the body, the person usually collapses and death can occur very quickly. Long-term exposure to lower levels of cyanide can cause skin and nose irritation, itching, rashes and thyroid changes.	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Cyclohexane Benzene hexahydride Hexahydrobenzene Hexamethylene Hexanaphthene	110-82-7	PID	300 ppm 1300 ppm	Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, respiratory system; drowsiness; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	DDE 4,4-DDE 4,4'-DDE 1,1-bis-(4-chlorophenyl)-2,2-dichloroethene Dichlorodiphenyldichloroethylene	72-55-9	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	Oral ingestion of food is the primary source of exposure for the general population. Acute and chronic ingestion may cause nausea, vomiting, diarrhea, stomach pain, headache, dizziness, disorientation, tingling sensation, kidney damage, liver damage, convulsions, coma, and death. 4,4' DDE may cross the placenta and can be excreted in breast milk	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	DDT 4,4-DDT 4,4'-DDT p,p'-DDT Dichlorodiphenyltrichloroethane 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane	50-29-3	None	1 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Delta BHC Delta-BHC Delta-hexachlorocyclohexane Delta Hexachlorocyclohexane	319-86-8	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; headache; nausea; clonic convulsions; resp difficulty; cyanosis; aplastic anemia; muscle spasm; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Dibenz(a,h)anthracene Dibenzo(a,h)anthracene	53-70-3	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support PID Swallow: Medical attention immediately
1.3.1 – 1.3.17	Dibenzofuran	132-64-9	None	NA NA	Soil	inhalation, absorption	irritation to eyes, and skin	Eyes: Irrigate immediately Skin: Soap wash promptly.
1.3.1 – 1.3.17	Dichlorodifluoromethane Difluorodichloromethane, Fluorocarbon 12 Freon 12 Freon® 12 Genetron® 12 Halon® 122 Propellant 12 Refrigerant 12 Dichlorodifluromethane	75-71-8	None	1000 pp, 15,000 ppm	Groundwater Soil Vapor	inhalation, skin and/or eye contact (liquid)	dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Diesel Fuel automotive diesel fuel oil No. 2 distillate diesoline diesel oil diesel oil light diesel oil No. 1-D summer diesel	68334-30-5	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Endosulfan I Alpha Endosulfan	959-98-8	None	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation skin; nausea, confusion, agitation, flushing, dry mouth, tremor, convulsions, headache; in animals: kidney, liver injury; decreased testis weight	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Ethyl benzene Ethylbenzene Ethylbenzol Phenylethane	100-40-4	PID	435 mg/m^3 3,472 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Fluoranthene Benzo(j, k)fluorene	206-44-0	PID	0.2 mg/m³ 80 mg/m³ (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.17	Fluorene	86-73-7	PID	0.2 mg/m³ 80 mg/m³ (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attenti
1.3.1 – 1.3.17	Fuel Oil No. 2	68476-30-2	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Gasoline	8006-61-9	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Helium	7440-59-7	Helium Detector	NA NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.17	Heptachlor	76-44-8	None	0.5 mg/m^3 35 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	In animals: tremor, convulsions; liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Heptane n-Heptane	142-82-5	PID	500 ppm 750 ppm	Goundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	dizziness, stupor, incoordination; loss of appetite, nausea; dermatitis; chemical pneumonitis (aspiration liquid); unconsciousness	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Indeno(1,2,3-cd)pyrene Indeno(1,2,3-c,d)Pyrene Indeno(1,2,3-cd)Pyrene	193-39-5	None	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately, wash mouth with water
1.3.1 – 1.3.17	Iron	7439-89-6	None	10 mg/m^3 NA	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; abdominal pain, diarrhea, vomiting	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Isopropyl alcohol Iso-Propyl Alcohol Carbinol IPA Isopropanol 2-Propanol sec-Propyl alcohol Rubbing alcohol Isopropylalcohol	67-63-0	PID	400 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, nose, throat; drowsiness, dizziness, headache; dry cracking skin; in animals: narcosis	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Lead	7439-92-1	None	0.050 mg/m³ 100 mg/m³	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation to the eyes; hypertension	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Lindane Gamma BHC HCH ã-Hexachlorocyclohexane gamma isomer of 1,2,3,4,5,6-Hexachlorocyclohexane gamma-Hexachlorocyclohexane	58-89-9	None	0.5 mg/m³ 50 mg/m³	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; headache; nausea; clonic convulsions; resp difficulty; cyanosis; aplastic anemia; muscle spasm; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Magnesium	7439-95-4	None	15 mg/m³ NA	Soil	inhalation, skin and/or eye contact	irritation to the eyes, skin, respiratory system; cough	Eye: Irrigate immediately Breathing: Fresh air
1.3.1 – 1.3.17	Manganese	7439-96-5	None	5 mg/m³ 500 mg/m³	Groundwater Soil	inhalation, ingestion	aerosol is irritating to the respiratory tract	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Mercury	7439-97-6	None	0.1 mg/m^3 10 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Methyl Acetate	79-20-9	PID	200 ppm 3100 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; headache, drowsiness; optic nerve atrophy; chest tightness; in animals: narcosis	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Methyl chloroform Chlorothene 1,1,1-Trichloroethane 1,1,1-Trichloroethane-(stabilized) 1,1,1-TCA	71-55-6	PID	350 ppm 700 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Methyl *tert*-butyl ether MTBE Methyl tertiary-butyl ether Methyl t-butyl ether tert-Butyl methyl ether tBME tert-BuOMe Methyl tert butyl ether	1634-04-4	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Methylcyclohexane Methyl cyclohexane Hexahydrotoluene Cyclohexylmethane Toluene hexahydride	108-87-2	PID	500 ppm 1200 ppm	Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, drowsiness; in animals: narcosis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Methylene Chloride Dichloromethane Methylene dichloride	75-09-2	PID	25 ppm 2300 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numb, tingle limbs; nausea; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	m-Xylenes 1,3-Dimethylbenzene m-Xylol Metaxylene	108-38-3	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Naphthalene Naphthalin Tar camphor White tar	91-20-3	PID	50 mg/m^3 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; hematuria (blood in the urine); dermatitis, optical neuritis	Eye: Irrigate immediately Skin: Molten flush immediately/solid-liquid soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	n-Hexane Hexane, Hexyl hydride, normal-Hexane	110-54-3	PID	500 ppm 1100 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, nose; nausea, headache; peripheral neuropathy: numb extremities, muscle weak; dermatitis; dizziness; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Nickel	7440-02-0	None	NA 10 mg/m^3	Groundwater Soil	ion, ingestion, skin and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	N-Nitrosodi-n-propylamine N-nitroso-di-n-propylamine	621-64-7	None	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, respiratory system	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Methane Hydrogen Sulfide Carbon Monoxide Nitrogen	 7782-44-7 74-82-8 7783-08-4 830-08-0 7727-37-9	Multi-Gas PID	 NA/NA NA/NA 10/100 ppm 50/1200 ppm NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.17	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Isobutylene Nitrogen	 7782-44-7 115-11-7 7727-37-9	PID	 NA/NA NA/NA NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.17	n-Propylbenzene Isocumene Propylbenzene 1-Phenylpropane 1-Propylbenzene Phenylpropane	103-65-1	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin; dry nose, throat; headache; low blood pressure, tachycardia, abnormal cardiovascular system stress; central nervous system, hematopoietic depression; metallic taste; liver, kidney injury	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	o-Xylenes 1,2-Dimethylbenzene ortho-Xylene o-Xylol	95-47-6	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Perfluorobutanesulfonic acid FC-98 Nonaflate Nonafluorobutanesulphonic acid Perfluorobutanesulfonic Acid Perfluorobutane sulfonate PFBS	375-73-5	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Perfluorobutanoic Acid Heptafluorobutyric acid Heptafluorobutanoic acid Perfluorobutyric acid PFBA	375-22-4	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Perfluoroheptanoic acid Perfluoroheptanoic acid Tridecafluoroheptanoic acid PFHpA	375-85-9	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Perfluorohexanesulfonic Acid perfluorohexanesulfonate perfluorohexanesulfonic acid PFHxS	355-46-4	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Perfluorohexanoic Acid PFHxA	307-24-4	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Perfluorooctanesulfonic Acid PFOS	1763-23-1	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Perfluorooctanoic Acid PFOA pentadecafluorooctanoic acid perfluorooctanoate perfluorocaprylic acid	335-67-1	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Perfluoropentanoic Acid PFPeA	2706-90-3	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	p-Ethyltoluene 4-Ethyltoluene 1-ethyl-4-methyl-benzene 1-methyl-4-ethylbenzene	622-96-8	NA	NA NA	Soil	ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Phenanthrene	85-01-8	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Potassium	7440-09-7	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin and/or eye contact inhalation, ingestion, skin and/or eye contact	eye: Causes eye burns. Skin: Causes skin burns. Reacts with moisture in the skin to form potassium hydroxide and hydrogen with much heat. ingestion: Causes gastrointestinal tract burns. inhalation: May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Causes chemical burns to the respiratory tract. inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema.	Eyes: Get medical aid immediately Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Ingestion: If victim is conscious and alert, give 2-4 full cups of milk or water. Get medical aid immediately. inhalation: Get medical aid immediately.
1.3.1 – 1.3.17	Propylene Propene Methyl ethylene	115-07-1	PID	NA NA	Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose, throat, skin burns asphyxiation	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Propylene dichloride Dichloro-1,2-propane 1,2-Dichloropropane	78-87-5	PEL	75 ppm 400 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, respiratory system; drowsiness, dizziness; liver, kidney damage; in animals: central nervous system depression; [potential occupational carcinogen]	irritation to the eyes, skin, respiratory system; drowsiness, dizziness; liver, kidney damage; in animals: central nervous system depression; [potential occupational carcinogen]
1.3.1 – 1.3.17	p-Xylenes 1,4-Dimethylbenzene para-Xylene p-Xylol	106-42-3	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Pyrene benzo[def]phenanthrene	129-00-0	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Selenium	7782-49-2	None	1 mg/m^3 0.2 mg/m^3	Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Sodium	7440-23-5	None	NA NA	Groundwater Soil	ion, ingestion, skin and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Styrene Ethenyl benzene Phenylethylene Styrene monomer Styrol Vinyl benzene	100-42-5	PID	100 ppm 700 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose, respiratory system; headache, lassitude (weakness, exhaustion), dizziness, confusion, malaise (vague feeling of discomfort), drowsiness, unsteady gait; narcosis; defatting dermatitis; possible liver injury; reproductive effects	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Tetrachloroethylene Perchlorethylene Perchloroethylene PCE Perk Tetrachlorethylene Tetrachloroethene	127-18-4	PID	100 ppm 150 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Tetrahydrofuran Diethylene oxide 1,4-Epoxybutane Tetramethylene oxide THF	109-99-9	PID	200 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, skin and/or eye contact, ingestion	irritation to the eyes, upper respiratory system; nausea, dizziness, headache, central nervous system depression	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immedi
1.3.1 – 1.3.17	Thallium	7440-28-0	None	0.1 mg/m^3 15 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Toluene Methyl benzene Methyl benzol Phenyl methane Toluol	108-88-3	PID	200 ppm 500 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, paresthesia; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Total Xylenes Dimethylbenzene Xylol	1330-20-7	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Trans-1,2-Dichloroethene trans-1,2-Dichloroethylene tDEC trans-Acetylene dichloride	156-60-5	PID	200 ppm 4000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	Irritant to eyes, skin, mucous membranes and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Trichloroethylene Ethylene trichloride TCE Trichloroethene Trilene	79-01-6	PID	100 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Trichlorofluoromethane Fluorotrichloromethane Freon® 11 Monofluorotrichloromethane Refrigerant 11 Trichloromonofluoromethane	75-69-4	PID	1000 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	incoordination, tremor; dermatitis; cardiac arrhythmias, cardiac arrest; asphyxia; liquid: frostbite	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Trivalent Chromium Chromium III Chromium, Trivalent	NA	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Vanadium	7440-62-2	None	0.1 mg/m3 15 mg/m3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.17	Vinyl Chloride Chloroethene Chloroethylen Ethylene monochloride Monochloroethene Monochloroethylene VC Vinyl chloride monomer (VCM)	75-01-4	PID	1 ppm NA	Groundwater Soil Vapor	inhalation, skin and/or eye contact (liquid)	lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.17	Vinylidene chloride 1,1-DCE 1,1-Dichloroethene 1,1-Dichloroethylene VDC Vinylidene chloride monomer Vinylidene dichloride	75-35-4	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.17	Zinc	7440-62-2	None	15 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation	chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function	Breathing: Respiratory support`

EXPLANATION OF ABBREVIATIONS

PID = Photoionization Detector
PEL = Permissible Exposure Limit (8-hour Time Weighted Average)
IDLH = Immediately Dangerous to Life and Health
ppm = part per million
mg/m^3 = milligrams per cubic meter
500 mg/m^3

TABLE 3
Summary of Monitoring Equipment

Instrument	Operation Parameters
Photoionization Detector (PID)	**Hazard Monitored:** Many organic and some inorganic gases and vapors. **Application:** Detects total concentration of many organic and some inorganic gases and vapors. Some identification of compounds is possible if more than one probe is measured. **Detection Method:** Ionizes molecules using UV radiation; produces a current that is proportional to the number of ions. **General Care/Maintenance:** Recharge or replace battery. Regularly clean lamp window. Regularly clean and maintain the instrument and accessories. **Typical Operating Time:** 10 hours. 5 hours with strip chart recorder.
Oxygen Meter	**Hazard Monitored:** Oxygen (O_2). **Application:** Measures the percentage of O_2 in the air. **Detection Method:** Uses an electrochemical sensor to measure the partial pressure of O_2 in the air, and converts the reading to O_2 concentration. **General Care/Maintenance:** Replace detector cell according to manufacturer's recommendations. Recharge or replace batteries prior to explanation of the specified interval. If the ambient air is less than 0.5% C O_2, replace the detector cell frequently. **Typical Operating Time:** 8 – 12 hours.
Additional equipment (if needed, based on site conditions)	
Combustible Gas Indicator (CGI)	**Hazard Monitored:** Combustible gases and vapors. **Application:** Measures the concentration of combustible gas or vapor. **Detection Method:** A filament, usually made of platinum, is heated by burning the combustible gas or vapor. The increase in heat is measured. Gases and vapors are ionized in a flame. A current is produced in proportion to the number of carbon atoms present. **General Care/Maintenance:** Recharge or replace battery. Calibrate immediately before use. **Typical Operating Time:** Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.
Flame Ionization Detector (FID) with Gas Chromatography Option *(i.e., Foxboro Organic Vapor Analyzer (OVA))*	**Hazard Monitored:** Many organic gases and vapors (approved areas only). **Application:** In survey mode, detects the concentration of many organic gases and vapors. In gas chromatography (GC) mode, identifies and measures specific compounds. In survey mode, all the organic compounds are ionized and detected at the same time. In GC mode, volatile species are separated. **General Care/Maintenance:** Recharge or replace battery. Monitor fuel and/or combustion air supply gauges. Perform routine maintenance as described in the manual. Check for leaks. **Typical Operating Time:** 8 hours; 3 hours with strip chart recorder.
Potable Infrared (IR) Spectrophotometer	**Hazard Monitored:** Many gases and vapors. **Application:** Measures concentration of many gases and vapors in air. Designed to quantify one or two component mixtures. **Detection Method:** Passes different frequencies of IR through the sample. The frequencies absorbed are specific for each compound. **General Care/Maintenance:** As specified by the manufacturer.

Instrument	Operation Parameters
Direct Reading Colorimetric Indicator Tube	**Hazard Monitored:** Specific gas and vapors. **Application:** Measures concentration of specific gases and vapors. **Detection Method:** The compound reacts with the indicator chemical in the tube, producing a stain whose length or color change is proportional to the compound's concentration. **General Care/Maintenance:** Do not use a previously opened tube even if the indicator chemical is not stained. Check pump for leaks before and after use. Refrigerate before use to maintain a shelf life of about 2 years. Check expiration dates of tubes. Calibrate pump volume at least quarterly. Avoid rough handling which may cause channeling.
Aerosol Monitor	**Hazard Monitored:** Airborne particulate (dust, mist, fume) concentrations **Application:** Measures total concentration of semi-volatile organic compounds, PCBs, and metals. **Detection Method:** Based on light-scattering properties of particulate matter. Using an internal pump, air sample is drawn into the sensing volume where near infrared light scattering is used to detect particles. **General Care/Maintenance:** As specified by the mfr. Also, the instrument must be calibrated with particulates of a size and refractive index similar to those to be measured in the ambient air.
Monitox	**Hazard Monitored:** Gases and vapors. **Application:** Measures specific gases and vapors. **Detection Method:** Electrochemical sensor relatively specific for the chemical species in question. **General Care/Maintenance:** Moisten sponge before use; check the function switch; change the battery when needed.
Gamma Radiation Survey Instrument	**Hazard Monitored:** Gamma Radiation. **Application:** Environmental radiation monitor. **Detection Method:** Scintillation detector. **General Care/Maintenance:** Must be calibrated annually at a specialized facility. **Typical Operating Time:** Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.

TABLE 4
INSTRUMENTATION ACTION LEVELS

Photoionization Detector Action Levels	**Action Required**
Background to 5 ppm	No respirator; no further action required
> 1 ppm but < 5 ppm for > 5 minutes	1. Temporarily discontinue all activities and evaluate potential causes of the excessive readings. If these levels persist and cannot be mitigated (i.e., by slowing drilling or excavation activities), contact HSO to review conditions and determine source and appropriate response action. 2. If PID readings remain above 1 ppm, temporarily discontinue work and upgrade to Level C protection. 3. If sustained PID readings fall below 1 ppm, downgrading to Level D protection may be permitted.
> 5 ppm but < 150 ppm for > 5 minutes	1. Discontinue all work; all workers shall move to an area upwind of the jobsite. 2. Evaluate potential causes of the excessive readings and allow work area to vent until VOC concentrations fall below 5 ppm. 3. Level C protection will continue to be used until PID readings fall below 1 ppm.
> 150 ppm	Evacuate the work area

Notes:
1. 1 ppm level based on OSHA Permissible Exposure Limit (PEL) for benzene.
2. 5 ppm level based on OSHA Short Term Exposure Limit (STEL) maximum exposure for benzene for any 15 minute period.
3. 150 ppm level based on NIOSH Immediately Dangerous to Life and Health (IDLH) for tetrachloroethylene.

TABLE 5
EMERGENCY NOTIFICATION LIST

ORGANIZATION	CONTACT	TELEPHONE
Local Police Department	NYPD	911
Local Fire Department	NYFD	911
Ambulance/Rescue Squad	NYFD	911
Hospital	Northern Westchester Hospital	911 or 914-666-1200
Langan Incident Hotline		800-952-6426 ex 4699
Medical Treatment Hotline	Incident Intervention	888-449-7787
Langan Environmental Project Manager	Greg Wyka	347-267-2679
Langan Health and Safety Manager (HSM)	Tony Moffa	215-756-2523 (cell)
Langan Health & Safety Officer (HSO)	William Bohrer	410-984-3068 (cell)
Langan Field Team Leader (FTL)	To Be Determined	
Client's Representative	Axay Patel	954-769-3074
National Response Center (NRC)		800-424-8802
Chemical Transportation Emergency Center (Chemtrec)		800-424-9300
Center for Disease Control (CDC)		404-639-3534
EPA (RCRA Superfund Hotline)		800-424-9346
TSCA Hotline		202-554-1404
Poison Control Center		800-222-1222

Immediately following an injury, unless immediate emergency medical treatment is required, the injured employee must contact Incident Intervention® at 888-449-7787.

For all other incidents or near misses, unless emergency response is required, either the employee or a coworker must contact the Langan Incident Hotline at 1-(800)-9-LANGAN (ext. #4699).

TABLE 6
SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORING FOR FIT AND ACCLIMATED WORKERS[A]

Adjusted Temperature[b]	Normal Work Ensemble[c]	Impermeable Ensemble
90°F or above (32.2°C) or above	After each 45 min. of work	After each 15 min. of work
87.5°F (30.8°-32.2°C)	After each 60 min. of work	After each 30 min. of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 min. of work	After each 60 min. of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 min. of work	After each 90 min. of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 min. of work	After each 120 min. of work

a For work levels of 250 kilocalories/hour.

b Calculate the adjusted air temperature (ta adj) by using this equation: ta adj ^{o}F = ta ^{o}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.

TABLE 7

HEAT INDEX

	ENVIRONMENTAL TEMPERATURE (Fahrenheit)										
	70	**75**	**80**	**85**	**90**	**95**	**100**	**105**	**110**	**115**	**120**
RELATIVE HUMIDITY	**APPARENT TEMPERATURE***										
0%	64	69	73	78	83	87	91	95	99	103	107
10%	65	70	75	80	85	90	95	100	105	111	116
20%	66	72	77	82	87	93	99	105	112	120	**130**
30%	67	73	78	84	90	96	104	113	123	**135**	**148**
40%	68	74	79	86	93	101	110	123	**137**	**151**	
50%	69	75	81	88	96	107	120	**135**	**150**		
60%	70	76	82	90	100	114	**132**	**149**			
70%	70	77	85	93	106	124	**144**				
80%	71	78	86	97	113	**136**					
90%	71	79	88	102	122						
100%	72	80	91	108							

*Combined Index of Heat and Humidity...what it "feels like" to the body
Source: National Oceanic and Atmospheric Administration

How to use Heat Index:
1. Across top locate Environmental Temperature
2. Down left side locate Relative Humidity
3. Follow across and down to find Apparent Temperature
4. Determine Heat Stress Risk on chart at right

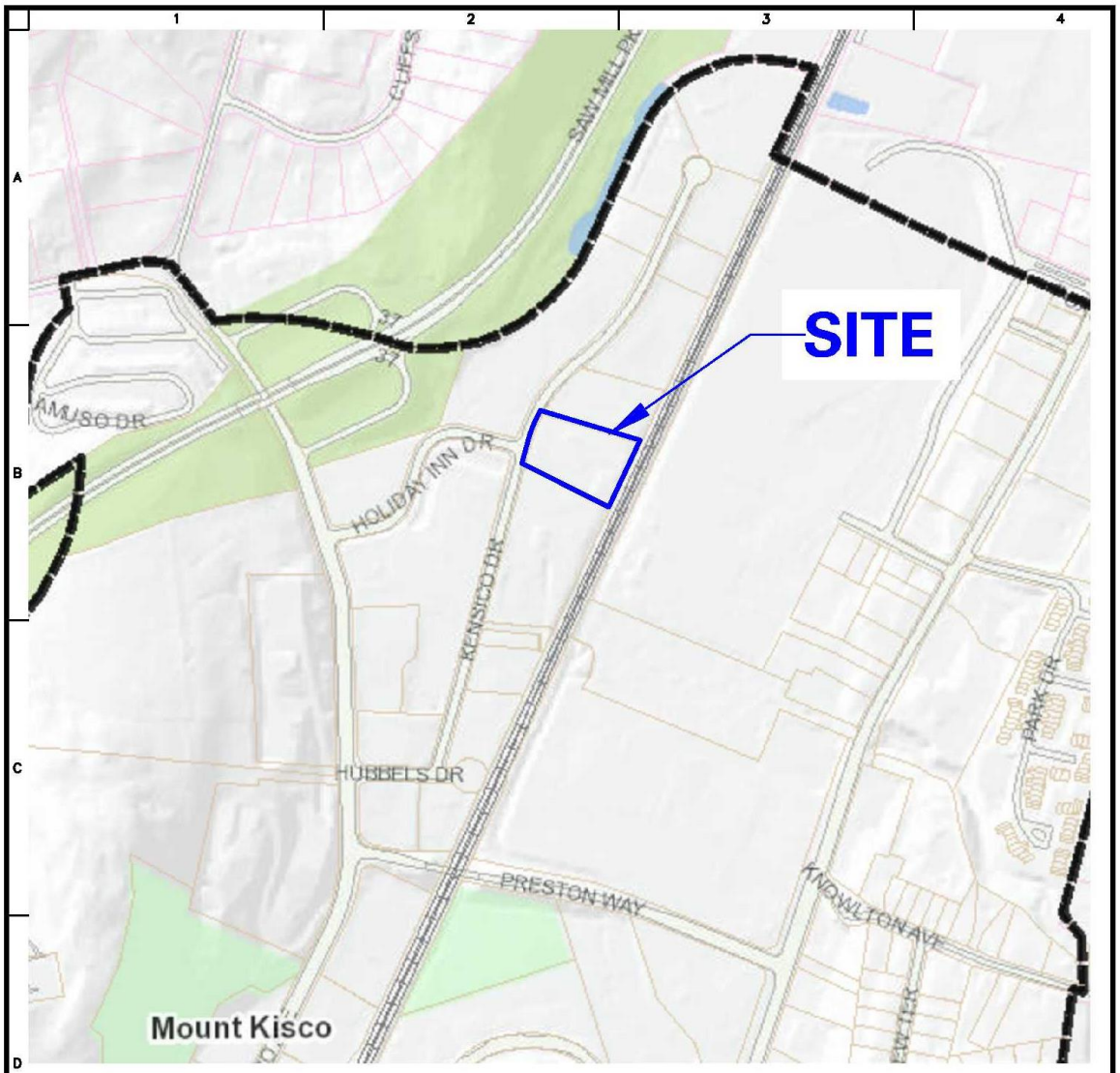
Note: Exposure to full sunshine can increase Heat Index values by up to 15 degrees F.

Apparent Temperature	**Heat Stress Risk with Physical Activity and/or Prolonged Exposure**
90-105	Heat Cramps or Heat Exhaustion Possible
105-130	Heat Cramps or Heat Exhaustion Likely, Heat Stroke Possible
>130	Heatstroke Highly Likely

FIGURES

FIGURE 1

Site Location Map



NOTES:

1. BASE MAP IS REFERENCED FROM WESTCHESTER COUNTY 2-FOOT TOPOGRAPHIC MAP, ACCESSED FROM WESTCHESTER COUNTY GEOGRAPHIC INFORMATION SYSTEMS ON OCTOBER 23, 2018.

500 0 250 500
SCALE IN FEET

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

LANGAN Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. 21 Penn Plaza, 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com	Project 41 KENSICO DRIVE SECTION 69.50, PARCEL No. 1-2 TOWN OF MOUNT KISCO WESTCHESTER COUNTY NEW YORK	Drawing Title SITE LOCATION MAP	Project No. 190046301 Date 10/23/2018 Drawn By ERA Checked By TC	Drawing No. 1 Sheet 1 of 9

Filename: \\langan.com\data\WPW\data3\190046301\Project Data\CAD\01\SheetFiles\Environmental\Figure 1 - Site Location Map.dwg Date: 10/24/2018 Time: 01:55 User: ktwombly Style Table: Langan.stb Layout: ANSI-BP

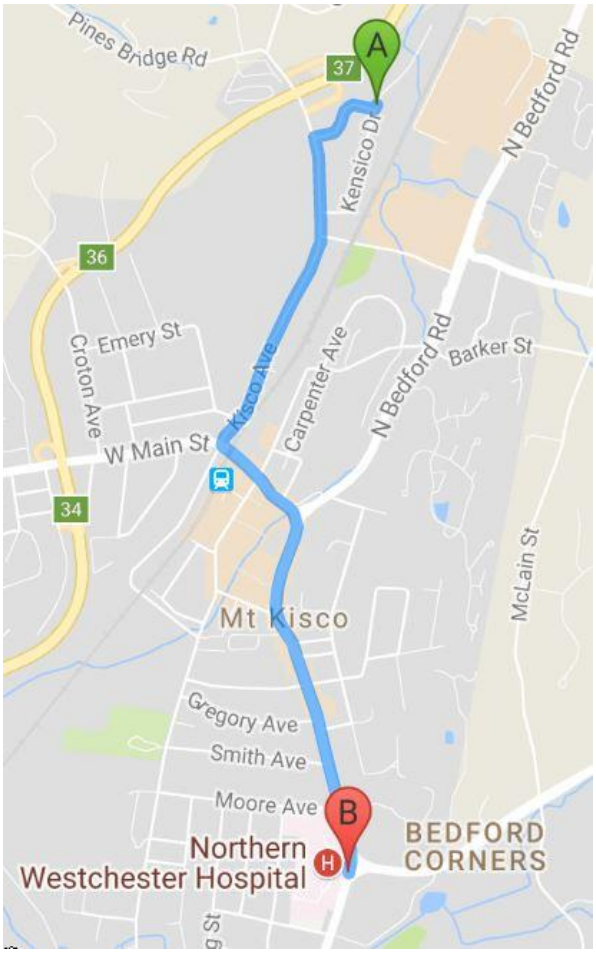
FIGURE 2
HOSPITAL ROUTE PLAN

Hospital Location: **Northern Westchester Hospital**
400 East Main Street
Mount Kisco, New York
914-666-1200

START: 41 Kensico Drive, Mount Kisco, NY

1. Head south on Kensico Drive toward Holiday Inn Drive
2. Turn right onto Holiday Inn Drive
3. Turn left onto Kisco Avenue
4. Turn left onto Main Street, destination will be on the right.

END: Northern Westchester Hospital, 400 East Main Street, Mount Kisco, NY



ATTACHMENT A

STANDING ORDERS

STANDING ORDERS

GENERAL

- No smoking, eating, or drinking in this work zone.
- Upon leaving the work zone, personnel will thoroughly wash their hands and face.
- Minimize contact with contaminated materials through proper planning of work areas and decontamination areas, and by following proper procedures. Do not place equipment on the ground. Do not sit on contaminated materials.
- No open flames in the work zone.
- Only properly trained and equipped personnel are permitted to work in potentially contaminated areas.
- Always use the appropriate level of personal protective equipment (PPE).
- Maintain close contact with your buddy in the work zone
- Contaminated material will be contained in the Exclusion Zone (EZ).
- Report any unusual conditions.
- Work areas will be kept clear and uncluttered. Debris and other slip, trip, and fall hazards will be removed as frequently as possible.
- The number of personnel and equipment in the work zone will be kept to an essential minimum.
- Be alert to the symptoms of fatigue and heat/cold stress, and their effects on the normal caution and judgment of personnel.
- Conflicting situations which may arise concerning safety requirements and working conditions must be addressed and resolved quickly by the site HSO.

TOOLS AND HEAVY EQUIPMENT

- Do not, under any circumstances, enter or ride in or on any backhoe bucket, materials hoist, or any other device not specifically designed to carrying passengers.
- Loose-fitting clothing or loose long hair is prohibited around moving machinery.
- Ensure that heavy equipment operators and all other personnel in the work zone are using the same hand signals to communicate.
- Drilling/excavating within 10 feet in any direction of overhead power lines is prohibited.
- The locations of all underground utilities must be identified and marked out prior to initiating any subsurface activities.
- Check to insure that the equipment operator has lowered all blades and buckets to the ground before shutting off the vehicle.
- If the equipment has an emergency stop device, have the operator show all personnel its location and how to activate it.
- Help the operator ensure adequate clearances when the equipment must negotiate in tight quarters; serve as a signalman to direct backing as necessary.
- Ensure that all heavy equipment that is used in the Exclusion Zone is kept in that zone until the job is done, and that such equipment is completely decontaminated before moving it into the clean area of the work zone.
- Samplers must not reach into or get near rotating equipment such as the drill rig. If personnel must work near any tools that could rotate, the equipment operator must completely shut down the rig prior to initiating such work. It may be necessary to use a remote sampling device.

ATTACHMENT B

DECONTAMINATION PROCEDURES

PERSONNEL DECONTAMINATION

LEVEL C DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Canister or Mask Change	4. If worker leaves Exclusion Zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5:	Boot, Gloves and Outer Garment Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6:	Face piece Removal	6. Face piece is removed (avoid touching face with fingers). Face piece deposited on plastic sheets.
Station 7:	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.

LEVEL D DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Boot, Gloves and Outer Garment Removal	4. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 5:	Field Wash	5. Hands and face are thoroughly washed. Shower as soon as possible.

EQUIPMENT DECONTAMINATION

GENERAL:

Equipment to be decontaminated during the project may include tools, monitoring equipment, respirators, sampling containers, laboratory equipment and drilling equipment.

All decontamination will be done by personnel in protective gear, appropriate for the level of decontamination, as determined by the site HSO. The decontamination work tasks will be split or rotated among support and work crews.

Depending on site conditions, backhoe and pumps may be decontaminated over a portable decontamination pad to contain wash water; or, wash water may be allowed to run off into a storm sewer system. Equipment needed may include a steam generator with high-pressure water, empty drums, screens, screen support structures, and shovels. Drums will be used to hold contaminated wash water pumped from the lined pit. These drums will be labeled as such.

Miscellaneous tools and equipment will be dropped into a plastic pail, tub, or other container. They will be brushed off and rinsed with a detergent solution, and finally rinsed with clean water.

MONITORING EQUIPMENT:

Monitoring equipment will be protected as much as possible from contamination by draping, masking, or otherwise covering as much of the instruments as possible with plastic without hindering the operation of the unit. The PID, HNu or OVA meter, for example, can be placed in a clear plastic bag, which allows reading of the scale and operation of knobs. The probes can be partially wrapped keeping the sensor tip and discharge port clear.

The contaminated equipment will be taken from the drop area and the protective coverings removed and disposed in the appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe.

RESPIRATORS:

Respirators will be cleaned and disinfected after every use. Taken from the drop area, the masks (with the cartridges removed and disposed of with other used disposable gear) will be immersed in a cleaning solution and scrubbed gently with a soft brush, followed by a rinse in plain warm water, and then allowed to air dry. In the morning, new cartridges will be installed. Personnel will inspect their own masks for serviceability prior to donning them. And, once the mask is on, the wearer will check the respirator for leakage using the negative and positive pressure fit check techniques.

ATTACHMENT C

EMPLOYEE EXPOSURE/ INJURY INCIDENT REPORT

EMPLOYEE INCIDENT/INJURY REPORT
LANGAN ENGINEERING & ENVIRONMENTAL SERVICES

(Complete and return to Tony Moffa in the Doylestown Office)

Affected Employee Name: _____ Date: _____

Incident type: ☐ Injury ☐ Report Only/No Injury
☐ Near Miss ☐ Other: _____

EMPLOYEE INFORMATION (Person completing Form)

Employee Name: _____ Employee No: _____

Title: _____ Office Location: _____

Length of time employed or date of hire: _____

Mailing address: _____

_____

Sex: M ☐ F ☐ Birth date: _____

Business phone & extension: _____ Residence/cell phone: _____

ACCIDENT INFORMATION

Project: _____ Project #: _____

Date & time of incident: _____ Time work started & ended: _____

Site location: _____

Incident Type: Possible Exposure ☐ Exposure ☐ Physical Injury ☐

Names of person(s) who witnessed the incident:_____

Exact location incident occurred:

Describe work being done:_____

Describe what affected employee was doing prior to the incident occurring:

Describe in detail how the incident occurred:

Nature of the incident (List the parts of the body affected):

Person(s) to whom incident was reported (Time and Date):

List the names of other persons affected during this incident:

Possible causes of the incident (equipment, unsafe work practices, lack of PPE, etc.):

Weather conditions during incident:

MEDICAL CARE INFORMATION

Did affected employee receive medical care? Yes ☐ No ☐

If Yes, when and where was medical care received:

Provide name of facility (hospital, clinic, etc.):

Length of stay at the facility?

Did the employee miss any work time? Yes ☐ No ☐ Undetermined ☐

Date employee last worked: Date employee returned to work:

Has the employee returned to work? Yes ☐ No ☐

Does the employee have any work limitations or restrictions from the injury? : Yes ☐ No ☐

If Yes, please describe:

Did the exposure/injury result in permanent disability? Yes ☐ No ☐ Unknown ☐

If Yes, please describe:

HEALTH & SAFETY INFORMATION

Was the operation being conducted under an established site specific CONSTRUCTION HEALTH AND SAFETY PLAN?
Yes ☐ No ☐ Not Applicable: ☐

Describe protective equipment and clothing used by the employee:

_____

_____

_____

Did any limitations in safety equipment or protective clothing contribute to or affect exposure / injury? If so, explain:

_____

_____

_____

_____

Employee Signature Date

_____

Langan Representative Date

ATTACHMENT D

CALIBRATION LOG

DATE:________________ **PROJECT:____________________**

CALIBRATION LOG

Date & Time	Inst Type	Inst #	Media	Initial Reading	Span #	Calibrat. Reading	Performed By:

DATE:________________ **PROJECT:____________________**

CALIBRATION LOG

Date & Time	Inst Type	Inst #	Media	Initial Reading	Span #	Calibrat. Reading	Performed By:

DATE:________________ PROJECT:____________________

CALIBRATION LOG

Date & Time	Inst Type	Inst #	Media	Initial Reading	Span #	Calibrat. Reading	Performed By:

DATE:________________ **PROJECT:____________________**

CALIBRATION LOG

Date & Time	Inst Type	Inst #	Media	Initial Reading	Span #	Calibrat. Reading	Performed By:

ATTACHMENT E

MATERIAL SAFETY DATA SHEETS

SAFETY DATA SHEETS

All Langan Field Personnel Completing This Work Plan Are To Have Real Time Accessibility To Material Safety Data Sheet (MSDs) or Safety Data Sheet (SDSs) Through Their Smart Phone.

The link is http://www.msds.com/
The login name is "drapehead"
The password is "2angan987"

If You Are Unable To Use the Smart Phone App, You Are To Bring Printed Copies of the MSDs/SDSs to the Site

ATTACHMENT F

JOBSITE SAFETY INSPECTION CHECKLIST

Jobsite Safety Inspection Checklist

Date: _____ **Inspected By:** _____

Location: _____ **Project #:** _____

Check one of the following: **A:** Acceptable **NA**: Not Applicable **D**: Deficiency

	A	NA	D	Remark
1. CHASP available onsite for inspection?				
2. Health & Safety Compliance agreement (in CHASP) appropriately signed by Langan employees and contractors?				
3. Hospital route map with directions posted on site?				
4. Emergency Notification List posted on site?				
5. First Aid kit available and properly stocked?				
6. Personnel trained in CPR/First Aid on site?				
7. MSDSs readily available, and all workers knowledgeable about the specific chemicals and compounds to which they may be exposed?				
8 Appropriate PPE being worn by Langan employees and contractors?				
9. Project site safe practices ("Standing Orders") posted?				
10. Project staff have 40-hr./8-hr./Supervisor HAZWOPER training?				
11. Project staff medically cleared to work in hazardous waste sites and fit-tested to wear respirators, if needed?				
12. Respiratory protection readily available?				
13. Health & Safety Incident Report forms available?				
14. Air monitoring instruments calibrated daily and results recorded on the Daily Instrument Calibration check sheet?				
15. Air monitoring readings recorded on the air monitoring data sheet/field log book?				
16. Subcontract workers have received 40-hr./8-hr./Spvsr. HAZWOPER training, as appropriate?				
17. Subcontract workers medically cleared to work on site, and fit-tested for respirator wear?				
18. Subcontract workers have respirators readily available?				
19. Mark outs of underground utilities done prior to initiating any subsurface activities?				
20. Decontamination procedures being followed as outlined in CHASP?				
21. Are tools in good condition and properly used?				
22. Drilling performed in areas free from underground objects including utilities?				

23. Adequate size/type fire extinguisher supplied?				
24. Equipment at least 20 feet from overhead powerlines?				
25. Evidence that drilling operator is responsible for the safety of his rig.				
26. Trench sides shored, layer back, or boxed?				
27. Underground utilities located and authorities contacted before digging?				
28. Ladders in trench (25-foot spacing)?				
29. Excavated material placed more than 2 feet away from excavation edge?				
30. Public protected from exposure to open excavation?				
31. People entering the excavation regarding it as a permit-required confined space and following appropriate procedures?				
32. Confined space entry permit is completed and posted?				
33. All persons knowledgeable about the conditions and characteristics of the confined space?				
34. All persons engaged in confined space operations have been trained in safe entry and rescue (non-entry)?				
35. Full body harnesses, lifelines, and hoisting apparatus available for rescue needs?				
36. Attendant and/or supervisor certified in basic first aid and CPR?				
37. Confined space atmosphere checked before entry and continuously while the work is going on?				
38. Results of confined space atmosphere testing recorded?				
39. Evidence of coordination with off-site rescue services to perform entry rescue, if needed?				
40. Are extension cords rated for this work being used and are they properly maintained?				
41. Are GFCIs provided and being used?				

Unsafe Acts: _____

_____

_____

_____

Notes: _____

_____

_____

_____

ATTACHMENT G

JOB SAFETY ANALYSIS FORM

LANGAN	**Job Safety Analysis (JSA)** **Health and Safety**
JSA TITLE: **JSA NUMBER:**	**DATE CREATED:** **CREATED BY**: **REVISION DATE:** **REVISED BY:**

Langan employees must review and revise the Job Safety Analysis (JSA) as needed to address the any site specific hazards not identified. Employees must provide their signatures on the last page of the JSA indicating they have review the JSA and are aware the potential hazards associated with this work and will follow the provided preventive or corrective measures.

PERSONAL PROTECTIVE EQUIPMENT REQUIRED: (PPE): ■ Required	☒ As Needed	
☐ Steel-toed boots	☐ Nitrile gloves	☐ Dermal Protection (Specify)
☐ Long-sleeved shirt	☐ Leather/ Cut-resistant gloves	☐ High visibility vest/clothing
☐ Safety glasses	☐Face Shield	☐ Hard hat
ADDITIONAL PERSONAL PROTECTIVE EQUIPMENT NEEDED (Provide specific type(s) or descriptions)		
☐ Air Monitoring:	☐ Respirators:	☐ Other:

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE OR CORRECTIVE ACTION
1.	1. 2.	1a. 1b. 2a. 2b.
2.	1.	1
Additional items identified in the field.		
Additional Items.		

If additional items are identified during daily work activities, please notify all relevant personnel about the change and document on this JSA.

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: General Construction Activities

JSA Number: JSA010-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. Transport equipment to work area	1. Back Strain 2. Slips/ Trips/ Falls 3. Traffic 4. Cuts/abrasions from equipment 5. Contusions from dropped equipment	1. Use proper lifting techniques / Use wheeled transport 2. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves) 5. Wear proper PPE (safety shoes)
2. Installation of piping from vapor wells to skid connections and from discharge piping to effluent stack	1. Pinch fingers when connecting pipes 2. Slips/ Trips/ Falls 3. Machinery Hazards	1. Wear proper PPE (leather gloves) 2. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint 3. Wear proper PPE (safety vest) / Maintain safe distance from operating machinery
3. Remediation equipment installation	1. Back strain when lifting heavy equipment 2. Slips/ Trips/ Falls 3. Traffic	1. Use proper lifting techniques / Use wheeled transport / Minimize distance to vehicle 2. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray pain 3. Wear proper PPE (safety vest)
4. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 7. High Noise levels	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. All activities (cont'd)	8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas were overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Subsurface Investigation**

JSA Number: **JSA030-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Dielectric Overshoes, Sun Block				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Transport equipment to work area	1. Back/strain 2. Slip/Trip/Falls 3. Traffic 4. Cuts/abrasions/contusions from equipment 5. Accidents due to vehicle operations	1. Use proper lifting techniques/Use wheeled transport 2. Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes) 5. Observe posted speed limits/ Wear seat belts at all times
6. Traffic	1. Hit by moving vehicle	1. Use traffic cones and signage/ Use High visibility traffic vests and clothing/ Caution tape when working near active roadways.
7. Field Work (drilling, resistivity testing, and inspection)	1. Biological Hazards: insects, rats, snakes, poisonous plants, and other animals 2. Heat stress/injuries 3. Cold Stress/injuries 4. High Energy Transmission Lines 5. Underground Utilities 6. Electrical (soil resistivity testing)	11. Inspect work area to identify biological hazards. Wear light colored long sleeve shirt and long pants/ Use insect repellant as necessary/ Beware of tall grass, bushes, woods and other areas where ticks may live/ Avoid leaving garbage on site to prevent attracting animals/ Identify and avoid contact with poisonous plants/Beware of rats, snakes, or stray animals. 12. Wear proper clothing (light colored)/ drink plenty of water/ take regular breaks/use sun block 13. Wear proper clothing/ dress in layers/ take regular breaks. 14. Avoid direct contact with high energy transmission lines/ position equipment at least 15 feet or as required by PSE&G from the transmission lines/ wear proper PPE (dielectric overshoes 15 kV minimum rating). 15. Call one-call service before performing intrusive field work/ Review utility mark-outs and available utility drawings (with respect to proposed work locations)/ Follow Underground Utility Guidelines

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		16. See AGI Sting R1 operating manual for specific concerns during operating instrument
8. All activities	11. Slips/ Trips/ Falls 12. Hand injuries, cuts or lacerations during manual handling of materials 13. Foot injuries 14. Back injuries 15. Traffic 16. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 17. High Noise levels 18. Overhead hazards 19. Heat Stress/ Cold Stress 20. Eye Injuries	17. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 18. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 19. Wear Langan approved safety shoes 20. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 21. Wear high visibility clothing & vest / Use cones or signs to designate work area 22. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 23. Wear proper hearing protection 24. Wear hard hat / Avoid areas were overhead hazards exist. 25. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 26. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Excavation Oversight**
JSA Number: **JSA041-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
9. Transport equipment to work area	6. Back Strain 7. Slips/Trips/Falls 8. Traffic 9. Cuts/abrasions/contusions from equipment	6. Use proper lifting techniques / Use wheeled transport 7. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 8. Wear proper PPE (high visibility vest or clothing) 9. Wear proper PPE (leather gloves, long sleeves, safety shoes)
10. Earth Moving Equipment	1. Equipment running over employee	1. Ensure you have direct line of sight with operator of equipment; don't walk behind equipment; maintain a safe distance away from equipment. 2. Wear proper PPE (high vis vest/clothing)
11. Excavation	4. Excavation collapse 5. Confined space 6. Soil	1. Use proper shoring/benching/sloping techniques; Ladder is properly situated in excavation; no water in excavation; competent person has inspected excavation prior to allow employees to enter. 2. Langan employees are not authorized to enter a confined space; 3. Soil and equipment is kept atleast 2 feet from edge of excavation
12. Excavated soil	1. Hazardous substances	1. Use proper equipment to monitor excavated soil for contaminates; ensure levels do not exceed PEL's for contaminates; Wear proper PPE
13. All activities	21. Slips/ Trips/ Falls 22. Hand injuries, cuts or lacerations during manual handling of materials 23. Foot injuries 24. Back injuries 25. Traffic	27. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 28. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 29. Wear proper PPE (Langan approved safety shoes)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	26. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 27. High Noise levels 28. Overhead hazards 29. Heat Stress/ Cold Stress 30. Eye Injuries	30. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 31. Wear high visibility clothing & vest / Use cones or signs to designate work area 32. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 33. Wear hearing protection 34. Wear hard hat / Avoid areas were overhead hazards exist. 35. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 36. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Field Sampling

JSA Number: JSA022-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

☒ Safety Shoes	☒ Long Sleeves	☐ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
14. Unpack/Transport equipment to work area.	10. Back Strains 11. Slip/Trips/Falls 12. Cuts/Abrasions from equipment 13. Contusions from dropped equipment	10. Use proper lifting techniques/Use wheeled transport 11. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 12. Wear proper PPE (leather gloves, long sleeves). 13. Wear proper PPE (Langan approved safety shoes).
15. Initial Site Arrival-Site Assessment	2. Traffic	3. Situational awareness (be alert of your surroundings). Secure area from through traffic.
16. Surface Water Sampling	7. Contaminated media. Skin/eye contact with biological agents and/or chemicals.	4. Wear appropriate PPE (Safety glasses, appropriate gloves). Review (M)SDS for all chemicals being.
17. Sampling from bridges	1. Struck by vehicles	1. Wear appropriate PPE (Safety Vest). Use buddy system and orange safety cones.
18. Icing of Samples/ Transporting coolers/equipment from work area.	31. Back Strains 32. Slips/Trips/Falls 33. Cuts/Abrasions from equipment 34. Pinch/Crushing Hazards.	37. Drain coolers of water. Use proper lifting techniques. Use wheeled transport. 38. Have unobstructed path from work area. Aware of surroundings. 39. Wear proper PPE (Leather gloves, long sleeves) 40. Wear proper PPE (Leather gloves, long sleeves)
19. Site Departure	1. Contaminated PPE/Vehicle	1. Contaminated PPE should be disposed of on-site. Remove boots and soiled clothing for secure storage in trunk. Wash hands promptly.
20. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts or lacerations during manual handling of materials	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	3. Foot injuries 4. Back injuries 35. Traffic 36. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 37. High Noise levels 38. Overhead hazards 39. Heat Stress/ Cold Stress 40. Eye Injuries	2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 41. Wear high visibility clothing & vest / Use cones or signs to designate work area 42. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 43. Wear hearing protection 44. Wear hard hat / Avoid areas were overhead hazards exist. 45. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 46. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	**Sign Name**	**Date**
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Equipment Transportation and Set-Up**

JSA Number: **JSA012-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
21. Transport equipment to work area	14. Back Strain 15. Slips/ Trips/ Falls 16. Traffic 17. Cuts/abrasions from equipment 18. Contusions from dropped equipment	6. Use proper lifting techniques / Use wheeled transport 7. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 8. Wear proper PPE (high visibility vest or clothing) 9. Wear proper PPE (leather gloves, long sleeves) 10. Wear proper PPE (safety shoes)
22. Moving equipment to its planned location	3. Pinch Hazard 4. Slips/ Trips/ Falls	4. Wear proper PPE (leather gloves) 5. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint
23. Equipment Set-up	8. Pinch Hazard 9. Cuts/abrasions to knuckles/hands 10. Back Strain	4. Wear proper PPE (leather gloves) 5. Wear proper PPE (leather gloves) 6. Use proper lifting techniques / Use wheeled transport
24. All activities	41. Slips/ Trips/ Falls 42. Hand injuries, cuts or lacerations during manual handling of materials 43. Foot injuries 44. Back injuries 45. Traffic 46. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 47. High Noise levels 48. Overhead hazards 49. Heat Stress/ Cold Stress	47. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 48. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 49. Wear Langan approved safety shoes 50. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 51. Wear high visibility clothing & vest / Use cones or signs to designate work area

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
7. All activities (cont'd)	50. Eye Injuries	52. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 53. Wear hearing protection 54. Wear hard hat / Avoid areas were overhead hazards exist. 55. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 56. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **55-gallon Drum Sampling**

JSA Number: **JSA043-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☒ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	

☒ Other: All Drums are required to be labeled. Langan employees do not open or move undocumented drums or unlabeled drums without proper project manager authorization.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
25. Unpack/Transport equipment to work area.	19. Back Strains 20. Slip/Trips/Falls 21. Cuts/Abrasions from equipment 4. Contusions from dropped equipment	14. Use proper lifting techniques/Use wheeled transport 15. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 16. Wear proper PPE (leather gloves, long sleeves). 4. Wear proper PPE (Langan approved safety shoes).
26. Open Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 2. Pressure from drums.	1. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 2. Open drum slowly to relieve pressure. Wear proper PPE: face shield and goggles; correct gloves; and over garments.
27. Collecting Soil/Fluid Sample	5. Irritation to eye from vapor, soil dust, or splashing 6. Irritation to exposed skin	4. Wear proper eye protection including safety glasses/ face shield/googles and when necessary, splash guard. If dust or vapor phase is present, wear appropriate safety breathing gear (1/2 mask or full face mask with correct filter) 5. Wear proper skin protection including nitrile gloves.
28. Closing Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid.	5. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches.
29. Moving Drums	2. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 3. Back Strains	2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 3. Use proper lifting techniques/Use wheeled transport

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
30. All activities	51. Slips/ Trips/ Falls 52. Hand injuries, cuts or lacerations during manual handling of materials 53. Foot injuries 54. Back injuries 55. Traffic 56. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 57. High Noise levels 58. Overhead hazards 59. Heat Stress/ Cold Stress 60. Eye Injuries	57. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 58. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 59. Wear Langan approved safety shoes 60. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 61. Wear high visibility clothing & vest / Use cones or signs to designate work area 62. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 63. Wear hearing protection 64. Wear hard hat / Avoid areas were overhead hazards exist. 65. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 66. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Site Inspection

JSA Number: JSA024-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☒ Rubber Boots
☒ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
31.Jobsite Pre-briefing	22.None	17. Review JSA, SOP's, and discuss hazards that may be present and control measures for present hazards while on-site.
2. Working near railroads	1. Passing Trains. 2. Slip/Trips/Falls.	1. Wear reflective vest/ Stay away from tracks/ Do not cross tracks within 10 ft. of train car or when there is a train within view/listen for train horn. 2. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones.
3. Walking around site	4. Uneven terrain 5. Wildlife: Stray animals, mice/rats, vectors (i.e. mosquitoes, bees, etc.) 6. Weather: Heat/cold stress 7. Slip/Trips/Falls 8. Foot injuries 9. Eye injuries	4. Pay attention to surrounding area (puddles, wet, frozen, uneven areas); Mark with cones or spray paint. 5. Use bug spray/ Avoid stray animals/Use repellant when needed. 6. Dress for the correct weather situation/ Use sunscreen or protective clothing in sunlight, layers in cold weather/ Drink plenty of fluids/ Take breaks when needed. 4. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones. 5. Wear proper PPE (Langan approved safety shoes)/ Change wet socks during cold weather. 6. Wear proper PPE (safety glasses/goggles).
4. Working near road	1. Passing vehicles 2. Slip/Trips/Falls	1. Wear reflective vest/ Stay away from roadway/ Use buddy system/ Place signage or cones when needed. 2. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones.
5. All activities	61. Slips/ Trips/ Falls 62. Hand injuries, cuts or lacerations during manual handling of materials 63. Foot injuries 64. Back injuries 65. Traffic	67. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 68. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 69. Wear Langan approved safety shoes

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	66. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 67. High Noise levels 68. Overhead hazards 69. Heat Stress/ Cold Stress 70. Eye Injuries	70. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 71. Wear high visibility clothing & vest / Use cones or signs to designate work area 72. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 73. Wear hearing protection 74. Wear hard hat / Avoid areas were overhead hazards exist. 75. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 76. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Building Construction Oversight**

JSA Number: **JSA006-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
32. Transport equipment to work area	23. Back Strain 24. Slips/ Trips/ Falls 25. Traffic 26. Cuts/abrasions from equipment 27. Contusions from dropped equipment	11. Use proper lifting techniques / Use wheeled transport 12. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 13. Wear proper PPE (high visibility vest or clothing) 14. Wear proper PPE (leather gloves, long sleeves) 15. Wear proper PPE (safety shoes)
33. Drilling/anchor bolt installation	7. Hazards associated with drilling, flying objects, heavy equipment, ground level hazards and dust 8. Slips/ Trips/ Falls 9. Hazards associated with concrete work	6. Maintain a safe distance from drilling operation / Wear proper PPE (hard hat, safety glasses, safety shoes, safety vest) 7. Be aware of potential trip hazards / Follow good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint / Wear the proper PPE (safety shoes) 8. Maintain a safe distance from pouring operation
34. Steel building erection	11. Overhead hazards, falling objects 12. Pinching/crushing hazards	8. Wear proper PPE (hard had, safety glasses, safety vest) / Be aware of overhead hazards and maintain a safe distance of at least 10 ft. 9. All personnel should make others aware of moving objects or their inten to move objects / Avoid areas where pinching and crushing hazards are possible
35. All activities	71. Slips/ Trips/ Falls 72. Hand injuries, cuts or lacerations during manual handling of materials 73. Foot injuries 74. Back injuries 75. Traffic 76. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.)	77. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 78. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 79. Wear Langan approved safety shoes

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. All activities (cont'd)	77. High Noise levels 78. Overhead hazards 79. Heat Stress/ Cold Stress 80. Eye Injuries	80. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 81. Wear high visibility clothing & vest / Use cones or signs to designate work area 82. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 83. Wear hearing protection 84. Wear hard hat / Avoid areas were overhead hazards exist. 85. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 86. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Direct-Push Soil Borings**
JSA Number: **JSA004-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT REQUIRED:				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Half-face respirator, dust cartridges, PID (if applicable)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
36. Move equipment to work site	28. Back strain when lifting equipment 29. Slips/ Trips/ Falls while moving equipment 30. Traffic (if applicable) 31. Pinched fingers or running over toes during geoprobe set-up 32. Overturn drilling rig while transporting to loading dock on flat-bed tow truck	18. Use proper lifting technique (use legs for bending and lifting and not the back)/ Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle 19. Use proper lifting technique (use legs for bending and lifting and not the back) / Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle / Have unobstructed path to vehicle or collection point / Do not lift/walk with boxes that are heavy/difficult to lift 20. Wear high visibility safety vests or clothing / Exercise caution 21. Wear proper PPE (cut-resistant gloves) / Stay alert, be aware of geoprobe rig at all times 22. Drill rig should be parked in center of flat-bed tow truck / Emergency brake shall be used at all times during transport on the flat-bed truck/ All unnecessary personnel should stay away from the flat-bed truck during moving activities
37. Calibration of monitoring equipment	10. Skin or eye contact with calibration chemicals 11. Pinch fingers in monitoring equipment	6. Wear proper PPE (safety glasses/ goggles) 7. Wear proper PPE (leather gloves)
38. Set-up geoprobe rig	13. Geoprobe rig movement	6. All field personnel should stay clear of the geoprobe rig while moving / Use a spotter when backing up the geoprobe
39. Advance geoprobe rods below ground surface to desired depth	10. Underground utilities 11. High noise levels	7. Clean all subsurface soil borings to a minimum of 5 feet below grade 8. Wear proper PPE (hearing protection)
40. Remove and open acetate liner	81. Pinched fingers while removing macrocore 82. Cuts/lacerations when cutting acetate liner open 83. Exposure to hazardous vapors	1. Wear proper PPE (nitrile gloves, cut-resistant or leather gloves 2. Wear proper PPE (cut-resistant or leather gloves) 3. Do not place face over acetate liner when opening / Monitor hazardous vapors in air with PID / Upgrade PPE as necessary based on levels contained in the Health and Safety Plan

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Remove and open acetate liner (cont'd)	84. Skin contact with contaminated soil	4. Wear proper PPE (nitrile gloves)
41. Sample Collections a) Monitor parameters b) Prepare sample containers and labels	1. Contact with potentially contaminated soil 2. Lacerations from broken sample bottles 3. Back strain while transporting full coolers 4. Internal exposure to contaminants and metals through inhalation of dust 5. Slips/ Trips/ Falls	1. Use monitoring devices / Wear proper PPE (safety glasses, nitrile gloves) 2. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage 9. Use proper lifting techniques / Do not lift heavy loads without assistance 10. Avoid creating dust / If necessary, wear a half mask respirator with applicable dust cartridge / Inspect respirator for damage and cleanliness prior to use / Clean respirator after each use and store in a clean, secure location 11. Be alert / Follow good housekeeping procedures
42. Remove excess soil from acetate liner and place in 55-gallon drum (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Cuts/lacerations from acetate liner 2. Pinched fingers/hand while opening/closing drum 3. Skin contact with contaminated soil 4. Soil debris in eyes	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Wear proper PPE (nitrile gloves) 4. Wear proper PPE (safety glasses)
8. Transport drums to central staging location (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Back, arm or shoulder strain from moving drums 2. Pinch fingers/hand in drum cart when moving drums 3. Pinch fingers/hand when operating lift-gate on vehicle 4. Contact with potentially contaminated groundwater when moving improperly sealed drums 5. Slips when moving drums 6. Drop drum on feet/toes	87. Use drum cart for moving drums / Use proper lifting techniques / Do not lift heavy loads without assistance 88. Wear proper PPE (cut-resistant or leather gloves) 89. Wear proper PPE (cut-resistant or leather gloves) 90. Wear proper PPE (nitrile gloves underneath work gloves) 91. Follow good housekeeping procedures / Ensure route to move drum and storage space is free from obstructions 92. Wear proper PPE (safety shoes) / Work in a safe manner to prevent dropped drum
9. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas were overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
9. All activities (cont'd)	10. Eye Injuries	10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

ATTACHMENT H

TAILGATE SAFETY BRIEFING FORM

LANGAN TAILGATE SAFETY BRIEFING

Date:_____ Time: _____

Leader:_____ Location:_____

Work Task:

_____

_____

SAFETY TOPICS (*provide some detail of discussion points*)

Chemical Exposure Hazards and Control:_____

_____

Physical Hazards and Control: _____

Air Monitoring: _____

PPE: _____

_____

Communications:_____

Safe Work Practices: _____

_____

Emergency Response: _____

Hospital/Medical Center Location: _____

Phone Nos.: _____

Other: _____

FOR FOLLOW-UP (the issues, responsibilities, due dates, etc.)

_____

_____

_____

ATTENDEES

PRINT NAME	COMPANY	SIGNATURE

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

Overview

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

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

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

Community Air Monitoring Plan

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

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

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

VOC Monitoring, Response Levels, and Actions

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

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

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

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

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

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/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' above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/in' 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/in' of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or 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 1 ppm, monitoring should occur within the occupied structure(s). 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/m3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m3 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.

Special Requirements for Indoor Work With Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

APPENDIX D

Quality Assurance Project Plan (QAPP)

QUALITY ASSURANCE PROJECT PLAN

for

Former Design for Leisure
NYSDEC BCP Site No. C360163

41 Kensico Drive
Mount Kisco, New York

Prepared For:

NY Luxury Motors of Mt. Kisco, Inc.
41 Kensico Drive
Mount Kisco, New York 10549

Prepared By:

Langan Engineering, Environmental, Surveying,
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21 Penn Plaza
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December 2020
Langan Project No. 190046301

LANGAN

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1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is for the 1.73 acre 41 Kensico Drive property located at 41 Kensico Drive in Mount Kisco, NY (the "site"). The site was entered into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) under BCP Site No. C360163 by NY Luxury Motors of Mt. Kisco, Inc. (the Volunteer) in June 2018. The volunteer has selected Langan Engineering and Environmental Services, DPC (Langan) as the Remediation Engineering firm for the proposed Remedial Action (RA). Langan will document and report the work of the other contractors and subcontractors to the volunteer for the services associated with the proposed RAs. This work includes, but is not limited to, site preparation, soil excavation, stockpiling, material removal and disposal, air monitoring, emergency spill response services (if necessary), and management of waste transport and disposal.

This QAPP specifies analytical methods to be used to ensure that data from the proposed RA are precise, accurate, representative, comparable, complete, and meet the sensitivity requirements of the project.

1.2 PROJECT OBJECTIVES

The environmental objectives of this Remedial Action Work Plan (RAWP) are to achieve a Track 4 cleanup under the New York State Brownfield Cleanup Program. The RAWP covers earthwork to be completed during remedial action at the site. A Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) for the protection of on-site workers, the community, and the environment has been developed and will be implemented during remediation and construction activities. These objectives have been established in order to protect public health and the environment for the anticipated commercial development at the site.

1.3 SCOPE OF WORK

Implementation of the RA is described in detail in the RAWP. All remedial work will be overseen by Langan on behalf of the volunteer. The RAWP will be executed by accomplishing the following tasks:

1. Development and implementation of a CHASP and CAMP for the protection of on-site workers, visitors, and the environment during remediation and construction activities;

2. Implementation of stormwater and soil erosion and control measures in compliance with applicable laws and regulations;
3. Screening contamination (by visual means, odor, and monitoring with a PID) of excavated soil/fill during any ground intrusive site work;
4. Completion of a waste characterization study before commencement of or concurrent with excavation activities; waste characterization soil samples would be collected and analyzed in accordance with typical waste disposal facility requirements.
5. Additional delineation of soil and/or historic fill that exceeds CU SCOs and characteristic hazardous lead waste limits in the northwestern part of the site as identified by the RI/SRI. The additional delineation would consist of field screening, soil sample collection, and laboratory analysis of soil samples. Soil samples would be analyzed for total lead and lead by the Toxicity Characteristic Leaching Procedure (TCLP).
6. Removal of soil and/or fill material exceeding the CU SCOs excavated for remedial purposes and for new building and site construction. The excavation activities would include the removal of characteristic hazardous lead soil in northwestern part of the site and removal of soil and/or fill material up to about 4 feet bgs, pending any design changes, across the remainder of the site. The estimated volume of soil and/or fill material to be excavated at the site (excluding the hazardous lead soil removal) is about 1,300 cubic yards; this material can be subsequently reused on-site provided it meets the CU SCOs. No hazardous lead soil will be reused on-site.
7. Decommissioning and removal of any unknown underground storage tanks (USTs) encountered during excavation and construction activities. A 1,000-gallon heating oil UST was removed from the site in 2008; no other USTs were identified at the site by the RI/SRI. Any USTs, if found, will be decommissioned in accordance with 6 NYCRR Part 613.9, NYSDEC Commissioner's Policy (CP)-51, and other applicable NYSDEC tank closure requirements, including DER-10. Endpoint soil samples will be collected to document the removal of any petroleum-impacted material in accordance with DER-10.
8. Collection and analysis of post-excavation confirmation endpoint soil samples in accordance with DER-10 to evaluate the performance of the remedy with respect to attainment of CU SCOs and to document the concentrations of residual contamination that may remain onsite. Confirmation endpoint soil samples would be collected from the excavation base at a frequency of one per 900 square feet per NYSDEC DER-10 5.4(b)(5)(ii), or at a lesser frequency if so approved by the NYSDEC.
9. Transportation and off-site disposal of excavated soil/fill material at permitted facilities in accordance with the RAWP and applicable federal, state, and local laws and regulations for handling, transport, and disposal.

10. Import of materials to be used for backfill and/or site cover in compliance with: 1) CU SCOs or Protection of Groundwater (PGW) SCOs, whichever is more stringent; 2) 6 NYCRR Part 360 regulations; and 3) federal, state, and local laws and regulations for handling and transport of material.
11. Construction and installation of a composite cover system consisting of an concrete building slab and foundation with a waterproofing/vapor barrier membrane system compatible with chlorinated solvents; impervious and porous asphalt pavement cover systems and/or gravel cover systems (6-inch minimum thickness) across outdoor vehicle parking areas; and minimum of 1 foot of soil in landscaped areas that meets the lower of CU and PGW SCOs;
12. Mitigation of stormwater runoff to Branch Brook by 1) installing porous asphalt pavement and gravel cover systems across most of the outdoor parking area and grading the site to allow for stormwater to flow towards these pervious areas and infiltrate into subsurface soil and 2) restoring an approximately 30-foot-wide wetland buffer area between the outdoor vehicle parking area and Branch Brook with new tree plantings and a re-seeding program.
13. Establishment of use restrictions including prohibitions on the use of groundwater from the site and prohibitions on sensitive site uses, such as farming or vegetable gardening, to eliminate future exposure pathways;
14. Establishment of an approved SMP to ensure long-term management of engineering and institutional controls, including the performance of periodic inspections and certification that the controls are performing as they were intended; and
15. Recording of an Environmental Easement (EE) to memorialize the remedial action and the engineering and institutional controls to ensure that future owners of the site continue to maintain these controls, as required.

1.3.1 SUMMARY OF PROPOSED FIELD SAMPLING ACTIVITIES

Implementation of the RA will include excavation of targeted fill and soil; backfilling as necessary with clean, imported material meeting the soil quality requirements in Part 375-6.8(a) CU SCOs, RCA or virgin crushed stone; removal of any encountered USTs; dewatering and treatment of groundwater; in-situ treatment of petroleum impacts to groundwater using enhanced oxygen release compound if a Track 1 cleanup is pursued and further groundwater treatment is necessary; and collection of documentation endpoint confirmation samples. A dust, odor, and organic vapor control and monitoring plan will be implemented during ground intrusive activities. In the event the soil and groundwater remedial objectives are not achieved, Institutional Controls, in the form of a Site Management Plan (SMP) and an Environmental Easement, will be implemented in the long term to restrict the site to restricted residential future use.

Documentation Endpoint Confirmation soil samples collected from the base of the excavation will be screened for environmental impacts with a photoionization detector (PID) equipped with a 10.6 electron volt (eV) bulb and for visual and olfactory evidence of a chemical or petroleum impacts (e.g., staining and/or odors). The post-excavation groundwater sample will be collected from a temporary groundwater monitoring well using a submersible pump or peristaltic pump with dedicated polyethylene tubing. The soil and groundwater samples will be placed in laboratory-supplied containers and will be sealed, labeled, and placed in an ice-chilled cooler (to maintain a temperature of about 4°C) for delivery to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory. Non-disposable equipment and sampling apparatus will be decontaminated between locations with Alconox® and water.

A table summarizing the anticipated sampling as outlined in the RAWP is included in Table 1.1.

TABLE 1.1
Analytical Methods / Quality Assurance Summary Table

SOIL

	Quantity (1)	Analysis (2, 3, 4)
Soil Samples	25	TCL VOCs, TCL SVOCs, pesticides, PCBs, herbicides, and TAL metals (including all 6 NYCRR Part 375 compounds)
Duplicate Soil Samples	2 (one per 20 soil samples)	
Soil Matrix Spike/Matrix Spike Duplicate	2 (one per 20 soil samples)	

GROUNDWATER

	Quantity (5)	Analysis (2, 3, 4)
Groundwater Samples	01	TCL VOCs, SVOCs, pesticides, PCBs, herbicides, and TAL metals (total and dissolved)
Duplicate Groundwater Samples	01 (one per 20 groundwater samples)	
Groundwater Matrix Spike/Matrix Spike Duplicate	01 (one per 20 groundwater samples)	

SOIL VAPOR

	Quantity	Analysis (2)
Soil Vapor Samples	0	NA
Duplicate Soil Vapor Samples	0 (one per 20 soil vapor samples)	

FIELD AND TRIP BLANKS

	Quantity	Analysis (2)
Soil Field Blanks	2 (one per 20 soil samples)	TCL VOCs, TCL SVOCs, pesticides, PCBs, herbicides, and TAL metals
Groundwater Field Blanks	1 (one per 20 groundwater samples)	TCL VOCs, SVOCs, pesticides, PCBs, herbicides, and TAL metals (total and dissolved)
Trip Blanks	1 (one per shipment of groundwater samples for VOC analysis)	TCL VOCs

Notes

1) Anticipated soil sample collection consists of documentation confirmation endpoint soil sampling. Per DER-10, documentation confirmation enpoint soil sample collection is typically performed from the excavation base at a frequency of one sample per 900 square feet of base.; however, due to the size of the site and results of previous investigations, soil sample collection will be performed from the excavation base at a frequency of one sample per 2,000 square feet.
2) For details regarding sample containerization, volume requirements, preservation, and holding times for water, soil, and soil vapor samples, refer to tables 5.1, 5.2, and 5.3, respectively.
3) For analytical methods and reporting limits, see Table 7.1 and Attachment B.
4) For detailed information on matrix spike and matrix spike duplicate analysis for groundwater and soil samples, see tables 4.1 and 4.2, respectively.
5) Following source removal, groundwater dewatering and treatment, groundwater will be sampled to determine if groundwater cleanup objectives have been met. If the objectives have not been met, additional remediation and groundwater monitoring will be performed.

VOCs = volatile organic compounds
SVOCs = semivolatile organic compounds
PCBs = polychlorinated biphenyls
TCL = target compound list
TAL = target analyte list
NA = not applicable

2.0 DATA QUALITY OBJECTIVES AND PROCESS

Data Quality Objectives (DQOs) are qualitative and quantitative statements to help ensure that data of known and appropriate quality are obtained during the project. The overall objective is to characterize soil within excavation areas in accordance with disposal facility requirements. DQOs for sampling activities are determined by evaluating five factors:

- Data needs and uses: The types of data required and how the data will be used after it is obtained.
- Parameters of Interest: The types of chemical or physical parameters required for the intended use.
- Level of Concern: Levels of constituents, which may require remedial actions or further investigations.
- Required Analytical Level: The level of data quality, data precision, and QA/QC documentation required for chemical analysis.
- Required Detection Limits: The detection limits necessary based on the above information.

The quality assurance and quality control objectives for all measurement data include:

- **Precision** – an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Field sampling precision will be determined by analyzing coded duplicate samples and analytical precision will be determined by analyzing internal QC duplicates and/or matrix spike duplicates.
- **Accuracy** – a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern. For soil and groundwater samples, accuracy will be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy will be assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), internal standards, laboratory method blanks, instrument calibration, and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks.
- **Representativeness** – expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness will be

determined by assessing a number of investigation procedures, including chain of custody, decontamination, and analysis of field blanks and trip blanks.

- **Completeness** – the percentage of measurements made which are judged to be valid. Completeness will be assessed through data validation. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested.
- **Comparability** – expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured using several procedures, including standard methods for sampling and analysis, instrument calibrations, using standard reporting units and reporting formats, and data validation.
- **Sensitivity** – the ability of the instrument or method to detect target analytes at the levels of interest. The project manager will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection.

3.0 PROJECT ORGANIZATION

Excavation activities will be overseen by Langan on behalf of NY Luxury Motors of Mt. Kisco, Inc.. Langan will perform the sampling collection as described in the IRMWP and will subcontract drilling, geophysical, and an Environmental Laboratory Approval Program (ELAP)-certified laboratory. Langan will also perform the data analysis, evaluation, and reporting tasks.

The analytical services will be performed by York Analytical Laboratories, Inc. of Stratford, Connecticut, (NYSDOH ELAP certification number 10654). Data validation services will be performed by Joseph Conboy; résumé attached (Attachment A).

Key contacts for this project are as follows:

NY Luxury Motors of Mt. Kisco, Inc.	Mrs. Laura Garcia Telephone: (212) 687-3444
Langan Project Manager:	Mr. Gregory C. Wyka, PG Telephone: (212) 479-5476
Langan Quality Assurance Officer (QAO) and Project Director:	Mr. Michael Burke, CHMM Telephone: (212) 479-5413
Program Quality Assurance Monitor:	Mr. Jason Hayes (Langan) Telephone: (212) 479-5427
Data Validator:	Mr. Joseph Conboy Telephone: (215) 845-8985
Laboratory Representative:	Patty Els (York) Telephone: (800) 306-9675

4.0 QUALITY ASSURANCE/QUALITY CONTROL OBJECTIVES FOR COLLECTION OF DATA

The overall quality assurance objective is to develop and implement procedures for sampling, laboratory analysis, field measurements, and reporting that will provide data of sufficient quality to evaluate the engineering controls on the site. The sample set, chemical analysis results, and interpretations must be based on data that meet or exceed quality assurance objectives established for the site. Quality assurance objectives are usually expressed in terms of accuracy or bias, sensitivity, completeness, representativeness, comparability, and sensitivity of analysis. Variances from the quality assurance objectives at any stage of the investigation will result in the implementation of appropriate corrective measures and an assessment of the impact of corrective measures on the usability of the data.

4.1 PRECISION

Precision is a measure of the degree to which two or more measurements are in agreement. Field precision is assessed through the collection and measurement of field duplicates. Laboratory precision and sample heterogeneity also contribute to the uncertainty of field duplicate measurements. This uncertainty is taken into account during the data assessment process. For field duplicates, results less than 2x the reporting limit (RL) meet the precision criteria if the absolute difference is less than ±2x the RL and acceptable based on professional judgement. For results greater than 2x the RL, the acceptance criteria is a relative percent difference (RPD) of ≤50% (soil and air), <30% (water). RLs and method detection limits (MDL) are provided in Attachment B.Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value (USEPA, 1987). Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), relative range, and relative percent difference (RPD) are common.

For this project, field sampling precision will be determined by analyzing coded duplicate samples (labeled so that the laboratory does not recognize them as duplicates) for the same parameters, and then, during data validation (Section 8), calculating the RPD for duplicate sample results.

Analytical precision will be determined by the laboratory by calculating the RPD for the results of the analysis of internal QC duplicates and matrix spike duplicates. The formula for calculating RPD is as follows:

$$RPD = \frac{|V1 - V2|}{\text{----------}} \times 100$$

$$(V1 + V2)/2$$

where:

RPD	=	Relative Percent Difference.
V1, V2	=	The two values to be compared.
|V1 – V2|	=	The absolute value of the difference between the two values.
(V1 + V2)/2	=	The average of the two values.

The data quality objectives for analytical precision, calculated as the RPD between duplicate analyses, are presented in Tables 4.1 and 4.2

TABLE 4.1
QUALITY CONTROL LIMITS FOR WATER SAMPLES

			Laboratory Accuracy and Precision				
Analytical Parameters	**Analytical Method (a)**	**Matrix Spike (MS) Compounds**	**MS/MSD (b) % Recovery**	**MS/MSD RPD l**	**LCS (d) % Recovery**	**Surrogate Compounds**	**Surrogate % Recovery**
VOCs (e)	8260	1,1-Dichloroethane	61-145	-	NA	Toluene-d8	88-110
		Trichloroethene	71-120	-	NA	Bromofluorobenzene	86-115
		Benzene	76-127	-	NA	1,2-Dichloroethane-d4	76-114
		Toluene	76-125	-	NA		
		Chlorobenzene	75-130	-	NA		
SVOCs (f)	8270	Phenol	12-110	-	NA	Nitrobenzene-d5	35-114
		2-Chlorophenol	27-123	-	NA	2-Fluorobiphenyl	43-116
		1,4-Dichlorobenzene	36-97	-	NA	Terphenyl-d14	33-141
		N-Nitroso-di-n-propylamine	41-116	-	NA	Phenol-d5	10-110
		1,2,4-Trichlorobenzene	39-98	-	NA	2-Fluorophenol	21-110
		4-Chloro-3-methylphenol	23-97	-	NA	2,4,6-Tribromophenol	10-123
		Acenaphthene	46-118	-	NA	2-Chlorophenol-d4	33-110 (g)
		4-Nitrophenol	10-80	-	NA	1,2-Dichlorobenzene-d4	16-110 (g)
		2,4-Dinitrotoluene	24-96	-	NA		
		Pentachlorophenol	9-103	-	NA		
		Pyrene	26-127	-	NA		
Inorganics (i)	6010,7470/7471 ,7841,9010, OIA-1677	Inorganic Analyte	75-125 (j)	- (k)	80-120	NA	NA

(a) Analytical Methods: USEPA SW-846, 3rd edition, Revision 1, November 1990; any subsequent revisions shall supersede this information
(b) Matrix Spike/Matrix Spike Duplicate
(c) Relative Percent Difference
(d) Laboratory Control Sample
(e) TCL VOCs plus library search
(f) TCL SVOCs plus library search
(g) Limits are advisory only
(i) Target Analyte List Inorganics (metals)
(j)Matrix spike only
(k) Laboratory duplicate RPD
NA - Not Applicable

TABLE 4.2
QUALITY CONTROL LIMITS FOR SOIL SAMPLES

Laboratory Accuracy and Precision

Analytical Parameter	Analytical Method (a)	Matrix Spike (MS) Compounds	MS/MSD (b) % Recovery	MS/MSD RPD (c)	LCS (d) % Recovery	Surrogate Compounds	Surrogate % Recovery
VOCs (e)	8260	1,1-Dichloroethane	59-172	22	NA	Toluene-d8	84-138
		Trichloroethene	62-137	24	NA	Bromofluorobenzene	59-113
		Benzene	66-142	21	NA	1,2-Dichloroethane-d4	70-121
		Toluene	59-139	21	NA		
		Chlorobenzene	60-133	21	NA		
SVOCs (f)	8270	Phenol	26-90	35	NA	Nitrobenzene-d5	23-120
		2-Chlorophenol	25-102	50	NA	2-Fluorobiphenyl	30-115
		1,4-Dichlorobenzene	28-104	27	NA	Terphenyl-d14	18-137
		N-Nitroso-di-n-propylamine	41-126	38	NA	Phenol-d5	24-113
		1,2,4-Trichlorobenzene	38-107	23	NA	2-Fluorophenol	25-121
		4-Chloro-3-methylphenol	26-103	33	NA	2,4,6-Tribromophenol	19-122
		Acenaphthene	31-137	19	NA	2-Chlorophenol-d4	20-130 (g)
		4-Nitrophenol	11-114	50	NA	1,2-Dichlorobenzene-d4	20-130 (g)
		2,4-Dinitrotoluene	28-89	47	NA		
		Pentachlorophenol	17-109	47	NA		
		Pyrene	35-142	36	NA		
Inorganics (i)	6010, 7470/7471, 7841, 9010	Inorganic Analyte	75-125 (j)	20 (k)	80-120	NA	NA
PCBs (h)	8082	PCB (Aroclor 1260)	50-128	50	NA	Tetrachlorometaxylene Decachlorobiphenyl	24-154 25-159

(A) ANALYTICAL METHODS: USEPA SW-846, 3RD EDITION, REVISION 1, NOVEMBER 1990, ANY SUBSEQUENT REVISIONS SHALL SUPERSEDE THIS INFORMATION
(B) MATRIX SPIKE/MATRIX SPIKE DUPLICATE
(C) RELATIVE PERCENT DIFFERENCE
(D) LABORATORY CONTROL SAMPLE
(E) TCL VOCS PLUS LIBRARY SEARCH
(F) TCL SVOCS PLUS LIBRARY SEARCH
(G) LIMITS ARE ADVISORY ONLY
(H) PCBS
(I) TARGET ANALYTE LIST INORGANICS (METALS AND CYANIDE)
(J) MATRIX SPIKE ONLY
(K) LABORATORY DUPLICATE RPD
NA - NOT APPLICABLE

4.2 ACCURACY

Accuracy is the measurement of the reproducibility of the sampling and analytical methodology. It should be noted that precise data may not be accurate data. For the purpose of this QAPP, bias is defined as the constant or systematic distortion of a measurement process, which manifests itself as a persistent positive or negative deviation from the known or true value. This may be due to (but not limited to) improper sample collection, sample matrix, poorly calibrated analytical or sampling equipment, or limitations or errors in analytical methods and techniques.

Accuracy in the field is assessed through the use of equipment blanks and through compliance to all sample handling, preservation, and holding time requirements. All equipment blanks should be non-detect when analyzed by the laboratory. Any contaminant detected in an associated equipment blank will be evaluated against laboratory blanks (preparation or method) and evaluated against field samples collected on the same day to determine potential for bias. Trip blanks are not required for non-aqueous matrices but are planned for non-aqueous matrices where high concentrations of VOCs are anticipated.

Laboratory accuracy is assessed by evaluating the percent recoveries of matrix spike/matrix spike duplicate (MS/MSD) samples, laboratory control samples (LCS), surrogate compound recoveries, and the results of method preparation blanks. MS/MSD, LCS, and surrogate percent recoveries will be compared to either method-specific control limits or laboratory-derived control limits. Sample volume permitting, samples displaying outliers should be reanalyzed. All associated method blanks should be non-detect when analyzed by the laboratory

4.3 COMPLETENESS

Laboratory completeness is the ratio of total number of samples analyzed and verified as acceptable compared to the number of samples submitted to the fixed-base laboratory for analysis, expressed as a percent. Three measures of completeness are defined:

- Sampling completeness, defined as the number of valid samples collected relative to the number of samples planned for collection;
- Analytical completeness, defined as the number of valid sample measurements relative to the number of valid samples collected; and

- Overall completeness, defined as the number of valid sample measurements relative to the number of samples planned for collection.

Air, soil vapor, soil, and groundwater data will meet a 90% completeness criterion. If the criterion is not met, sample results will be evaluated for trends in rejected and unusable data. The effect of unusable data required for a determination of compliance will also be evaluated

4.4 REPRESENTATIVENESS

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. This is performed by following applicable standard operating procedures (SOPs) and this QAPP. All field technicians will be given copies of appropriate documents prior to sampling events and are required to read, understand, and follow each document as it pertains to the tasks at hand.

Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is performed by following all applicable EPA methods, laboratory-issued SOPs, the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited

4.5 COMPARABILITY

Comparability is an expression of the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the sampling plan is followed and that sampling is performed according to the SOPs or other project-specific procedures. Analytical data will be comparable when similar sampling and analytical methods are used as documented in the QAPP. Comparability will be controlled by requiring the use of specific nationally-recognized analytical methods and requiring consistent method performance criteria. Comparability is also dependent on similar quality assurance objectives. Previously collected data will be evaluated to determine whether they may be combined with contemporary data sets

4.6 SENSITIVITY

Sensitivity is the ability of the instrument or method to detect target analytes at the levels of interest. The project director will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection and QC acceptance limits that meet established performance criteria. Concurrently, the project director will select the level of data assessment to ensure that only data meeting the project DQOs are used in decision-making.

Field equipment will be used that can achieve the required levels of detection for analytical measurements in the field. In addition, the field sampling staff will collect and submit full volumes of samples as required by the laboratory for analysis, whenever possible. Full volume aliquots will help ensure achievement of the required limits of detection and allow for reanalysis if necessary. The concentration of the lowest level check standard in a multi-point calibration curve will represent the reporting limit.

Analytical methods and quality assurance parameters associated with the sampling program are presented in Attachment C. The frequency of associated equipment blanks and duplicate samples will be based on the recommendations listed in DER-10, and as described in Section 5.3.

5.0 SAMPLE COLLECTION AND FIELD DATA ACQUISITION PROCEDURES

Soil sampling will be conducted in accordance with the established NYSDEC protocols contained in DER-10/Technical Guidance for Site Investigation and Remediation (May 2010). The following sections describe procedures to be followed for specific tasks.

5.1 FIELD DOCUMENTATION PROCEDURES

Field documentation procedures will include summarizing field data in field books and proper sample labeling. These procedures are described in the following sections.

5.1.1 Field Data and Notes

Field notebooks contain the documentary evidence regarding procedures conducted by field personnel. Hard cover, bound field notebooks will be used because of their compact size, durability, and secure page binding. The pages of the notebook will not be removed.

Entries will be made in waterproof, permanent blue or black ink. No erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change. Each entry will be dated. Entries will be legible and contain accurate and complete documentation of the individual or sampling team's activities or observations made. The level of detail will be sufficient to explain and reconstruct the activity conducted. Each entry will be signed by the person(s) making the entry.

The following types of information will be provided for each sampling task, as appropriate:

- Project name and number
- Reasons for being on-site or taking the sample
- Date and time of activity
- Sample identification numbers
- Geographical location of sampling points with references to the site, other facilities or a map coordinate system. Sketches will be made in the field logbook when appropriate
- Physical location of sampling locations such as depth below ground surface

- Description of the method of sampling including procedures followed, equipment used and any departure from the specified procedures
- Description of the sample including physical characteristics, odor, etc.
- Readings obtained from health and safety equipment
- Weather conditions at the time of sampling and previous meteorological events that may affect the representative nature of a sample
- Photographic information including a brief description of what was photographed, the date and time, the compass direction of the picture and the number of the picture on the camera
- Other pertinent observations such as the presence of other persons on the site, actions by others that may affect performance of site tasks, etc.
- Names of sampling personnel and signature of persons making entries

Field records will also be collected on field data sheets including boring logs, which will be used for geologic and drilling data during soil boring activities. Field data sheets will include the project-specific number and stored in the field project files when not in use. At the completion of the field activities, the field data sheets will be maintained in the central project file.

5.1.2 Sample Labeling

Each sample collected will be assigned a unique identification number in accordance with the sample nomenclature guidance included in Attachment D, and placed in an appropriate sample container. Each sample container will have a sample label affixed to the outside with the date and time of sample collection and project name. In addition, the label will contain the sample identification number, analysis required and chemical preservatives added, if any. All documentation will be completed in waterproof ink.

5.2 EQUIPMENT CALIBRATION AND PREVENTATIVE MAINTENANCE

A photoionization detector (PID) will be used during the sampling activities to evaluate work zone action levels and screen soil samples. Field calibration and/or field checking of the PID will be the responsibility of the field team leader and the site HSO, and will be

accomplished by following the procedures outlined in the operating manual for the instrument. At a minimum, field calibration and/or field equipment checking will be performed once daily, prior to use. Field calibration will be documented in the field notebook. Entries made into the logbook regarding the status of field equipment will include the following information:

- Date and time of calibration
- Type of equipment serviced and identification number (such as serial number)
- Reference standard used for calibration
- Calibration and/or maintenance procedure used
- Other pertinent information

Equipment that fails calibration or becomes inoperable during use will be removed from service and segregated to prevent inadvertent utilization. The equipment will be properly tagged to indicate that it is out of calibration. Such equipment will be repaired and recalibrated to the manufacturer's specifications by qualified personnel. Equipment that cannot be repaired will be replaced.

Off-site calibration and maintenance of field instruments will be conducted as appropriate throughout the duration of project activities. All field instrumentation, sampling equipment and accessories will be maintained in accordance with the manufacturer's recommendations and specifications and established field equipment practice. Off-site calibration and maintenance will be performed by qualified personnel. A logbook will be kept to document that established calibration and maintenance procedures were followed. Documentation will include both scheduled and unscheduled maintenance.

5.3 SAMPLE COLLECTION

Soil Samples

Soil samples will be visually classified and field screened using a PID to assess potential impacts from VOCs and for health and safety monitoring. Soil samples collected for analysis of VOCs will be collected using either EnCore® or Terra Core® sampling equipment. For analysis of non-volatile parameters, samples will be homogenized and placed into glass jars. After collection, all sample jars will be capped and securely

tightened, and placed in iced coolers and maintained at 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4. Analysis and/or extraction and digestion of collected soil samples will meet the holding times required for each analyte as specified in Attachment C. In addition, analysis of collected soil samples will meet all quality assurance criteria set forth by this QAPP and DER-10.

Field QA/QC Samples

To assess field sampling and decontamination performance, two types of "blanks" will be collected and submitted to the laboratory for analyses. In addition, the precision of field sampling procedures will be assessed by collecting coded field duplicates and matrix spike/matrix spike duplicates (MS/MSDs). The blanks will include:

a. Trip Blanks - A trip blank will be prepared before the sample containers are sent by the laboratory. The trip blank will consist of a 40-ml VOA vial containing distilled, deionized water, which accompanies the other water sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of water samples for Part 375 volatiles analysis. The Trip Blank will be analyzed for volatile organic compounds to assess any contamination from sampling and transport, and internal laboratory procedures.

b. Field Blanks - Field blanks will be taken at a minimum frequency of one per 20 field samples per sample matrix. Field blanks are used to determine the effectiveness of the decontamination procedures for sampling equipment. The field blank will consist of a sample of deionized, distilled water provided by the laboratory that has passed through a decontaminated bailer, tubing or other sampling apparatus. It is usually collected as a last step in the decontamination procedure, prior to taking an environmental sample. The field blank may be analyzed for all or some of the parameters of interest.

The duplicates will include:

c. Coded Field Duplicate - To determine the representativeness of the sampling methods, coded field duplicates will be collected at a minimum frequency of one per 20 field samples for each matrix (soil, groundwater, and soil vapor). The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are a duplicate sample. This will eliminate any possible bias that could arise.

d. Matrix Spike/Matrix Spike Duplicate (MS/MSD) - MS/MSD samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be taken at a frequency of one

pair per 20 field samples (soil and groundwater). These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes.

TABLE 5.1
SOIL SAMPLE
CONTAINERIZATION, PRESERVATION AND HOLDING TIMES

Analysis	Bottle Type	Preservation [(a)]	Holding Time [(b)]
VOCs	40 mL glass VOA vials or 5-g Encore samplers	Cool to 4°C, MeOH (VOA vials)	14 days*
SVOCs	Wide-mouth glass w/ Teflon lined cap	Cool to 4°C	14 days
Metals	Wide-mouth plastic or glass	Cool to 4°C	180 days, except mercury (28 days)
PCBs	Wide-mouth glass w/ Teflon-lined cap	Cool to 4°C	14 days**
Herbicides	Wide-mouth glass w/ Teflon-lined cap	Cool to 4°C	14 days**
Cyanide, Total	Wide-mouth glass w/ Teflon-lined cap	Cool to 4°C	14 days
Hexavalent Chromium	Wide-mouth glass w/ Teflon-lined cap	Cool to 4°C	30 Days
1,4-Dioxane	Wide-mouth glass w/ Teflon lined cap	Cool to 4°C	14 days
PFAS	High Density Polyethylene (HDPE) /polypropylene	Cool to 4°C	40 days

(a) All samples to be preserved in ice during collection and transport. Samples collected for VOC analysis in VOA vials are preserved with methanol (MeOH).

(b) Days from date of sample collection.

* Samples collected for VOC analysis using Encore samplers must be analyzed within 48 hours unless frozen. Samples frozen within 48 hours can be analyzed up to 14 days from the date of sample collection.

* Soxhlet or sonication procedures for extraction and concentration of soil/waste samples for SVOCs must be completed within 14 days from the date of sample collection. Extracts of soil samples must be analyzed within 40 days of extraction.

** Procedures for extraction and concentration of soil/waste samples for PCBs and herbicides must be completed within 14 days from the date of sample collection. Extracts of soil samples must be analyzed within 40 days of extraction.

5.4 SAMPLE CONTAINERS AND HANDLING

Certified, commercially clean sample containers will be obtained from the analytical laboratory. If soil or groundwater samples are being collected, the laboratory will also prepare and supply the required trip blanks and field blank sample containers and reagent preservatives. Sample bottle containers, including the field blank containers, will be placed into plastic coolers by the laboratory. These coolers will be received by the field sampling team within 24 hours of their preparation in the laboratory. Prior to the commencement of field work, Langan field personnel will fill the plastic coolers with ice in Ziploc® bags (or equivalent) to maintain a temperature of 4° ±2° C.

Soil samples collected in the field for laboratory analysis will be placed directly into the laboratory-supplied sample containers. Samples will then be placed and stored on-ice in laboratory provided coolers until shipment to the laboratory. The temperature in the coolers containing samples and associated field blanks will be maintained at a temperature of 4°±2°C while on-site and during sample shipment to the analytical laboratory.

Possession of samples collected in the field will be traceable from the time of collection until they are analyzed by the analytical laboratory or are properly disposed. Chain-of-custody procedures, described in Section 5.9, will be followed to maintain and document sample possession. Samples will be packaged and shipped as described in Section 5.6.

5.5 SAMPLE PRESERVATION

Sample preservation measures will be used in an attempt to prevent sample decomposition by contamination, degradation, biological transformation, chemical interactions and other factors during the time between sample collection and analysis. Preservation will commence at the time of sample collection and will continue until analyses are performed. Should chemical preservation be required, the analytical laboratory will add the preservatives to the appropriate sample containers before shipment to the office or field. Samples will be preserved according to the requirements of the specific analytical method selected, as shown in Attachment C.

5.6 SAMPLE SHIPMENT

5.6.1 Packaging

Soil sample containers will be placed in plastic coolers. Ice in Ziploc® bags (or equivalent) will be placed around sample containers. Cushioning material will be added around the sample containers if necessary. Chains-of-custody and other paperwork will be placed in a Ziploc® bag (or equivalent) and placed inside the cooler. The cooler will be taped closed and custody seals will be affixed to one side of the cooler at a minimum. If the samples are being shipped by an express delivery company (e.g. FedEx) then laboratory address labels will be placed on top of the cooler.

5.6.2 Shipping

Standard procedures to be followed for shipping environmental samples to the analytical laboratory are outlined below.

- All environmental samples will be transported to the laboratory by a laboratory-provided courier under the chain-of-custody protocols described in Section 5.9.

- Prior notice will be provided to the laboratory regarding when to expect shipped samples. If the number, type or date of shipment changes due to site constraints or program changes, the laboratory will be informed.

5.7 DECONTAMINATION PROCEDURES

Sampling equipment will be thoroughly decontaminated before mobilization and between sample locations. Field sampling equipment, including water level indicators and other non-dedicated equipment, requires cleaning between uses. The Safety Data Sheets of detergents used in decontamination procedures will be reviewed to ensure fluoro-surfactants and 1,4-dioxane are not listed as ingredients. Laboratory-verified PFAS-free water will be used as the final rinse during decontamination of sampling equipment.

5.8 RESIDUALS MANAGEMENT

Debris (e.g., paper, plastic and disposable PPE) will be collected in plastic garbage bags and disposed of as non-hazardous industrial waste. Debris is expected to be transported to a local municipal landfill for disposal. If applicable, residual solids (e.g., leftover soil cuttings) will be placed back in the borehole from which it was sampled. If gross

contamination is observed, soil will be collected and stored in Department of Transportation (DOT)-approved 55-gallon drums in a designated storage area at the Site. The residual materials stored in a designated storage area at the site for further characterization, treatment or disposal.

Residual fluids (such as purge water) will be collected and stored in DOT-approved (or equivalent) 55-gallon drums in a designated storage area at the site. The residual fluids will be transported to the on-site wastewater treatment plant or analyzed, characterized and disposed off-site in accordance with applicable federal and state regulations. Residual fluids such as decontamination water may be discharged to the ground surface, however, if gross contamination is observed, the residual fluids will be collected, stored, and transported similar purge water or other residual fluids.

5.9 CHAIN OF CUSTODY PROCEDURES

A chain-of-custody protocol has been established for collected samples that will be followed during sample handling activities in both field and laboratory operations. The primary purpose of the chain-of-custody procedures is to document the possession of the samples from collection through shipping, storage and analysis to data reporting and disposal. Chain-of-custody refers to actual possession of the samples. Samples are considered to be in custody if they are within sight of the individual responsible for their security or locked in a secure location. Each person who takes possession of the samples, except the shipping courier, is responsible for sample integrity and safe keeping. Chain-of-custody procedures are provided below:

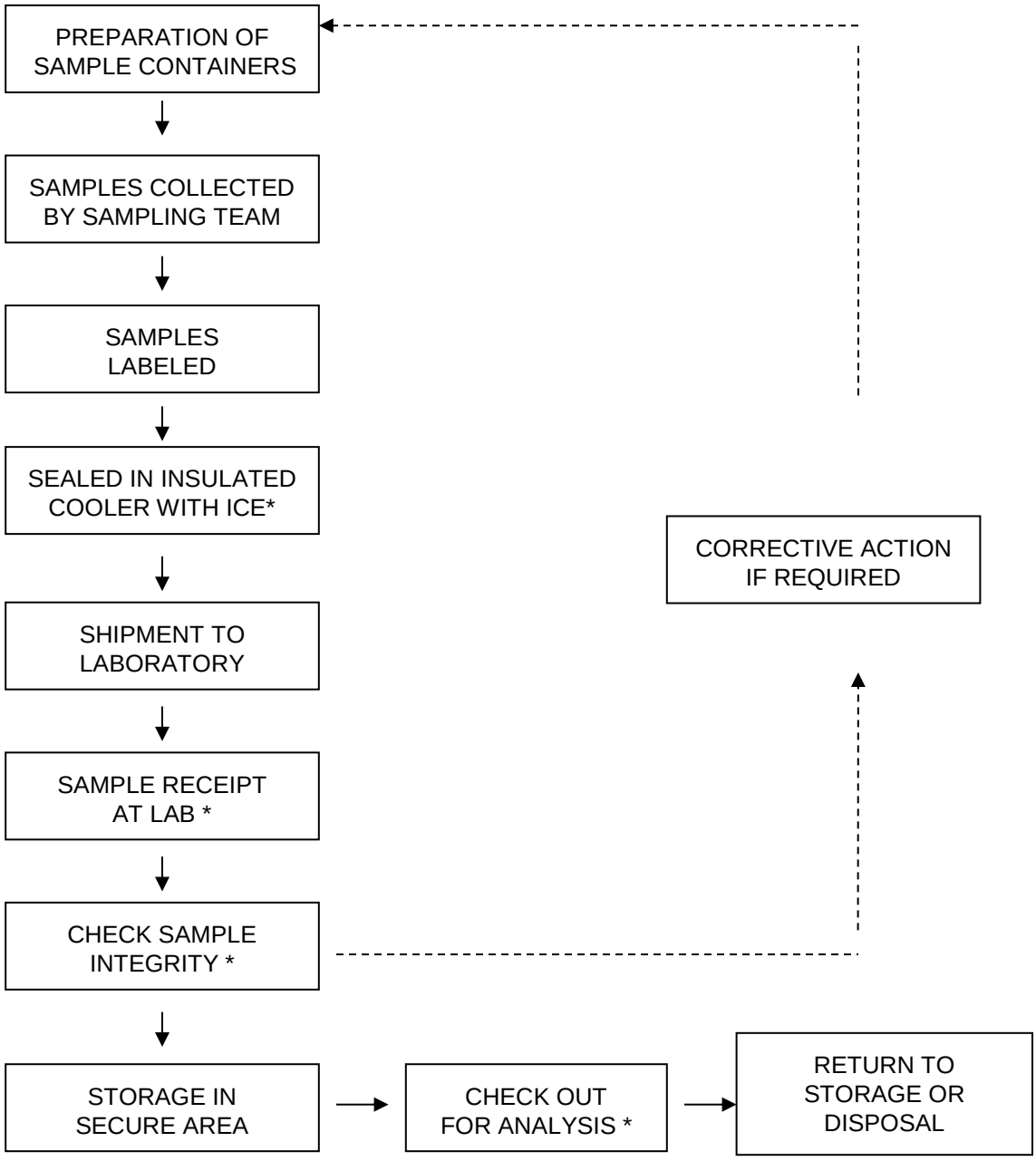
- Chain-of-custody will be initiated by the laboratory supplying the pre-cleaned and prepared sample containers. Chain-of-custody forms will accompany the sample containers.
- Following sample collection, the chain-of-custody form will be completed for the sample collected. The sample identification number, date and time of sample collection, analysis requested and other pertinent information (e.g., preservatives) will be recorded on the form. All entries will be made in waterproof, permanent blue or black ink.
- Langan field personnel will be responsible for the care and custody of the samples collected until the samples are transferred to another party, dispatched to the laboratory, or disposed. The sampling team leader will be responsible for enforcing chain-of-custody procedures during field work.

- When the form is full or when all samples have been collected that will fit in a single cooler, the sampling team leader will check the form for possible errors and sign the chain-of-custody form. Any necessary corrections will be made to the record with a single strike mark, dated, and initialed.

Sample coolers will be accompanied by the chain-of-custody form, sealed in a Ziploc® bag (or equivalent) and placed on top of the samples or taped to the inside of the cooler lid. If applicable, a shipping bill will be completed for each cooler and the shipping bill number recorded on the chain-of-custody form.

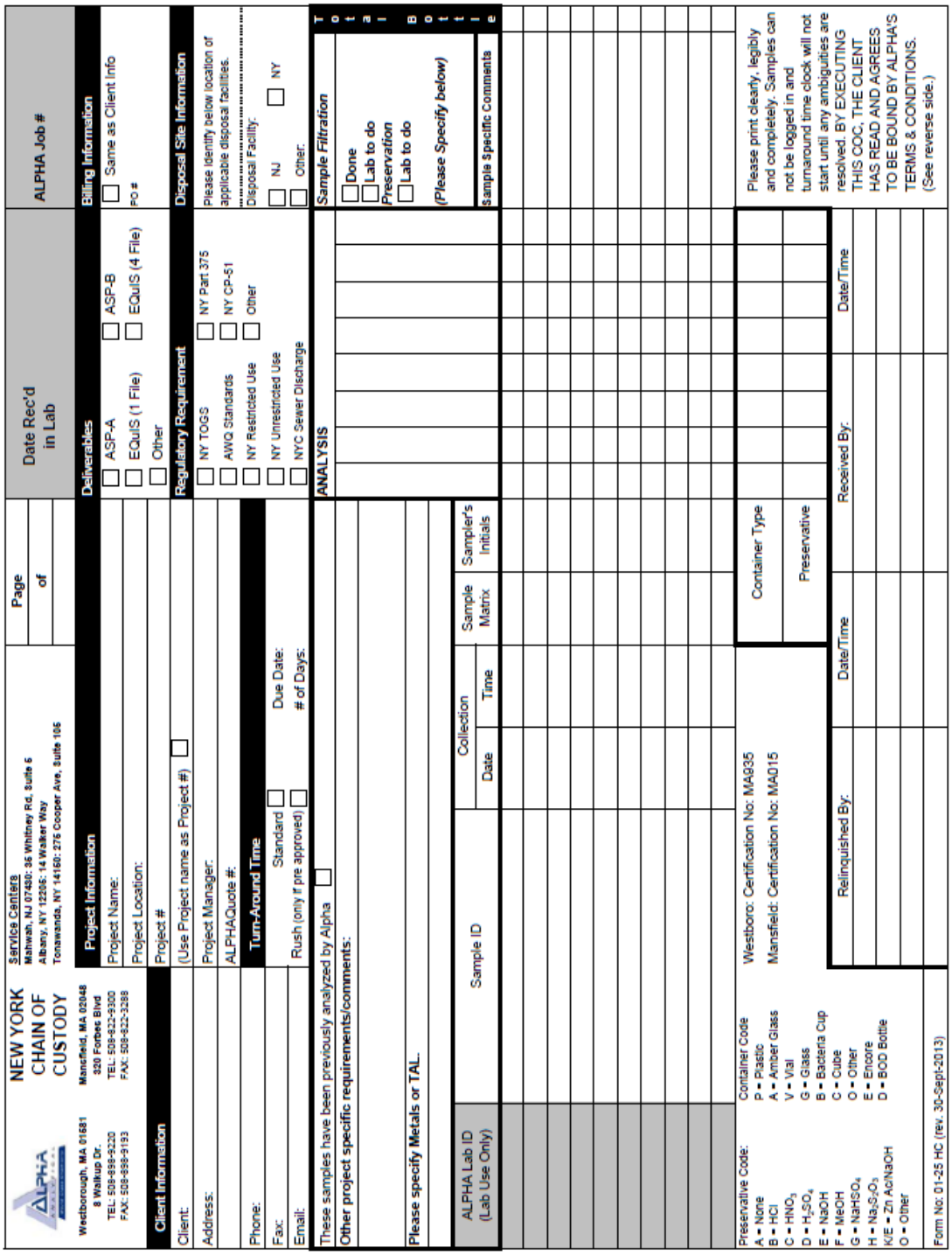
Samples will be packaged for shipment to the laboratory with the appropriate chain-of-custody form. A copy of the form will be retained by the sampling team for the project file and the original will be sent to the laboratory with the samples. Bills of lading will also be retained as part of the documentation for the chain-of-custody records, if applicable. When transferring custody of the samples, the individuals relinquishing and receiving custody of the samples will verify sample numbers and condition and will document the sample acquisition and transfer by signing and dating the chain-of-custody form. This process documents sample custody transfer from the sampler to the analytical laboratory. A flow chart showing a sample custody process is included as Figure 5.1, and chain-of-custody forms from Alpha are included as Figures 5.2 and 5.3.

Figure 5.1 Sample Custody



* REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

Figure 5.2 Sample Chain-of-Custody Form – Soil and Groundwater



Laboratory chain-of-custody will be maintained throughout the analytical processes as described in the laboratory's Quality Assurance Manual. The analytical laboratory will provide a copy of the chain-of-custody in the analytical data deliverable package. The chain-of-custody becomes the permanent record of sample handling and shipment.

5.10 LABORATORY SAMPLE STORAGE PROCEDURES

The subcontracted laboratory will use a laboratory information management system (LIMS) to track and schedule samples upon receipt by the analytical laboratories. Any sample anomalies identified during sample log-in must be evaluated on individual merit for the impact upon the results and the data quality objectives of the project. When irregularities do exist, the environmental consultant must be notified to discuss recommended courses of action and documentation of the issue must be included in the project file.

For samples requiring thermal preservation, the temperature of each cooler will be immediately recorded. Each sample and container will be will be assigned a unique laboratory identification number and secured within the custody room walk-in coolers designated for new samples. Samples will be, as soon as practical, disbursed in a manner that is functional for the operational team. The temperature of all coolers and freezers will be monitored and recorded using a certified temperature sensor. Any temperature excursions outside of acceptance criteria (i.e., below 2°C or above 6°C) will initiate an investigation to determine whether any samples may have been affected. Samples for VOCs will be maintained in satellite storage areas within the VOC laboratory. Following analysis, the laboratory's specific procedures for retention and disposal will be followed as specified in the laboratory's SOPs and/or QA manual.

5.11 SPECIAL CONSIDERATIONS FOR PFAS SAMPLE COLLECTION

The following special considerations apply to the collection of samples for PFAS analysis to prevent cross-contamination:

- Field equipment will not contain Teflon®
- All sampling material will be made from stainless steel, HDPE, acetate, or silicon
- No waterproof field books will be used
- No plastic clipboards, binders, or spiral hard cover notebooks will be used
- No adhesives will be used

- No sharpies or permanent markers will be used; ball point pens are acceptable
- Aluminum foil will not be used
- PFAS samples will be kept in a separate cooler from other sampling containers
- Coolers will be filled only with regular ice

PFAS compound sampling protocol is provided in Attachment E.

6.0 CALIBRATION PROCEDURES

6.1 FIELD INSTRUMENTS

All field analytical equipment will be calibrated immediately prior to each day's use. The calibration procedures will conform to manufacturer's standard instructions. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. Records of all instrument calibration will be maintained by the Field Team Leader. Copies of all the instrument manuals will be maintained on-site by the Field Team Leader.

Calibration procedures for instruments used for monitoring health and safety hazards (e.g., photoionization detector and explosimeter) are provided in the Health and Safety Plan.

6.2 LABORATORY INSTRUMENTS

The laboratory will follow all calibration procedures and schedules as specified in the sections of the USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods given in Section 7.

7.0 ANALYTICAL PROCEDURES

7.1 INTRODUCTION

Samples will be analyzed according to the USEPA SW-846 "Test Methods for Evaluating Solid Waste," November 1986, 3rd edition and subsequent updates. The methods to be used for the laboratory analysis of water and soil samples are presented in Table 7.1. These methods were selected because they attain the desired quantitation limits, which are compiled on Table 7.1.

TABLE 7.1
PROJECT QUANTITATION LIMITS - SOIL

			Estimated Quantitation Limits (Soil)	
	Compound	**Method**	**RL (mg/kg)**	**MDL(mg/kg)**
	VOCs			
1	Methylene chloride	8260C/5035	0.01	0.00165
2	1,1-Dichloroethane	8260C/5035	0.0015	0.00027
3	Chloroform	8260C/5035	0.0015	0.00037
4	Carbon tetrachloride	8260C/5035	0.001	0.000345
5	1,2-Dichloropropane	8260C/5035	0.0035	0.000228
6	Dibromochloromethane	8260C/5035	0.001	0.000176
7	1,1,2-Trichloroethane	8260C/5035	0.0015	0.000313
8	Tetrachloroethene	8260C/5035	0.001	0.000302
9	Chlorobenzene	8260C/5035	0.001	0.000348
10	Trichlorofluoromethane	8260C/5035	0.005	0.000417
11	1,2-Dichloroethane	8260C/5035	0.001	0.000246
12	1,1,1-Trichloroethane	8260C/5035	0.001	0.00035
13	Bromodichloromethane	8260C/5035	0.001	0.000308
14	trans-1,3-Dichloropropene	8260C/5035	0.001	0.000208
15	cis-1,3-Dichloropropene	8260C/5035	0.001	0.000231
16	1,3-Dichloropropene, Total	8260C/5035	0.001	0.000208
17	1,1-Dichloropropene	8260C/5035	0.005	0.000328
18	Bromoform	8260C/5035	0.004	0.000237
19	1,1,2,2-Tetrachloroethane	8260C/5035	0.001	0.000298
20	Benzene	8260C/5035	0.001	0.000193
21	Toluene	8260C/5035	0.0015	0.000195
22	Ethylbenzene	8260C/5035	0.001	0.00017
23	Chloromethane	8260C/5035	0.005	0.000436
24	Bromomethane	8260C/5035	0.002	0.000338
25	Vinyl chloride	8260C/5035	0.002	0.000315
26	Chloroethane	8260C/5035	0.002	0.000316
27	1,1-Dichloroethene	8260C/5035	0.001	0.000372
28	trans-1,2-Dichloroethene	8260C/5035	0.0015	0.000241
29	Trichloroethene	8260C/5035	0.001	0.000302
30	1,2-Dichlorobenzene	8260C/5035	0.005	0.000182
31	1,3-Dichlorobenzene	8260C/5035	0.005	0.000218
32	1,4-Dichlorobenzene	8260C/5035	0.005	0.000182
33	Methyl tert butyl ether	8260C/5035	0.002	0.000153
34	p/m-Xylene	8260C/5035	0.002	0.000351
35	o-Xylene	8260C/5035	0.002	0.000338

TABLE 7.1
PROJECT QUANTITATION LIMITS - SOIL

			Estimated Quantitation Limits (Soil)	
	Compound	**Method**	**RL (mg/kg)**	**MDL(mg/kg)**
36	Xylene (Total)	8260C/5035	0.002	0.000338
37	cis-1,2-Dichloroethene	8260C/5035	0.001	0.000342
38	1,2-Dichloroethene (total)	8260C/5035	0.001	0.000241
39	Dibromomethane	8260C/5035	0.01	0.000239
40	Styrene	8260C/5035	0.002	0.000401
41	Dichlorodifluoromethane	8260C/5035	0.01	0.0005
42	Acetone	8260C/5035	0.01	0.00229
43	Carbon disulfide	8260C/5035	0.01	0.0011
44	2-Butanone	8260C/5035	0.01	0.00069
45	Vinyl acetate	8260C/5035	0.01	0.000153
46	4-Methyl-2-pentanone	8260C/5035	0.01	0.000244
47	1,2,3-Trichloropropane	8260C/5035	0.01	0.000177
48	2-Hexanone	8260C/5035	0.01	0.000666
49	Bromochloromethane	8260C/5035	0.005	0.000357
50	2,2-Dichloropropane	8260C/5035	0.005	0.00045
51	1,2-Dibromoethane	8260C/5035	0.004	0.000199
52	1,3-Dichloropropane	8260C/5035	0.005	0.000183
53	1,1,1,2-Tetrachloroethane	8260C/5035	0.001	0.000318
54	Bromobenzene	8260C/5035	0.005	0.000219
55	n-Butylbenzene	8260C/5035	0.001	0.000228
56	sec-Butylbenzene	8260C/5035	0.001	0.000217
57	tert-Butylbenzene	8260C/5035	0.005	0.000247
58	o-Chlorotoluene	8260C/5035	0.005	0.000221
59	p-Chlorotoluene	8260C/5035	0.005	0.000183
60	1,2-Dibromo-3-chloropropane	8260C/5035	0.005	0.000396
61	Hexachlorobutadiene	8260C/5035	0.005	0.000348
62	Isopropylbenzene	8260C/5035	0.001	0.000194
63	p-Isopropyltoluene	8260C/5035	0.001	0.000202
64	Naphthalene	8260C/5035	0.005	0.000138
65	Acrylonitrile	8260C/5035	0.01	0.000514
66	n-Propylbenzene	8260C/5035	0.001	0.000215
67	1,2,3-Trichlorobenzene	8260C/5035	0.005	0.000251
68	1,2,4-Trichlorobenzene	8260C/5035	0.005	0.000215
69	1,3,5-Trimethylbenzene	8260C/5035	0.005	0.000161
70	1,2,4-Trimethylbenzene	8260C/5035	0.005	0.000186
71	1,4-Dioxane	8260C/5035	0.04	0.0144

TABLE 7.1
PROJECT QUANTITATION LIMITS - SOIL

			Estimated Quantitation Limits (Soil)	
	Compound	**Method**	**RL (mg/kg)**	**MDL(mg/kg)**
72	1,4-Diethylbenzene	8260C/5035	0.004	0.004
73	4-Ethyltoluene	8260C/5035	0.004	0.000234
74	1,2,4,5-Tetramethylbenzene	8260C/5035	0.004	0.000156
75	Ethyl ether	8260C/5035	0.005	0.00026
76	trans-1,4-Dichloro-2-butene	8260C/5035	0.005	0.000392
77	1,4-Dioxane	8270D-SIM	0.008	0.00204
	SVOCs			
1	Acenaphthene	8270D	0.1332	0.0172494
2	1,2,4-Trichlorobenzene	8270D	0.1665	0.0190476
3	Hexachlorobenzene	8270D	0.0999	0.018648
4	Bis(2-chloroethyl)ether	8270D	0.14985	0.0225774
5	2-Chloronaphthalene	8270D	0.1665	0.0165168
6	1,2-Dichlorobenzene	8270D	0.1665	0.0299034
7	1,3-Dichlorobenzene	8270D	0.1665	0.028638
8	1,4-Dichlorobenzene	8270D	0.1665	0.0290709
9	3,3'-Dichlorobenzidine	8270D	0.1665	0.044289
10	2,4-Dinitrotoluene	8270D	0.1665	0.0333
11	2,6-Dinitrotoluene	8270D	0.1665	0.0285714
12	Fluoranthene	8270D	0.0999	0.0191142
13	4-Chlorophenyl phenyl ether	8270D	0.1665	0.0178155
14	4-Bromophenyl phenyl ether	8270D	0.1665	0.0254079
15	Bis(2-chloroisopropyl)ether	8270D	0.1998	0.0284382
16	Bis(2-chloroethoxy)methane	8270D	0.17982	0.0166833
17	Hexachlorobutadiene	8270D	0.1665	0.0243756
18	Hexachlorocyclopentadiene	8270D	0.47619	0.150849
19	Hexachloroethane	8270D	0.1332	0.0269397
20	Isophorone	8270D	0.14985	0.0216117
21	Naphthalene	8270D	0.1665	0.0202797
22	Nitrobenzene	8270D	0.14985	0.024642
23	NitrosoDiPhenylAmine(NDPA)/DPA	8270D	0.1332	0.0189477
24	n-Nitrosodi-n-propylamine	8270D	0.1665	0.0257076
25	Bis(2-Ethylhexyl)phthalate	8270D	0.1665	0.057609
26	Butyl benzyl phthalate	8270D	0.1665	0.041958
27	Di-n-butylphthalate	8270D	0.1665	0.0315684
28	Di-n-octylphthalate	8270D	0.1665	0.05661

TABLE 7.1
PROJECT QUANTITATION LIMITS - SOIL

			Estimated Quantitation Limits (Soil)	
	Compound	**Method**	**RL (mg/kg)**	**MDL(mg/kg)**
29	Diethyl phthalate	8270D	0.1665	0.0154179
30	Dimethyl phthalate	8270D	0.1665	0.034965
31	Benzo(a)anthracene	8270D	0.0999	0.0187479
32	Benzo(a)pyrene	8270D	0.1332	0.040626
33	Benzo(b)fluoranthene	8270D	0.0999	0.0280386
34	Benzo(k)fluoranthene	8270D	0.0999	0.02664
35	Chrysene	8270D	0.0999	0.017316
36	Acenaphthylene	8270D	0.1332	0.0257076
37	Anthracene	8270D	0.0999	0.0324675
38	Benzo(ghi)perylene	8270D	0.1332	0.0195804
39	Fluorene	8270D	0.1665	0.0161838
40	Phenanthrene	8270D	0.0999	0.0202464
41	Dibenzo(a,h)anthracene	8270D	0.0999	0.0192474
42	Indeno(1,2,3-cd)Pyrene	8270D	0.1332	0.0232101
43	Pyrene	8270D	0.0999	0.0165501
44	Biphenyl	8270D	0.37962	0.038628
45	4-Chloroaniline	8270D	0.1665	0.030303
46	2-Nitroaniline	8270D	0.1665	0.0321012
47	3-Nitroaniline	8270D	0.1665	0.0314019
48	4-Nitroaniline	8270D	0.1665	0.068931
49	Dibenzofuran	8270D	0.1665	0.0157509
50	2-Methylnaphthalene	8270D	0.1998	0.0201132
51	Acetophenone	8270D	0.1665	0.0206127
52	2,4,6-Trichlorophenol	8270D	0.0999	0.0315684
53	P-Chloro-M-Cresol	8270D	0.1665	0.0248085
54	2-Chlorophenol	8270D	0.1665	0.0196803
55	2,4-Dichlorophenol	8270D	0.14985	0.0267732
56	2,4-Dimethylphenol	8270D	0.1665	0.054945
57	2-Nitrophenol	8270D	0.35964	0.062604
58	4-Nitrophenol	8270D	0.2331	0.067932
59	2,4-Dinitrophenol	8270D	0.7992	0.077589
60	4,6-Dinitro-o-cresol	8270D	0.4329	0.07992
61	Pentachlorophenol	8270D	0.1332	0.03663
62	Phenol	8270D	0.1665	0.0251415
63	2-Methylphenol	8270D	0.1665	0.0258075
64	3-Methylphenol/4-Methylphenol	8270D	0.23976	0.0260739

TABLE 7.1
PROJECT QUANTITATION LIMITS - SOIL

			Estimated Quantitation Limits (Soil)	
	Compound	**Method**	**RL (mg/kg)**	**MDL(mg/kg)**
65	2,4,5-Trichlorophenol	8270D	0.1665	0.0319014
66	Benzoic Acid	8270D	0.53946	0.168498
67	Benzyl Alcohol	8270D	0.1665	0.050949
68	Carbazole	8270D	0.1665	0.0161838
	Pesticides			
1	Delta-BHC	8081B	0.007992	0.0015651
2	Lindane	8081B	0.00333	0.00148851
3	Alpha-BHC	8081B	0.00333	0.00094572
4	Beta-BHC	8081B	0.007992	0.0030303
5	Heptachlor	8081B	0.003996	0.00179154
6	Aldrin	8081B	0.007992	0.00281385
7	Heptachlor epoxide	8081B	0.014985	0.0044955
8	Endrin	8081B	0.00333	0.0013653
9	Endrin aldehyde	8081B	0.00999	0.0034965
10	Endrin ketone	8081B	0.007992	0.00205794
11	Dieldrin	8081B	0.004995	0.0024975
12	4,4'-DDE	8081B	0.007992	0.00184815
13	4,4'-DDD	8081B	0.007992	0.00285048
14	4,4'-DDT	8081B	0.014985	0.0064269
15	Endosulfan I	8081B	0.007992	0.00188811
16	Endosulfan II	8081B	0.007992	0.00267066
17	Endosulfan sulfate	8081B	0.00333	0.00152181
18	Methoxychlor	8081B	0.014985	0.004662
19	Toxaphene	8081B	0.14985	0.041958
20	cis-Chlordane	8081B	0.00999	0.00278388
21	trans-Chlordane	8081B	0.00999	0.00263736
22	Chlordane	8081B	0.064935	0.0264735
	Herbicides			
1	2,4,5-TP (Silvex)	8151A	0.1665	0.0044289
	PCBs			
1	Aroclor 1016	8082A	0.0335	0.0026465
2	Aroclor 1221	8082A	0.0335	0.0030887
3	Aroclor 1232	8082A	0.0335	0.0039262

TABLE 7.1
PROJECT QUANTITATION LIMITS - SOIL

			Estimated Quantitation Limits (Soil)	
	Compound	**Method**	**RL (mg/kg)**	**MDL(mg/kg)**
4	Aroclor 1242	8082A	0.0335	0.0041004
5	Aroclor 1248	8082A	0.0335	0.0028274
6	Aroclor 1254	8082A	0.0335	0.0027537
7	Aroclor 1260	8082A	0.0335	0.0025527
8	Aroclor 1262	8082A	0.0335	0.0016616
9	Aroclor 1268	8082A	0.0335	0.0048575
10	PCBs, Total	8082A	0.0335	0.0016616
	Metals			
1	Aluminum, Total	6010C	4	1.08
2	Antimony, Total	6010C	2	0.152
3	Arsenic, Total	6010C	0.4	0.0832
4	Barium, Total	6010C	0.4	0.0696
5	Beryllium, Total	6010C	0.2	0.0132
6	Cadmium, Total	6010C	0.4	0.0392
7	Calcium, Total	6010C	4	1.4
8	Chromium, Total	6010C	0.4	0.0384
9	Cobalt, Total	6010C	0.8	0.0664
10	Copper, Total	6010C	0.4	0.1032
11	Iron, Total	6010C	2	0.3612
12	Lead, Total	6010C	2	0.1072
13	Magnesium, Total	6010C	4	0.616
14	Manganese, Total	6010C	0.4	0.0636
15	Mercury	7471B	0.08	0.016896
16	Nickel, Total	6010C	1	0.0968
17	Potassium, Total	6010C	100	5.76
18	Selenium, Total	6010C	0.8	0.1032
19	Silver, Total	6010C	0.4	0.1132
20	Sodium, Total	6010C	80	1.26
21	Thallium, Total	6010C	0.8	0.126
22	Vanadium, Total	6010C	0.4	0.0812
23	Zinc, Total	6010C	2	0.1172
	General Chemistry			
1	Cyanide	SW9010C	0.8	0.16
2	Hexavalent Chromium	SW7196A	1	0.166

TABLE 7.1
PROJECT QUANTITATION LIMITS - SOIL

			Estimated Quantitation Limits (Soil)	
	Compound	**Method**	**RL (mg/kg)**	**MDL(mg/kg)**
3	Trivalent Chromium	SW107	0.8	0.8

TABLE 7.1
PROJECT QUANTITATION LIMITS - SOIL

			Estimated Quantitation Limits (Soil)	
	Compound	**Method**	**RL (ng/g)**	**MDL (mg/kg)**
	PFAS			
1	Perfluorobutanoic Acid (PFBA)	Modified 537	1	0.0213
2	Perfluoropentanoic Acid (PFPeA)	Modified 537	1	0.01035
3	Perfluorobutanesulfonic Acid (PFBS)	Modified 537	1	0.0635
4	Perfluorohexanoic Acid (PFHxA)	Modified 537	1	0.064
5	Perfluoroheptanoic Acid (PFHpA)	Modified 537	1	0.064
6	Perfluorohexanesulfonic Acid (PFHxS)	Modified 537	1	0.057
7	Perfluorooctanoic Acid (PFOA)	Modified 537	1	0.04105
8	1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	Modified 537	1	0.198
9	Perfluoroheptanesulfonic Acid (PFHpS)	Modified 537	1	0.136
10	Perfluorononanoic Acid (PFNA)	Modified 537	1	0.083
11	Perfluorooctanesulfonic Acid (PFOS)	Modified 537	1	0.1205
12	Perfluorodecanoic Acid (PFDA)	Modified 537	1	0.072
13	1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	Modified 537	1	0.275
14	N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	Modified 537	1	0.103
15	Perfluoroundecanoic Acid (PFUnA)	Modified 537	1	0.056
16	Perfluorodecanesulfonic Acid (PFDS)	Modified 537	1	0.097
17	Perfluorooctanesulfonamide (FOSA)	Modified 537	1	0.1025
18	N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	Modified 537	1	0.09
19	Perfluorododecanoic Acid (PFDoA)	Modified 537	1	0.086
20	Perfluorotridecanoic Acid (PFTrDA)	Modified 537	1	0.062
21	Perfluorotetradecanoic Acid (PFTA)	Modified 537	1	0.07
22	PFOA/PFOS, Total	Modified 537	1	0.04105

Notes:
1) RL = Reporting Limit
2) MDL = Method Detection Limit
3) RL and MDL values were supplied by Alpha Analytical Laboratories
4) RL and MDL values are estimated and may vary depending on instruments
5) mg/kg = milligram per kilogram

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

8.1 INTRODUCTION

Endpoint or investigation sampling data collected during the remedial activities will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format.

The completed copies of the chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

8.2 DATA REDUCTION

The Analytical Services Protocol (ASP) Category B data packages and an electronic data deliverable (EDD) will be provided by the laboratory after receipt of a complete sample delivery group. The Project Manager will immediately arrange for archiving the results and preparation of result tables. These tables will form the database for assessment of the site contamination condition.

Each EDD deliverable must be formatted using a Microsoft Windows operating system and the NYSDEC data deliverable format for EQuIS. To avoid transcription errors, data will be loaded directly into the ASCII format from the laboratory information management system (LIMS). If this cannot be accomplished, the consultant should be notified via letter of transmittal indicating that manual entry of data is required for a particular method of analysis. All EDDs must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review is completed, the Project Manager may direct others to initiate and finalize the analytical data assessment.

8.3 DATA VALIDATION

Data validation will be performed in accordance with the USEPA validation guidelines for organic and inorganic data review. For PFAS compounds, EPA Method 537 was developed and validated for the analysis of finished drinking water from surface water and groundwater sources. Laboratories have modified Method 537 to enable the analysis of groundwater and soil, and to incorporate PFAS analytes not currently addressed by the promulgated method. NYSDOH offers certification for PFOA and PFOS in the drinking water category. Non-potable water and soil certification is not available; however, the method describes acceptable modifications. EPA recommends that modified methods be assessed relative to project goals and data quality objectives.Validation will include the following:

- Verification of the QC sample results,
- Verification of the identification of sample results (both positive hits and non-detects),
- Recalculation of 10% of all investigative sample results, and
- Preparation of Data Usability Summary Reports (DUSR).

A DUSR will be prepared and reviewed by the QAO. The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each sample delivery group (SDG) will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Target compound identification;

- Chromatogram quality;
- Pesticide cleanup (if applicable);
- Compound quantitation and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;
- Calibrations;
- Blank results;
- Interference check sample;
- Laboratory check samples;
- Duplicates;
- Matrix Spike;
- Furnace atomic absorption analysis QC;
- ICP serial dilutions; and
- Results verification and reported detection limits.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" – Not detected. The associated number indicates the approximate sample concentration necessary to be detected significantly greater than the level of the highest associated blank;
- "UJ" – Not detected. Quantitation limit may be inaccurate or imprecise;
- "J" – The analyte is present. Reported value may be associated with a higher level of uncertainty than is normally expected with the analytical method
- "N" – Tentative identification. The analyte is considered present in the sample;
- "R" – Unreliable result; data is rejected or unusable. The analyte may or may not be present in the sample; and

- No Flag – Result accepted without qualification.

9.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

9.1 QUALITY ASSURANCE BATCHING

Each set of samples will be analyzed concurrently with calibration standards, method blanks, matrix spikes (MS), matrix spike duplicates (MSD) or laboratory duplicates, and QC check samples (if required by the protocol). The MS/MSD samples will be designated by the field personnel. If no MS/MSD samples have been designated, the laboratory will contact the Langan Project Manager for corrective action.

9.2 CALIBRATION STANDARDS AND SURROGATES

All organic standard and surrogate compounds are checked by the method of mass spectrometry for correct identification and gas chromatography for degree of purity and concentration. All standards are traceable to a source of known quality certified by the USEPA or NIST, or other similar program. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions. Concentrations of the solutions are checked for accuracy before release for laboratory use. Standard solutions are replaced monthly or more frequently, based upon data indicating deterioration.

9.3 ORGANIC BLANKS AND MATRIX SPIKE

Analysis of blank samples verifies that the analytical method does not introduce contaminants or detect "false positives." The blank water can be generated by reverse osmosis and Super-Q filtration systems, or distillation of water containing $KMnO_4$. The matrix spike is generated by addition of surrogate standard to each sample.

9.4 TRIP AND FIELD BLANKS

Trip blanks and field blanks will be utilized in accordance with the specifications in Section 5. These blanks will be analyzed to provide a check on sample bottle preparation and to evaluate the possibility of atmospheric or cross contamination of the samples.

10.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

10.1 INTRODUCTION

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the QAO. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

10.2 SYSTEM AUDITS

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may occur.

10.3 PERFORMANCE AUDITS

The laboratory may be required to conduct an analysis of Performance Evaluation samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

10.4 FORMAL AUDITS

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Non-compliances will be logged, and documented through audit findings, which are attached to and are a part of the integral audit report. These audit-finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

11.0 PREVENTATIVE MAINTENANCE PROCEDURES AND SCHEDULES

11.1 PREVENTIVE MAINTENANCE PROCEDURES

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators.

A list of critical spare parts will be established by the operator. These spare parts will be available for use in order to reduce the downtime. A service contract for rapid instrument repair or backup instruments may be substituted for the spare part inventory.

11.2 SCHEDULES

Written procedures will establish the schedule for servicing critical items to minimize the downtime of the measurement system. Rental equipment subcontractors and the laboratory will adhere to the maintenance schedule, and arrange any necessary and prompt service. Required service will be performed by qualified personnel.

11.3 RECORDS

Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories. The QAO may audit these records to verify complete adherence to these procedures.

12.0 CORRECTIVE ACTION

12.1 INTRODUCTION

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

12.2 PROCEDURE DESCRIPTION

When a significant condition adverse to quality is noted at site or laboratory, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and laboratory management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management and staff, such as field investigation teamsand laboratory groups, will monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites or laboratory. Activities ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be

mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Project Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 12.1 or similar). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

CORRECTIVE ACTION REQUEST

Number: _____ Date: _____

TO: _____

You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _____

CONDITION:

REFERENCE DOCUMENTS:

RECOMMENDED CORRECTIVE ACTIONS:

_____ _____ _____ _____ _____ _____

Originator Date Approval Date Approval Date

RESPONSE

CAUSE OF CONDITION

CORRECTIVE ACTION

(A) RESOLUTION

(B) PREVENTION

(C) AFFECTED DOCUMENTS

13.0 REFERENCES

NYSDEC. Division of Environmental Remediation. DER-10/Technical Guidance for Site Investigation and Remediation, dated May 3, 2010.

Taylor, J. K., 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Inc., Chelsea, Michigan

USEPA, 1986. SW-846 "Test Method for Evaluating Solid Waste," dated November 1986. U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 1987. Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7- U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 1992a. CLP Organics Data Review and Preliminary Review. SOP No. HW-6, Revision #8, dated January 1992. USEPA Region II.

USEPA, 1992b. Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW 3/90. SOP No. HW-2, Revision XI, dated January 1992. USEPA Region II.

USEPA. Hazardous Waste Support Section. Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15. SOP No. HW-31, Revision #6, dated June 2014.

Attachment A
Resumes

JASON J. HAYES, PE, LEED AP

PRINCIPAL/VICE PRESIDENT

ENVIRONMENTAL ENGINEERING

Mr. Hayes has experience in New York, New Jersey, Washington D.C., California, Washington, Oregon, Alaska, and Internationally. His experience includes Environmental Protection Agency (EPA), New York State (NYS) Brownfields applications, investigation, and remediation; New York City Department of Environmental Protection (NYCDEP) and New York City Office of Environmental Remediation (OER) E-designated site applications, investigations, and remediation. His expertise also includes Phase I and II Environmental Site Investigations and Assessments; contaminated building cleanup and demolition; Underground Storage Tank (UST) permitting, removal specifications, and closure reporting; soil vapor intrusion investigation and mitigation system design (depressurization systems, etc.); development of groundwater contaminant plume migration models; environmental analysis; and oversight, design and specification generation for remediation operations with contaminants of concern to include polychlorinated biphenyls (PCBs), solvents, mercury, arsenic, petroleum products, asbestos, mold and lead.

SELECTED PROJECTS

- Confidential Location (Remediation for Mercury-Contaminated Site), New York, NY
- Confidential Location (Phase II ESI and Remedial Design for Mercury Impacted Site), Brooklyn, NY
- NYC School Construction Authority (PCB Remediation), Various Locations, New York, NY
- 28-29 High Line (Phase I ESA, Phase II ESI, and Environmental Remediation), New York, NY
- Georgetown Heating Plant (Phase II ESI and Remedial Design for Mercury Impacted Site), Washington D.C.
- 268 West Street (BCP Application, RI and RIWP), New York, NY
- Confidential Multiple Mixed-Use Tower Location (BCP Application, RI, Phase I ESA, and Phase II ESI), New York, NY
- Dock 72 at Brooklyn Navy Yard, (NYS Voluntary Cleanup Program), Brooklyn, NY
- 27-21 44th Drive (BCP Application, Remedial Investigation Phase I ESA, and Phase II ESI), Long Island City, NY
- Purves Street Development, BCP Application, RAWP, and Phase II ESI, Long Island City, NY
- 267-273 West 87th Street (BCP Application, Remedial Investigation, RIWP, RAWP), New York, NY
- New York Aquarium, Shark Tank and Animal Care Facility (Environmental Remediation), Coney Island, NY
- International Leadership Charter School (Environmental Remediation), Bronx, NY
- West & Watts (BCP Application), New York, NY
- Hudson Yards Redevelopment (Phase I ESA and Phase II ESI), New York, NY

EDUCATION

M.S., Environmental Engineering Columbia University

B.S., Chemistry, Environmental Toxicology Humboldt State University

Business Administration (minor) Humboldt State University

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

LEED Accredited Professional (LEED AP)

Troxler Certification for Nuclear Densometer Training

CPR and First Aid Certification

OSHA 40-Hour HAZWOPER

OSHA HAZWOPER Site Supervisor

AFFILIATIONS

US Green Building Council, NYC Chapter (USGBC), Communications Committee

- 627 Smith Street (RI and Report), Brooklyn, NY
- Gateway Center II Retail (Phase I ESA and Phase II ESI), Brooklyn, NY
- 261 Hudson Street (Phase I ESA, Phase II ESI, BCP, and RAWP), New York, NY
- Riverside Center, Building 2 (BCP, Phase I ESA and Phase II ESI), New York, NY
- New York Police Academy, (Sub-Slab Depressurization and Vapor Barrier System), College Point, NY
- Bronx Terminal Market (BCP, RIWP, RAWP, Phase I ESA and Phase II ESI), Bronx, NY
- Jacob Javits Convention Center (Phase I ESA and Phase II ESI), New York, NY
- Yankee Stadium Development Waterfront Park (NYSDEC Spill Sites), Bronx, NY
- Bushwick Inlet Park (Phase I ESA, Approvals for NYC E-Designation), Brooklyn, NY
- Silvercup West (BCP, RIWP, RIR, RAWP, and RAA), Long Island City, NY
- 29 Flatbush, Tall Residential Building (Groundwater Studies, RIR and RAWP), Brooklyn, NY
- Gowanus Village I (BCP, RIWP and RIR), Brooklyn, NY
- Sullivan Street Hotel (Site Characterization Study and Owner Representation), New York, NY
- Riker's Island Co-Generation Plant (Soil and Soil Vapor Quality Investigations), Bronx, NY
- The Shops at Atlas Park (Sub-Slab Depressurization and Vapor Barrier Design), Glendale, NY
- Memorial Sloan-Kettering Cancer Center (Subsurface and Soil Vapor Intrusion Investigations), New York, NY
- Element West 59th Street (Oversight and Monitoring of Sub-Slab Depressurization and Vapor Barrier Systems), New York, NY
- Teterboro Airport (Delineation and Remedial Oversight of Petroleum-Contaminated Soils), Teterboro, NJ
- Proposed New York JETS Stadium (Phase I ESA), New York, NY
- Former Con Edison Manufactured Gas Plant Sites (Research Reports), New York, NY
- 7 World Trade Center (Endpoint Sampling and Final Closure Report), New York, NY
- Peter Cooper Village, Environmental Subsurface Investigations, New York, NY

Urban Land Institute (ULI), member

Commercial Real Estate Development Associations (NAIOP), member

NYC Brownfield Partnership, member

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

NYC Mayor's Office of Environmental Remediation – Big Apple Brownfield Workshop – Presented on Soil Vapor Intrusion Remedies (e.g., SSD Systems, Vapor Barriers, Modified HVAC)

New York City Brownfield Partnership – Presented on environmental considerations and complications of the Hudson Yards Development

Waterfront Development Technical Course – Presented on Impacted Waterfront Planning Considerations

MICHAEL D. BURKE, PG, CHMM, LEED AP

PRINCIPAL/VICE PRESIDENT

ENVIRONMENTAL ENGINEERING AND REMEDIATION

Mr. Burke is a geologist/environmental scientist whose practice involves site investigation and remediation, transactional due diligence, environmental site assessments, in-situ remedial technology, and manufactured gas plant (MGP) site characterization and remediation. His additional services include multi-media compliance audits, sub-slab depressurization system design, non-hazardous and hazardous waste management, emergency response, community air monitoring programs, environmental and geotechnical site investigations, and health and safety monitoring. He has experience with projects in the New York State Department of Environmental Conservation (NYSDEC) and New York State Brownfield Cleanup (NYS BCP) Programs; Inactive Hazardous Waste, and Spill Programs, and New York City Office of Environmental Remediation (OER) e-designated and New York City Voluntary Cleanup Program (NYC VCP) sites.

SELECTED PROJECTS

- 227-14 North Conduit Avenue, Industrial Wastewater Compliance, Jamaica, NY
- 420 Kent Avenue, NYS Brownfield Cleanup Program, Brooklyn, NY
- 572 Eleventh Avenue, NYC VCP, New York, NY
- Monian Site A, OER E-Designated Site, New York, NY
- 537 Sackett Street, Gowanus Canal Due Diligence/MGP Site, Brooklyn, NY
- ABC Blocks 25, 26 and 27, NYS Brownfield Cleanup Program Sites, Long Island City, NY
- 432 Rodney Street, NYS Brownfield Cleanup Program, Petroleum and Chlorinated Volatile Organic Compound Investigation and Remediation, Brooklyn, NY
- 787 Eleventh Avenue, NYS Brownfield Cleanup Program Site, New York, NY
- President Street at Gowanus Canal, NYS Brownfield Cleanup Program Site, Brooklyn, NY
- 22-36 Second Avenue at Gowanus Canal, NYS Brownfield Cleanup Program Site, Brooklyn, NY
- 563 Sacket Street, NYS Brownfield Cleanup Program Site, MGP Investigation, and Remediation, Brooklyn, NY
- 156-162 Perry Street, NYS Brownfield Cleanup Program Site, New York, NY
- Christopher and Weehawken Streets, NYS Brownfield Cleanup Program, New York, NY
- Phelps Dodge Block 2529 (Lots 40, 50, and 45), Inactive Hazardous Waste Disposal Site, Maspeth NY
- 42-50 24th Street, NYS Brownfield Cleanup Program Site, Long Island City, NY
- Storage Deluxe (163 6th Street), OER E-Designation Site, New York, NY

EDUCATION

M.S., Environmental Geology
Rutgers University

B.S., Geological Sciences
Rutgers University

B.S., Environmental Science
Rutgers University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

Certified Hazardous Materials Manager – CHMM No. 15998

LEED Accredited Professional (LEED AP)

OSHA Certification for Hazardous Waste Site Supervisor

OSHA 29 CFR 1910.120 Certification for Hazardous Waste Operations and Emergency Response

NJDEP Certification for Community Noise Enforcement

Troxler Certification for Nuclear Densometer Training

- Prospect Park Redevelopment, Landfill Reclamation, Prospect Park, NJ
- 431 Carroll Street, Gowanus Canal Due Diligence, Brooklyn, NY
- 76 4th Street Property, Gowanus Due Diligence, Brooklyn, NY
- Foxgate/MREC, Due Diligence and Solid Waste Compliance, Central Islip, NY
- 175-225 3rd Street at Gowanus Canal, NYS Brownfield Cleanup Program, Brooklyn, NY
- New York University Tandon School of Engineering, Spill Investigation/Remediation Dual Phase Recovery, and Laser Fluorescence Investigation, Brooklyn, NY
- 2420-2430 Amsterdam Avenue, NYS Brownfield Cleanup Program/Board of Standards and Appeals Variance, New York, NY
- 170 Amsterdam Avenue, NYC VCP, New York, NY
- 538-540 Hudson Street, NYS Brownfield Cleanup Program (Former Gas Station), New York, NY
- 234 Butler Street, Gowanus Canal Due Diligence, Brooklyn, NY
- 550 Clinton Street, NYS Brownfield Cleanup Program E-Designation, Brooklyn, NY
- 111 Leroy Street, OER E-Designation Site, New York, NY
- 335 Bond Street, NYS Brownfield Cleanup Program, New York, NY
- Gowanus Canal Northside, NYS BCP Former Fuel Oil Terminal, Brooklyn, NY
- Multiple Buildings, Major Oil Storage Facility, Gowanus Canal Location, Brooklyn, NY
- 197-205 Smith Street at Gowanus Canal, MGP Due Diligence, Brooklyn, NY
- 450 Union Street at Gowanus Canal, NYS Brownfield Cleanup Program, Brooklyn, NY
- 86 Fleet Place, NYC VCP E-Designation, Brooklyn, NY
- New York University College of Nursing at 433 1st Avenue, NYS BCP, Bronx, NY
- Retail Building at 225 3rd Street, Brooklyn, NY
- 29-37 41st Avenue, NYS Brownfield Cleanup Program, Long Island City, NY
- 43-01 22nd Street, NYS Brownfield Cleanup Program, Long Island City, NY
- Compliance Audit for NYU at Washington Square Park, New York, NY
- Former Watermark Locations, NYS Brownfield Cleanup Program, Chlorinated Volatile Organic Compound Investigation and Remediation; AS/SVE, Brooklyn, NY
- Former Gas Station (1525 Bedford Avenue), Brooklyn, NY
- NYS Brownfield Cleanup Program at 514 West 24th Street, New York, NY
- Gowanus Canal Due Diligence at 76 4th Street, Brooklyn, NY
- Urban Health Plan, Medical Building, NYS Brownfield Cleanup Program CVOC Investigation and Remediation, Bronx, NY
- 420 East 54th Street, NYS Spill Closure, New York, NY
- Equity Residential at 160 Riverside Boulevard, NYS Spill Closure, New York, NY
- 357-359 West Street and 156 Leroy Street, NYC VCP, New York, NY
- Emergency Spill Response at 322 West 57th Street, Investigation and Closure, New York, NY

- Hurricane Sandy, Emergency Response at 21 West Street, New York, NY
- Hurricane Sandy, Emergency Response at 71 Pine Street, New York, NY
- Greenpoint Landing, NYC E-Designation, Brooklyn, NY
- 23-01 42nd Road, NYS Brownfield Cleanup Program, Long Island City, NY
- Greenpoint Waterfront Development, NYS Brownfield Cleanup Program, Brooklyn, NY
- 125th Street and Lenox Avenue, NYC VCP, New York, NY
- Whitehead Realty Solvent Site, Inactive Hazardous Waste site, CVOC
  Investigation and Remediation, Brooklyn, NY
- SunCap Property Group Environmental On-Call Consulting,
  Various Locations, Nationwide
- Consolidated Edison Company of New York, Underground Storage Tank On-Call Contract, Five Boroughs of New York City, NY
- Consolidated Edison Company of New York, Appendix B Spill Sites On-Call Contract, Five Boroughs of New York City, NY
- Meeker Avenue Plume Trackdown Site, Brooklyn, NY
- Distribution Facility, Superfund Redevelopment, Long Island City, NY
- Edison Properties, West 17th Street Development Site (Former MGP Site), New York, NY
- Con Edison on Governors Island, Dielectric Fluid Spill, Investigation and Remediation, New York, NY
- 144-150 Barrow Street, NYS Brownfield Cleanup Program, New York, NY
- West 17th Street Development, NYS Brownfield Cleanup Program, MGP Investigation and Remediation, New York, NY
- Montefiore Medical Center, Emergency Response, PCB Remediation, Bronx, NY
- New York University, 4 Washington Square Village Fuel Oil Remediation, New York, NY
- NYCSCA, Proposed New York City School Construction Sites,
  Five Boroughs of New York City, NY
- Con Edison, East 60th Street Generating Station, New York, NY
- Residential Building at 82 Irving Place, Environmental Remediation, New York, NY
- 1113 York Avenue, Storage Tank Closures, New York, NY
- Peter Cooper Village/Stuyvesant Town, Phase I ESA, New York, NY
- Superior Ink, Waste Characterization and Remedial Action Plans, New York, NY
- Bronx Mental Health Redevelopment Project, Phase I ESA, Bronx, NY
- 2950 Atlantic Avenue, Site Characterization Investigation, Brooklyn, NY
- Con Edison, East 74th Street Generating Station, Sediment Investigation, New York, NY
- Con Edison, First Avenue Properties, New York, NY
- Queens West Development Corp. Stage II, Long Island City, NY
- Article X Project Environmental Reviews, Various New York State Electrical Generation Sites, NY
- Poletti Generating Station, Astoria, NY
- Arthur Kill Generating Station, Staten Island, NY

- Distribution Facility, Phase I & Phase II ESA and Regulatory Compliance, Bohemia, NY
- Huntington Station Superfund Due Diligence, Huntington Station, NY
- Garvies Point Bulkhead, Glen Cove, NY
- Johnson & Hoffman Metal Stamping Facility, Environmental Compliance, Carle Place, NY
- Floral Park Storage Facility, Phase I and Phase II ESA
- Garden City Phase I ESAs at two sites, including part of a Superfund Site, Garden City, NY
- Huntington Station Storage Facility, Phase I and II ESA, Huntington Station, NY
- Trevor Day School, NYS Spill Site Expert Testimony, New York, NY

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

Burke, M., Ciambruschini, S., Nicholls, G., Tashji, A., Vaidya, S., "Redeveloping a Remediated MGP Site", MGP Symposium 2019, Atlantic City, NJ.

GREGORY C. WYKA, PG, LEED AP

SENIOR PROJECT GEOLOGIST

ENVIRONMENTAL ENGINEERING

Mr. Wyka is a geologist with experience in regulatory government, brownfield development, and environmental liability consulting. His expertise includes site characterization, remedial investigation, waste characterization, conceptual site modeling, remedial design and implementation, construction management, GIS, and sustainability. Mr. Wyka's abilities integrate remediation with property redevelopment and he provides technical, regulatory, logistical, and risk management guidance to clients, including developers, owners, and environmental attorneys. He provides direct assistance for clients on construction and remediation projects in the New York State Inactive Hazardous Waste Disposal Site Program, New York State Spill Response Program, New York State Brownfield Cleanup Program (BCP), New York City E-Designation Program and New York City Voluntary Cleanup Program (VCP).

EDUCATION

B.A., Geology, Chemistry and Environmental Studies
Bowdoin College

PROFESSIONAL REGISTRATION

LEED Accredited Professional (LEED AP) Neighborhood Development

Professional Geologist (PG) in NY

10-Hour OSHA

CPR and First Aid Certified

AFFILIATIONS

New York State Council of Professional Geologists (NYSCPG)

NYSCPG Board of Directors

Urban Green Council

New York City Brownfield Partnership

SELECTED PROJECTS

- Greenpoint Landing Waterfront Development, Brooklyn, NY: Brownfield Redevelopment, E-Designation, NYC VCP
- Anable Basin, Long Island City, NY; Brownfield Redevelopment, BCP.
- 82 King Street, New York, NY: Brownfield Redevelopment, BCP
- 300 West 122nd Street, New York, NY: Brownfield Redevelopment, BCP
- 2409 Jerome Avenue, Bronx, NY: Brownfield Redevelopment, BCP.
- City DPW Yard, New Rochelle, NY: Brownfield Redevelopment, BCP
- 160 Leroy Street, New York, NY: Brownfield Redevelopment; E-Designation, NYC VCP 685 First Avenue. New York, NY: Brownfield Redevelopment: NYSDEC Voluntary Cleanup Program
- 60 West Street, Brooklyn, NY: Brownfield Redevelopment, E-Designation
- 27-19 44th Drive, Long Island City, NY: Brownfield Redevelopment
- 515 West 42nd Street, New York, NY: E-Designation
- Brooklyn Bridge Park, Pierhouse: Brownfield Redevelopment 550 Myrtle Avenue, Brooklyn, NY: E-Designation
- 50 Jay Street, Phase I ESA, Brooklyn, NY
- 205 Water Street, Brooklyn, NY: Brownfield Redevelopment, E-Designation
- 29-01 Borden Avenue, Long Island City, NY; Brownfield Redevelopment, NYSDEC Spills
- 29-10 Hunters Point Avenue, Long Island City, NY: Brownfield Redevelopment
- 30-27 Greenpoint Avenue, Long Island City, NY: NYSDEC Spills
- 55 Water Street, New York, NY: Emergency petroleum spill closure (Tropical Storm Sandy)
- 144 East 201st Street, New York, NY: Brownfield Redevelopment, E-Designation
- 310 Meserole Street, Phase I ESA, Brooklyn, NY

- 13-17 Laight Street, Phase I ESA, New York, NY
- 460 Mother Gaston Boulevard, Phase I ESA, Brooklyn, NY
- 25 Kent Avenue, Phase I ESA, Brooklyn, NY
- 1110 Oak Point Avenue, Phase I ESA, Bronx, NY
- 859-863 Lexington Avenue, Phase I ESA, New York, NY
- 49 East 21st Street, Phase I ESA, New York, NY
- 1552-1560 Broadway, Phase I ESA, New York, NY
- 287-291 East Houston Street, Phase I ESA, New York, NY
- Big River Study Area (Superfund), Old Lead Belt, Park Hills and Desloge, MO: Remedial Investigation
  Berry's Creek Study Area (Superfund Site), Bergen County, NJ: Remedial Investigation
- Everglades Restoration Project, Clewiston, FL: Remedial Investigation
- Marble River Wind Farm, Ellenburg, NY: Wetland Delineation

ANTHONY MOFFA, JR., ASP, CHMM, COSS, CSP

ASSOCIATE
CORPORATE HEALTH AND SAFETY MANAGER

Anthony is Langan's Corporate Health & Safety Manager and is responsible for managing health and safety compliance in all Langan office locations. He has nearly 20 years of experience in the health and safety field. He is responsible for ensuring compliance with all federal and state occupational health and safety laws and development and implementation of corporate health and safety policies. His responsibilities include reviewing and updating Langan's Corporate Health and Safety Program and assisting employees in the development of site specific Health & Safety Plans. He maintains and manages health and safety records for employees in all Langan office locations including medical evaluations, respirator fit testing, and Hazardous Waste Operations and Emergency Response training. He is also responsible for documentation and investigation of work-related injuries and incidents and sharing this information with employees to assist in the prevention of future incidents. He is also the chairman of the Corporate Health & Safety Committee and Health & Safety Leadership Team that meet periodically throughout the year. He is responsible for coordinating and providing health and safe training to Langan employees. He was formerly the Environmental, Health and Safety Coordinator at a chemical manufacturer. His experience included employee hazard communications, development of material safety data sheets for developed products, respirator fit testing and conducting required Occupational Health & Safety Association and Department of Transportation training.

EDUCATION

B.S., Physics
West Chester University

PROFESSIONAL REGISTRATION

Associate Safety Professional (ASP)

Certified Hazardous Material Manager (CHMM)

Certified Occupational Safety Specialist (COSS)

Certified Safety Professional (CSP)

AFFILIATIONS

Pennsylvania Chamber of Business & Industry

Chemical Council of New Jersey

New Jersey Business & Industry Association

Geoprofessional Business Association

American Society of Safety Professionals

WILLIAM BOHRER, PG

PROJECT GEOLOGIST

GEOLOGIST

Mr. Bohrer is an experienced geologist responsible for managing Langan's environmental standards and Health and Safety compliance for projects throughout New York City. His services include dissemination of environmental protocols, troubleshooting at project sites, in-house/field training, and maintenance of quality standards across the environmental discipline. Mr. Bohrer has a diverse and extensive background in geophysics, hydrogeology, mining and petroleum, and geotechnical engineering. He has developed conceptual site models for public, industrial and commercial facilities nationwide.

SELECTED PROJECTS

- NYU Poly – 122 Johnson Street, Brooklyn, NY
- Con Edison of New York at Governor's Island, NY, NY
- 535 4th Avenue, Brooklyn, NY
- 27 Wooster Street, New York, NY
- 42 West Street, Brooklyn, NY
- 455 West 19th Street, New York, NY
- Kings Plaza Mall, Brooklyn, NY
- Hudson Yards "Terra Firma", New York, NY
- Hudson Yards, Platform Special Inspection, New York, NY
- PSAC II, Bronx, NY
- 595-647 Smith Street, Brooklyn, NY
- New York University, 7-13 Washington Square North Investigation, New York, NY
- NYU 4 Washington Square Village, New York, NY
- 125th Street and Lenox Avenue, New York, NY
- Sullivan Street Development, New York, NY
- Hudson Crossing II, New York, NY
- New York Aquarium, Shark Tank & Animal Care Facility, Brooklyn, NY
- 209-219 Sullivan Street, New York, NY
- 261 Hudson Street, New York, NY
- 460 Washington Street, New York, NY
- 552 West 24th Street, New York, NY
- Brooklyn Bridge Park Pier 1, New York, NY
- International Leadership Bronx Charter School, Bronx, NY
- 203 East 92nd Street, New York, NY
- HighLine 28-29, New York, NY
- 539 Smith Street Bulkhead, Brooklyn, NY
- Willets Point, Corona, NY
- Plume Migration and Fracture Flow Aquifer Investigation, Brunswick, MD
- Plume Migration and Fracture Flow Aquifer Investigation, Fallston, MD
- Emergency Response Site Investigation & Remediation, Wappingers Falls, NY
- Emergency Response Site Investigation & Remediation, Allentown, PA

EDUCATION

Post Graduate Studies in Geophysics
Cornell University

B.S., Geology
Tufts University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

40 Hour OSHA HazWOPER

OSHA Construction Safety & Health

OSHA Supervisory Certification
Credential (TWIC)

Transportation Worker Identification

NYS DEC- Protecting New York's Natural Resources with Better Construction Site Management

AFFILIATIONS

American Association of Petroleum Geologists

National Groundwater Association

Geological Society of America

LANGAN

- Emergency Response Site Investigation & Remediation, Shamokin, PA
- Bermuda International Airport, Jet Fuel Release Investigation, Bermuda
- Little Missouri River Basin, Geotechnical Site Evaluation (Horizontal Drilling Pipeline Install), ND
- Seismic Susceptibility Evaluation (Class 2 Injection Wells), Litchfield, OH
- Bedrock Mapping, Bradford and Sullivan Counties, PA
- Soil Solidification, Carteret, NJ

PA Council of Professional Geologists

JOSEPH CONBOY

STAFF CHEMIST

ENVIRONMNETAL

Mr. Conboy has seven years of environmental chemistry, quality assurance, and environmental database management experience, with a current emphasis on validation of laboratory data for submittal to NJDEP via the New Jersey Data of Known Quality Protocols and to NYSDEC. Previous work experience includes performing validation of data for projects in USEPA Regions 2 and 3 while employing appropriate validation guidelines for each region, managing large data sets, updating appropriate regulatory limits, performing statistical evaluations, and preparing electronic data deliverables and report deliverables using the Earthsoft EQuIS database program, and acted as an intermediary between project managers, field staff, and laboratories. Mr. Conboy also has experience in field sampling techniques and maintains current OSHA HAZWOPER certification.

EDUCATION

B.Sc., Chemistry with a minor in Mathematics
Rowan University

CERTIFICATIONS & TRAINING

OSHA 40-Hour HAZWOPER 29 CFR 1910.120(e)(4) Certification

NJ Analytical Guidance and Data Usability Training

USEPA Data Validation Training

Earthsoft EQuIS Environmental Database Training

SELECTED PROJECTS

- 1400 Ferris, Bronx, NY – Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs and SVOCs including 1,4-dioxane, and tangentially used based on professional judgment to perform validation of PFAS data.
- Broome Street Parking Lot, NY - Completed validation of waste characterization data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs, SVOCs, herbicides, PCBs, pesticides, metals including mercury, ignitability temperature, pH, reactive cyanide, reactive sulfide, cyanide, and hexavalent chromium. Toxicity characteristic leachate procedure extraction data for VOCs, SVOCs, herbicides, pesticides, metals, and mercury were also validated.
- 215 North 10th Street, Brooklyn, NY - Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data.
- 35 Commercial Street, Brooklyn, NY - Completed validation of soil data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.
- Suffolk Street, Lower East Side, NY- Completed validation of soil, groundwater, and soil vapor data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II

guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, VOCs by USEPA TO-15, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.

- Managed a database for a confidential client containing 10+ years of environmental chemical data from multiple laboratories, requiring select data validation in accordance with New Jersey Data of Known Quality Protocols and identifying areas of delineation from historic field information. Once identified, NJDEP designated groundwater, surface water, soil, sediment, soil vapor, and custom screening criteria were researched and applied to each area, requiring individualized flagging for reporting.*
- Prepared the New Jersey Data of Known Quality Protocol Data Usability Evaluation and managed the database for a confidential client for a data set greater than 20 years old. A DUE or any validation effort was not prepared in the 20 years prior to current. This included data from variations of methods for volatile organic compounds, semivolatile organic compounds, total and dissolved metals, pesticides, herbicides, natural attenuation parameters, and per- and polyfluoroalkyl substances in multiple media.*
- Performed 200+ Stage 2a validations for a combined 87-acre USEPA designated Corrective Action site under the Resource Conservation and Recovery Act, including a quick-turn USEPA required PCB by soxhlet extraction investigation across multiple plants. Once a former train car painting facility, USEPA required a quick-turn PCB by soxhlet extraction soil investigation.
- Preparation of a quality assurance program for a confidential client in West Virginia. A quick turn QAPP was prepared in a service location new to the consultant, resulting in research into state requirements for data usability and auditing newly employed laboratories. The QAPP was understood to be prepared for groundwater only, but the client did not reveal the need for sediment and soil. Two QAPPs were submitted for review to governing agencies.*
- Used statistical software to determine a localized background upper confidence limit of chromium for a confidential client's sand and gravel site. Validation was used to confirm laboratory procedures, and data was used in ProUCL calculations to compare to researched background chromium levels for Pennsylvania soils. *
- Prepared daily perimeter dust and air monitoring summaries and validation of low level mirex data for a confidential client's superfund site. Low level mirex data was generated by university laboratories and subject to validation following national functional guidelines to aide in river clean-up, including sediment, surface water, and treatment system water matrices.*

**Project completed prior to employment at LANGAN.*

Attachment B

Laboratory Analytical Limits and
Method Detection Limits

APPENDIX B

SOIL SAMPLES
LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

Method	Matrix	Analyte	RL	MDL	Units
Volatile Organic Compounds					
EPA 8260C/5035	Soil	1,1,1,2-Tetrachloroethane	0.001	0.000318	mg/kg
EPA 8260C/5035	Soil	1,1,1-Trichloroethane	0.001	0.0001108	mg/kg
EPA 8260C/5035	Soil	1,1,2,2-Tetrachloroethane	0.001	0.0001008	mg/kg
EPA 8260C/5035	Soil	1,1,2-Trichloro-1,2,2-Trifluoroethane	0.02	0.000274	mg/kg
EPA 8260C/5035	Soil	1,1,2-Trichloroethane	0.0015	0.000304	mg/kg
EPA 8260C/5035	Soil	1,1-Dichloroethane	0.0015	0.0000856	mg/kg
EPA 8260C/5035	Soil	1,1-Dichloroethene	0.001	0.000262	mg/kg
EPA 8260C/5035	Soil	1,1-Dichloropropene	0.005	0.0001414	mg/kg
EPA 8260C/5035	Soil	1,2,3-Trichlorobenzene	0.005	0.0001476	mg/kg
EPA 8260C/5035	Soil	1,2,3-Trichloropropane	0.01	0.0001626	mg/kg
EPA 8260C/5035	Soil	1,2,4,5-Tetramethylbenzene	0.004	0.0001302	mg/kg
EPA 8260C/5035	Soil	1,2,4-Trichlorobenzene	0.005	0.0001818	mg/kg
EPA 8260C/5035	Soil	1,2,4-Trimethylbenzene	0.005	0.0001414	mg/kg
EPA 8260C/5035	Soil	1,2-Dibromo-3-chloropropane	0.005	0.000396	mg/kg
EPA 8260C/5035	Soil	1,2-Dibromoethane	0.004	0.0001744	mg/kg
EPA 8260C/5035	Soil	1,2-Dichlorobenzene	0.005	0.0001532	mg/kg
EPA 8260C/5035	Soil	1,2-Dichloroethane	0.001	0.0001134	mg/kg
EPA 8260C/5035	Soil	1,2-Dichloropropane	0.0035	0.000228	mg/kg
EPA 8260C/5035	Soil	1,3,5-Trimethylbenzene	0.005	0.0001434	mg/kg
EPA 8260C/5035	Soil	1,3-Dichlorobenzene	0.005	0.000135	mg/kg
EPA 8260C/5035	Soil	1,3-Dichloropropane	0.005	0.0001452	mg/kg
EPA 8260C/5035	Soil	1,4-Dichlorobenzene	0.005	0.0001384	mg/kg
EPA 8260C/5035	Soil	1,4-Diethylbenzene	0.004	0.0001598	mg/kg
EPA 8260C/5035	Soil	1,4-Dioxane	0.1	0.01442	mg/kg
EPA 8260C/5035	Soil	2,2-Dichloropropane	0.005	0.000226	mg/kg
EPA 8260C/5035	Soil	2-Butanone	0.01	0.000272	mg/kg
EPA 8260C/5035	Soil	2-Hexanone	0.01	0.000666	mg/kg
EPA 8260C/5035	Soil	4-Ethyltoluene	0.004	0.000124	mg/kg
EPA 8260C/5035	Soil	4-Methyl-2-pentanone	0.01	0.000244	mg/kg
EPA 8260C/5035	Soil	Acetone	0.01	0.001036	mg/kg
EPA 8260C/5035	Soil	Acrolein	0.025	0.00806	mg/kg
EPA 8260C/5035	Soil	Acrylonitrile	0.01	0.000514	mg/kg
EPA 8260C/5035	Soil	Benzene	0.001	0.000118	mg/kg
EPA 8260C/5035	Soil	Bromobenzene	0.005	0.000208	mg/kg
EPA 8260C/5035	Soil	Bromochloromethane	0.005	0.000276	mg/kg
EPA 8260C/5035	Soil	Bromodichloromethane	0.001	0.0001732	mg/kg
EPA 8260C/5035	Soil	Bromoform	0.004	0.000236	mg/kg
EPA 8260C/5035	Soil	Bromomethane	0.002	0.000338	mg/kg
EPA 8260C/5035	Soil	Carbon disulfide	0.01	0.001102	mg/kg
EPA 8260C/5035	Soil	Carbon tetrachloride	0.001	0.00021	mg/kg
EPA 8260C/5035	Soil	Chlorobenzene	0.001	0.000348	mg/kg
EPA 8260C/5035	Soil	Chloroethane	0.002	0.000316	mg/kg
EPA 8260C/5035	Soil	Chloroform	0.0015	0.00037	mg/kg
EPA 8260C/5035	Soil	Chloromethane	0.005	0.000294	mg/kg
EPA 8260C/5035	Soil	cis-1,2-Dichloroethene	0.001	0.0001428	mg/kg
EPA 8260C/5035	Soil	cis-1,3-Dichloropropene	0.001	0.0001176	mg/kg
EPA 8260C/5035	Soil	Cyclohexane	0.02	0.000146	mg/kg
EPA 8260C/5035	Soil	Dibromochloromethane	0.001	0.0001536	mg/kg
EPA 8260C/5035	Soil	Dibromomethane	0.01	0.0001636	mg/kg
EPA 8260C/5035	Soil	Dichlorodifluoromethane	0.01	0.0001908	mg/kg
EPA 8260C/5035	Soil	Ethyl ether	0.005	0.00026	mg/kg
EPA 8260C/5035	Soil	Ethylbenzene	0.001	0.0001274	mg/kg
EPA 8260C/5035	Soil	Hexachlorobutadiene	0.005	0.000228	mg/kg
EPA 8260C/5035	Soil	Isopropylbenzene	0.001	0.0001038	mg/kg
EPA 8260C/5035	Soil	Methyl Acetate	0.02	0.00027	mg/kg
EPA 8260C/5035	Soil	Methyl cyclohexane	0.004	0.0001546	mg/kg
EPA 8260C/5035	Soil	Methyl tert butyl ether	0.002	0.0000844	mg/kg
EPA 8260C/5035	Soil	Methylene chloride	0.01	0.001104	mg/kg
EPA 8260C/5035	Soil	Naphthalene	0.005	0.0001384	mg/kg
EPA 8260C/5035	Soil	n-Butylbenzene	0.001	0.0001148	mg/kg
EPA 8260C/5035	Soil	n-Propylbenzene	0.001	0.0001092	mg/kg
EPA 8260C/5035	Soil	o-Chlorotoluene	0.005	0.0001598	mg/kg
EPA 8260C/5035	Soil	o-Xylene	0.002	0.0001718	mg/kg
EPA 8260C/5035	Soil	p/m-Xylene	0.002	0.0001978	mg/kg
EPA 8260C/5035	Soil	p-Chlorotoluene	0.005	0.0001328	mg/kg
EPA 8260C/5035	Soil	p-Isopropyltoluene	0.001	0.000125	mg/kg
EPA 8260C/5035	Soil	sec-Butylbenzene	0.001	0.000122	mg/kg
EPA 8260C/5035	Soil	Styrene	0.002	0.000402	mg/kg
EPA 8260C/5035	Soil	tert-Butyl Alcohol	0.06	0.00292	mg/kg
EPA 8260C/5035	Soil	tert-Butylbenzene	0.005	0.0001354	mg/kg
EPA 8260C/5035	Soil	Tetrachloroethene	0.001	0.0001402	mg/kg
EPA 8260C/5035	Soil	Toluene	0.0015	0.0001948	mg/kg
EPA 8260C/5035	Soil	trans-1,2-Dichloroethene	0.0015	0.000212	mg/kg
EPA 8260C/5035	Soil	trans-1,3-Dichloropropene	0.001	0.0001208	mg/kg
EPA 8260C/5035	Soil	trans-1,4-Dichloro-2-butene	0.005	0.000392	mg/kg
EPA 8260C/5035	Soil	Trichloroethene	0.001	0.000125	mg/kg
EPA 8260C/5035	Soil	Trichlorofluoromethane	0.005	0.000388	mg/kg
EPA 8260C/5035	Soil	Vinyl acetate	0.01	0.0001322	mg/kg
EPA 8260C/5035	Soil	Vinyl chloride	0.002	0.0001174	mg/kg
EPA 8260C/5035	Soil	Xylenes, Total	0.002	0.0001978	mg/kg

APPENDIX B

SOIL SAMPLES
LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

Method	Matrix	Analyte	RL	MDL	Units
Semivolatile Organic Compounds					
EPA 8270D	Soil	1,2,4,5-Tetrachlorobenzene	0.1665	0.0515817	mg/kg
EPA 8270D	Soil	1,2,4-Trichlorobenzene	0.1665	0.0545787	mg/kg
EPA 8270D	Soil	1,2-Dichlorobenzene	0.1665	0.0546453	mg/kg
EPA 8270D	Soil	1,3-Dichlorobenzene	0.1665	0.0524808	mg/kg
EPA 8270D	Soil	1,4-Dichlorobenzene	0.1665	0.050616	mg/kg
EPA 8270D	Soil	2,3,4,6-Tetrachlorophenol	0.1665	0.028305	mg/kg
EPA 8270D	Soil	2,4,5-Trichlorophenol	0.1665	0.053946	mg/kg
EPA 8270D	Soil	2,4,6-Trichlorophenol	0.0999	0.0314019	mg/kg
EPA 8270D	Soil	2,4-Dichlorophenol	0.14985	0.053946	mg/kg
EPA 8270D	Soil	2,4-Dimethylphenol	0.1665	0.049617	mg/kg
EPA 8270D	Soil	2,4-Dinitrophenol	0.7992	0.227772	mg/kg
EPA 8270D	Soil	2,4-Dinitrotoluene	0.1665	0.0359307	mg/kg
EPA 8270D	Soil	2,6-Dinitrotoluene	0.1665	0.042624	mg/kg
EPA 8270D	Soil	2-Chloronaphthalene	0.1665	0.054279	mg/kg
EPA 8270D	Soil	2-Chlorophenol	0.1665	0.050283	mg/kg
EPA 8270D	Soil	2-Methylnaphthalene	0.1998	0.0531801	mg/kg
EPA 8270D	Soil	2-Methylphenol	0.1665	0.053613	mg/kg
EPA 8270D	Soil	2-Nitroaniline	0.1665	0.046953	mg/kg
EPA 8270D	Soil	2-Nitrophenol	0.35964	0.051948	mg/kg
EPA 8270D	Soil	3,3'-Dichlorobenzidine	0.1665	0.044289	mg/kg
EPA 8270D	Soil	3-Methylphenol/4-Methylphenol	0.23976	0.054612	mg/kg
EPA 8270D	Soil	3-Nitroaniline	0.1665	0.045954	mg/kg
EPA 8270D	Soil	4,6-Dinitro-o-cresol	0.4329	0.060939	mg/kg
EPA 8270D	Soil	4-Bromophenyl phenyl ether	0.1665	0.038295	mg/kg
EPA 8270D	Soil	4-Chloroaniline	0.1665	0.043956	mg/kg
EPA 8270D	Soil	4-Chlorophenyl phenyl ether	0.1665	0.0506493	mg/kg
EPA 8270D	Soil	4-Nitroaniline	0.1665	0.044955	mg/kg
EPA 8270D	Soil	4-Nitrophenol	0.2331	0.053946	mg/kg
EPA 8270D	Soil	Acenaphthene	0.1332	0.034299	mg/kg
EPA 8270D	Soil	Acenaphthylene	0.1332	0.0311355	mg/kg
EPA 8270D	Soil	Acetophenone	0.1665	0.051615	mg/kg
EPA 8270D	Soil	Anthracene	0.0999	0.0277056	mg/kg
EPA 8270D	Soil	Atrazine	0.1332	0.0377289	mg/kg
EPA 8270D	Soil	Azobenzene	0.1665	0.044622	mg/kg
EPA 8270D	Soil	Benzaldehyde	0.21978	0.067266	mg/kg
EPA 8270D	Soil	Benzidine	0.54945	0.130203	mg/kg
EPA 8270D	Soil	Benzo(a)anthracene	0.0999	0.0326007	mg/kg
EPA 8270D	Soil	Benzo(a)pyrene	0.1332	0.0407259	mg/kg
EPA 8270D	Soil	Benzo(b)fluoranthene	0.0999	0.033633	mg/kg
EPA 8270D	Soil	Benzo(ghi)perylene	0.1332	0.034632	mg/kg
EPA 8270D	Soil	Benzo(k)fluoranthene	0.0999	0.0317682	mg/kg
EPA 8270D	Soil	Benzoic Acid	0.53946	0.168498	mg/kg
EPA 8270D	Soil	Benzyl Alcohol	0.1665	0.051282	mg/kg
EPA 8270D	Soil	Biphenyl	0.37962	0.0549117	mg/kg
EPA 8270D	Soil	Bis(2-chloroethoxy)methane	0.17982	0.0504162	mg/kg
EPA 8270D	Soil	Bis(2-chloroethyl)ether	0.14985	0.0466866	mg/kg
EPA 8270D	Soil	Bis(2-chloroisopropyl)ether	0.1998	0.058608	mg/kg
EPA 8270D	Soil	Bis(2-Ethylhexyl)phthalate	0.1665	0.043623	mg/kg
EPA 8270D	Soil	Butyl benzyl phthalate	0.1665	0.0325341	mg/kg
EPA 8270D	Soil	Caprolactam	0.1665	0.045954	mg/kg
EPA 8270D	Soil	Carbazole	0.1665	0.0357975	mg/kg
EPA 8270D	Soil	Chrysene	0.0999	0.0327006	mg/kg
EPA 8270D	Soil	Dibenzo(a,h)anthracene	0.0999	0.0322344	mg/kg
EPA 8270D	Soil	Dibenzofuran	0.1665	0.0555777	mg/kg
EPA 8270D	Soil	Diethyl phthalate	0.1665	0.0351981	mg/kg
EPA 8270D	Soil	Dimethyl phthalate	0.1665	0.042291	mg/kg
EPA 8270D	Soil	Di-n-butylphthalate	0.1665	0.0321345	mg/kg
EPA 8270D	Soil	Di-n-octylphthalate	0.1665	0.040959	mg/kg
EPA 8270D	Soil	Fluoranthene	0.0999	0.0305694	mg/kg
EPA 8270D	Soil	Fluorene	0.1665	0.0477189	mg/kg
EPA 8270D	Soil	Hexachlorobenzene	0.0999	0.0310356	mg/kg
EPA 8270D	Soil	Hexachlorobutadiene	0.1665	0.046953	mg/kg
EPA 8270D	Soil	Hexachlorocyclopentadiene	0.47619	0.106893	mg/kg
EPA 8270D	Soil	Hexachloroethane	0.1332	0.0302697	mg/kg
EPA 8270D	Soil	Indeno(1,2,3-cd)Pyrene	0.1332	0.036963	mg/kg
EPA 8270D	Soil	Isophorone	0.14985	0.044289	mg/kg
EPA 8270D	Soil	Naphthalene	0.1665	0.055278	mg/kg
EPA 8270D	Soil	Nitrobenzene	0.14985	0.039627	mg/kg
EPA 8270D	Soil	NitrosoDiPhenylAmine(NDPA)/DPA	0.1332	0.034965	mg/kg
EPA 8270D	Soil	n-Nitrosodimethylamine	0.333	0.0539127	mg/kg
EPA 8270D	Soil	n-Nitrosodi-n-propylamine	0.1665	0.049617	mg/kg
EPA 8270D	Soil	P-Chloro-M-Cresol	0.1665	0.048285	mg/kg
EPA 8270D	Soil	Pentachlorophenol	0.1332	0.035631	mg/kg
EPA 8270D	Soil	Phenanthrene	0.0999	0.0325674	mg/kg
EPA 8270D	Soil	Phenol	0.1665	0.049284	mg/kg
EPA 8270D	Soil	Pyrene	0.0999	0.0323676	mg/kg

APPENDIX B

SOIL SAMPLES
LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

Method	Matrix	Analyte	RL	MDL	Units
		Pesticides			
EPA 8081B	Soil	4,4'-DDD	0.007992	0.00285048	mg/kg
EPA 8081B	Soil	4,4'-DDE	0.007992	0.00184815	mg/kg
EPA 8081B	Soil	4,4'-DDT	0.014985	0.0064269	mg/kg
EPA 8081B	Soil	Aldrin	0.007992	0.00281385	mg/kg
EPA 8081B	Soil	Alpha-BHC	0.00333	0.00094572	mg/kg
EPA 8081B	Soil	Beta-BHC	0.007992	0.0030303	mg/kg
EPA 8081B	Soil	Chlordane	0.064935	0.0264735	mg/kg
EPA 8081B	Soil	cis-Chlordane	0.00999	0.00278388	mg/kg
EPA 8081B	Soil	Delta-BHC	0.007992	0.0015651	mg/kg
EPA 8081B	Soil	Dieldrin	0.004995	0.0024975	mg/kg
EPA 8081B	Soil	Endosulfan I	0.007992	0.00188811	mg/kg
EPA 8081B	Soil	Endosulfan II	0.007992	0.00267066	mg/kg
EPA 8081B	Soil	Endosulfan sulfate	0.00333	0.00158508	mg/kg
EPA 8081B	Soil	Endrin	0.00333	0.0013653	mg/kg
EPA 8081B	Soil	Endrin aldehyde	0.00999	0.0034965	mg/kg
EPA 8081B	Soil	Endrin ketone	0.007992	0.00205794	mg/kg
EPA 8081B	Soil	Heptachlor	0.003996	0.00179154	mg/kg
EPA 8081B	Soil	Heptachlor epoxide	0.014985	0.0044955	mg/kg
EPA 8081B	Soil	Lindane	0.00333	0.00148851	mg/kg
EPA 8081B	Soil	Methoxychlor	0.014985	0.004662	mg/kg
EPA 8081B	Soil	Toxaphene	0.14985	0.041958	mg/kg
EPA 8081B	Soil	trans-Chlordane	0.00999	0.00263736	mg/kg
		Polychlorinated Biphenyls			
EPA 8082A	Soil	Aroclor 1016	0.0335	0.0026465	mg/kg
EPA 8082A	Soil	Aroclor 1221	0.0335	0.0030887	mg/kg
EPA 8082A	Soil	Aroclor 1232	0.0335	0.0039262	mg/kg
EPA 8082A	Soil	Aroclor 1242	0.0335	0.0041004	mg/kg
EPA 8082A	Soil	Aroclor 1248	0.0335	0.0028274	mg/kg
EPA 8082A	Soil	Aroclor 1254	0.0335	0.0027537	mg/kg
EPA 8082A	Soil	Aroclor 1260	0.0335	0.0025527	mg/kg
EPA 8082A	Soil	Aroclor 1262	0.0335	0.0016616	mg/kg
EPA 8082A	Soil	Aroclor 1268	0.0335	0.0048575	mg/kg
EPA 8082A	Soil	Total PCBs	0.0335	0.0016616	mg/kg
		Herbicides			
EPA 8151A	Soil	2,4-D	0.1665	0.0051615	mg/kg
EPA 8151A	Soil	2,4,5-TP (Silvex)	0.1665	0.0044289	mg/kg
EPA 8151A	Soil	2,4,5-T	0.1665	0.0104895	mg/kg
		Metals			
EPA 6010C	Soil	Aluminum	4	0.8	mg/kg
EPA 6010C	Soil	Antimony	2	0.32	mg/kg
EPA 6010C	Soil	Arsenic	0.4	0.08	mg/kg
EPA 6010C	Soil	Barium	0.4	0.12	mg/kg
EPA 6010C	Soil	Beryllium	0.2	0.04	mg/kg
EPA 6010C	Soil	Cadmium	0.4	0.028	mg/kg
EPA 6010C	Soil	Calcium	4	1.2	mg/kg
EPA 6010C	Soil	Chromium	0.4	0.08	mg/kg
EPA 7196A	Soil	Hexvalent Chromium	0.8	0.16	mg/kg
EPA 6010C	Soil	Cobalt	0.8	0.2	mg/kg
EPA 6010C	Soil	Copper	0.4	0.08	mg/kg
EPA 6010C	Soil	Iron	2	0.8	mg/kg
EPA 6010C	Soil	Lead	2	0.08	mg/kg
EPA 6010C	Soil	Magnesium	4	0.4	mg/kg
EPA 6010C	Soil	Manganese	0.4	0.08	mg/kg
EPA 7473	Soil	Mercury	0.08	0.016896	mg/kg
EPA 6010C	Soil	Nickel	1	0.16	mg/kg
EPA 6010C	Soil	Potassium	100	16	mg/kg
EPA 6010C	Soil	Selenium	0.8	0.12	mg/kg
EPA 6010C	Soil	Silver	0.4	0.08	mg/kg
EPA 6010C	Soil	Sodium	80	12	mg/kg
EPA 6010C	Soil	Thallium	0.8	0.16	mg/kg
EPA 6010C	Soil	Vanadium	0.4	0.04	mg/kg
EPA 6010C	Soil	Zinc	2	0.28	mg/kg

Attachment C

Analytical Methods/Quality Assurance Summary Table

ATTACHMENT C

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Field Duplicate Samples	Equipment Blank Samples	Trip Blank Samples	Ambient Air Samples	MS/MSD Samples
Groundwater	Temperature, Turbidity, pH, ORP, Conductivity	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C; HCl to pH <2;no headspace	Three 40-mL VOC vials with Teflon®-lined cap	Analyze within 14 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per shipment of VOC samples	NA	1 per 20 samples
		1,4-dioxane	8270 SIM isotope dilution	Cool to 4°C	One 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TCL SVOCs	EPA 8270D	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TAL Metals	EPA 6010C, EPA 7470	Cool to 4°C; HNO_3	250 ml plastic	6 months, except Mercury 28 days					
		Hexavalent Chromium	EPA 7196A	Cool to 4°C	250 ml plastic	24 hours					
		Cyanide	EPA 9010C/9012A	Cool to 4°C; NaOH plus 0.6g ascorbic acid	250 ml plastic	14 days					
		Part 375 + TCL Herbicides	EPA 8151A	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	Two 1-Liter Amber Glass for Pesticides/PCB	7 days to extract, 40 days after extraction to analysis					
		PCBs	EPA 8082A	Cool to 4°C		7 days to extract, 40 days after extraction to analysis					
		Biological Oxygen Demand	SM21 5210B	None	One 500mL plastic	48 hours	N/A	N/A	N/A	N/A	N/A
		Chemical Oxygen Demand	SM21 5220C	H2SO4	250mL plastic	28 days	N/A	N/A	N/A	N/A	N/A
		Total Organic Carbon	SM21 5310B, SW8469060	H3PO4	Three 40mL VOA vials	28 days	N/A	N/A	N/A	N/A	N/A
		Sulfate (SO_4^{2-})	ASTM516-90,02	None	250mL plastic	28 days	N/A	N/A	N/A	N/A	N/A
		Sulfide (S^{2-})	SM21 4500 S F	NaOH, Zinc Acetate	Two 250mL	7 days	N/A	N/A	N/A	N/A	N/A
		Nitrate (NO_3^{1-})	SM4500NO_3-F	H2SO4	Two 250mL plastic	48 hours	N/A	N/A	N/A	N/A	N/A
		Nitrite (NO_{2-})	EPA 353.2	H2SO4	Two 250mL plastic	48 hours	N/A	N/A	N/A	N/A	N/A
		Total Phosphorus	EPA 365.4/4500PE	H2SO4	250 mL plastic	28 days	N/A	N/A	N/A	N/A	N/A
		Ammonia	SM18 4500 NH3F	H2SO4	250 mL plastic	28 days	N/A	N/A	N/A	N/A	N/A
		Per- and polyfluoroalkyl substances (PFAS)	EPA 537 Modified	Cool to 4°C; Trizma	Two 250 mL plastic	14 days	N/A	N/A	N/A	N/A	N/A
		Naphthalene Dioxygenase (NAH)	N/A	Cool to 4°C	1-2 liters	48 hours	N/A	N/A	N/A	N/A	N/A
		Napthalene Inducible Dioxygenase (NIDA)	N/A	Cool to 4°C	1-2 liters	48 hours	N/A	N/A	N/A	N/A	N/A
		Phenol Hydroxylase (PHE)	N/A	Cool to 4°C	1-2 liters	48 hours	N/A	N/A	N/A	N/A	N/A
		Naphthyl-2-methyl-succinate synthase (NMS)	N/A	Cool to 4°C	1-2 liters	48 hours	N/A	N/A	N/A	N/A	N/A
		Naphthalene Carboxylase (ANC)	N/A	Cool to 4°C	1-2 liters	48 hours	N/A	N/A	N/A	N/A	N/A

ATTACHMENT C

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Field Duplicate Samples	Equipment Blank Samples	Trip Blank Samples	Ambient Air Samples	MS/MSD Samples
Soil	Total VOCs via PID	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C	Two 40-ml VOC vials with 5ml H_2O, one with MeOH or 3 Encore Samplers (separate container for % solids)	14 days	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per shipment of VOC samples	NA	1 per 20 samples
		Part 375 + TCL SVOCs	EPA 8270D	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Part 375 + TAL Metals	EPA 6010C, EPA 7470, EPA 7196A, EPA 9014/9010C	Cool to 4°C	2 oz. amber glass jar	6 months, except mercury 28 days					
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Part 375 + TCL Herbicides	EPA 8151A	Cool to 4°C	4 oz. amber glass jar	14 days extract					
		Part 375 + TCL PCBs	EPA 8082A	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Grain Size	ASTM SM2540G	N/A	Quart Ziplock Bag	N/A	N/A	N/A	N/A	N/A	N/A
		Biological Oxygen Demand	SM21 5210B	None	4 oz. glass jar	14 days	N/A	N/A	N/A	N/A	N/A
		Chemical Oxygen Demand	SM21 5220C	None	4 oz. glass jar	28 days	N/A	N/A	N/A	N/A	N/A
		pH	EPA 9040C	None	4 oz. glass jar	immediate	N/A	N/A	N/A	N/A	N/A
		Total Organic Carbon	Lloyd Kahn Method	None	2 oz. glass jar	28 days	N/A	N/A	N/A	N/A	N/A
		Sulfate	ASTM516-90,02	None	4 oz. glass jar	28 days	N/A	N/A	N/A	N/A	N/A
		Sulfide	SM21 4500 S F	None	4 oz. glass jar	7 days	N/A	N/A	N/A	N/A	N/A
		Total Kjeldahl Nitrogen (TKN)	EPA 351.2	None	4 oz. glass jar	28 days	N/A	N/A	N/A	N/A	N/A
		Total Phosphorous	EPA 365.4/4500PE	None	4 oz. glass jar	28 days	N/A	N/A	N/A	N/A	N/A
		Ammonia	SM18 4500 NH3F	None	4 oz. glass jar	28 days	N/A	N/A	N/A	N/A	N/A
Product	N/A	Petrleum Hydrocarbon Identification (PHI)	EPA 8015D	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis	N/A	N/A	N/A	N/A	N/A
		Density	Calculation	Cool to 4°C	4 oz. amber glass jar	N/A	N/A	N/A	N/A	N/A	N/A
		Viscosity	Calculation	Cool to 4°C	4 oz. amber glass jar	N/A	N/A	N/A	N/A	N/A	N/A
Soil Vapor	Total VOCs and Methane with MultiGas Meter	TO-15 Listed VOCs	TO-15	Ambient Temperature	6-Liter Summa Canister	Analyze within 30 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	NA	1 per 10 samples (minimum 1)	NA
Indoor Air and Ambient Air	Total VOCs via PID	TO-15 Listed VOCs	TO-15	Ambient Temperature	6-Liter Summa Canister	Analyze within 30 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	NA	1 per 10 samples (minimum 1)	NA

Notes:
1. PID - Photoionization Detector
2. VOC - Volatile organic compound
3. EPA - Environmental Protection Agency
4. TCL - Target compound list
5. TAL - Target analyte list

Attachment D

Sample Nomenclature

SOP #01 – Sample Nomenclature

INTRODUCTION

The Langan Environmental Group conducts an assortment of site investigations where samples (Vapor, Solids, and Aqueous) are collected and submitted to analytical laboratories for analysis. The results of which are then evaluated and entered into a data base allowing quick submittal to the state regulatory authority (New York State Division of Environmental Conservation [NYSDEC]). In addition, Langan is linking their data management system to graphic and analytical software to enable efficient evaluation of the data as well as creating client-ready presentational material.

SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) is applicable to the general framework for labeling vapor, solid (soil) and aqueous (groundwater) samples that will be submitted for laboratory analysis. The nomenclature being introduced is designed to meet the NYSDEC EQuIS standard and has been incorporated into Langan software scripts to assist project personnel in processing the data. While this SOP is applicable to all site investigation; unanticipated conditions may arise which may require considerable flexibility in complying with this SOP. Therefore, guidance provided in this SOP is presented in terms of general steps and strategies that should be applied; but deviation from this SOP must be reported to the Project Manager (PM) immediately.

GENERAL SAMPLE IDENTIFICATION CONSIDERATIONS

Sample Labels

All sample ware must have a label. Recall that when you are using the Encore™ samples (see below); they are delivered in plastic lined foil bags. You are to label the bags[1]:

All other samples containers including Terra Cores™ must be labeled with laboratory provided self-adhesive labels.

Quick Breakdown of Sample Format

The general format for sample nomenclature is:

[1]Both Alpha and York laboratories permit the combining of the three Encore™ into a single bag. This may not be appropriate for all laboratories so please confirm with the labs themselves

LLNN_ID

Where

LL is a grouping of two (2) to four (4) letters signifying the sample media source. In older nomenclature SOPs this portion of the sample identification is commonly referred to as the *Sample Investigation Code*

NN represents a two digit number identifying the specific sample location or sample sequence number

_ ***(underscore)*** is required between the sample lettering and numeric identification and additional modifying data that determines the date of sampling or the depth of the sample interval

ID is a modifier specific to the sample type media (depth of soil sample or date of groundwater sample)

LL – Sample Investigation Code

Langan has devised a list of two to four letters to insure a quick ability to identify the sample investigation.

Code	Investigation
AA	Ambient Air
DS	Drum
EPB	Endpoint Location - Bottom (Excavation)
EPSW	Endpoint Location - Sidewall (Excavation)
FP	Free Product
IA	Indoor Air
IDW	Investigation Derived Waste (Soil Pile)
MW	Monitoring Well (Permanent)
SB	Soil Boring
SG	Staff Gauge (Stream Gauging)
SL	Sludge
SV	Soil Vapor Point
SVE	Soil Vapor Extraction Well
SW	Surface Water
TMW	Temporary Monitoring Well
TP	Test Pit (Excavated Material from Test Pit Not Associated With Sidewall or Bottom Samples)
WC	Waste Characterization Boring
COMP	Composite Sample
TB	Trip Blank (QA/QC Sampling – All Investigations)
FB	Field Blank (QA/QC Sampling – All Investigations)
DUP	Duplicate (QA/QC Sampling – All Investigations)

NN – Numeric Identifier

The two digit number that follows the sample investigation code (LL) identifies the specific sample based on the soil boring, monitoring well, endpoint or other location identification. For a subset of samples

where there is no specific location identifier, the two digit number is the sequence number for the sample submitted. For example, an aqueous sample from a monitoring well identified as MW-1 would have the sample investigation code of MW and the numeric identifier as 01. Note there is no hyphen. The same can be done for soil borings, a soil sample collected from soil boring 9 (SB-9) would be have the LLNN identification of SB09 (again, no hyphen).

Note however that there is a subset of samples related to laboratory analytical quality assurance, among these includes TB, FB, and DUP. On many investigations, the Scope will require multiple collections of these types of samples, therefore the numerical number represents the sequence sample count where the first sample is 01, the second sample is 02, and the third sample is 03 and so on.

_ Underscore
The underscore is required. It separates the investigation code and numeric identifier from the modifier specific to the sample itself. Note that every effort should be made to insure that the underscore is clear on the sample label and chain of custody (COC).

ID – Modifier Specific to Type Media
Each sample investigation code and numeric identifier is further modified by an ID specific to the sample type media. In general, soil samples (soil borings or endpoint samples) use an ID that indicates the depth at which the sample was taken. Aqueous samples (groundwater or surface water samples) are identified by the date the sample was collected. Other types of samples including quality control (TB, FB, and DUP), Vapor samples (AA, IA, SV or SVE), other soil type samples (IDW, sludge, free product, drum, and others) are also identified by a date. The following rules apply to the ID when using sample depth or sample date.

Sample Depth
The sample depth must be whole numbers (no fractions) separated by a hyphen. Thus for a soil sample collected from the soil boring SB-1 from a depth of 6 feet to 8 feet, the sample would be identified as:

SB01_6-8

Unfortunately, the NYSDEC EQuIS system does not accept fractions. Therefore, if your sample interval is a fraction of a foot (6.5-7.5), round up to the larger interval (6-8).

Sample Date
The sample date is always in the format of MMDDYY. Note that the year is two digits. Thus for a groundwater sample collected on July 1, 2015 from the monitoring well MW-1, the sample would be identified as:

MW01_070115

Special Cases
There are a couple of specific sample types that require further explanation.

Endpoint Sampling
End point sidewall samples are sometimes modified by magnetic direction (N, S, E, and W). For example, the first sidewall endpoint sample from the north wall of an excavation at a depth of 5 feet would be written as:

EPSW01_N_5

Again, note that the N in the identification refers to north and is separated from the prefix investigation code/numeric identifier and ID modifier suffix by underscores.

Vapor Extraction Well Sample
As with the sidewall endpoint samples, the sample name is altered by inserting a middle modifier between the prefix and suffix of the sample name. The middle modifier is used to identify the source of the sample (inlet sample port, midpoint sample port or outlet sample port). For example the midpoint port of the vapor extraction well number 1 sampled on July 1, 2015 would be written as;

SVE01_MID_070115

Matrix Spike and Matrix Spike Duplicate
On occasion, a Langan investigation will collect a sample to be used to provide the lab with a site specific medium to spike to determine the quality of the analytical method. This special case of sampling requires additional information to be used in the sample name, specifically, a suffix specifying whether the sample is the matrix spike (MS) or the matrix spike duplicate (MSD). In the following example, the sample is collected from soil boring number 1 at a depth of 2-4 feet. For the matrix spike sample:

SB01_2-4_MS

and for the matrix spike duplicate sample:

SB01_2-4_MSD

Multiple Interval Groundwater Sampling
Although not currently a common practice, low flow sampling facilitates stratigraphic sampling of a monitoring well. If the scope requires stratigraphic sampling then groundwater samples will be labeled with a lower case letter following the well number. For example, placing the pump or sampling tube at 10 feet below surface in MW01 on July 1, 2015 would require the sample to be labeled as:

MW01a_070115

While a second sample where the pump or tubing intake is placed at 20 feet would be labeled as:

MW01b_070115

Note that it is important that you record what depth the intake for each sample represents in your field notes; as this information is going to be critical to interpreting the results.

Attachment E

Emerging Contaminant Sampling Protocol

February 2019

Sampling for 1,4-Dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DEC's Part 375 Remedial Programs

Objective

The Department of Environmental Conservation (DEC) is requiring sampling of all environmental media and subsequent analysis for the emerging contaminants 1,4-Dioxane and PFAS as part of all remedial programs implemented under 6 NYCRR Part 375, as further described in the guidance below.

Sample Planning

The number of samples required for emerging contaminant analyses is to be the same number of samples where "full TAL/TCL sampling" would typically be required in an investigation or remedial action compliance program.

Upon a new site being brought into any program (e.g., SSF, BCP), PFAS and 1,4-dioxane will be incorporated into the investigation of potentially affected media, including soil, groundwater, surface water, and sediment as an addition to the standard "full TAL/TCL sampling." Biota sampling may be necessary based upon the potential for biota to be affected as determined pursuant to a Fish and Wildlife Impact analysis. Soil vapor sampling for PFAS and 1,4-dioxane is not required.

Upon an emerging contaminant being identified as a contaminant of concern (COC) for a site, those compounds must be assessed as part of the remedy selection process in accordance with Part 375 and DER-10 and included as part of the monitoring program upon entering the site management phase.

Soil imported to a site for use in a soil cap, soil cover, or as backfill must be sampled for 1,4-dioxane and PFAS contamination in general conformance with DER-10, section 5.4(e). Assessment of the soil data will be made on a site-specific basis to determine appropriateness for use.

The work plan should explicitly describe analysis and reporting requirements, including laboratory analytical procedures for modified methods discussed below.

Analysis and Reporting

Labs should provide a full category B deliverable, and a DUSR should be prepared by an independent 3rd party data validator. QA/QC samples should be collected as required in DER-10, Section 2.3(c). The electronic data submission should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html.

PFAS analysis and reporting: DEC has developed a *PFAS Analyte List* (below) for remedial programs. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any compounds, the DEC project manager, in consultation with the DEC remedial program chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site.

Currently, ELAP does not offer certification for PFAS compounds in matrices other than finished drinking water. However, laboratories analyzing environmental samples (e.g., soil, sediments, and groundwater) are required by DER to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537 or ISO 25101.

Modified EPA Method 537 is the preferred method to use for environmental samples due to its ability to achieve very low detection limits. Reporting limits for PFAS in groundwater and soil are to be 2 ng/L (ppt) and 1 ug/kg (ppb), respectively. If contract labs or work plans submitted by responsible parties indicate that they are not able to achieve these reporting limits for the entire list of 21 PFAS, site-specific decisions will need to be made by the DEC project manager in consultation with the DEC remedial program chemist. Note: Reporting limits for PFOA and PFOS in groundwater should not exceed 2 ng/L.

Additional laboratory methods for analysis of PFAS may be warranted at a site. These methods include Synthetic Precipitation Leaching Procedure (SPLP) by EPA Method 1312 and Total Oxidizable Precursor Assay (TOP Assay).

SPLP is a technique for determining the potential for chemicals in soil to leach to groundwater and may be helpful in determining the need for addressing PFAS-containing soils or other solid material as part of the remedy. SPLP sampling need not be considered if there are no elevated PFAS levels in groundwater. If elevated levels of PFAS are detected in water, and PFAS are also seen in soil, then an SPLP test should be considered to better understand the relationship between the PFAS in the two media.

The TOP Assay can assist in determining the potential PFAS risk at a site. For example, some polyfluoroalkyl substances may transform to form perfluoroalkyl substances, resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from the site. To conceptualize the amount and type of oxidizable perfluoroalkyl substances which could be liberated in the environment, a “TOP Assay” analysis can be performed, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized.

PFAS-containing materials can be made up of per- and polyfluoroalkyl substances that are not analyzable by routine analytical methodology (LC-MS/MS). The TOP assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by current analytical methodology. Please note that analysis of highly contaminated samples, such as those from an AFFF site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. Please consult with a DEC remedial program chemist for assistance interpreting the results.

<u>1,4-Dioxane analysis and reporting:</u> The reporting limit for 1,4-dioxane in groundwater should be no higher than 0.35 µg/L (ppb) and no higher than 0.1 mg/kg (ppm) in soil. Although ELAP offers certification for both EPA Method 8260 SIM and EPA Method 8270 SIM in waters, DER is advising the use of Method 8270 SIM because it provides a more robust extraction procedure, uses a larger sample volume, and is less vulnerable to interference from chlorinated solvents. The analysis currently performed for SVOCs in soil is adequate for evaluation of 1,4-dioxane in soil, which already has an established SCO.

Refinement of sample analyses

As with other contaminants that are analyzed for at a site, the emerging contaminant analyte list may be refined for future sampling events based on investigative findings. Initially, however, sampling using this PFAS Analyte List and 1,4-dioxane is needed to understand the nature of contamination.

PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanessulfonic acid	PFOS	1763-23-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluroroctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

June 2019

Sampling for 1,4-Dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DEC's Part 375 Remedial Programs

Objective

The Department of Environmental Conservation (DEC) is requiring sampling of all environmental media and subsequent analysis for the emerging contaminants 1,4-Dioxane and PFAS as part of all remedial programs implemented under 6 NYCRR Part 375, as further described in the guidance below.

Sample Planning

The number of samples required for emerging contaminant analyses is to be the same number of samples where "full TAL/TCL sampling" would typically be required in an investigation or remedial action compliance program.

Sampling of all media for ECs is required at all sites coming into or already in an investigative phase of any DER program. In other words, if the sampling outlined in the guidance hasn't already been done or isn't part of an existing work plan to be sampled for in the future, it will be necessary to go back out and perform the sampling prior to approving a SC report or issuing a decision document.

PFAS and 1,4-dioxane shall be incorporated into the investigation of potentially affected media, including soil, groundwater, surface water, and sediment as an addition to the standard "full TAL/TCL sampling." Biota sampling may be necessary based upon the potential for biota to be affected as determined pursuant to a Fish and Wildlife Impact analysis. Soil vapor sampling for PFAS and 1,4-dioxane is not required.

Upon an emerging contaminant being identified as a contaminant of concern (COC) for a site, those compounds must be assessed as part of the remedy selection process in accordance with Part 375 and DER-10 and included as part of the monitoring program upon entering the site management phase.

Special Testing Requirements for Import or Reuse of Soil: Soil imported to a site for use in a soil cap, soil cover, or as backfill must be tested for 1,4-dioxane and PFAS contamination in general conformance with DER-10, Section 5.4(e). Soil samples must be analyzed for 1,4-dioxane using EPA Method 8270, as well as the full list of PFAS compounds (currently 21) using EPA Method 537.1 (modified).

For 1,4-dioxane, soil exceeding the Unrestricted SCO of 0.1 ppm must be rejected per DER 10: Appendix 5 - Allowable Constituent Levels for Imported Fill or Soil, Subdivision 5.4(e).

If PFOA or PFOS is detected in any sample at or above 1 ppb, then a soil sample must be tested by the Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed. If the SPLP results exceed 70 ppt combined PFOA/S, then the source of backfill must be rejected. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays.

The work plan should explicitly describe analysis and reporting requirements, including laboratory analytical procedures for modified methods discussed below.

Analysis and Reporting

Labs should provide a full category B deliverable, and a DUSR should be prepared by an independent 3rd party data validator. QA/QC samples should be collected as required in DER-10, Section 2.3(c). The electronic data submission should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html.

PFAS analysis and reporting: DEC has developed a *PFAS Analyte List* (below) for remedial programs. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any compounds, the DEC project manager, in consultation with the DEC remedial program chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site.

Currently, ELAP does not offer certification for PFAS compounds in matrices other than finished drinking water. However, laboratories analyzing environmental samples (e.g., soil, sediments, and groundwater) are required by DER to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537 or ISO 25101. Labs must also adhere to the requirements and criteria set forth in the Laboratory Guidance for Analysis of PFAS in Non-Potable Water and Solids.

Modified EPA Method 537 is the preferred method to use for environmental samples due to its ability to achieve very low detection limits. Reporting limits for PFAS in groundwater and soil are to be 2 ng/L (ppt) and 1 ug/kg (ppb), respectively. If contract labs or work plans submitted by responsible parties indicate that they are not able to achieve these reporting limits for the entire list of 21 PFAS, site-specific decisions will need to be made by the DEC project manager in consultation with the DEC remedial program chemist. Note: Reporting limits for PFOA and PFOS in groundwater should not exceed 2 ng/L.

Additional laboratory methods for analysis of PFAS may be warranted at a site. These methods include Synthetic Precipitation Leaching Procedure (SPLP) by EPA Method 1312 and Total Oxidizable Precursor Assay (TOP Assay).

SPLP is a technique for determining the potential for chemicals in soil to leach to groundwater and may be helpful in determining the need for addressing PFAS-containing soils or other solid material as part of the remedy. SPLP sampling need not be considered if there are no elevated PFAS levels in groundwater. If elevated levels of PFAS are detected in water, and PFAS are also seen in soil, then an SPLP test should be considered to better understand the relationship between the PFAS in the two media.

The TOP Assay can assist in determining the potential PFAS risk at a site. For example, some polyfluoroalkyl substances may transform to form perfluoroalkyl substances, resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from the site. To conceptualize the amount and type of oxidizable perfluoroalkyl substances which could be liberated in the environment, a “TOP Assay” analysis can be performed, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized.

PFAS-containing materials can be made up of per- and polyfluoroalkyl substances that are not analyzable by routine analytical methodology (LC-MS/MS). The TOP assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by current

analytical methodology. Please note that analysis of highly contaminated samples, such as those from an AFFF site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. Please consult with a DEC remedial program chemist for assistance interpreting the results.

1,4-Dioxane analysis and reporting: The reporting limit for 1,4-dioxane in groundwater should be no higher than 0.35 µg/L (ppb) and no higher than 0.1 mg/kg (ppm) in soil. Although ELAP offers certification for both EPA Method 8260 and EPA Method 8270 for 1,4-dioxane, DER is advising the use of Method 8270 SIM for water samples and EPA Method 8270 for soil samples. EPA Method 8270 SIM is not necessary for soils if the lab can achieve the required reporting limits without the use of SIM. Note: 1,4-dioxane is currently listed as a VOC in the Part 375 SCO tables but will be moved to the SVOC table with the next update to Part 375.

Refinement of sample analyses: As with other contaminants that are analyzed for at a site, the emerging contaminant analyte list may be refined for future sampling events based on investigative findings. Initially, however, sampling using this PFAS Analyte List and 1,4-dioxane is needed to understand the nature of contamination.

PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluroroctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

APPENDIX E

Project Personnel Resumes

JASON J. HAYES, PE, LEED AP

PRINCIPAL/VICE PRESIDENT

ENVIRONMENTAL ENGINEERING

Mr. Hayes has experience in New York, New Jersey, Washington D.C., California, Washington, Oregon, Alaska, and Internationally. His experience includes Environmental Protection Agency (EPA), New York State (NYS) Brownfields applications, investigation, and remediation; New York City Department of Environmental Protection (NYCDEP) and New York City Office of Environmental Remediation (OER) E-designated site applications, investigations, and remediation. His expertise also includes Phase I and II Environmental Site Investigations and Assessments; contaminated building cleanup and demolition; Underground Storage Tank (UST) permitting, removal specifications, and closure reporting; soil vapor intrusion investigation and mitigation system design (depressurization systems, etc.); development of groundwater contaminant plume migration models; environmental analysis; and oversight, design and specification generation for remediation operations with contaminants of concern to include polychlorinated biphenyls (PCBs), solvents, mercury, arsenic, petroleum products, asbestos, mold and lead.

SELECTED PROJECTS

- Confidential Location (Remediation for Mercury-Contaminated Site), New York, NY
- Confidential Location (Phase II ESI and Remedial Design for Mercury Impacted Site), Brooklyn, NY
- NYC School Construction Authority (PCB Remediation), Various Locations, New York, NY
- 28-29 High Line (Phase I ESA, Phase II ESI, and Environmental Remediation), New York, NY
- Georgetown Heating Plant (Phase II ESI and Remedial Design for Mercury Impacted Site), Washington D.C.
- 268 West Street (BCP Application, RI and RIWP), New York, NY
- Confidential Multiple Mixed-Use Tower Location (BCP Application, RI, Phase I ESA, and Phase II ESI), New York, NY
- Dock 72 at Brooklyn Navy Yard, (NYS Voluntary Cleanup Program), Brooklyn, NY
- 27-21 44th Drive (BCP Application, Remedial Investigation Phase I ESA, and Phase II ESI), Long Island City, NY
- Purves Street Development, BCP Application, RAWP, and Phase II ESI, Long Island City, NY
- 267-273 West 87th Street (BCP Application, Remedial Investigation, RIWP, RAWP), New York, NY
- New York Aquarium, Shark Tank and Animal Care Facility (Environmental Remediation), Coney Island, NY
- International Leadership Charter School (Environmental Remediation), Bronx, NY
- West & Watts (BCP Application), New York, NY
- Hudson Yards Redevelopment (Phase I ESA and Phase II ESI), New York, NY

EDUCATION

M.S., Environmental Engineering Columbia University

B.S., Chemistry, Environmental Toxicology Humboldt State University

Business Administration (minor) Humboldt State University

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

LEED Accredited Professional (LEED AP)

Troxler Certification for Nuclear Densometer Training

CPR and First Aid Certification

OSHA 40-Hour HAZWOPER

OSHA HAZWOPER Site Supervisor

AFFILIATIONS

US Green Building Council, NYC Chapter (USGBC), Communications Committee

- 627 Smith Street (RI and Report), Brooklyn, NY
- Gateway Center II Retail (Phase I ESA and Phase II ESI), Brooklyn, NY
- 261 Hudson Street (Phase I ESA, Phase II ESI, BCP, and RAWP), New York, NY
- Riverside Center, Building 2 (BCP, Phase I ESA and Phase II ESI), New York, NY
- New York Police Academy, (Sub-Slab Depressurization and Vapor Barrier System), College Point, NY
- Bronx Terminal Market (BCP, RIWP, RAWP, Phase I ESA and Phase II ESI), Bronx, NY
- Jacob Javits Convention Center (Phase I ESA and Phase II ESI), New York, NY
- Yankee Stadium Development Waterfront Park (NYSDEC Spill Sites), Bronx, NY
- Bushwick Inlet Park (Phase I ESA, Approvals for NYC E-Designation), Brooklyn, NY
- Silvercup West (BCP, RIWP, RIR, RAWP, and RAA), Long Island City, NY
- 29 Flatbush, Tall Residential Building (Groundwater Studies, RIR and RAWP), Brooklyn, NY
- Gowanus Village I (BCP, RIWP and RIR), Brooklyn, NY
- Sullivan Street Hotel (Site Characterization Study and Owner Representation), New York, NY
- Riker's Island Co-Generation Plant (Soil and Soil Vapor Quality Investigations), Bronx, NY
- The Shops at Atlas Park (Sub-Slab Depressurization and Vapor Barrier Design), Glendale, NY
- Memorial Sloan-Kettering Cancer Center (Subsurface and Soil Vapor Intrusion Investigations), New York, NY
- Element West 59th Street (Oversight and Monitoring of Sub-Slab Depressurization and Vapor Barrier Systems), New York, NY
- Teterboro Airport (Delineation and Remedial Oversight of Petroleum-Contaminated Soils), Teterboro, NJ
- Proposed New York JETS Stadium (Phase I ESA), New York, NY
- Former Con Edison Manufactured Gas Plant Sites (Research Reports), New York, NY
- 7 World Trade Center (Endpoint Sampling and Final Closure Report), New York, NY
- Peter Cooper Village, Environmental Subsurface Investigations, New York, NY

Urban Land Institute (ULI), member

Commercial Real Estate Development Associations (NAIOP), member

NYC Brownfield Partnership, member

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

NYC Mayor's Office of Environmental Remediation – Big Apple Brownfield Workshop – Presented on Soil Vapor Intrusion Remedies (e.g., SSD Systems, Vapor Barriers, Modified HVAC)

New York City Brownfield Partnership – Presented on environmental considerations and complications of the Hudson Yards Development

Waterfront Development Technical Course – Presented on Impacted Waterfront Planning Considerations

MICHAEL D. BURKE, PG, CHMM, LEED AP

PRINCIPAL/VICE PRESIDENT

ENVIRONMENTAL ENGINEERING AND REMEDIATION

Mr. Burke is a geologist/environmental scientist whose practice involves site investigation and remediation, transactional due diligence, environmental site assessments, in-situ remedial technology, and manufactured gas plant (MGP) site characterization and remediation. His additional services include multi-media compliance audits, sub-slab depressurization system design, non-hazardous and hazardous waste management, emergency response, community air monitoring programs, environmental and geotechnical site investigations, and health and safety monitoring. He has experience with projects in the New York State Department of Environmental Conservation (NYSDEC) and New York State Brownfield Cleanup (NYS BCP) Programs; Inactive Hazardous Waste, and Spill Programs, and New York City Office of Environmental Remediation (OER) e-designated and New York City Voluntary Cleanup Program (NYC VCP) sites.

SELECTED PROJECTS

- 227-14 North Conduit Avenue, Industrial Wastewater Compliance, Jamaica, NY
- 420 Kent Avenue, NYS Brownfield Cleanup Program, Brooklyn, NY
- 572 Eleventh Avenue, NYC VCP, New York, NY
- Monian Site A, OER E-Designated Site, New York, NY
- 537 Sackett Street, Gowanus Canal Due Diligence/MGP Site, Brooklyn, NY
- ABC Blocks 25, 26 and 27, NYS Brownfield Cleanup Program Sites, Long Island City, NY
- 432 Rodney Street, NYS Brownfield Cleanup Program, Petroleum and Chlorinated Volatile Organic Compound Investigation and Remediation, Brooklyn, NY
- 787 Eleventh Avenue, NYS Brownfield Cleanup Program Site, New York, NY
- President Street at Gowanus Canal, NYS Brownfield Cleanup Program Site, Brooklyn, NY
- 22-36 Second Avenue at Gowanus Canal, NYS Brownfield Cleanup Program Site, Brooklyn, NY
- 563 Sacket Street, NYS Brownfield Cleanup Program Site, MGP Investigation, and Remediation, Brooklyn, NY
- 156-162 Perry Street, NYS Brownfield Cleanup Program Site, New York, NY
- Christopher and Weehawken Streets, NYS Brownfield Cleanup Program, New York, NY
- Phelps Dodge Block 2529 (Lots 40, 50, and 45), Inactive Hazardous Waste Disposal Site, Maspeth NY
- 42-50 24th Street, NYS Brownfield Cleanup Program Site, Long Island City, NY
- Storage Deluxe (163 6th Street), OER E-Designation Site, New York, NY

EDUCATION

M.S., Environmental Geology
Rutgers University

B.S., Geological Sciences
Rutgers University

B.S., Environmental Science
Rutgers University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

Certified Hazardous Materials Manager – CHMM No. 15998

LEED Accredited Professional (LEED AP)

OSHA Certification for Hazardous Waste Site Supervisor

OSHA 29 CFR 1910.120 Certification for Hazardous Waste Operations and Emergency Response

NJDEP Certification for Community Noise Enforcement

Troxler Certification for Nuclear Densometer Training

- Prospect Park Redevelopment, Landfill Reclamation, Prospect Park, NJ
- 431 Carroll Street, Gowanus Canal Due Diligence, Brooklyn, NY
- 76 4th Street Property, Gowanus Due Diligence, Brooklyn, NY
- Foxgate/MREC, Due Diligence and Solid Waste Compliance, Central Islip, NY
- 175-225 3rd Street at Gowanus Canal, NYS Brownfield Cleanup Program, Brooklyn, NY
- New York University Tandon School of Engineering, Spill Investigation/Remediation Dual Phase Recovery, and Laser Fluorescence Investigation, Brooklyn, NY
- 2420-2430 Amsterdam Avenue, NYS Brownfield Cleanup Program/Board of Standards and Appeals Variance, New York, NY
- 170 Amsterdam Avenue, NYC VCP, New York, NY
- 538-540 Hudson Street, NYS Brownfield Cleanup Program (Former Gas Station), New York, NY
- 234 Butler Street, Gowanus Canal Due Diligence, Brooklyn, NY
- 550 Clinton Street, NYS Brownfield Cleanup Program E-Designation, Brooklyn, NY
- 111 Leroy Street, OER E-Designation Site, New York, NY
- 335 Bond Street, NYS Brownfield Cleanup Program, New York, NY
- Gowanus Canal Northside, NYS BCP Former Fuel Oil Terminal, Brooklyn, NY
- Multiple Buildings, Major Oil Storage Facility, Gowanus Canal Location, Brooklyn, NY
- 197-205 Smith Street at Gowanus Canal, MGP Due Diligence, Brooklyn, NY
- 450 Union Street at Gowanus Canal, NYS Brownfield Cleanup Program, Brooklyn, NY
- 86 Fleet Place, NYC VCP E-Designation, Brooklyn, NY
- New York University College of Nursing at 433 1st Avenue, NYS BCP, Bronx, NY
- Retail Building at 225 3rd Street, Brooklyn, NY
- 29-37 41st Avenue, NYS Brownfield Cleanup Program, Long Island City, NY
- 43-01 22nd Street, NYS Brownfield Cleanup Program, Long Island City, NY
- Compliance Audit for NYU at Washington Square Park, New York, NY
- Former Watermark Locations, NYS Brownfield Cleanup Program, Chlorinated Volatile Organic Compound Investigation and Remediation; AS/SVE, Brooklyn, NY
- Former Gas Station (1525 Bedford Avenue), Brooklyn, NY
- NYS Brownfield Cleanup Program at 514 West 24th Street, New York, NY
- Gowanus Canal Due Diligence at 76 4th Street, Brooklyn, NY
- Urban Health Plan, Medical Building, NYS Brownfield Cleanup Program CVOC Investigation and Remediation, Bronx, NY
- 420 East 54th Street, NYS Spill Closure, New York, NY
- Equity Residential at 160 Riverside Boulevard, NYS Spill Closure, New York, NY
- 357-359 West Street and 156 Leroy Street, NYC VCP, New York, NY
- Emergency Spill Response at 322 West 57th Street, Investigation and Closure, New York, NY

- Hurricane Sandy, Emergency Response at 21 West Street, New York, NY
- Hurricane Sandy, Emergency Response at 71 Pine Street, New York, NY
- Greenpoint Landing, NYC E-Designation, Brooklyn, NY
- 23-01 42nd Road, NYS Brownfield Cleanup Program, Long Island City, NY
- Greenpoint Waterfront Development, NYS Brownfield Cleanup Program, Brooklyn, NY
- 125th Street and Lenox Avenue, NYC VCP, New York, NY
- Whitehead Realty Solvent Site, Inactive Hazardous Waste site, CVOC
  Investigation and Remediation, Brooklyn, NY
- SunCap Property Group Environmental On-Call Consulting,
  Various Locations, Nationwide
- Consolidated Edison Company of New York, Underground Storage Tank On-Call Contract, Five Boroughs of New York City, NY
- Consolidated Edison Company of New York, Appendix B Spill Sites On-Call Contract, Five Boroughs of New York City, NY
- Meeker Avenue Plume Trackdown Site, Brooklyn, NY
- Distribution Facility, Superfund Redevelopment, Long Island City, NY
- Edison Properties, West 17th Street Development Site (Former MGP Site), New York, NY
- Con Edison on Governors Island, Dielectric Fluid Spill, Investigation and Remediation, New York, NY
- 144-150 Barrow Street, NYS Brownfield Cleanup Program, New York, NY
- West 17th Street Development, NYS Brownfield Cleanup Program, MGP Investigation and Remediation, New York, NY
- Montefiore Medical Center, Emergency Response, PCB Remediation, Bronx, NY
- New York University, 4 Washington Square Village Fuel Oil Remediation, New York, NY
- NYCSCA, Proposed New York City School Construction Sites,
  Five Boroughs of New York City, NY
- Con Edison, East 60th Street Generating Station, New York, NY
- Residential Building at 82 Irving Place, Environmental Remediation, New York, NY
- 1113 York Avenue, Storage Tank Closures, New York, NY
- Peter Cooper Village/Stuyvesant Town, Phase I ESA, New York, NY
- Superior Ink, Waste Characterization and Remedial Action Plans, New York, NY
- Bronx Mental Health Redevelopment Project, Phase I ESA, Bronx, NY
- 2950 Atlantic Avenue, Site Characterization Investigation, Brooklyn, NY
- Con Edison, East 74th Street Generating Station, Sediment Investigation, New York, NY
- Con Edison, First Avenue Properties, New York, NY
- Queens West Development Corp. Stage II, Long Island City, NY
- Article X Project Environmental Reviews, Various New York State Electrical Generation Sites, NY
- Poletti Generating Station, Astoria, NY
- Arthur Kill Generating Station, Staten Island, NY

- Distribution Facility, Phase I & Phase II ESA and Regulatory Compliance, Bohemia, NY
- Huntington Station Superfund Due Diligence, Huntington Station, NY
- Garvies Point Bulkhead, Glen Cove, NY
- Johnson & Hoffman Metal Stamping Facility, Environmental Compliance, Carle Place, NY
- Floral Park Storage Facility, Phase I and Phase II ESA
- Garden City Phase I ESAs at two sites, including part of a Superfund Site, Garden City, NY
- Huntington Station Storage Facility, Phase I and II ESA, Huntington Station, NY
- Trevor Day School, NYS Spill Site Expert Testimony, New York, NY

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

Burke, M., Ciambruschini, S., Nicholls, G., Tashji, A., Vaidya, S., "Redeveloping a Remediated MGP Site", MGP Symposium 2019, Atlantic City, NJ.

GREGORY C. WYKA, PG, LEED AP

SENIOR PROJECT GEOLOGIST

ENVIRONMENTAL ENGINEERING

Mr. Wyka is a geologist with experience in regulatory government, brownfield development, and environmental liability consulting. His expertise includes site characterization, remedial investigation, waste characterization, conceptual site modeling, remedial design and implementation, construction management, GIS, and sustainability. Mr. Wyka's abilities integrate remediation with property redevelopment and he provides technical, regulatory, logistical, and risk management guidance to clients, including developers, owners, and environmental attorneys. He provides direct assistance for clients on construction and remediation projects in the New York State Inactive Hazardous Waste Disposal Site Program, New York State Spill Response Program, New York State Brownfield Cleanup Program (BCP), New York City E-Designation Program and New York City Voluntary Cleanup Program (VCP).

EDUCATION

B.A., Geology, Chemistry and Environmental Studies
Bowdoin College

PROFESSIONAL REGISTRATION

LEED Accredited Professional (LEED AP) Neighborhood Development

Professional Geologist (PG) in NY

10-Hour OSHA

CPR and First Aid Certified

AFFILIATIONS

New York State Council of Professional Geologists (NYSCPG)

NYSCPG Board of Directors

Urban Green Council

New York City Brownfield Partnership

SELECTED PROJECTS

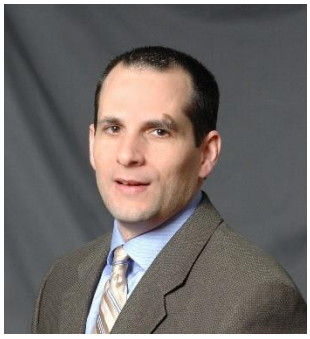
- Greenpoint Landing Waterfront Development, Brooklyn, NY: Brownfield Redevelopment, E-Designation, NYC VCP
- Anable Basin, Long Island City, NY; Brownfield Redevelopment, BCP.
- 82 King Street, New York, NY: Brownfield Redevelopment, BCP
- 300 West 122nd Street, New York, NY: Brownfield Redevelopment, BCP
- 2409 Jerome Avenue, Bronx, NY: Brownfield Redevelopment, BCP.
- City DPW Yard, New Rochelle, NY: Brownfield Redevelopment, BCP
- 160 Leroy Street, New York, NY: Brownfield Redevelopment; E-Designation, NYC VCP 685 First Avenue. New York, NY: Brownfield Redevelopment: NYSDEC Voluntary Cleanup Program
- 60 West Street, Brooklyn, NY: Brownfield Redevelopment, E-Designation
- 27-19 44th Drive, Long Island City, NY: Brownfield Redevelopment
- 515 West 42nd Street, New York, NY: E-Designation
- Brooklyn Bridge Park, Pierhouse: Brownfield Redevelopment 550 Myrtle Avenue, Brooklyn, NY: E-Designation
- 50 Jay Street, Phase I ESA, Brooklyn, NY
- 205 Water Street, Brooklyn, NY: Brownfield Redevelopment, E-Designation
- 29-01 Borden Avenue, Long Island City, NY; Brownfield Redevelopment, NYSDEC Spills
- 29-10 Hunters Point Avenue, Long Island City, NY: Brownfield Redevelopment
- 30-27 Greenpoint Avenue, Long Island City, NY: NYSDEC Spills
- 55 Water Street, New York, NY: Emergency petroleum spill closure (Tropical Storm Sandy)
- 144 East 201st Street, New York, NY: Brownfield Redevelopment, E-Designation
- 310 Meserole Street, Phase I ESA, Brooklyn, NY

- 13-17 Laight Street, Phase I ESA, New York, NY
- 460 Mother Gaston Boulevard, Phase I ESA, Brooklyn, NY
- 25 Kent Avenue, Phase I ESA, Brooklyn, NY
- 1110 Oak Point Avenue, Phase I ESA, Bronx, NY
- 859-863 Lexington Avenue, Phase I ESA, New York, NY
- 49 East 21st Street, Phase I ESA, New York, NY
- 1552-1560 Broadway, Phase I ESA, New York, NY
- 287-291 East Houston Street, Phase I ESA, New York, NY
- Big River Study Area (Superfund), Old Lead Belt, Park Hills and Desloge, MO: Remedial Investigation
  Berry's Creek Study Area (Superfund Site), Bergen County, NJ: Remedial Investigation
- Everglades Restoration Project, Clewiston, FL: Remedial Investigation
- Marble River Wind Farm, Ellenburg, NY: Wetland Delineation

ANTHONY MOFFA, JR., ASP, CHMM, COSS, CSP

ASSOCIATE
CORPORATE HEALTH AND SAFETY MANAGER

Anthony is Langan's Corporate Health & Safety Manager and is responsible for managing health and safety compliance in all Langan office locations. He has nearly 20 years of experience in the health and safety field. He is responsible for ensuring compliance with all federal and state occupational health and safety laws and development and implementation of corporate health and safety policies. His responsibilities include reviewing and updating Langan's Corporate Health and Safety Program and assisting employees in the development of site specific Health & Safety Plans. He maintains and manages health and safety records for employees in all Langan office locations including medical evaluations, respirator fit testing, and Hazardous Waste Operations and Emergency Response training. He is also responsible for documentation and investigation of work-related injuries and incidents and sharing this information with employees to assist in the prevention of future incidents. He is also the chairman of the Corporate Health & Safety Committee and Health & Safety Leadership Team that meet periodically throughout the year. He is responsible for coordinating and providing health and safe training to Langan employees. He was formerly the Environmental, Health and Safety Coordinator at a chemical manufacturer. His experience included employee hazard communications, development of material safety data sheets for developed products, respirator fit testing and conducting required Occupational Health & Safety Association and Department of Transportation training.



EDUCATION

B.S., Physics
West Chester University

PROFESSIONAL REGISTRATION

Associate Safety Professional (ASP)

Certified Hazardous Material Manager (CHMM)

Certified Occupational Safety Specialist (COSS)

Certified Safety Professional (CSP)

AFFILIATIONS

Pennsylvania Chamber of Business & Industry

Chemical Council of New Jersey

New Jersey Business & Industry Association

Geoprofessional Business Association

American Society of Safety Professionals

WILLIAM BOHRER, PG

PROJECT GEOLOGIST

GEOLOGIST

Mr. Bohrer is an experienced geologist responsible for managing Langan's environmental standards and Health and Safety compliance for projects throughout New York City. His services include dissemination of environmental protocols, troubleshooting at project sites, in-house/field training, and maintenance of quality standards across the environmental discipline. Mr. Bohrer has a diverse and extensive background in geophysics, hydrogeology, mining and petroleum, and geotechnical engineering. He has developed conceptual site models for public, industrial and commercial facilities nationwide.

SELECTED PROJECTS

- NYU Poly – 122 Johnson Street, Brooklyn, NY
- Con Edison of New York at Governor's Island, NY, NY
- 535 4th Avenue, Brooklyn, NY
- 27 Wooster Street, New York, NY
- 42 West Street, Brooklyn, NY
- 455 West 19th Street, New York, NY
- Kings Plaza Mall, Brooklyn, NY
- Hudson Yards "Terra Firma", New York, NY
- Hudson Yards, Platform Special Inspection, New York, NY
- PSAC II, Bronx, NY
- 595-647 Smith Street, Brooklyn, NY
- New York University, 7-13 Washington Square North Investigation, New York, NY
- NYU 4 Washington Square Village, New York, NY
- 125th Street and Lenox Avenue, New York, NY
- Sullivan Street Development, New York, NY
- Hudson Crossing II, New York, NY
- New York Aquarium, Shark Tank & Animal Care Facility, Brooklyn, NY
- 209-219 Sullivan Street, New York, NY
- 261 Hudson Street, New York, NY
- 460 Washington Street, New York, NY
- 552 West 24th Street, New York, NY
- Brooklyn Bridge Park Pier 1, New York, NY
- International Leadership Bronx Charter School, Bronx, NY
- 203 East 92nd Street, New York, NY
- HighLine 28-29, New York, NY
- 539 Smith Street Bulkhead, Brooklyn, NY
- Willets Point, Corona, NY
- Plume Migration and Fracture Flow Aquifer Investigation, Brunswick, MD
- Plume Migration and Fracture Flow Aquifer Investigation, Fallston, MD
- Emergency Response Site Investigation & Remediation, Wappingers Falls, NY
- Emergency Response Site Investigation & Remediation, Allentown, PA

EDUCATION

Post Graduate Studies in Geophysics
Cornell University

B.S., Geology
Tufts University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

40 Hour OSHA HazWOPER

OSHA Construction Safety & Health

OSHA Supervisory Certification
Credential (TWIC)

Transportation Worker Identification

NYS DEC- Protecting New York's Natural Resources with Better Construction Site Management

AFFILIATIONS

American Association of Petroleum Geologists

National Groundwater Association

Geological Society of America

LANGAN

- Emergency Response Site Investigation & Remediation, Shamokin, PA
- Bermuda International Airport, Jet Fuel Release Investigation, Bermuda
- Little Missouri River Basin, Geotechnical Site Evaluation (Horizontal Drilling Pipeline Install), ND
- Seismic Susceptibility Evaluation (Class 2 Injection Wells), Litchfield, OH
- Bedrock Mapping, Bradford and Sullivan Counties, PA
- Soil Solidification, Carteret, NJ

PA Council of Professional Geologists

JOSEPH CONBOY

STAFF CHEMIST

ENVIRONMNETAL

Mr. Conboy has seven years of environmental chemistry, quality assurance, and environmental database management experience, with a current emphasis on validation of laboratory data for submittal to NJDEP via the New Jersey Data of Known Quality Protocols and to NYSDEC. Previous work experience includes performing validation of data for projects in USEPA Regions 2 and 3 while employing appropriate validation guidelines for each region, managing large data sets, updating appropriate regulatory limits, performing statistical evaluations, and preparing electronic data deliverables and report deliverables using the Earthsoft EQuIS database program, and acted as an intermediary between project managers, field staff, and laboratories. Mr. Conboy also has experience in field sampling techniques and maintains current OSHA HAZWOPER certification.

EDUCATION

B.Sc., Chemistry with a minor in Mathematics
Rowan University

CERTIFICATIONS & TRAINING

OSHA 40-Hour HAZWOPER 29 CFR 1910.120(e)(4) Certification

NJ Analytical Guidance and Data Usability Training

USEPA Data Validation Training

Earthsoft EQuIS Environmental Database Training

SELECTED PROJECTS

- 1400 Ferris, Bronx, NY – Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs and SVOCs including 1,4-dioxane, and tangentially used based on professional judgment to perform validation of PFAS data.
- Broome Street Parking Lot, NY - Completed validation of waste characterization data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs, SVOCs, herbicides, PCBs, pesticides, metals including mercury, ignitability temperature, pH, reactive cyanide, reactive sulfide, cyanide, and hexavalent chromium. Toxicity characteristic leachate procedure extraction data for VOCs, SVOCs, herbicides, pesticides, metals, and mercury were also validated.
- 215 North 10th Street, Brooklyn, NY - Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data.
- 35 Commercial Street, Brooklyn, NY - Completed validation of soil data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.
- Suffolk Street, Lower East Side, NY- Completed validation of soil, groundwater, and soil vapor data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II

guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, VOCs by USEPA TO-15, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.

- Managed a database for a confidential client containing 10+ years of environmental chemical data from multiple laboratories, requiring select data validation in accordance with New Jersey Data of Known Quality Protocols and identifying areas of delineation from historic field information. Once identified, NJDEP designated groundwater, surface water, soil, sediment, soil vapor, and custom screening criteria were researched and applied to each area, requiring individualized flagging for reporting.*
- Prepared the New Jersey Data of Known Quality Protocol Data Usability Evaluation and managed the database for a confidential client for a data set greater than 20 years old. A DUE or any validation effort was not prepared in the 20 years prior to current. This included data from variations of methods for volatile organic compounds, semivolatile organic compounds, total and dissolved metals, pesticides, herbicides, natural attenuation parameters, and per- and polyfluoroalkyl substances in multiple media.*
- Performed 200+ Stage 2a validations for a combined 87-acre USEPA designated Corrective Action site under the Resource Conservation and Recovery Act, including a quick-turn USEPA required PCB by soxhlet extraction investigation across multiple plants. Once a former train car painting facility, USEPA required a quick-turn PCB by soxhlet extraction soil investigation.
- Preparation of a quality assurance program for a confidential client in West Virginia. A quick turn QAPP was prepared in a service location new to the consultant, resulting in research into state requirements for data usability and auditing newly employed laboratories. The QAPP was understood to be prepared for groundwater only, but the client did not reveal the need for sediment and soil. Two QAPPs were submitted for review to governing agencies.*
- Used statistical software to determine a localized background upper confidence limit of chromium for a confidential client's sand and gravel site. Validation was used to confirm laboratory procedures, and data was used in ProUCL calculations to compare to researched background chromium levels for Pennsylvania soils. *
- Prepared daily perimeter dust and air monitoring summaries and validation of low level mirex data for a confidential client's superfund site. Low level mirex data was generated by university laboratories and subject to validation following national functional guidelines to aide in river clean-up, including sediment, surface water, and treatment system water matrices.*

**Project completed prior to employment at LANGAN.*

APPENDIX F

Citizen Participation Plan

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
41 Kensico Drive

December 2019

NYSDEC BCP No. C360163
41 Kensico Drive
Mount Kisco, New York

Contents

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **NY Luxury Motors of Mt. Kisco, Inc. ("Applicant")**
Site Name: **Former Designs for Leisure ("Site")**
Site Address: **41 Kensico Drive, Mount Kisco, NY 10549**
Site County: **Westchester**
Site Number: **C360163**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:
http://www.dec.ny.gov/chemical/8450.html .

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment

- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the site and properties adjacent to the site;
- the public water supplier which services the area in which the site is located;
- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation

and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, the significant threat determination for the site had not yet been made.

To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at http://www.dec.ny.gov/regulations/2590.html

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

Remediation of soil may impact air quality while work is being performed. NYSDEC and NYSDOH are overseeing the project to ensure the air and odor issues are monitored and mitigated during implementation of the work plan.

4. Site Information

Site Description

The site, owned by NY Luxury Motors of Mt. Kisco, Inc., is a 1.73-acre lot with a 13,000-square-foot vacant commercial building, an asphalt-paved parking lot, landscaped areas around the building and parking lot, and a wooded area along Branch Brook. The site is located in the Village/Town of Mount Kisco, New York and is identified as Westchester County Tax Map No. 17258 Section 69.50, Block 1, Lot 2 (69.50-1-2). The site is located in a commercial office park and is bound by a 2-story commercial office building with multiple tenants (45 Kensico Drive) to the north; Branch Brook and a raised, railway embankment utilized by Metro-North Railroad to the east; a propane supplier (Suburban Propane, 25 Kensico Drive) to the south; and, a hotel (Holiday Inn, 1 Holiday Inn Drive) and a car dealership (Lexus of Mt. Kisco, 265-281 Kisco Avenue) to the west. Site topography slopes to the east towards the wooded area along Branch Brook. A raised, railway embankment is located on the opposite side of Branch Brook and roughly parallels the course of the brook and the site's eastern property boundary. The railway embankment includes northbound and southbound tracks and is utilized by the Metro North Railroad. Appendix C contains a map identifying the location of the site.

The proposed development includes demolition of site structures and the construction of an one-story, approximately 2,500-square-foot, vehicle preparation facility with a slab-on-grade foundation and outdoor vehicle parking and storage areas for the Land Rover Mt. Kisco dealership located to the west of the site at 299 Kisco Avenue, Mount Kisco, NY. Landscaped buffers will be constructed along the entire perimeter of the site; the buffers along the northern and southern site boundaries will be about 10 feet wide, while the buffer along the eastern site boundary and Branch Brook will be about 30 feet wide.

History of Site Use, Investigation, and Cleanup

Prior and current uses:

The existing building on the site was constructed as a commercial office building in 1976 and was used as a veterinary hospital (1976 to 1982), manufacturing facility for pool tables and bar stools (1982 to 1998), and offices for a commercial and movie production company (1998 to 2017).

The site and northern, southern, and western adjoining properties were undeveloped until about 1955, after which time they were developed into commercial properties. The railroad embankment to the east of the site was constructed circa 1892.

Before the Site was entered into the NYSDEC BCP, it was the subject of the following investigations which are documented in the following reports and summarized below:

- Phase I Environmental Site Assessment (ESA), dated September 2016, prepared by URS Corporation
- Phase II ESA, dated December 2016, prepared by URS Corporation
- Limited Site Assessment, dated May 2017, prepared by AECOM
- Report on Subsurface Soil and Foundation Investigation, dated May 2018, prepared by Carlin Simpson & Associates
- Remedial Investigation Report (RIR), dated November 2019, prepared by Langan Engineering & Environmental Services., Inc.

The RIR (November 2019) identified the following:

- A layer of historic fill material consisting of fine-grained sand with varying amounts of fine gravel, medium and coarse sand, silt, clay, brick, concrete, asphalt, timber, rubber, plastic, and glass that extends to about 9 feet below ground surface. The historic fill is present across most of the site (including around the existing building and in the northern and eastern areas of the site), but was not observed in the southern-central and southwestern parts of the site;
- Semivolatile organic compounds (SVOCs), pesticides, and metals exceeded the unrestricted use soil cleanup objectives (SCOs) in one or more soil samples collected from the historic fill layer; one SVOC, benzo(a)pyrene, and lead were the only contaminants that exceeded the commercial use SCOs.
- Characteristic hazardous concentrations of lead in soil in the northwestern corner of the site;
- Elevated concentrations of chlorinated volatile organic compounds (CVOCs) in soil, groundwater, and soil vapor; these constituents are attributed to a suspected hydraulically upgradient, off-site source;
- Incidental, residual petroleum impacts in on-site groundwater that are not migrating offsite;
- Elevated concentrations of metals in the sediment of Branch Brook that are likely attributed to unidentified off-site sources of metals.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for restricted purposes.

To achieve this goal, the Applicant will conduct investigation and cleanup activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant has completed a full site investigation before it entered into the BCP. The Applicant has submitted an investigation report for the full site investigation. NYSDEC will determine if the investigation goals and requirements of the BCP have been met or if additional work is needed before a remedy can be selected.

The site investigation has several goals:

1) define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) identify the source(s) of the contamination;
3) assess the impact of the contamination on public health and the environment; and
4) provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant submits a draft "Remedial Investigation Work Plan" to NYSDEC for review and approval. NYSDEC makes the draft plan available to the public review during a 30-day public comment period.

NYSDEC will use the information in the investigation report to determine if the site poses

a significant threat to public health or the environment. If the site is a “significant threat,” it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a “Certificate of Completion” (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a “Remedial Work Plan”. The Remedial Work Plan describes the Applicant’s proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision

Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a final engineering report that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the final engineering report. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A -
Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Michael Squire
Project Manager
NYSDEC
Division of Environmental Remediation
625 Broadway, 11th Floor
Albany, NY 12233-7014
(518) 402-9546
Email: Michael.Squire@dec.ny.gov

Stephanie Mossey
Public Participation Specialist
NYSDEC Region 3 Office
21 South Putt Corners Road
New Paltz, NY 12561
(845) 256-3154
Email: Stephanie.Mossey@dec.ny.gov

New York State Department of Health (NYSDOH):

Renata Ockerby
NYSDOH
Empire State Plaza
Corning Tower Rm 1787
Albany, NY 21137
BEEI@Health.ny.gov
(518) 402-7860

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

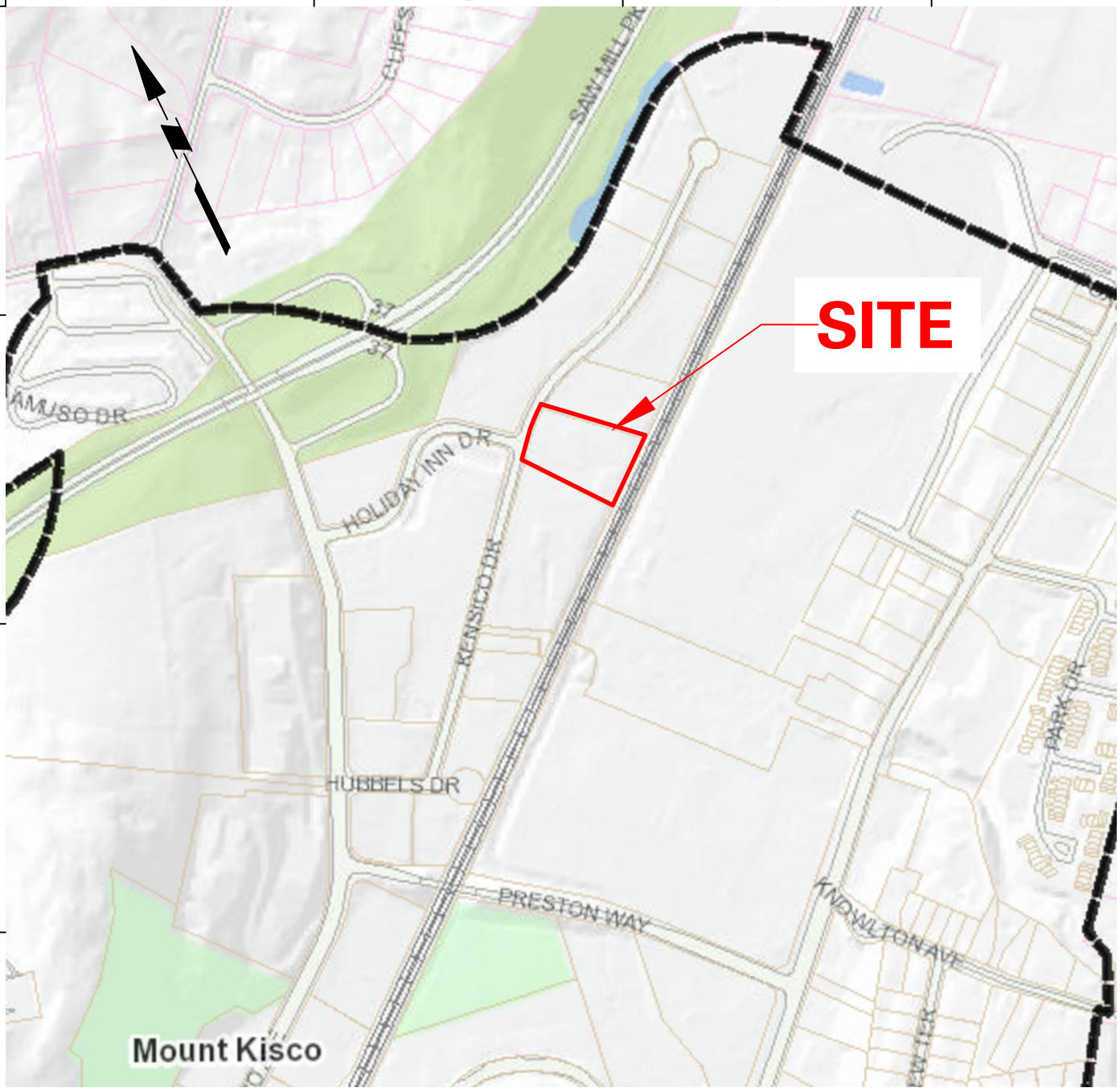
Mount Kisco Public Library
100 Main Street
Mount Kisco, NY 10549
Phone: 914-666-8041

Hours:	Monday	10 a.m. to 6 p.m.
	Tuesday	10 a.m. to 6 p.m.
	Wednesday	10 a.m. to 7 p.m.
	Thursday	10 a.m. to 7 p.m.
	Friday	10 a.m. to 5 p.m.
	Saturday	10 a.m. to 4 p.m.
	Sunday	12 p.m. to 4 p.m.

Appendix B - Site Contact List

	APPENDIX B								
	Site Contact List								
	Site #: C360163								
	Site Name: Former Design For Leisure Site - List Last Updated: 12/5/2019								
	Current Occupant	Name, Title	Address 1	Address 2	Street Address	City	State	Zip	Site Name (County)
1		Gina D. Picinich, Mayor			104 Main Street	Mount Kisco	NY	10549	Former Design for Leisure (Westchester)
2		Douglas Hertz Chairman, Mount Kisco Planning Board			104 Main Street	Mount Kisco	NY	10549	Former Design for Leisure (Westchester)
3		Timothy Idoni, Westchester County Clerk			111 Dr. Martin Luther King Junior Boulevard	White Plains	NY	10601	Former Design for Leisure (Westchester)
4		Westchester County Executive, George Latimer			148 Martine Avenue	White Plains	NY	10601	Former Design for Leisure (Westchester)
5		Weschester Department Planning Board Chair	Richard Hyman		148 Martine Avenue	White Plains	NY	10601	Former Design for Leisure (Westchester)
6		Westchester County Department of Health			145 Huguenot Street	New Rochelle	NY	10801	Former Design for Leisure (Westchester)
7		Mt. Kisco Water and Sewer Department	Attn: Alyssa Forzano		104 Main Street	Mount Kisco	NY	10549	Former Design for Leisure (Westchester)
8		New York Times			229 West 43rd Street	New York	NY	10036	Former Design for Leisure (Westchester)
9		Northern Westchester Examiner			rpezzullo@theexaminernews.com				Former Design for Leisure (Westchester)
10		New York Post			1211 Avenue of the Americas	New York	NY	10036	Former Design for Leisure (Westchester)
11		Mount Kisco Chamber of Commerce	Attn: Loretta Brooks		3 North Moger Avenue	Mount Kisco	NY	10549	Former Design for Leisure (Westchester)
12		Mount Kisco Department of Recreation	Attn: Joanne Aquilino		104 Main Street	Mount Kisco	NY	10549	Former Design for Leisure (Westchester)
13		Hon. Nita M. Lowey	U.S. House of Representatives		222 Mamaroneck Avenue., #312	White Plains	NY	10605	Former Design for Leisure (Westchester)
14		Hon. Charles Schumer	U.S. Senator		780 Third Avenue, Suite 2301	New York	NY	10017	Former Design for Leisure (Westchester)
15		Hon. Kirsten Gillibrand	U.S. Senator		780 Third Avenue, Suite 2601	New York	NY	10017	Former Design for Leisure (Westchester)
16	Current Occupant	RESIDENT/BUSINESS OWNER			25 Kensico Drive	Mount Kisco	NY	10549	Former Design for Leisure (Westchester)
17	Current Occupant	RESIDENT/BUSINESS OWNER			45 Kensico Drive	Mount Kisco	NY	10549	Former Design for Leisure (Westchester)
18	Current Occupant	RESIDENT/BUSINESS OWNER			1 Holiday Inn Drive	Mount Kisco	NY	10549	Former Design for Leisure (Westchester)
19	Current Occupant	RESIDENT/BUSINESS OWNER			275 Kisco Avenue	Mount Kisco	NY	10549	Former Design for Leisure (Westchester)

Appendix C - Site Location Map



NOTES:

1. BASE MAP IS REFERENCED FROM WESTCHESTER COUNTY 2-FOOT TOPOGRAPHIC MAP, ACCESSED FROM WESTCHESTER COUNTY GEOGRAPHIC INFORMATION SYSTEMS ON OCTOBER 23, 2018.

500 0 250 500
SCALE IN FEET

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project
41 KENSICO DRIVE
SECTION 69.50, PARCEL No. 1–2
TOWN OF MOUNT KISCO
WESTCHESTER COUNTY NEW YORK

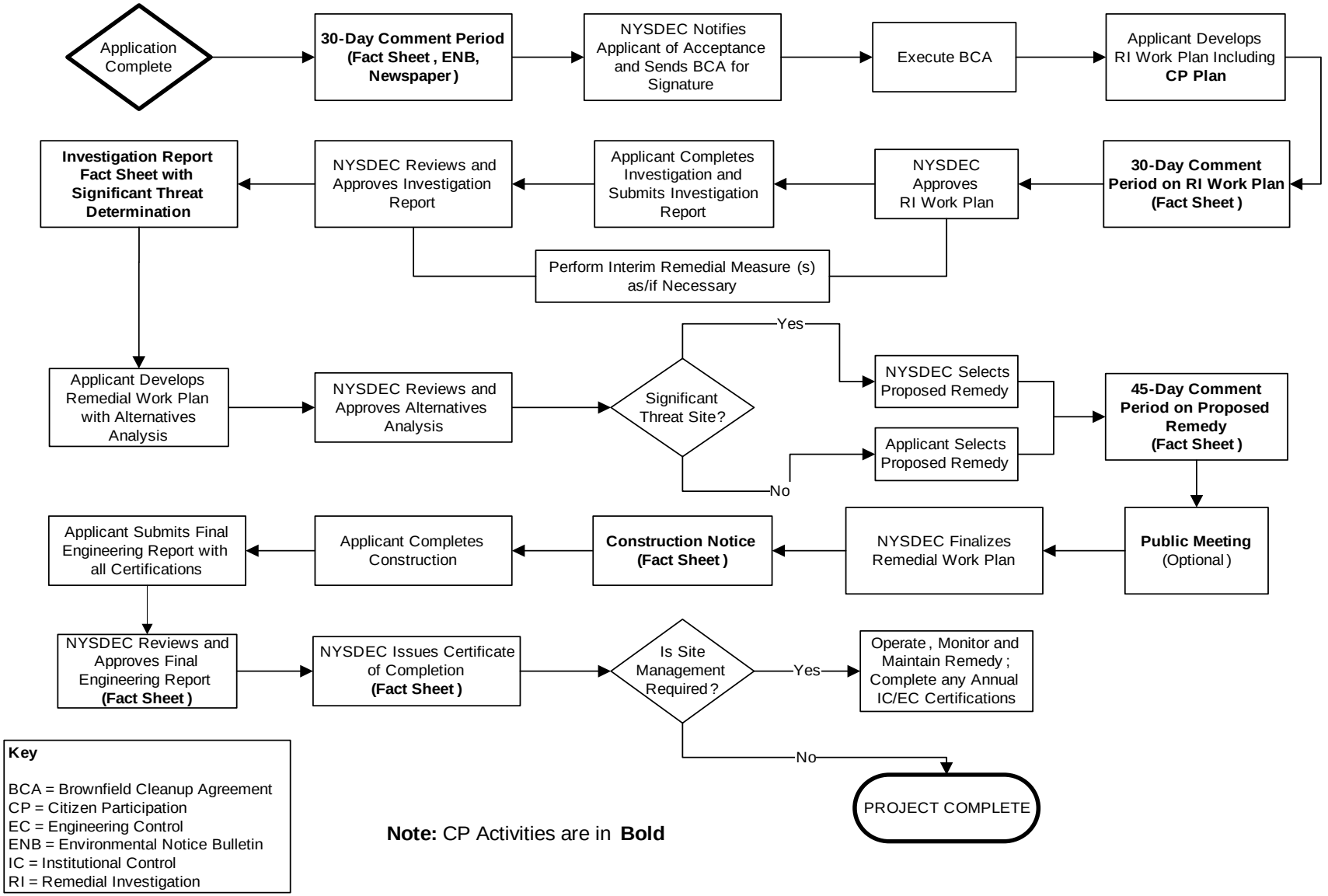
Figure Title
SITE LOCATION MAP

Project No.	190046301
Date	10/23/2018
Drawn By	ERA
Checked By	TC

Figure No. 1

Filename: \\langan.com\data\WPW\data3\190046301\Project Data\CAD\01\SheetFiles\Environmental\RIR\Figure 1 - Site Location Map.dwg Date: 7/18/2019 Time: 12:36 User: eburgess Style Table: Langan.stb Layout: ANSIA-BP

Appendix D– Brownfield Cleanup Program Process



Key

BCA = Brownfield Cleanup Agreement
CP = Citizen Participation
EC = Engineering Control
ENB = Environmental Notice Bulletin
IC = Institutional Control
RI = Remedial Investigation

Note: CP Activities are in **Bold**

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern

Instructions

This Scoping Sheet assesses major issues of public concern; impacts of the site and its remedial program on the community; community interest in the site; information the public needs; and information needed from the public.

The information generated helps to plan and conduct required citizen participation (CP) activities, and to choose and conduct additional CP activities, if appropriate. The scoping sheet can be revisited and updated as appropriate during the site's remedial process to more effectively implement the site's CP program.

Note: Use the information as an aid to prepare and update the Major Issues of Public Concern section of the site CP Plan.

General Instructions

- When to prepare: During preparation of the CP Plan for the site. It can be revisited and updated anytime during the site remedial process.
- Fill in site name and other information as appropriate.
- The Scoping Sheet may be prepared by DEC or a remedial party, but must be reviewed and approved by the DER site project manager or his/her designee.

Instructions for Numbered Parts

Consider the bulleted issues and questions below and any others that may be unique or appropriate to the site and the community to help complete the five Parts of this Scoping Sheet. Identify the issue stakeholders in Parts 1 through 3 and adjust the site's contact list accordingly.

Part 1. List Major Issues of Public Concern and Information the Community Wants.

- Is our health being impacted? (e.g. Are there problems with our drinking water or air? Are you going to test our water, yards, sumps, basements? Have health studies been done?)
- There are odors in the neighborhood. Do they come from the site and are they hazardous?
- Are there restrictions on what we may do (e.g. Can our children play outside? Can we garden? Must we avoid certain areas? Can we recreate (fish, hunt, hike, etc. on/around the site?)
- How and when were the site's contamination problems created?
- What contaminants are of concern and why? How will you look for contamination and find out where it is going? What is the schedule for doing that?
- The site is affecting our property values!
- How can we get more information (e.g. who are the project contacts?)
- How will we be kept informed and involved during the site remedial process?
- Who has been contacted in the community about site remedial activities?
- What has been done to this point? What happens next and when?
- The site is going to be cleaned up for restricted use. What does that mean? We don't want redevelopment on a "dirty" site.

Part 2. List Important Information Needed <u>From</u> the Community, if Applicable.

- Can the community supplement knowledge about past/current uses of the site?
- Does the community have knowledge that the site may be significantly impacting nearby people, properties, natural resources, etc.?
- Are activities currently taking place at the site or at nearby properties that may need to be restricted?
- Who may be interested or affected by the site that has not yet been identified?
- Are there unique community characteristics that could affect how information is exchanged?
- Does the community and/or individuals have any concerns they want monitored?
- Does the community have information about other sources in the area for the contamination?

Part 3. List Major Issues and Information That Need to be Communicated <u>to</u> the Community.

- Specific site investigation or remediation activities currently underway, or that will begin in the near future.
- The process and general schedule to investigate, remediate and, if applicable, redevelop the site.
- Current understanding about the site contamination and effects, if any, on public health and the environment.
- Site impacts on the community and any restrictions on the public's use of the site and/or nearby properties.
- Planned CP activities, their schedule, and how they relate to the site's remedial process.
- Ways for the community to obtain/provide information (document repositories, contacts, etc.).

Part 4. Community Characteristics

a. - e. Obtain information from local officials, property owners and residents, site reports, site visits, "windshield surveys," other staff, etc.

f. Has the affected community experienced other **significant** present or past environmental problems unrelated to this site? Such experiences could significantly affect public concerns and perspectives about the site; how the community will relate to project staff; the image and credibility of project staff within the community; and the ways in which project staff communicate with the community.

g. In its remedial programs, DER seeks to integrate, and be consistent with, environmental justice principles set forth in *DEC Commissioner Policy 29 on Environmental Justice* and *DER 23 – Citizen Participation Handbook for Remedial Programs*. Is the site and/or affected community wholly or partly in an Environmental Justice (EJ) Area? Use the Search feature on DEC's public web site for "environmental justice". DEC's EJ pages define an EJ area, and link to county maps to help determine if the site and/or community are in an EJ area.

h. Consider factors such as:

- Is English the primary language of the affected community? If not, provisions should be considered regarding public outreach activities such as fact sheets, meetings, door-to-door visits and other activities to ensure their effectiveness.
- The age demographics of the community. For example, is there a significant number of senior citizens in the community? It may be difficult for some to attend public meetings and use document repositories. This may suggest adopting more direct interaction with the community with activities such as door-to-door visits, additional fact sheets, visits to community and church centers, nursing homes, etc.
- How do people travel about the community? Would most people drive to a public meeting or document repository? Is there adequate public transportation?

Part 5. Affected/Interested Public.

Individuals and organizations who need or want information and input can change during the site's remedial process. This need is influenced by real, potential, or perceived impacts of the site or the remedial process. Some people may want information and input throughout the remedial process. Others may participate only during specific remedial stages, or may only be interested in particular issues.

It is important to revisit this question when reviewing this scoping sheet. Knowing who is interested in the site – and the issues that are important to them – will help to select and conduct appropriate outreach activities, and to identify their timing and the information to be exchanged.

Check all affected/interested parties that apply to the site. **Note: Adjust the site's contact list appropriately.** The following are some ways to identify affected/interested parties:

- Tax maps of adjacent property owners
- Attendees at public meetings
- Telephone discussions
- Letters and e-mails to DER, the remedial party, and other agencies
- Political jurisdictions and boundaries
- Media coverage
- Current/proposed uses of site and/or nearby properties (recreational, commercial, industrial)
- Discussions with community organizations: grass roots organizations, local environmental groups, environmental justice groups, churches, and neighborhood advisory groups

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern (see instructions)

Site Name: 41 Kensico Drive

Site Number: C360163

Site Address and County: 41 Kensico Drive, Mount Kisco, NY, Westchester County

Remedial Party(ies): NY Luxury Motors of Mt. Kisco, Inc.

Note: For Parts 1. – 3. the individuals, groups, organizations, businesses and units of government identified should be added to the site contact list as appropriate.

Part 1. List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and information needs. **Use this information as an aid to prepare or update the Major Issues of Public Concern section of the site Citizen Participation Plan.**

Remediation of soil may impact air quality while work is being performed. NYSDEC and NYSDOH are overseeing the project to ensure the air and odor issues are monitored and mitigated during implementation of the work plan.

How were these issues and/or information needs identified?
The remedial investigation identified contaminated soil and groundwater at the site.

Part 2. List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed.
N/A

How were these information needs identified?
N/A

Part 3. List major issues and information that need to be communicated **to** the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information.

The major issues that need to be communicated to the community include the remedial investigation results, remedial action plan, and redevelopment coordination for the site. This information needs to be provided to the contact list appended to the CPP.

How were these issues and/or information needs identified?
Click here to enter text.

Part 4. Identify the following characteristics of the affected/interested community. This knowledge will help to identify and understand issues and information important to the community, and ways to effectively develop and implement the site citizen participation plan (mark all that apply):

a. Land use/zoning at and around site:
☐ **Residential** ☐ **Agricultural** ☐ **Recreational** ☒ **Commercial** ☐ **Industrial**

b. Residential type around site:

☐ **Urban** ☒ **Suburban** ☐ **Rural**

c. Population density around site:
☐ **High** ☒ **Medium** ☐ **Low**

d. Water supply of nearby residences:
☒ **Public** ☐ **Private Wells** ☐ **Mixed**

e. Is part or all of the water supply of the affected/interested community currently impacted by the site?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

f. Other environmental issues significantly impacted/impacting the affected community?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

g. Is the site and/or the affected/interested community wholly or partly in an Environmental Justice Area?
☐ **Yes** ☒ **No**

h. Special considerations:
☐ **Language** ☐ **Age** ☐ **Transportation** ☐ **Other**

Explain any marked categories in **h:**
Click here to enter text.

Part 5. The site contact list must include, at a minimum, the individuals, groups, and organizations identified in Part 2. of the Citizen Participation Plan under 'Site Contact List'. Are *other* individuals, groups, organizations, and units of government affected by, or interested in, the site, or its remedial program? (Mark and identify all that apply, then adjust the site contact list as appropriate.)

☐ **Non-Adjacent Residents/Property Owners:** Click here to enter text.

☒ **Local Officials:** See contact list.

☒ **Media:** See contact list.

☒ **Business/Commercial Interests:** See contact list.

☐ **Labor Group(s)/Employees:** Click here to enter text.

☐ **Indian Nation:** Click here to enter text.

☐ **Citizens/Community Group(s):** Click here to enter text.

☐ **Environmental Justice Group(s):** Click here to enter text.

☐ **Environmental Group(s):** Click here to enter text.

☐ **Civic Group(s):** Click here to enter text.

☐ **Recreational Group(s):** Click here to enter text.

☐ **Other(s):** Click here to enter text.

Prepared/Updated By: Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.

Date: 12/5/2019

Reviewed/Approved By: Click here to enter text.

Date: Click here to enter text.

APPENDIX G

Project/Remediation Schedule

BCP Remediation Schedule
41 Kensico Drive
Mt. Kisco, NY
Langan Project No. 190046301
Last Updated: 11/12/2020

Item	Action	2018		2019												2020												2021											
		NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	BCA Agreement and RIR Submittal																																						
2	NYSDEC Review and Approval of RIR																																						
3	SRI, NYSDEC Review and Approval of Updated RIR (November 2019)																																						
4	Post-RIR Technical Discussions (Contributing On-Site Source)																																						
5	RDI Work Plan, NYSDEC Review, RDI Implementation and Reporting																																						
6	RAWP Update and Submittal																																						
7	NYSDEC Review of RAWP and Public Comment Period																																						
8	NYSEC Issues Decision Document																																						
9	Construction Documents, Bid Support																																						
10	RAWP Implementation/Construction																																						
11	FER and SMP Preparation and Submittal																																						
12	NYSDEC Review of FER and SMP and Environmental Easement																																						
13	NYSDEC Issues COC																																						

Notes:

1 BCA = Brownfield Cleanup Agreement
2 RIR = Remedial Investigation Report
3 NYSDEC = New York State Department of Environmental Conservation
4 SRI = Supplemental Investigation Report
5 RDI = Remedial Design Investigation
6 RAWP = Remedial Action Work Plan
7 BCP = Brownfield Cleanup Program
8 FER = Final Engineering Report
9 SMP = Site Management Plan
10 COC = Certificate of Completion

APPENDIX H

RetroCoat™ Product Details

Vapor Intrusion Coating System for Existing Structures

Retro-Coat™

Vapor Intrusion Coating

www.landsciencetech.com

Key Benefits

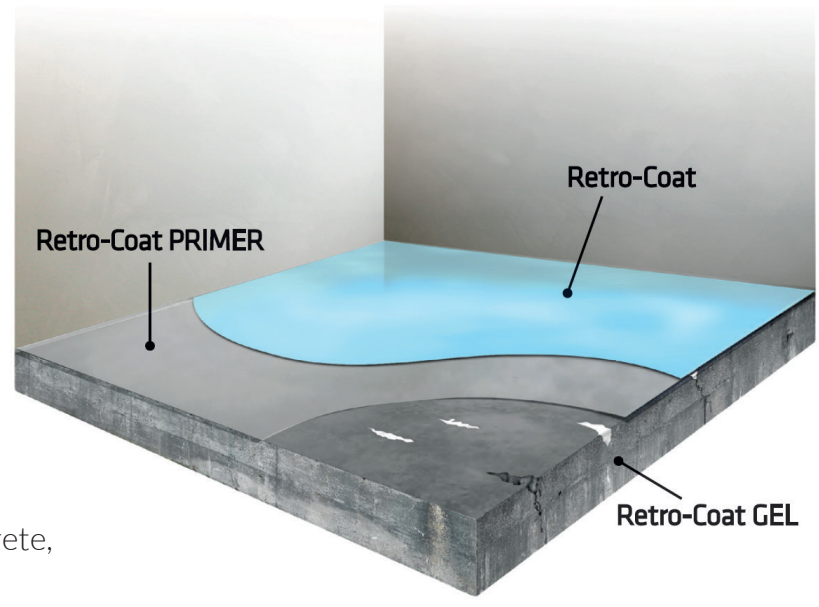
- Eliminates Risk
- Excellent Constructability
- Highest Chemical Resistance on the Market
- Competitively Priced

Retro-Coat finishes to a high gloss, easy-to-clean surface that is impervious to vapor and moisture intrusion.

Product Description

The Retro-Coat™ Vapor Intrusion Coating System is a complete product line that consists of chemically resistant materials to properly protect existing structures from the threat of vapor intrusion without the need for additional concrete protection. Developed by the Research and Development team of Land Science®, the Retro-Coat system has been subjected to rigorous testing procedures to prove its ability to combat the most aggressive chemical vapors. The main component of the Retro-Coat system is the Retro-Coat coating which is a two part, odorless, no volatile organic compounds (VOCs), 100% solids coating.

Available in a variety of colors, Retro-Coat can be applied on damp as well as dry concrete, concrete masonry units, tile, brick, and metal. For enhanced slip resistance, a suitable aggregate can be added. In addition, other additives or materials can be utilized to achieve a desired performance or aesthetic look.



Typical Application

Retro-Coat is a suitable barrier to block contaminated vapors from entering existing structures. Particular uses include coating the horizontal surfaces of existing structures where contamination under, or adjacent to, a structure can potentially migrate inside the structure and create a vapor encroachment condition. This condition is most commonly found when the existing structure was operated as a dry cleaner, gas station, manufacturing facility, or located in close proximity to any structure where carcinogenic chemicals were utilized.

A typical application consists of a minimum 20 mil thick system and of two 10 mil coats of Retro-Coat at 160 square foot/gallon per coat and is recommended along with a 6 mil coat of Retro-Coat PRIMER. The typical 20 mil application can withstand forklift traffic, other machinery, and even act as secondary containment. However, if Retro-Coat is exposed to harsh conditions over a longer period of time and/or used for a unique application, please consult with a Land Science representative to discuss options and a recommended approach.

Retro-Coat™
Vapor Intrusion Coating

Retro-Coat Advantages

- ☑ Our R&D team developed all of the Retro-Coat system components specifically for vapor intrusion protection in existing structures
- ☑ Resistant to both TCE and PCE
- ☑ A wearing surface, meaning no additional concrete protection is necessary
- ☑ No odor and fast cure time reduce building downtime
- ☑ Carpet, tile, linoleum or other floor coverings can be applied directly over Retro-Coat, if desired
- ☑ Eliminates the need to remove the existing slab and when combined with in situ treatment, lowers overall remediation cost
- ☑ Can increase the performance of an existing active sub-slab depressurization system
- ☑ Can aid in the retiring of existing active systems
- ☑ Available and installed by Land Science certified contractors

Former Jazz Club Protected from Vapor Intrusion

Challenge:

Renton, Washington is a bedroom community located just outside of downtown Seattle. As a suburb to downtown Seattle, Renton has seen tremendous growth over the last two decades as technology giants like Microsoft, Amazon, and Nintendo chose the area for their global headquarters. With commercial properties and home values ever increasing, developers are looking for new ways to restore brownfield sites quickly and effectively, to allow them to move forward with future development. In the case of this former popular jazz club in the historic section of downtown Renton, indoor air quality was impacted by volatile organic compounds associated with dry cleaning solvents that had spread from a nearby dry cleaning operation.

In May, 2017, Maul Foster Alongi conducted an indoor air quality assessment at the Property after installation of Retro-Coat VI System. In order to obtain samples representative of indoor air conditions at the Property and to ensure that the same indoor air conditions existed during the previous indoor air quality assessment conducted by Maul Foster Alongi in January 2017.

Results:

The objective of mitigating VI of VOCs into the building structure for future occupants at the property has been met by the installation of the Retro-Coat VI System. The Retro-Coat VI System provides a long-term solution to the property indoor air quality issues arising from the adjoining dry cleaners facility.

Laboratory analytical results for the indoor air quality assessment after installation of the Retro-Coat VI System indicated the following:

- The PCE concentration in the dining room area (JRIA-5 indoor air sample—5.1 µg/m3) measured below the Department of Ecology Vapor Intrusion Indoor Air Method B cancer CUL of 9.6 µg/m3 (DOE, 2016).
- Other VOCs associated with dry-cleaning solvents, including carbon tetrachloride, 2 butanone, toluene, and xylenes, were also detected below their respective DOE Vapor Intrusion Indoor Air Method B cancer CULs.

Former Industrial Manufacturing Facility Reborn

Challenge:

A former industrial manufacturing facility in Greenville, SC was purchased for redevelopment in 2017. Building improvements were planned to include a warehouse, offices, and self-storage units to serve a growing commercial area. Redevelopment plans included converting the industrial warehouse building into climate controlled self-storage units, and renovating the office into an apartment unit and office. Sub-slab soil gas samples detected various VOCs above the laboratory method detection limit. Bunnell Lammons Engineering utilized the Environmental Protection Agency (EPA) Vapor Intrusion Screening Level (VISL) calculator to model potential indoor air concentrations of VOCs based on the sub-slab soil gas results. Based on EPA VISL calculations, two VOCs, chloroform and TCE, had estimated indoor air concentrations above their respective EPA Industrial/Commercial Risk Based Screening Level (RSL). The indoor air samples also had detections of TCE above the EPA Residential RSL.

Results:

Incorporating the vapor mitigation technology into the anticipated renovations was both cost and time effective for the site owner. The combination of Vapor-Vent and Retro-Coat was determined as a mitigation technique to reduce the potential risk of harmful vapor intrusion in the new apartment and office. Bunnell Lammons Engineering plans for two rounds of post-mitigation sampling. One was already performed in the summer of 2019 and one is planned in the winter between December 2019 and February 2020 to verify the effectiveness to the system.

World Class Clients

Environmental consultants, engineers, and real estate professionals trust Land Science to produce results knowing our expertise and industry knowledge has been proven time and again at the job site. Our world class clients include leaders in the food, banking, government, and housing industries.

Get Started Today

To receive a custom vapor intrusion solution, please call

949.481.8118 or email

info@landsciencetech.com

One of our Technical Solutions Managers will review your project details and provide you with a customized vapor intrusion solution designed to achieve your goals.

Retro-Coat™

Vapor Intrusion Coating

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