APPENDIX D
COMMUNITY AIR MONITORING PLAN

Appendix D
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 and 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 the New York State Department of Health (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 New York State Department of Environmental Conservation (NYSDEC)/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

VOCs must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** bases or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work 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.

- 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.

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

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

All 15-minute readings must be recorded and available for State (DEC and DOH) 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.

- 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.

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

All readings must be recorded and be available for State (DEC and DOH) 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/m^3, work activities should be suspended until controls are

implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

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.

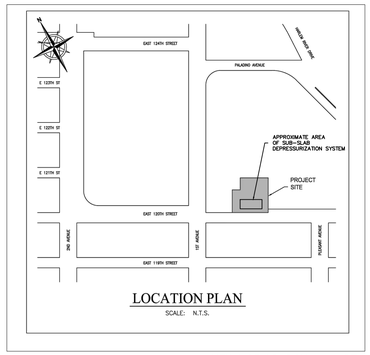
APPENDIX E
SUB-MEMBRANE DEPRESSURIZATION SYSTEM PLAN

GENERAL NOTES

1. DRAWING NOT TO BE USED FOR STRUCTURAL, ARCHITECTURAL, OR OTHER REFERENCE EXCEPT FOR SUB-MEMBRANE DEPRESSURIZATION (SMD) SYSTEM .
2. COORDINATE ALL WORK FOR SMD SYSTEM WITH OTHER TRADES PRIOR TO INSTALLATION.
3. ANY DEVIATION FROM THIS INSTALLATION MUST BE SUBMITTED TO THE OWNER AND ENGINEER OF RECORD FOR REVIEW.
4. INSTALLATION TESTING (I.E., PRESSURE TESTING, SMOKE TEST, ETC.) AND START-UP OF THE SMD SYSTEM COMPONENTS SHALL BE COMPLETED WITH OVERSIGHT BY THE ENGINEER OF RECORD.
5. WE ASSUME THAT BUILDING HVAC SYSTEMS WILL BE BALANCED AND WILL NOT EXHIBIT ANY NEGATIVE PRESSURE WITHIN THE INDOOR BUILDING AIR.

DRAWING LIST

SHEET NO.	SHEET TITLE	DOB SET
H-001.00	SUB-MEMBRANE DEPRESSURIZATION SYSTEM GENERAL NOTES	1
H-101.00	SUB-MEMBRANE DEPRESSURIZATION SYSTEM BARRIER PLAN, SUBGRADE PITS, PIPING	2
H-102.00	SUB-MEMBRANE DEPRESSURIZATION SYSTEM ROOF PLAN AND INSTRUMENTATION	3
H-201.00	SUB-MEMBRANE DEPRESSURIZATION SYSTEM TYPICAL DETAILS	4
H-202.00	SUB-MEMBRANE DEPRESSURIZATION SYSTEM TYPICAL DETAILS (CONT.)	5



LOCATION PLAN
SCALE: N.T.S.

NEW YORK BLOCK 1808 LOT 8

WORK SCOPE: SUB-SLAB DEPRESSURIZATION SYSTEM
WORK ON FLOORS: CELLAR, FLOORS 1-6, ROOF

RELATED DOB JOB NUMBERS	
NB:	ATLCO:
M01030184-I1: GC	M01031445-I1: GC
M01030184-S1: FO	M01031445-S1: MS
M01030184-S2: ST	M01031445-S2: PL
M01030184-S3: MS	M01031445-S3: SPSD
M01030184-S4: PL	M01031445-S5: SSDS
M01030184-S5: SPSD	M01031445-S6: FO
M01030184-S6: TEMP SD	M01031445-S7: ST
	M01031445-S8: FS

SUB-MEMBRANE DEPRESSURIZATION SYSTEM NOTES

1. REFER TO DRAWINGS H-001.00, H-101.00, H-102.00, H-201.00, and H-202.00 FOR SMD SYSTEM PLAN AND DETAILS.
2. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR OWNER APPROVAL PRIOR TO THE SMD SYSTEM INSTALLATION. ANY CONDITION OR DETAIL NOT DEPICTED IN THESE DRAWINGS SHALL BE PROVIDED AS A SHOP DRAWING FOR APPROVAL.
3. SMD SYSTEM PIPE, FITTINGS, UNIONS, CLEANOUTS, SLEEVES, SUPPORTS, HANGERS, AND RELATED ACCESSORIES SHALL BE FURNISHED IN ACCORDANCE WITH THE REQUIREMENTS FOR PLUMBING SANITARY VENT PIPING IN 2022 NEW YORK CITY PLUMBING CODE SECTION PC 702-MATERIALS .
4. ALL PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE NEW YORK CITY MECHANICAL AND PLUMBING CODE, INCLUDING, BUT NOT LIMITED TO, THOSE REQUIREMENTS PERTAINING TO:
   - PROTECTION OF SYSTEM COMPONENTS
   - TRENCHING, EXCAVATION, AND BACKFILL
   - STRUCTURAL SAFETY
   - PIPING SUPPORT
   - JOINTS
   - RISER LOCATION
   - MATERIALS OF CONSTRUCTION
5. INSTALLATION OF THE VAPOR COLLECTION PIPING SHALL BE COORDINATED WITH THE INSTALLATION OF OTHER UTILITIES AND STRUCTURAL AND ARCHITECTURAL COMPONENTS.
6. SYSTEM INSTALLATION SHALL ADHERE TO: OCTOBER 2006 FINAL GUIDANCE FOR EVALUATING SOIL VAPOR INTRUSION IN THE STATE OF NEW YORK PREPARED BY NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH), ALL APPLICABLE PORTIONS OF THE BUILDING CODE OF THE CITY OF NEW YORK, INCLUDING BUT NOT LIMITED TO 2022 NEW YORK CITY MECHANICAL CODE, CHAPTER 5, SECTION MC 512-SUB-SLAB SOIL EXHAUST SYSTEMS AND 2022 NEW YORK CITY PLUMBING CODE SECTION PC 702-MATERIALS.
7. RISER PIPE SHALL BE EXTENDED TO THE ROOF WITH MINIMAL CHANGES IN DIRECTION. HORIZONTAL RISER PIPE RUNS SHALL MAINTAIN A MINIMUM SLOPE OF 1%, SLOPING BACK TOWARDS THE SUBSURFACE PERFORATED PIPE (FOR BELOW GRADE SOLID PIPE) OR SLOPING BACK TOWARDS THE RISER (FOR ABOVE-SLAB SOLID PIPE). RISER PIPE SHALL BE AIR-TIGHT. THE CONTRACTOR SHALL PERFORM PRESSURE TESTING TO DEMONSTRATE THAT THE RISER PIPE IS AIR-TIGHT BEFORE IT IS PUT INTO SERVICE. PRESSURE TESTING SHALL BE COMPLETED AT EVERY VERTICAL VENT RISER PIPE TO CONFIRM NO DAMAGE TO THE ABOVE GRADE SMD PIPES. PRESSURE TESTING WILL INVOLVE ISOLATING THE RISERS AND SHALL GENERALLY FOLLOW THE TESTING PROCEDURES SET FORTH IN 2022 NYC PLUMBING, CHAPTER 3, PC 312.3. A MINIMUM OF 5 POUNDS PER SQUARE INCH SHALL BE APPLIED TO THE PIPE AND MAINTAINED FOR A MINIMUM OF 20 MINUTES. ANY DAMAGE OR DEFECT DETECTED SHALL BE REPAIRED OR REPLACED.
8. RISER PIPE SHALL BE CLEARLY LABELED "CAUTION: DO NOT ALTER SUB-SLAB VAPOR VENT PIPE" IN EACH ACCESSIBLE AREA A MINIMUM OF EVERY 10 LINEAR FEET OF RISER PIPE RUN.
9. SMD SYSTEM EFFLUENT DISCHARGE POINTS SHALL BE:
   - COORDINATED WITH ARCHITECT AND MECHANICAL ENGINEER;
   - ABOVE THE EAVE OF THE ROOF (PREFERABLY, ABOVE THE HIGHEST EAVE OF THE BUILDING AND AT LEAST 24-INCHES ABOVE THE SURFACE OF THE ROOF);
   - AT LEAST 10 FEET ABOVE GROUND LEVEL;
   - AT LEAST 10 FEET AWAY FROM ANY OPERABLE AIR INTAKE THAT IS LESS THAN 2 FEET BELOW THE EXHAUST POINT; AND
   - 10 FEET FROM ANY ADJOINING OR ADJACENT BUILDINGS, OR HVAC INTAKES OR SUPPLY REGISTERS.
11. ALL EXTERNAL PIPES SHALL BE PAINTED WITH A UV-RATED AND/OR CORROSION RESISTANT COATING, DEPENDING ON PIPE MATERIAL.
12. CONTRACTOR SHALL PROTECT VAPOR COLLECTION PIPE FOLLOWING PLACEMENT OF 3/4-INCH STONE LAYER.
13. CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS (SIGNED AND SEALED BY A NYS-LICENSED PROFESSIONAL ENGINEER) OF COMPLETE SMD SYSTEM TO OWNER FOLLOWING INSTALLATION. THE SUBSURFACE SYSTEM COMPONENTS (E.G. PIPES) SHALL BE SURVEYED BY A NYS LICENSED SURVEYOR.
14. RAIN CAP MUST BE PLACED ON THE ACTIVE DISCHARGE EXHAUST POINT TO PROTECT THE RISER FROM RAIN AND DEBRIS, BUT SHALL NOT INCREASE THE POTENTIAL FOR SUBSURFACE VAPORS TO ENTER THE BUILDING BY BLOCKING THE EXHAUST OR CREATE BACK PRESSURE ON THE BLOWER.
15. A MINIMUM 3-INCH-THICK 3/4-INCH CLEAN STONE LAYER MUST NOT BE COMPACTED AND MUST BE CONTINUOUS ACROSS DEPRESSURIZED AREA
16. RISER PIPE SHALL BE 4-INCH-DIAMETER METAL PIPE OR OTHER MATERIAL THAT COMPLIES WITH APPLICABLE BUILDING CODE.
17. VAPOR COLLECTION PIPE SHALL BE 1-INCH THICK TERRAVENT SCREEN (OR APPROVED ALTERNATE).
18. ALL FITTINGS AND CONNECTIONS FOR THE VAPOR COLLECTION PIPE SHALL BE 2-INCH-DIAMETER SCHEDULE 80 PVC FITTINGS, AND OF THE TYPE RECOMMENDED BY THE MANUFACTURER FOR USE WITH THE 2-INCH-DIAMETER PIPE.
19. THE 3/4-INCH CLEAN STONE LAYER PLACED ACROSS THE ENTIRE DEPRESSURIZED AREA AND MUST BE COARSE, NATURAL, ANGULAR, WASHED 3/4-INCH AGGREGATE WITH THE FOLLOWING GRADATION (OR NYSDOT #2/ASTM #5) :

SIEVE SIZE	% PASSING BY WEIGHT
1 1/2-INCH	100
1-INCH	90-100
3/4-INCH	20-55
1/2-INCH	0-10
3/8-INCH	0-5

20. RECYCLED CONCRETE AGGREGATE (RCA) OR SOFT, BRITTLE AND/OR FOLIATED STONE (E.G., SCHIST) IS NOT ACCEPTABLE TO USE FOR STONE LAYER.

WATERPROOFING/VAPOR BARRIER NOTES

1. REFER TO WATERPROOFING/VAPOR BARRIER DRAWINGS FOR DESIGN.
2. WATERPROOFING/VAPOR BARRIER SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE MANUFACTURER GUIDELINES AND DETAILS.
3. WATERPROOFING/VAPOR BARRIER SHALL BE INSTALLED BY A MANUFACTURER-CERTIFIED OR -APPROVED INSTALLER.
4. THE VAPOR BARRIER (MINIMUM THICKNESS OF 20-MILS [THOUSANDTH OF AN INCH]) MUST BE INSTALLED ACROSS THE ENTIRE FOUNDATION FOOTPRINT (INCLUDING AREAS WHERE DEPRESSURIZATION IS NOT REQUIRED AND ABOVE THE GAS PERMEABLE AGGREGATE LAYER) IN ACCORDANCE WITH ALL APPLICABLE MANUFACTURER GUIDELINES AND DETAILS BY A MANUFACTURER-CERTIFIED INSTALLER.
5. VAPOR BARRIER SHALL BE AN ASTM E1745 CLASS A, NON-BITUMINOUS, VAPOR MEMBRANE AND BE VOC- AND CVOC-RESISTANT.
6. WATERPROOFING/VAPOR BARRIER SHALL BE INSPECTED IMMEDIATELY BEFORE CONCRETE IS PLACED. ALL PENETRATIONS, HOLES, AND/OR TEARS SHALL BE SEALED BEFORE CONCRETE IS PLACED. THE WATERPROOFING/VAPOR BARRIER DETAILS SHOWN ARE GENERALIZED IN NATURE AND ARE INTENDED TO INDICATE THE EXTENT AND LOCATIONS OF THE WATERPROOFING/VAPOR BARRIER. ACTUAL INSTALLATION AND REPAIRS SHALL BE IN ACCORDANCE WITH THE WATERPROOFING/VAPOR BARRIER MANUFACTURER'S STANDARD DETAILS AND WRITTEN INSTALLATION INSTRUCTIONS.
7. CONTRACTOR SHOP DRAWINGS INDICATING WATERPROOFING/VAPOR BARRIER INSTALLATION DETAILS AND METHODS SHALL BE REVIEWED AND APPROVED BY THE MATERIAL MANUFACTURER PRIOR TO SUBMITTAL TO THE ENGINEER OF RECORD FOR REVIEW.
8. ALL WATERPROOFING/VAPOR BARRIER ACCESSORY MATERIALS, INCLUDING BUT NOT LIMITED TO TAPE, SEALANT, LIQUID MEMBRANE, ETC. SHALL BE COMPATIBLE WITH AND DESIGNED FOR USE WITH THE SELECTED WATERPROOFING/VAPOR BARRIER.
9. INSTALLED WATERPROOFING/VAPOR BARRIER MATERIALS AND INSTALLATION SHALL HAVE WARRANTIES PROVIDED BY THE INSTALLER AND MANUFACTURER.
10. DO NOT PENETRATE THE WATERPROOFING/VAPOR BARRIER MEMBRANE. CARE SHALL BE TAKEN DURING THE PLACEMENT OF THE SLAB REINFORCING REBAR AND THE POURING OF THE BUILDING SLAB TO PREVENT ACTIVITIES [I.E., VEHICLE TRAFFIC DIRECTLY ON TOP OF WATERPROOFING/VAPOR BARRIER] WHICH MAY DAMAGE THE WATERPROOFING/VAPOR BARRIER PRIOR TO INSTALLING THE BUILDING SLAB. IF VEHICLE TRAFFIC OVER THE WATERPROOFING/VAPOR BARRIER IS REQUIRED, PROPER PRECAUTIONS SHALL BE COORDINATED WITH THE ENGINEER OF RECORD PRIOR TO INITIATING SUCH WORK. IT IS THE GENERAL CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE MEMBRANE IS NOT PENETRATED OR DAMAGED.
11. THE WATERPROOFING/VAPOR BARRIER SHALL BE INSPECTED FOR HOLES, PUNCTURES AND GAPS USING METHODS APPROVED BY THE MANUFACTURER.
12. THE VAPOR BARRIER MATERIALS ARE INTENDED TO MITIGATE INTRUSION OF CONTAMINATED SUB-SLAB VAPORS INTO OCCUPIED BUILDING SPACES. IF WATERPROOFING IS ALSO REQUIRED, THIS SHALL BE COORDINATED ACCORDINGLY TO ENSURE COMPATIBLE MATERIALS ARE SELECTED AND APPLIED.

CODE COMPLIANCE NOTES:

1. THE SMD SYSTEM COMPLIES WITH THE REQUIREMENTS OF THE 2022 NYC MECHANICAL CODE SECTION 512, "SUB-SLAB SOIL EXHAUST SYSTEMS".
2. THE SMD SYSTEM IS NOT A "HAZARDOUS EXHAUST SYSTEM", AS DEFINED IN THE 2022 NYC MECHANICAL CODE SECTION 510.
3. CHAPTER 6, "DUCT SYSTEMS", PARAGRAPH 601.4, "CONTAINMENT PREVENTION", OF THE 2012 NYC MECHANICAL CODE DOES NOT APPLY TO SMD SYSTEMS.
4. CHAPTER 6, "DUCT SYSTEMS", PARAGRAPH 607.5.5.2, "LIMITATIONS", OF THE 2022 NYC MECHANICAL CODE DOES NOT APPLY TO SMD SYSTEMS.
5. SMD SYSTEM IS NOT DESIGNED TO VENT METHANE OR RADON.
6. THE CONTRACTOR SHALL OBTAIN "CERTIFICATE OF COMPLIANCE" REQUIRED IN ACCORDANCE WITH CHAPTER 1 OF TITLE 28 OF THE ADMINISTRATIVE CODE, ARTICLE 116, 28-116.4.1. CERTIFICATE OF COMPLIANCE SHALL BE REQUIRED FOR THE USE AND OPERATION OF THE SMD.

PERMITS:
CONTRACTOR SHALL FILE FOR AND OBTAIN PERMITS FOR ALL MECHANICAL SYSTEMS. PERMITS SHALL COMPLY WITH CHAPTER 1 ADMINISTRATION, TITLE 28, SECTION MC105.

LISTED AND LABELED:
ALL APPLIANCES REGULATED BY NEW YORK CITY MECHANICAL CODE SHALL BE LISTED AND LABELED AS REQUIRED BY MC301.7. LABEL INFORMATION SHALL COMPLY WITH REQUIREMENTS OF MC 301.9.

VIBRATION ISOLATION:
ALL MECHANICAL EQUIPMENT SHALL BE MOUNTED AND SUPPORTED AND PROVIDED WITH VIBRATION ISOLATORS AS REQUIRED BY MC 313.

WIND RESISTANCE:
ALL MECHANICAL EQUIPMENT, APPLIANCES, AND SUPPORTS THAT ARE EXPOSED TO WIND SHALL BE DESIGNED AND INSTALLED AS PER BC 1609 "WIND LOADS".

FIRE STOPPING COMPLIANCE NOTE:
- FOR FIRE STOPPING AT ANY FIRE RATED CONSTRUCTION PENETRATION, CONTRACTOR SHALL REFER TO ARCHITECT DRAWINGS AND SPECIFICATIONS.
- ALL DUCT AND PIPE PENETRATIONS OF RATED CONSTRUCTION SHALL COMPLY WITH BC 711 AND 714.

INSPECTION SCHEDULE

No.	MILESTONE DESCRIPTION	DATE COMPLETED
1	DELIVERY OF GAS PERMEABLE AGGREGATE TO THE SITE.	
2	SUB-MEMBRANE DEPRESSURIZATION PIPING INSTALLATION PROGRESS, AT A MINIMUM, 25% COMPLETENESS.	
3	SUB-MEMBRANE DEPRESSURIZATION PIPING INSTALLATION PROGRESS, AT A MINIMUM, 50% COMPLETENESS.	
4	SUB-MEMBRANE DEPRESSURIZATION PIPING INSTALLATION PROGRESS, AT A MINIMUM, 75% COMPLETENESS.	
5	SUB-MEMBRANE DEPRESSURIZATION PIPING INSTALLATION PROGRESS, AT 100% COMPLETENESS.	
6	INSTALLATION OF GAS VAPOR BARRIER (GVB)	
7	INSTALLATION OF VACUUM MONITORING POINTS (VMP).	
8	COMPLETION OF GAS PERMEABLE AGGREGATE LAYER.	
9	COMPLETION OF INSTALLATION OF ALL PORTIONS OF ABOVE-SLAB PIPING FROM THE RISER STUB-UP TO THE ROOF (INCLUDING LABELS ON EXPOSED PORTIONS OF THE ABOVE-SLAB RISER PIPING).	
10	IMPLEMENTATION OF PRESSURE TEST OF COMPLETED INTERIOR PIPES.	
11	INSTALLATION BLOWER AND BLOWER ACCESSORIES.	
12	INSTALLATION OF ALARM INDICATOR STATION (AIS)	
13	PLACEMENT OF FINISHED TOPPING SLAB.	
14	START-UP OF COMPLETED SYSTEM.	

SPECIAL INSPECTIONS

SPECIAL INSPECTIONS REQUIRED UNDER THIS APPLICATION IN ACCORDANCE WITH CHAPTER 17 AND THE APPLICABLE SECTIONS OF THE NYC CONSTRUCTION CODE ARE LISTED IN THE FOLLOWING TABLES. SPECIAL INSPECTIONS FOR PORTIONS OF THE WORK THAT ARE FILED UNDER SEPARATE APPLICATION ARE NOT LISTED HERE AND ARE TO BE LISTED ON THOSE APPLICATIONS BY THE CONTRACTOR'S APPLICANT OF RECORD.

THE CONTRACTOR MUST NOTIFY THE RELEVANT SPECIAL INSPECTOR OR SPECIAL INSPECTION AGENCY IN WRITING FOR SPECIAL INSPECTIONS AT LEAST 72 HOURS BEFORE THE SPECIFIC WORK COMMENCES.

THE OWNER SHALL BE RESPONSIBLE FOR THE FOLLOWING SPECIAL INSPECTIONS:

FIRE-RESISTANT PENETRATIONS AND JOINTS	BC 1705.17
POST-INSTALLED ANCHORS (BB# 2014-018,2014-19)	BC 1705.37
FLOOD ZONE COMPLIANCE	BC 1704.34
MECHANICAL SYSTEMS	BC 1704.21
STRUCTURAL STABILITY - ALTERATIONS TO EXISTING SYSTEMS	BC 1704.25.1

PROGRESS INSPECTIONS

PROGRESS INSPECTIONS REQUIRED UNDER CHAPTER 1 OF THE NYC BUILDING CODE AND THE APPLICABLE SECTIONS OF THE NYC CONSTRUCTION CODE ARE LISTED IN THE FOLLOWING TABLES.

THE CONTRACTOR MUST NOTIFY THE RELEVANT SPECIAL INSPECTOR OR SPECIAL INSPECTION AGENCY IN WRITING FOR SPECIAL INSPECTIONS AT LEAST 72 HOURS BEFORE THE SPECIFIC WORK COMMENCES.

THE "OWNER" SHALL BE RESPONSIBLE FOR THE FOLLOWING PROGRESS INSPECTIONS:

ENERGY CODE COMPLIANCE INSPECTIONS * TR8	BC 110.3.5
FINAL	BC 110.5 28-116.2.4.2 1 RCNY 101-10

	SUBMITTALS/DELIVERABLES SCHEDULE	DATE SUBMITTED	DATE APPROVED
1	CONTRACTOR TO PROVIDE ANTICIPATED INSTALLATION SCHEDULE.		
2	CONTRACTOR TO PROVIDE MANUFACTURER CUT SHEETS FOR ALL PROPOSED COMPONENTS OF THE SMDS (INCLUDING BUT NOT LIMITED TO GEOTEXTILE FABRIC, SUB-SLAB PVC VAPOR COLLECTION PIPING AND PIPE FITTINGS, GAS PERMEABLE AGGREGATE, VAPOR BARRIER, GALVANIZED STEEL RISER PIPE, FITTINGS, AND BLOWERS) BEFORE PROCUREMENT AND INSTALLATION.		
3	CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR THE BLOWER (ALL COMPONENTS OF THE BLOWER SHOULD BE COMPATIBLE WITH VOLATILE ORGANIC COMPOUNDS).		
4	CONTRACTOR TO PROVIDE PE-STAMPED AS-BUILT DRAWINGS OF UNDER-SLAB AND ABOVE-SLAB SMDS COMPONENTS TO REMEDIATION ENGINEER FOLLOWING INSTALLATION. THE LOCATIONS OF ALL ELBOWS AND TEES SHOULD BE SURVEYED BY A LICENSED SURVEYOR.		
5	CONTRACTOR TO PROVIDE TESTING REPORTS (INCLUDING RESULTS OF PRESSURE/LEAK TESTING OF ALL PIPING).		

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, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

NYC DOB NUMBER: M01031445-S5

REVISIONS

9/17/2024	50% CD	1
2/17/2025	90% CD	2
8/15/2025	DOB SUBMISSION REV 1	3
10/28/2025	DOB SUBMISSION REV 2	4

STATE OF NEW YORK · MATTHEW JAMES AMBRUSH · 110412 · LICENSED PROFESSIONAL ENGINEER

SIGNATURE 10/28/2025 DATE SIGNED

PROFESSIONAL ENGINEER
STATE LIC. No. 110412

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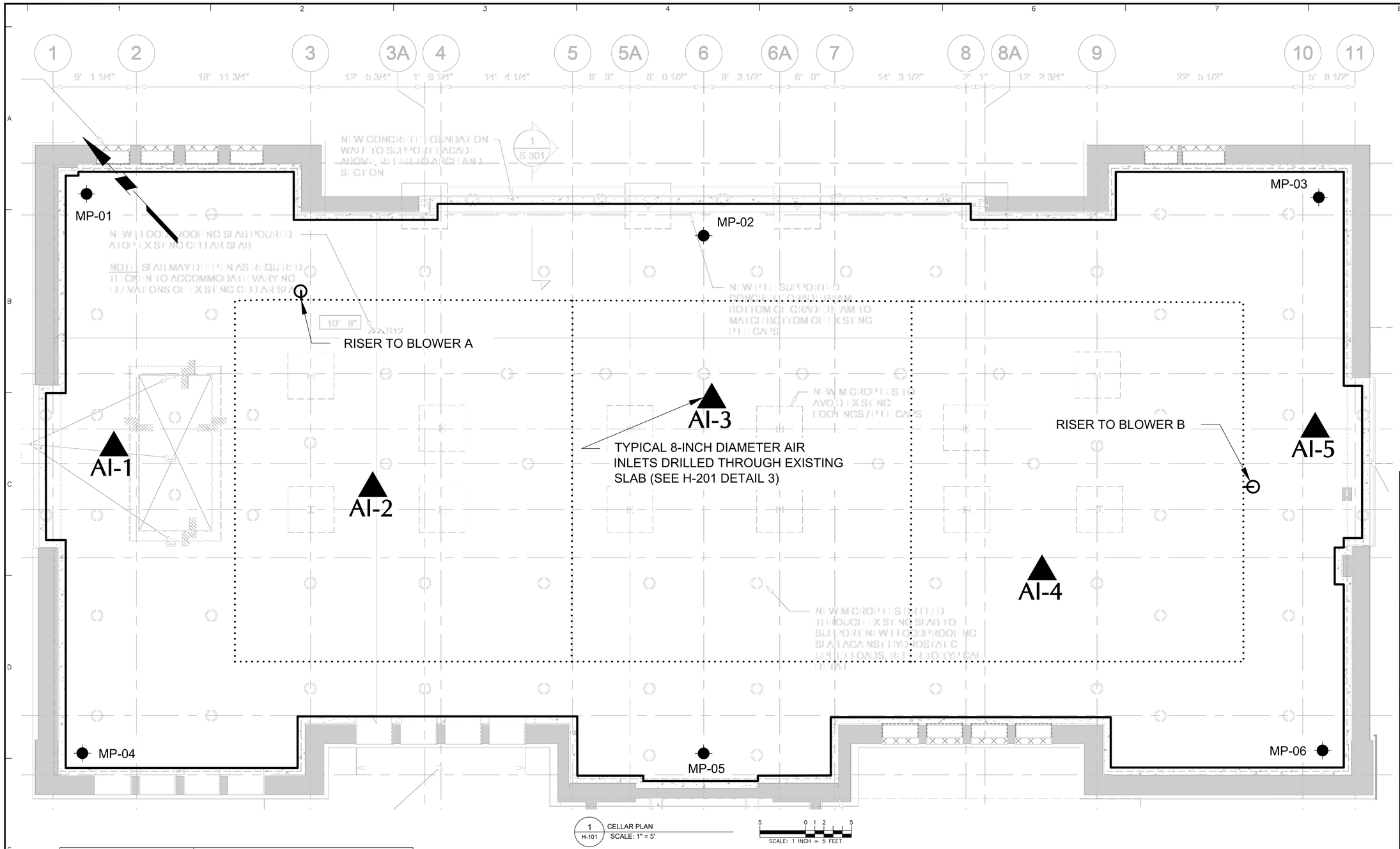
Project
THE BEACON COMMUNITY FACILITY
413 E 120TH STREET
BLOCK No. 1808, LOT No. 8
NEW YORK NEW YORK

Drawing Title
SMD SYSTEM NOTES

Project No.	Drawing No.
170745301	H-001.00
Date: 10/28/2025	
Drawn By: RL	
Checked By: MA	
	Sheet 1 of 5

LANGAN
PROJECT NO. 170745301

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1 H-101 CELLAR PLAN
SCALE: 1" = 5'

5 0 1 2 5
SCALE: 1 INCH = 5 FEET

MONITORING POINT ID	LOCATION
MP-01	COMMON AREA 1824 SF
MP-02	RENTABLE AREA 2735 SF
MP-03	BOH 1251 SF
MP-04	RENTABLE AREA 1130 SF
MP-05	BOH 1120 SF
MP-06	RENTABLE AREA 1155SF

LEGEND:

- SMD SYSTEM EXTENTS
- SMD SYSTEM VAPOR COLLECTION SCREEN
- AI-1 — APPROXIMATE LOCATION OF AIR INTAKE POINT
- SMD SYSTEM 4" Ø GALVANIZED STEEL RISER PIPE SLAB PENETRATION TO ROOF MOUNTED BLOWER
- SMD SYSTEM DIFFERENTIAL PRESSURE MONITORING POINTS

NOTES:

1. BACKGROUND ADAPTED FROM 04 OCTOBER 2023 100% DD COMMUNITY FACILITY CELLAR PLAN S-101.00 BY SILMAN STRUCTURAL SOLUTIONS.

NYC DOB NUMBER: M01031445-S5

REVISIONS		
9/17/2024	50% CD	1
2/17/2025	90% CD	2
8/15/2025	DOB SUBMISSION REV 1	3
10/28/2025	DOB SUBMISSION REV 2	4

STATE OF NEW YORK · MATTHEW JAMES AMBRUSCH · LICENSED PROFESSIONAL ENGINEER · 110412

SIGNATURE 10/28/2025 DATE SIGNED

PROFESSIONAL ENGINEER
STATE LIC. No. 110412

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New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project
THE BEACON COMMUNITY FACILITY
413 E 120TH STREET
BLOCK No. 1808, LOT No. 8
NEW YORK NEW YORK

Drawing Title
SMD SYSTEM CELLAR PLAN

Project No.	Drawing No.
170745301	H-101.00
Date: 10/28/2025	
Drawn By: RL	
Checked By: MA	

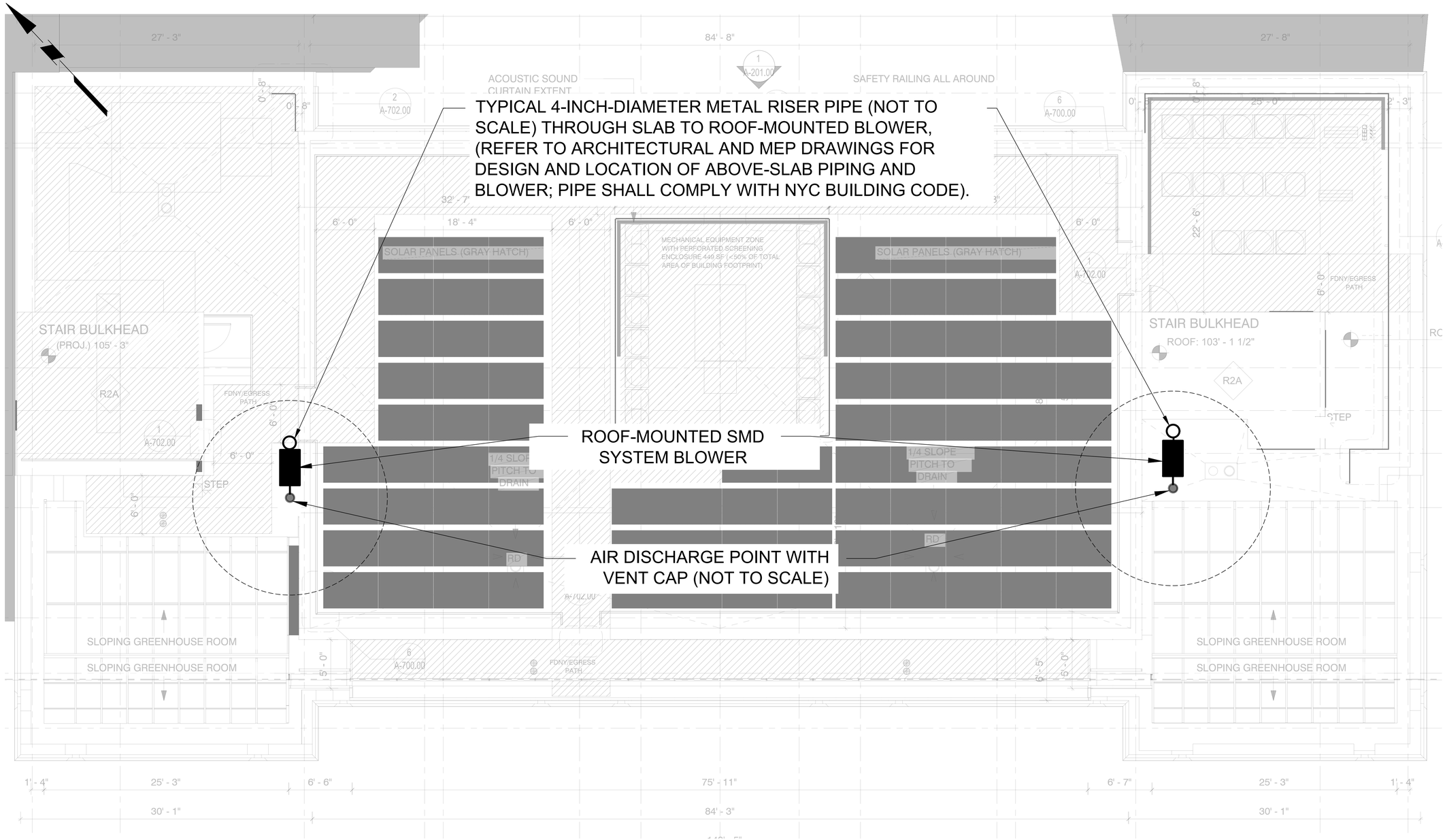
Sheet 2 of 5

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Filename: \\langan.com\data\NYC\data3\170745301\Project Data\Cadd Data - 170745301_Environmental\SSDS\170745301-ND001-0101 SSDS.dwg Date: 10/28/2025 Time: 12:28 User: rolo Style Table: Langan.stb Layout: H-101

LANGAN PROJECT NO. 170745301



LEGEND:

- SMD ABOVE-SLAB 4-INCH DIAMETER METAL RISER PIPING
- SMD SYSTEM RISER PIPE
- SMD AIR DISCHARGE POINT
- ROOF MOUNTED SMD BLOWER
- 10-FOOT RADIUS FROM AIR DISCHARGE POINT

1 / H-102 ROOFTOP PLAN
SCALE: 1" = 5'

SCALE: 1 INCH = 5 FEET

FAN SCHEDULE								
UNIT NO.	LOCATION	MOTOR SIZE	MIN CFM	MIN. VACUUM(INCHES WC)	MOTOR REQUIREMENTS			MANUFACTUER/MODEL
1	6TH FLOOR ROOF	0.32 HP - 0.36 HP (4 AMPS)	30	5	4 PHASE	60 HZ	120 VOLTS	RADONAWAY HS5500
2	6TH FLOOR ROOF	0.32 HP - 0.36 HP (4 AMPS)	30	5	4 PHASE	60 HZ	120 VOLTS	RADONAWAY HS5500

NOTES:

1. BACKGROUND ADAPTED FROM 27 JUNE 2025 DOB SUBMISSION ROOF PLAN A-108 BY CASTRUCCI ARCHITECTS.
2. THE RISER ROUTING TO BLOWERS ARE TO BE COORDINATED WITH THE DESIGN TEAM AND MAY DIFFER FROM WHAT IS SHOWN.

NYC DOB NUMBER: M01031445-S5

REVISIONS		
9/17/2024	50% CD	1
2/17/2025	90% CD	2
8/15/2025	DOB SUBMISSION REV 1	3
10/28/2025	DOB SUBMISSION REV 2	4

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Project

THE BEACON COMMUNITY FACILITY

413 E 120TH STREET
BLOCK No. 1808, LOT No. 8
NEW YORK NEW YORK

Drawing Title

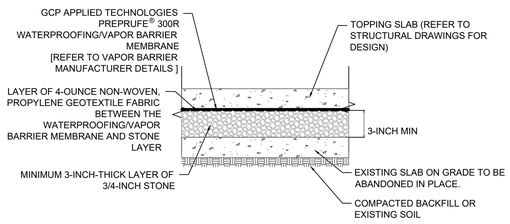
SMD SYSTEM ROOF PLAN AND FAN SCHEDULE

Project No.	Drawing No.
170745301	H-102.00
Date: 10/28/2025	
Drawn By: RL	
Checked By: MA	Sheet 3 of 5

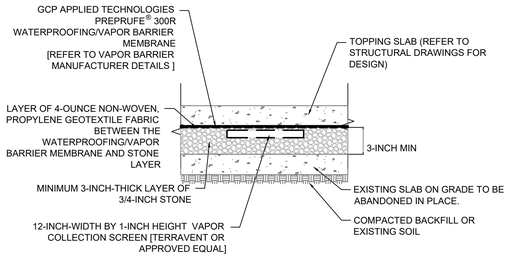
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Filename: \\langan.com\data\NYC\data3\170745301\Project Data\Cadd Data - 170745301_Environmental\SSDS\170745301-ND001-0101 SSDS.dwg Date: 10/28/2025 Time: 12:28 User: rolo Style Table: Langan.stb Layout: H-102

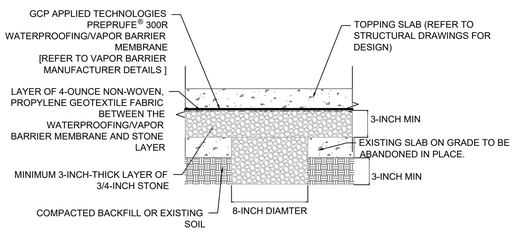
LANGAN
PROJECT NO. 170745301



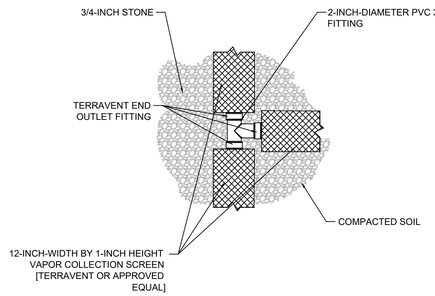
DETAIL 1: TYPICAL DEPRESSURIZED SLAB (SECTION VIEW)
NOT TO SCALE



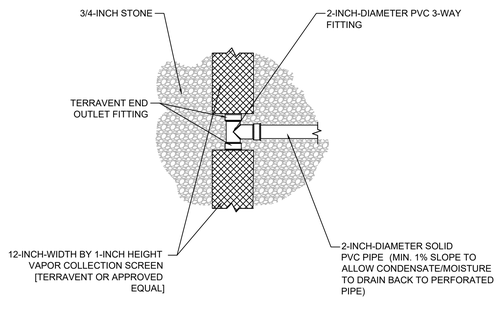
DETAIL 2: TYPICAL VAPOR COLLECTION PIPE (SECTION VIEW)
NOT TO SCALE



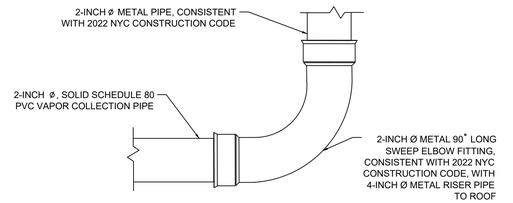
DETAIL 3: TYPICAL AIR INTAKE (SECTION VIEW)
NOT TO SCALE



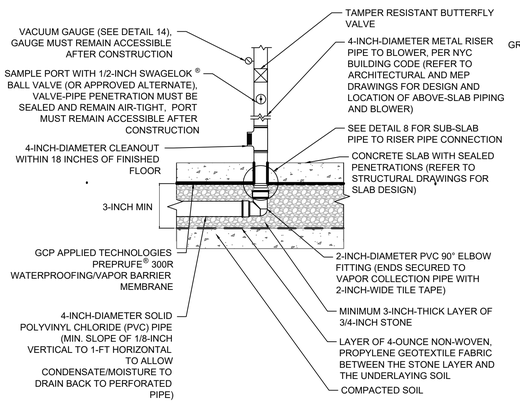
DETAIL 4: TYPICAL 3-WAY TEE FITTING CONNECTION FOR TERRAVENT VAPOR COLLECTION SCREEN (PLAN VIEW)
NOT TO SCALE



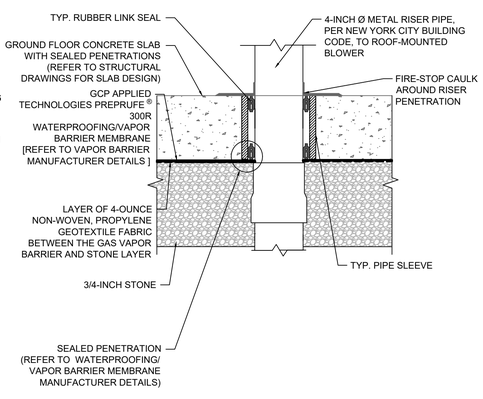
DETAIL 5: TYPICAL CONNECTION FROM TERRAVENT VAPOR COLLECTION SCREEN TO SOLID PIPE (PLAN VIEW)
NOT TO SCALE



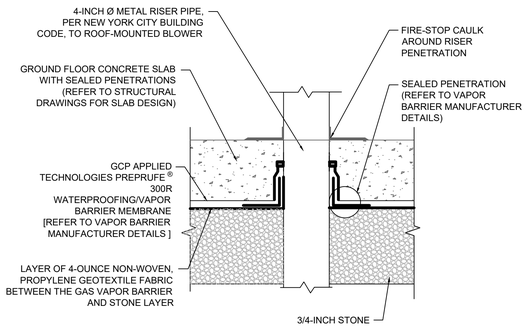
DETAIL 6: VAPOR COLLECTION PIPE TO RISER PIPE CONNECTION (PLAN VIEW)
NOT TO SCALE



DETAIL 7: TYPICAL TRANSITION FROM SUB-SLAB PIPE TO RISER PIPE (SECTION VIEW)
NOT TO SCALE



DETAIL 8A: TYPICAL CONNECTION FROM SUB-SLAB PIPE TO RISER PIPE - WITH SLEEVE (SECTION VIEW)
NOT TO SCALE



DETAIL 8B: TYPICAL SLAB PENETRATION DETAIL - WITHOUT SLEEVE (SECTION VIEW)
NOT TO SCALE

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NYC DOB NUMBER: M01031445-S5

REVISIONS		
9/17/2024	50% CD	1
2/17/2025	90% CD	2
8/15/2025	DOB SUBMISSION REV 1	3
10/28/2025	DOB SUBMISSION REV 2	4

STATE OF NEW YORK · MATTHEW JAMES AMBROSEN · LICENSED PROFESSIONAL ENGINEER · 110412

SIGNATURE DATE SIGNED 10/28/2025

PROFESSIONAL ENGINEER
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Project
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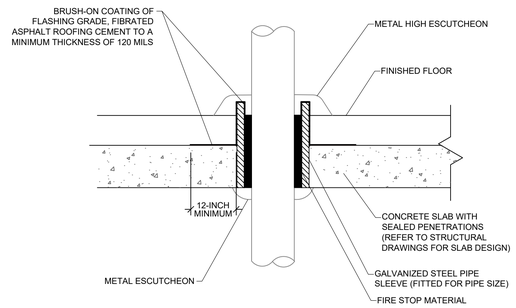
Drawing Title
SMD SYSTEM TYPICAL DETAILS

Project No.	Drawing No.
170745301	H-201.00
Date: 10/28/2025	
Drawn By: RL	
Checked By: MA	

Sheet 4 of 5

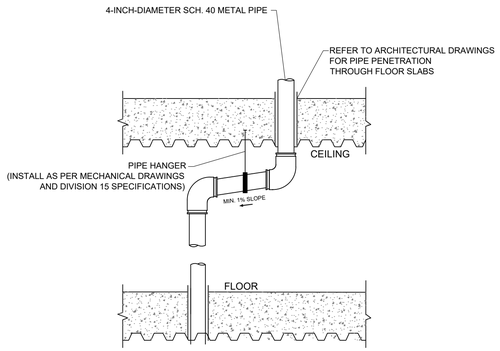
LANGAN
PROJECT NO. 170745301

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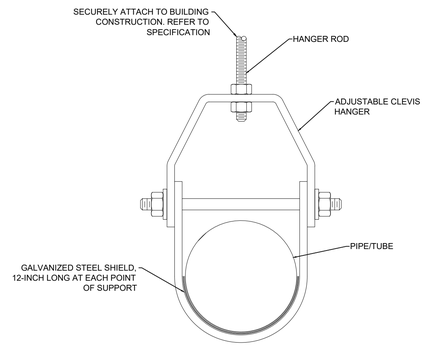
NOTE: INSTALL AS PER PLUMBING DRAWINGS AND DIVISION 15 SPECIFICATIONS, AND SPECIFICATION 07270 - FIRESTOPPING/SMOKE SEALS.

DETAIL 9: PIPE PENETRATION OF RATED FLOOR OR WALL
NOT TO SCALE



NOTE: EXTEND RISER FROM THE FLOOR PENETRATION TO CEILING. INSTALL HORIZONTAL PIPING BENEATH CEILING AT 1% SLOPE TOWARD SUCTION PIT.

DETAIL 10: TYPICAL RISER PIPE OFFSET (SECTION VIEW)
NOT TO SCALE



NOTE: INSTALL AS PER PLUMBING DRAWINGS AND DIVISION 15 SPECIFICATIONS.

DETAIL 11: TYPICAL PIPE SUPPORT
NOT TO SCALE

NOTE: TYPICAL WIKA® TYPE 611.10 LOW PRESSURE CAPSULE GAUGE RANGING FROM -10 TO 0 INCHES OF WATER AT THE SLAB SURFACE AND AT THE BLOWER (OR APPROVED ALTERNATE).

DETAIL 12: TYPICAL VACUUM GAUGE
NOT TO SCALE

NOTE: USE VAPOR PIN EXTENSION KIT IF SLAB IS TOO THICK. TYPICAL CONSTRUCTION SHOWN IN THE DETAIL. CONTRACTOR MUST FOLLOW MANUFACTURER INSTRUCTIONS/MANUALS FOR ACTUAL CONSTRUCTION.

DETAIL 13: TYPICAL MONITORING POINT (SECTION VIEW)
NOT TO SCALE

DETAIL 13: RISER TO IN-LINE FAN AND EXHAUST
NOT TO SCALE

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, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

NYC DOB NUMBER: M01031445-S5

REVISIONS

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8/15/2025	DOB SUBMISSION REV 1	3
10/28/2025	DOB SUBMISSION REV 2	4

STATE OF NEW YORK · MATTHEW JAMES AMBRUSH · 110412 · LICENSED PROFESSIONAL ENGINEER

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Project

THE BEACON COMMUNITY FACILITY

413 E 120TH STREET
BLOCK No. 1808, LOT No. 8
NEW YORK NEW YORK

Drawing Title

SMD SYSTEM TYPICAL DETAILS - 2

Project No.	Drawing No.
170745301	H-202.00
Date: 10/28/2025	
Drawn By: RL	
Checked By: MA	Sheet 5 of 5

LANGAN
PROJECT NO. 170745301

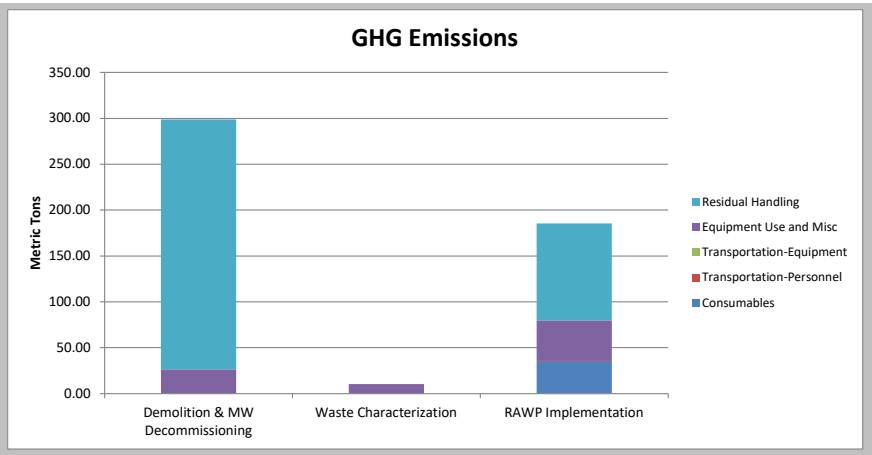
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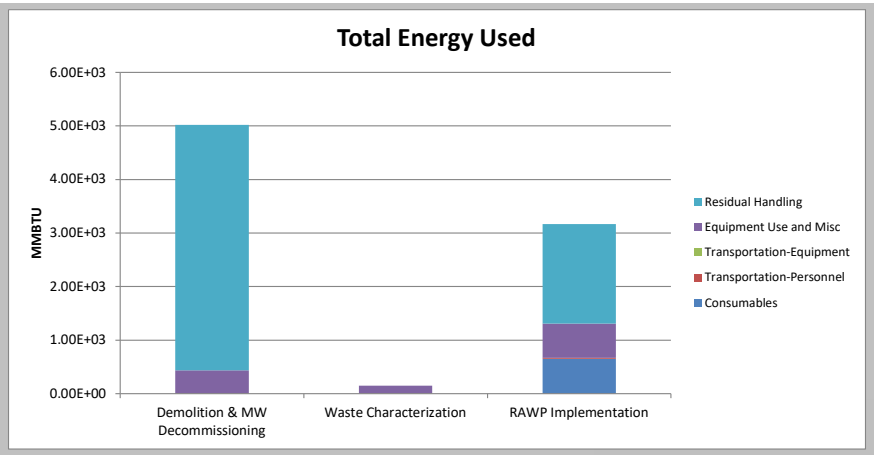
APPENDIX F
ENVIRONMENTAL FOOTPRINT SUMMARIES

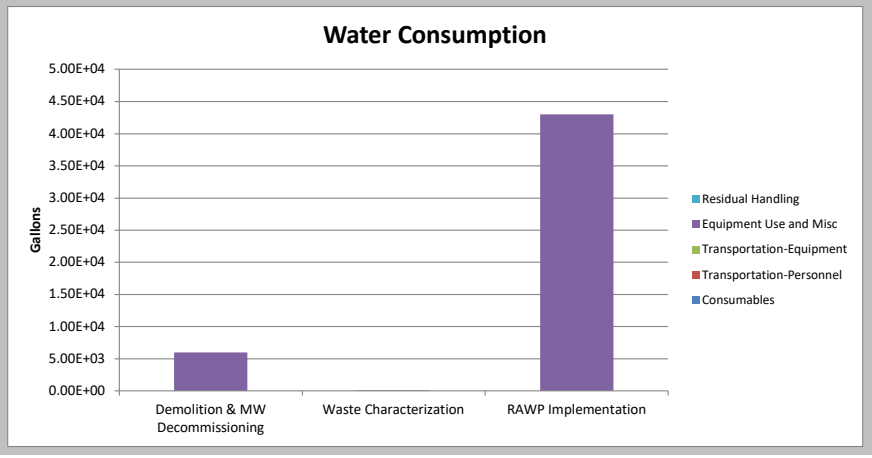
The Beacon - 413 E 120th Street - Environmental Footprint Summary
Alternative I - Track 1

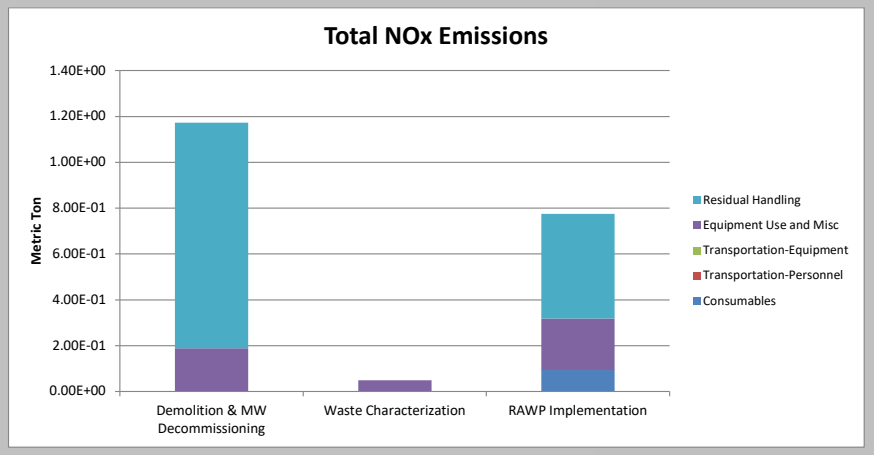
Phase	Activities	GHG Emissions	Total Energy Used	Water Consumption	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx Emissions	Total SOx Emissions	Total PM10 Emissions	Accident Risk Fatality	Accident Risk Injury
		metric ton	MMBTU	gallons	MWH	metric ton	metric ton	metric ton	metric ton	metric ton	metric ton		
Demolition & MW Decommissioning	Consumables	0.15	3.0E+00	NA	NA	NA	NA	NA	2.8E-04	4.6E-04	6.6E-05	NA	NA
	Transportation-Personnel	0.05	5.8E-01	NA	NA	NA	NA	NA	1.8E-05	3.0E-06	2.6E-06	1.3E-06	1.0E-04
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	26.12	4.3E+02	6.0E+03	0.0E+00	1.7E-01	4.0E-02	1.2E-02	1.9E-01	5.1E-02	1.5E-02	2.3E-04	5.9E-02
	Residual Handling	272.48	4.6E+03	NA	NA	0.0E+00	0.0E+00	0.0E+00	9.8E-01	5.1E-01	2.7E+00	2.5E-04	2.0E-02
	Sub-Total	298.79	5.02E+03	6.00E+03	0.00E+00	1.69E-01	4.04E-02	1.19E-02	1.17E+00	5.62E-01	2.74E+00	4.88E-04	7.92E-02
Waste Characterization	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	0.32	4.0E+00	NA	NA	NA	NA	NA	1.2E-04	1.8E-05	2.0E-05	7.7E-06	6.2E-04
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	10.14	1.4E+02	1.0E+02	0.0E+00	1.5E-03	1.6E-04	1.4E-04	5.0E-02	3.6E-02	4.1E-03	4.2E-06	1.7E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	10.46	1.49E+02	1.00E+02	0.00E+00	1.55E-03	1.58E-04	1.39E-04	4.97E-02	3.61E-02	4.17E-03	1.18E-05	2.33E-03
RAWP Implementation	Consumables	35.41	6.5E+02	NA	NA	NA	NA	NA	9.3E-02	1.6E-01	3.8E-02	NA	NA
	Transportation-Personnel	1.19	1.5E+01	NA	NA	NA	NA	NA	3.3E-04	5.1E-04	5.9E-05	1.6E-05	1.4E-03
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	43.31	6.4E+02	4.3E+04	6.2E-01	5.2E-02	1.3E-02	4.3E-03	2.3E-01	1.4E-01	2.0E-02	2.5E-05	1.6E-02
	Residual Handling	105.59	1.9E+03	NA	NA	0.0E+00	0.0E+00	0.0E+00	4.6E-01	2.4E-01	1.3E+00	6.8E-05	5.5E-03
	Sub-Total	185.50	3.17E+03	4.30E+04	6.21E-01	5.18E-02	1.27E-02	4.34E-03	7.75E-01	5.38E-01	1.34E+00	1.10E-04	2.24E-02
Total		**4.9E+02**	**8.3E+03**	**4.9E+04**	**6.2E-01**	**2.2E-01**	**5.3E-02**	**1.6E-02**	**2.0E+00**	**1.1E+00**	**4.1E+00**	**6.1E-04**	**1.0E-01**

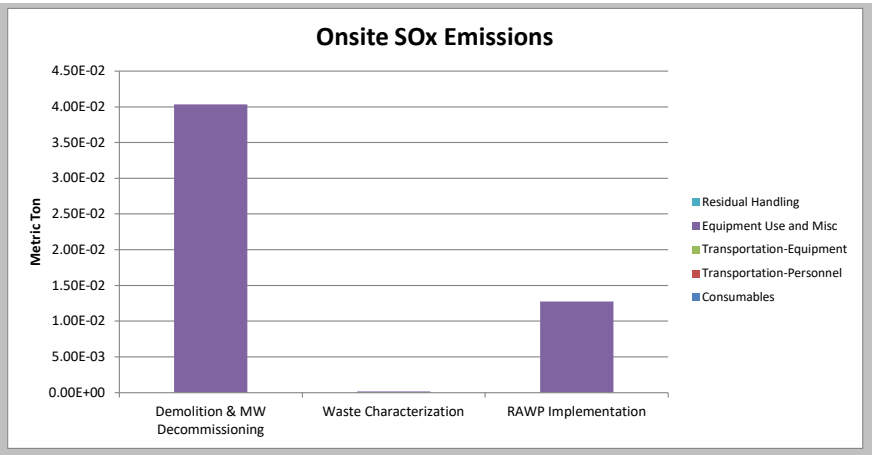
Remedial Alternative Phase	Non-Hazardous Waste Landfill Space	Hazardous Waste Landfill Space	Topsoil Consumption	Costing	Lost Hours - Injury	Percent electricity from renewable sources	Total Cost with Footprint Reduction
	tons	tons	cubic yards	$		%	
Demolition & MW Decommissioning	1.5E+04	0.0E+00	0.0E+00	0	6.3E-01	0.0%	$0
Waste Characterization	0.0E+00	0.0E+00	0.0E+00	0	1.9E-02	0.0%	
RAWP Implementation	7.1E+03	0.0E+00	0.0E+00	0	1.8E-01	24.2%	
Total	**2.2E+04**	**0.0E+00**	**0.0E+00**	**$0**	**8.3E-01**	**6.1%**	

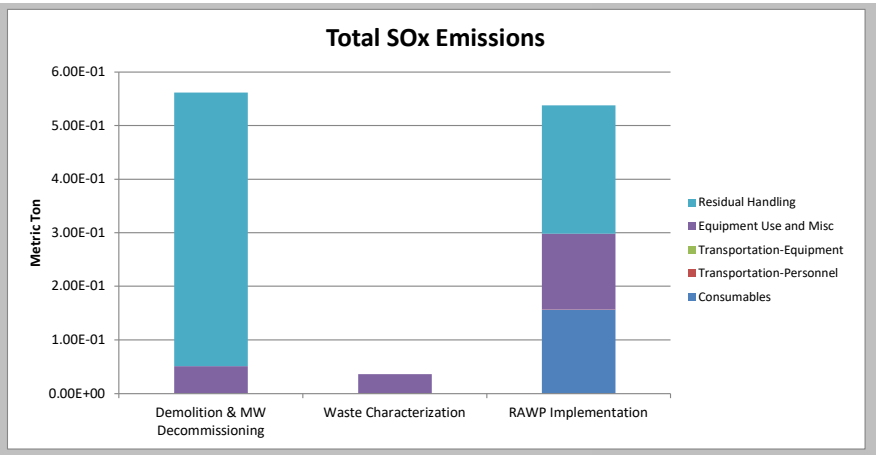

GHG Emissions
Metric Tons
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

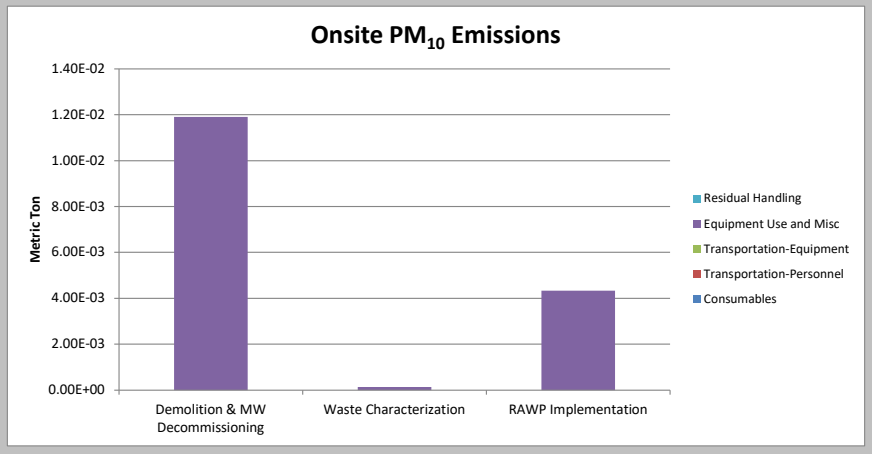

Total Energy Used
MMBTU
6.00E+03
5.00E+03
4.00E+03
3.00E+03
2.00E+03
1.00E+03
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

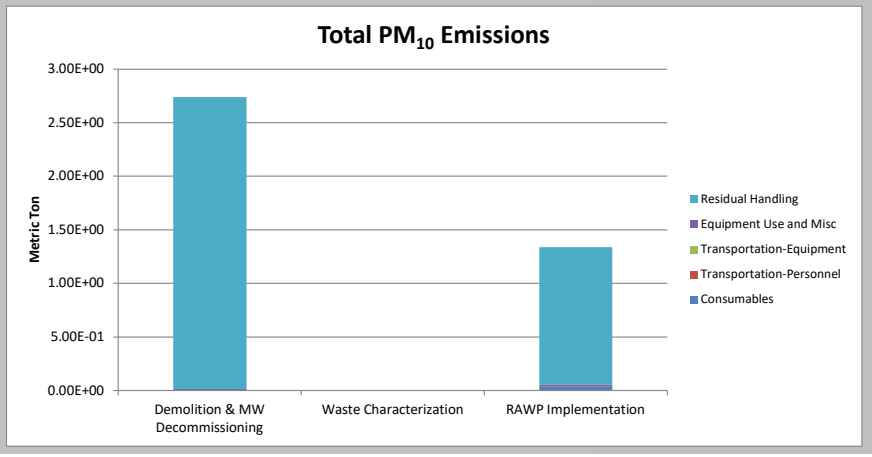

Water Consumption
Gallons
5.00E+04
4.50E+04
4.00E+04
3.50E+04
3.00E+04
2.50E+04
2.00E+04
1.50E+04
1.00E+04
5.00E+03
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

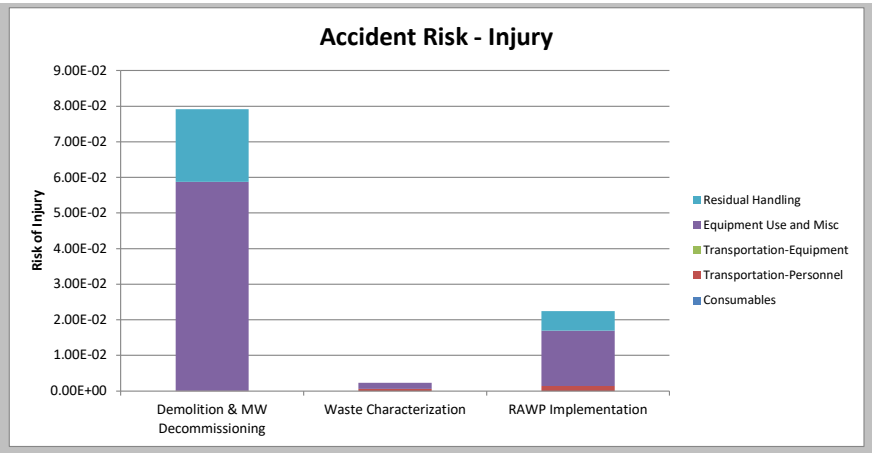

Total NOx Emissions
Metric Ton
1.40E+00
1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

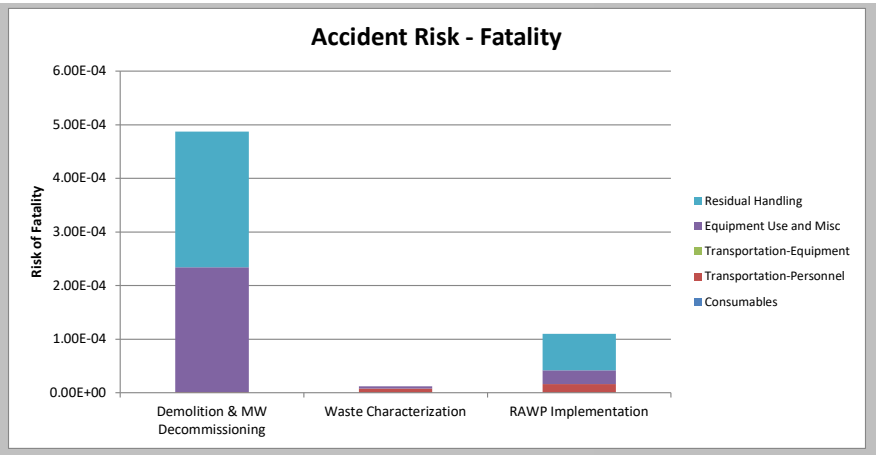

Onsite SOx Emissions
Metric Ton
4.50E-02
4.00E-02
3.50E-02
3.00E-02
2.50E-02
2.00E-02
1.50E-02
1.00E-02
5.00E-03
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

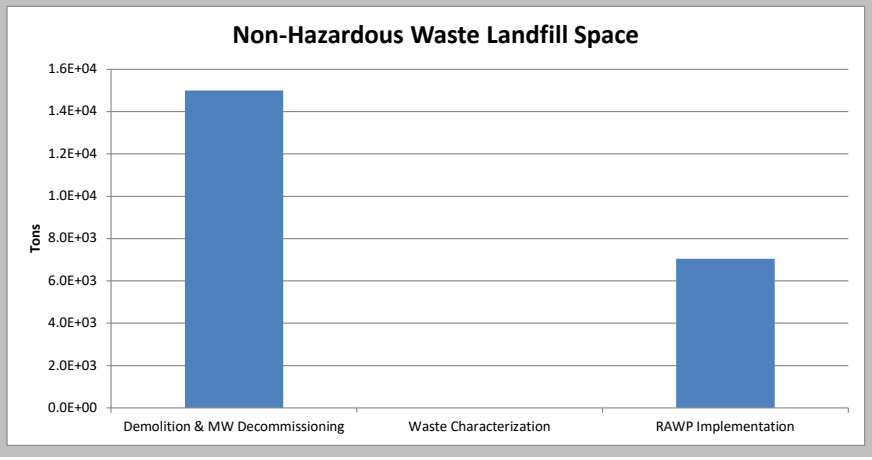

Total SOx Emissions
Metric Ton
6.00E-01
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

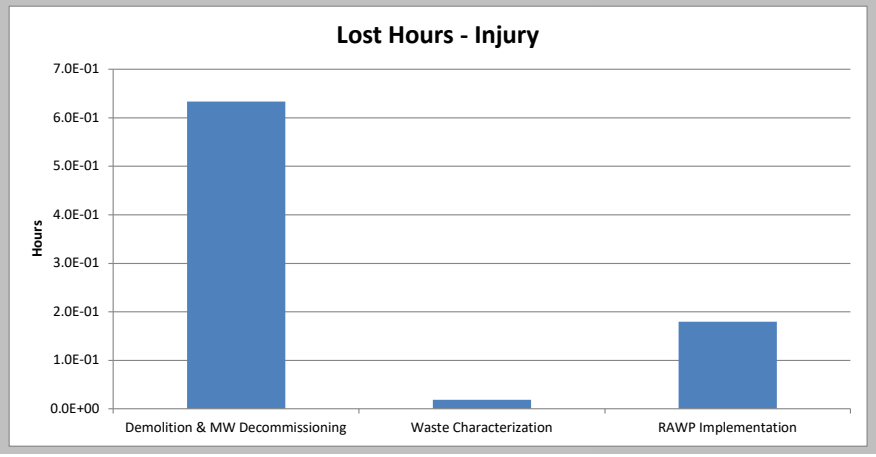

Onsite PM10 Emissions
Metric Ton
1.40E-02
1.20E-02
1.00E-02
8.00E-03
6.00E-03
4.00E-03
2.00E-03
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Total PM10 Emissions
Metric Ton
3.00E+00
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Accident Risk - Injury
9.00E-02
8.00E-02
7.00E-02
6.00E-02
5.00E-02
4.00E-02
3.00E-02
2.00E-02
1.00E-02
0.00E+00
Risk of Injury
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Accident Risk - Fatality
6.00E-04
5.00E-04
4.00E-04
3.00E-04
2.00E-04
1.00E-04
0.00E+00
Risk of Fatality
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

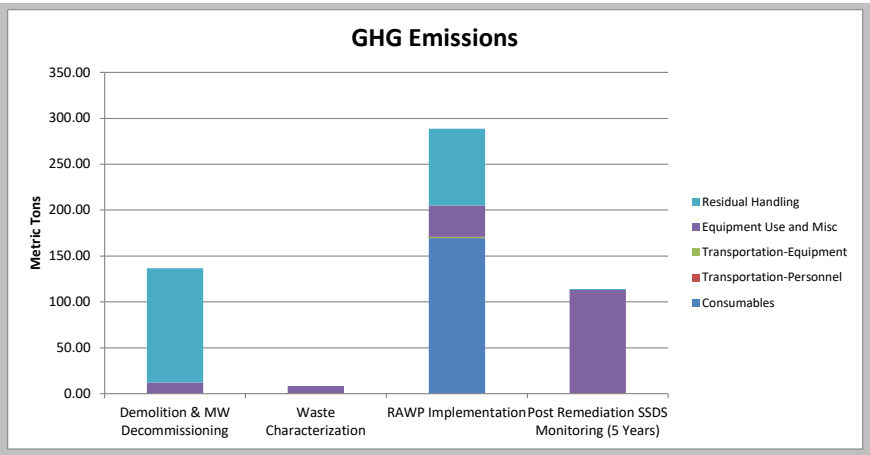

Non-Hazardous Waste Landfill Space
1.6E+04
1.4E+04
1.2E+04
1.0E+04
8.0E+03
6.0E+03
4.0E+03
2.0E+03
0.0E+00
Tons
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation

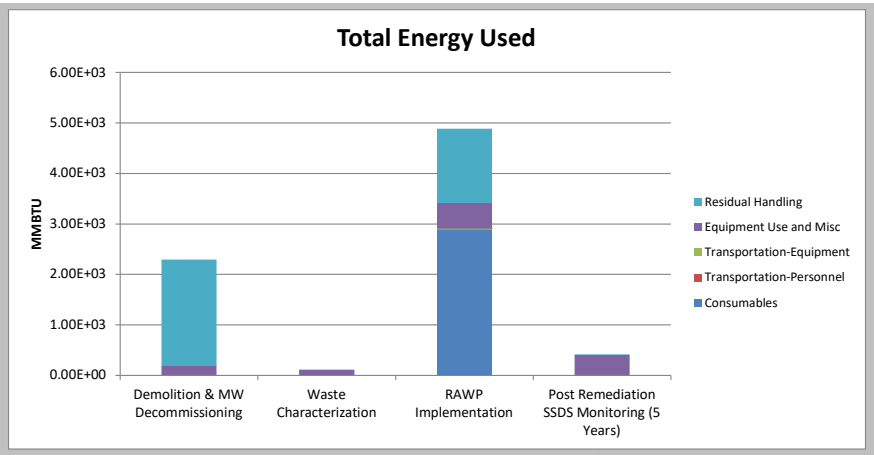

Lost Hours - Injury
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
Hours
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation

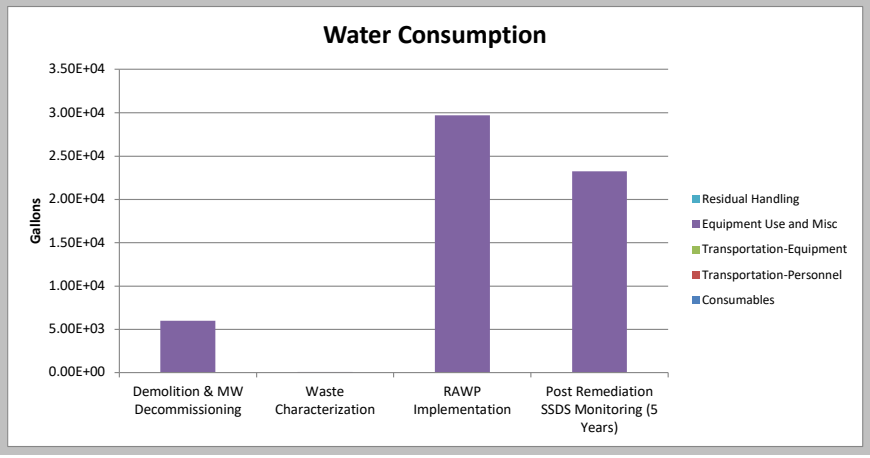
The Beacon - 413 E 120th Street - Environmental Footprint Summary
Alternative II - Track 1/Track 4

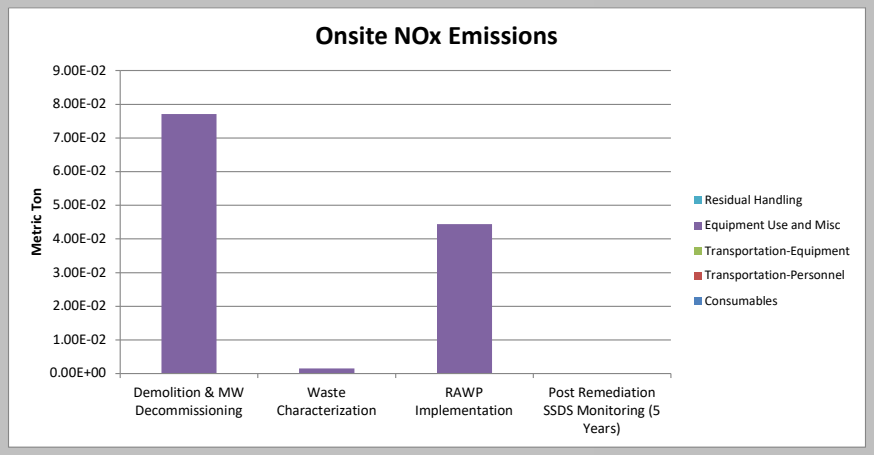
Phase	Activities	GHG Emissions	Total Energy Used	Water Consumption	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx Emissions	Total SOx Emissions	Total PM10 Emissions	Accident Risk Fatality	Accident Risk Injury
		metric ton	MMBTU	gallons	MWH	metric ton	metric ton	metric ton	metric ton	metric ton	metric ton		
Demolition & MW Decommissioning	Consumables	0.15	3.0E+00	NA	NA	NA	NA	NA	2.8E-04	4.6E-04	6.6E-05	NA	NA
	Transportation-Personnel	0.05	5.8E-01	NA	NA	NA	NA	NA	1.8E-05	3.0E-06	2.6E-06	1.3E-06	1.0E-04
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	11.94	2.0E+02	6.0E+03	0.0E+00	7.7E-02	1.8E-02	5.4E-03	8.6E-02	2.3E-02	6.8E-03	2.3E-04	5.7E-02
	Residual Handling	124.48	2.1E+03	NA	NA	0.0E+00	0.0E+00	0.0E+00	4.5E-01	2.3E-01	1.2E+00	1.2E-04	9.3E-03
	Sub-Total	136.61	2.29E+03	6.00E+03	0.00E+00	7.71E-02	1.84E-02	5.44E-03	5.36E-01	2.57E-01	1.25E+00	3.43E-04	6.64E-02
Waste Characterization	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	0.32	4.0E+00	NA	NA	NA	NA	NA	1.2E-04	1.8E-05	2.0E-05	7.7E-06	6.2E-04
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	7.87	1.1E+02	1.0E+02	0.0E+00	1.5E-03	1.6E-04	1.4E-04	3.9E-02	2.8E-02	3.2E-03	4.2E-06	1.7E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	8.19	1.16E+02	1.00E+02	0.00E+00	1.55E-03	1.58E-04	1.39E-04	3.88E-02	2.80E-02	3.26E-03	1.18E-05	2.33E-03
RAWP Implementation	Consumables	169.47	2.9E+03	NA	NA	NA	NA	NA	6.4E-01	8.3E-01	3.1E-01	NA	NA
	Transportation-Personnel	1.10	1.4E+01	NA	NA	NA	NA	NA	3.3E-04	3.6E-04	5.9E-05	1.7E-05	1.4E-03
	Transportation-Equipment	0.12	1.6E+00	NA	NA	NA	NA	NA	3.9E-05	6.8E-07	3.4E-06	7.8E-07	6.3E-05
	Equipment Use and Misc	34.44	5.1E+02	3.0E+04	4.3E-01	4.4E-02	1.1E-02	3.7E-03	1.8E-01	1.1E-01	1.6E-02	2.2E-05	1.2E-02
	Residual Handling	83.46	1.5E+03	NA	NA	0.0E+00	0.0E+00	0.0E+00	3.6E-01	1.9E-01	1.0E+00	5.4E-05	4.4E-03
	Sub-Total	288.60	4.88E+03	2.97E+04	4.26E-01	4.44E-02	1.09E-02	3.68E-03	1.18E+00	1.13E+00	1.34E+00	9.36E-05	1.79E-02
Post Remediation SSDS Monitoring (5 Years)	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	0.43	5.2E+00	NA	NA	NA	NA	NA	2.0E-04	1.4E-05	3.0E-05	7.2E-06	5.8E-04
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	112.62	4.0E+02	2.3E+04	4.6E+01	0.0E+00	0.0E+00	0.0E+00	3.6E-02	3.5E-02	1.2E-02	1.7E-06	8.0E-04
	Residual Handling	0.85	1.1E+01	NA	NA	0.0E+00	0.0E+00	0.0E+00	2.7E-04	4.7E-06	2.4E-05	4.7E-06	3.8E-04
	Sub-Total	113.89	4.16E+02	2.32E+04	4.56E+01	0.00E+00	0.00E+00	0.00E+00	3.63E-02	3.51E-02	1.24E-02	1.36E-05	1.76E-03
Total		**5.5E+02**	**7.7E+03**	**5.9E+04**	**4.6E+01**	**1.2E-01**	**3.0E-02**	**9.3E-03**	**1.8E+00**	**1.5E+00**	**2.6E+00**	**4.6E-04**	**8.8E-02**

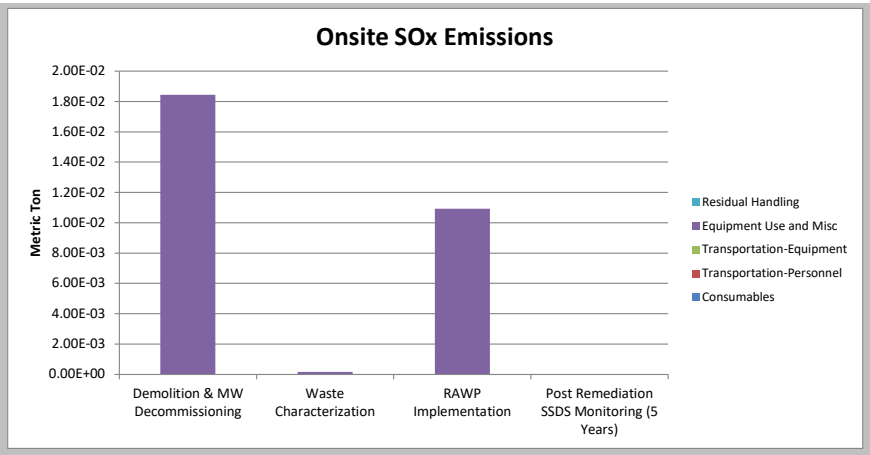
Remedial Alternative Phase	Non-Hazardous Waste Landfill Space	Hazardous Waste Landfill Space	Topsoil Consumption	Costing	Lost Hours - Injury	Percent electricity from renewable sources	Total Cost with Footprint Reduction
	tons	tons	cubic yards	$		%	
Demolition & MW	6.9E+03	0.0E+00	0.0E+00	0	5.3E-01	0.0%	
Waste Characterization	0.0E+00	0.0E+00	0.0E+00	0	1.9E-02	0.0%	
RAWP Implementation	5.6E+03	0.0E+00	0.0E+00	0	1.4E-01	24.2%	**$0**
Post Remediation SSDS	0.0E+00	0.0E+00	0.0E+00	0	1.4E-02	24.2%	
Total	**1.2E+04**	**0.0E+00**	**0.0E+00**	**$0**	**7.1E-01**	**12.1%**	

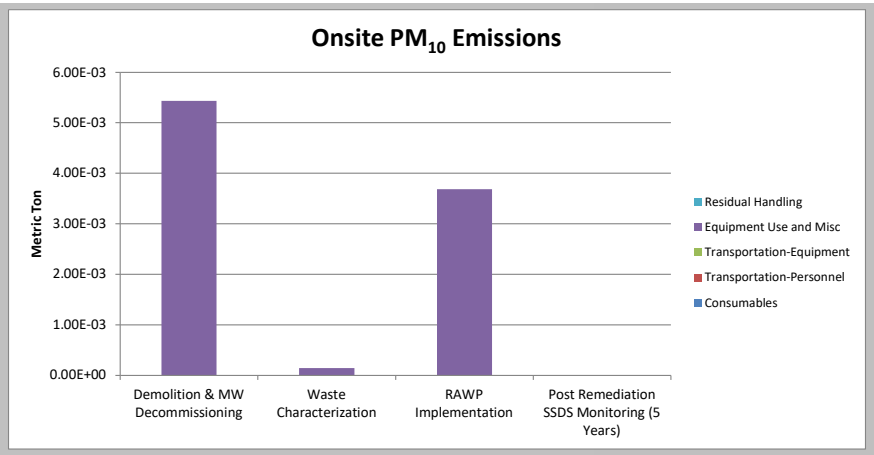

GHG Emissions
Metric Tons
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

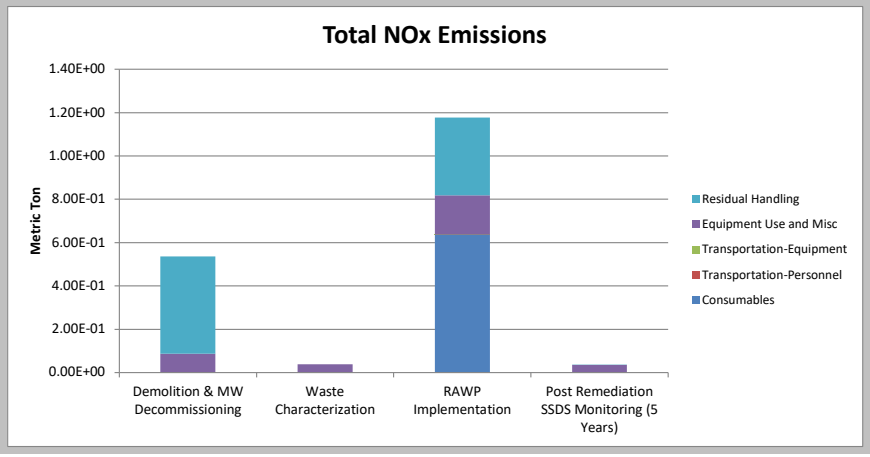

Total Energy Used
MMBTU
6.00E+03
5.00E+03
4.00E+03
3.00E+03
2.00E+03
1.00E+03
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

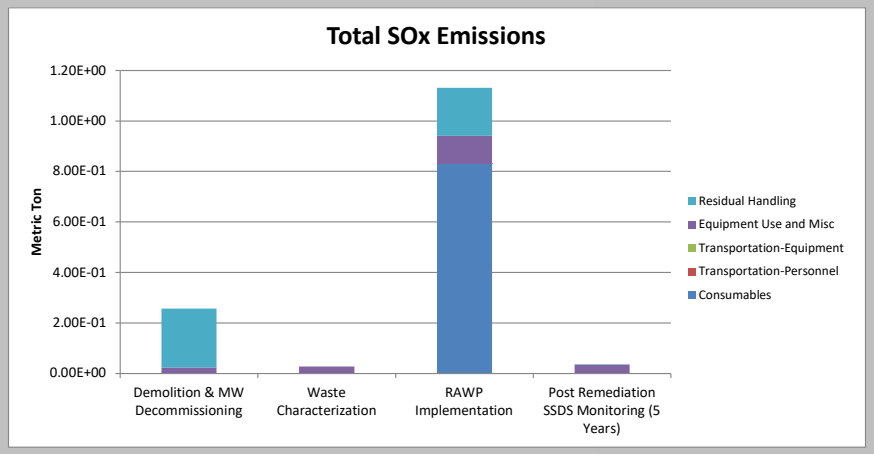

Water Consumption
Gallons
3.50E+04
3.00E+04
2.50E+04
2.00E+04
1.50E+04
1.00E+04
5.00E+03
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

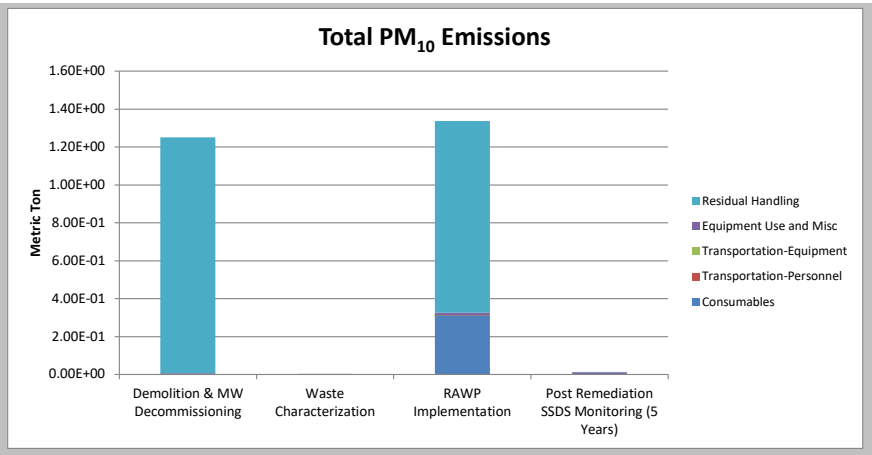

Onsite NOx Emissions
Metric Ton
9.00E-02
8.00E-02
7.00E-02
6.00E-02
5.00E-02
4.00E-02
3.00E-02
2.00E-02
1.00E-02
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

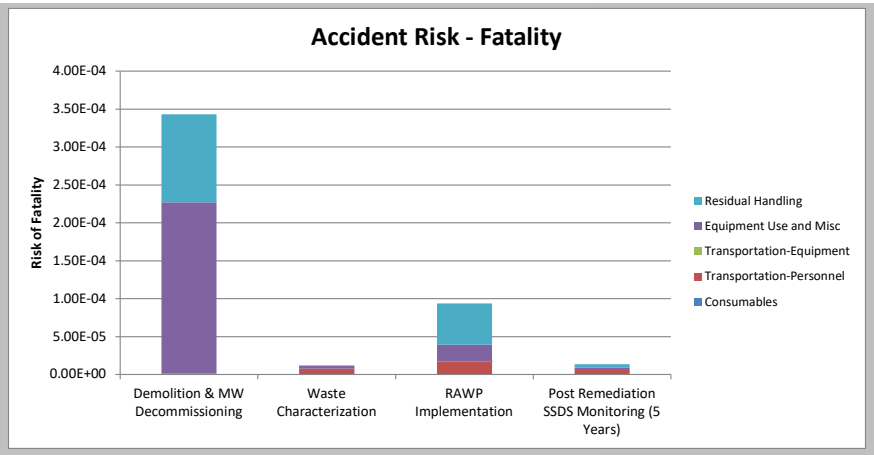

Onsite SOx Emissions
Metric Ton
2.00E-02
1.80E-02
1.60E-02
1.40E-02
1.20E-02
1.00E-02
8.00E-03
6.00E-03
4.00E-03
2.00E-03
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

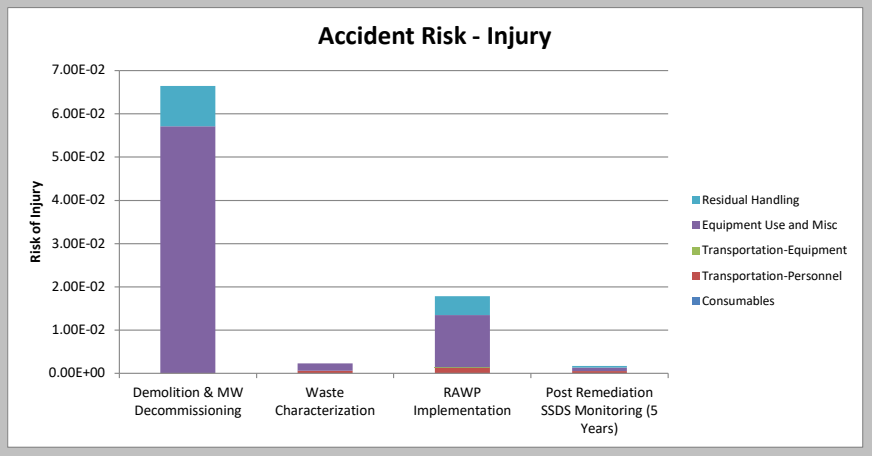

Onsite PM10 Emissions
Metric Ton
6.00E-03
5.00E-03
4.00E-03
3.00E-03
2.00E-03
1.00E-03
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

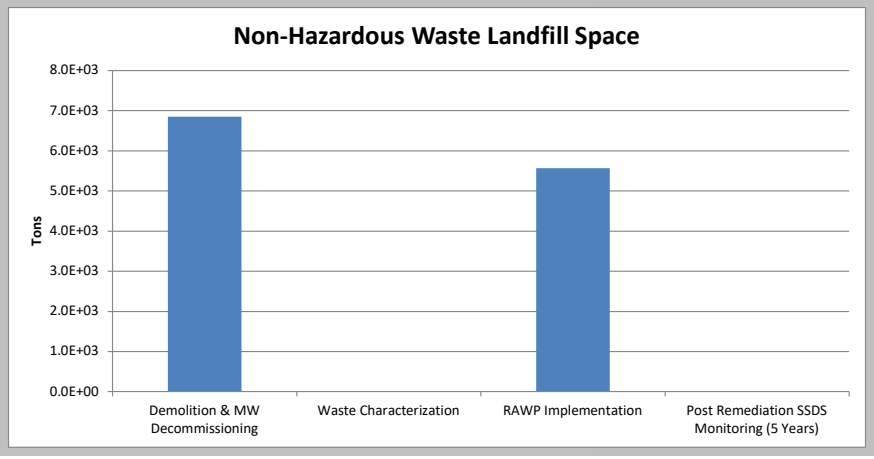

Total NOx Emissions
Metric Ton
1.40E+00
1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

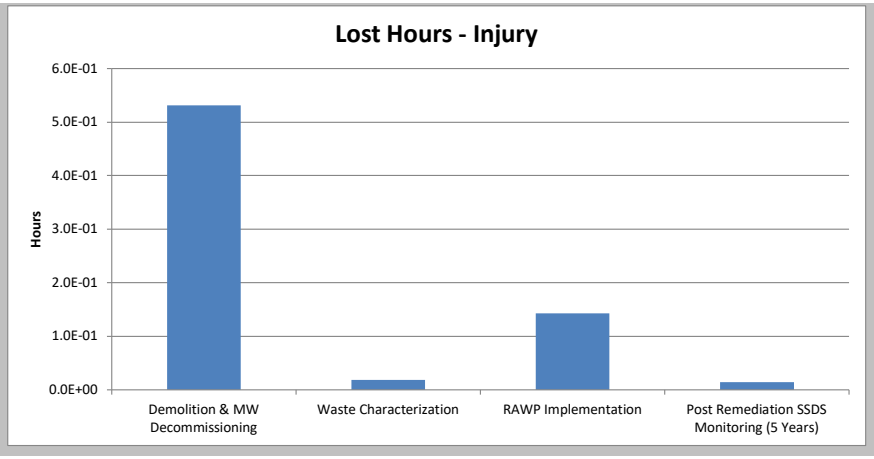

Total SOx Emissions
Metric Ton
1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Total PM10 Emissions
Metric Ton
1.60E+00
1.40E+00
1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Accident Risk - Fatality
Risk of Fatality
4.00E-04
3.50E-04
3.00E-04
2.50E-04
2.00E-04
1.50E-04
1.00E-04
5.00E-05
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Accident Risk - Injury
Risk of Injury
7.00E-02
6.00E-02
5.00E-02
4.00E-02
3.00E-02
2.00E-02
1.00E-02
0.00E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Non-Hazardous Waste Landfill Space
Tons
8.0E+03
7.0E+03
6.0E+03
5.0E+03
4.0E+03
3.0E+03
2.0E+03
1.0E+03
0.0E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)


Lost Hours - Injury
Hours
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
Demolition & MW Decommissioning
Waste Characterization
RAWP Implementation
Post Remediation SSDS Monitoring (5 Years)

APPENDIX G
CLIMATE SCREENING CHECKLIST

Climate Screening Checklist

Background Information

- **Project Manager**: Jennifer Armstrong
- **Site Name:** The Beacon
- **Site Number**: C231155
- **Site Location**: 413 East 120th Street, New York, New York
- **Site Elevation (average above sea level)**: The site elevation (el) is about 11 feet (North American Vertical Datum of 1988 [NAVD88])
- **ClimAID Region**: Region 4 - New York City and Long Island



- **Remedial Stage/Site Classification**: Remedial Design Stage, Class A
- **Contamination - Media Impacted/ Contaminants of Concern:**

  Based on the source, concentration, frequency, and locations of contaminants identified in soil, groundwater and soil vapor across the site, the contaminants of concern for the site are volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and metals, in soil, groundwater, and/or soil vapor.

- **Proposed/Current Remedy:**

  The proposed split Track 1/Track 4 remedy will include removal of the sources of soil, contamination, localized dewatering, as necessary to complete remedial excavation in the Track 1 area, and installation of a sub-slab depressurization system and composite cover system in the Track 4 area. The Track 4 area will also be subject to an Environmental Easement post remediation and managed in accordance with a New York State Department of Environmental Conservation (NYSDEC) approved Site Management Plan.

- **What is the predicted timeframe of the remedy? Will components of the remedy still be in place in 10+ years?**

  The remedy will be implemented following approval of the Remedial Action Work Plan and is anticipated to take 7 months to implement. The remedy will still be in place in 10+ years.

- **Is the site in proximity to any sensitive receptors? (e.g. wetlands, waterbodies, residential properties, hospitals, schools, drinking water supplies, etc.)**

  The closest ecological receptor is the Harlem River, which is about 800 feet east of the site. Land use within a half mile of the site is urbanized and includes residential, commercial, and mixed-use residential and commercial buildings. Sensitive receptors, as defined in DER-10, located within a half mile of the site include those listed below:

Name (Approximate distance from Site)	Address
Success Academy Charter School – Harlem 2 – M384 (approximately 0.52 miles to the northwest)	144-176 East 128 Street New York, NY 10035
The Kings Academy (approximately 0.49 miles northwest)	2345 3rd Avenue New York, NY 10035
Addie Mae Collins 3 – MASA/Collins Daycare + Lewis Senior (approximately 0.47 miles northwest)	2322 3rd Avenue New York, NY 10035
Harlem Prep Charter School – M708/Touro College (approximately 0.25 miles northwest)	240 East 123 Street, New York, NY 10035
P.S. 007 – Samuel Stern – M007 (approximately 0.38 miles west)	160 East 120th Street, New York, NY 10035
P.S. 096 Joseph Lanzetta – M096 (approximately 0.28 miles west)	216 East 120th Street New York, NY 10035
GED Plus Youth Actions & Homes Program (approximately 0.32 miles west)	206 East 118th Street New York, NY 10035
James Weldon Johnson – M057 (approximately 0.45 miles southwest)	176 East 115th Street New York, NY 10029
P.S. 155 William Paca/Renaissance School of the Arts – M377 (approximately 0.19 miles southwest)	319 East 117th Street New York, NY 10035
Harlem Village Academy East Charter School – M335 (approximately 0.09 miles northwest)	2351 First Avenue New York, NY 10035
P.S. 102 Jacques Cartier – M102 (approximately 0.38 miles southwest)	315 East 113th Street New York, NY 10029

Name (Approximate distance from Site)	Address
P.S. M169 – Robert F. Kennedy (approximately 0.29 miles southeast)	260 Pleasant Avenue New York, NY 10029
Isaac Newton Middle School for Math & Science – M825 (approximately 0.30 miles southeast)	260 Pleasant Avenue New York, NY 10029
Mt. Carmel Holy Rosary School (approximately 0.08 miles southeast)	371 Pleasant Avenue New York, NY 10035
River East Elementary/P.S. 206 Jose Celso Barbosa – M206 (approximately 0.17 miles east)	508 East 120 Street New York, NY 10035

- **Is the site in a disadvantaged community (DAC) or potential environmental justice area (PEJA) (Use DECinfolocator: [DECinfo Locator (ny.gov)])?**

  ■ Yes☐ No

  The site is located in a disadvantaged community as shown below (map taken from the DECInfo Locator)



  If the site is in a DAC or PEJA, will climate impacts be magnified? If yes, list how and why.

  ☐ Yes ■ No

- **Should thresholds of concern be lowered to account for magnification of impacts? If yes,**

indicate how lower thresholds will be used in the screening.

☐ **Yes** ■ **No**

Climate Screening Table*

Potential Climate Hazards	**Relevant to the Site Location** (Y/N/NA)[1]	**Projected Change** (Reference data source/Model)[3]	**Potential to Impact Remedy** (Y/N)	**Is remedy/site already resilient?** (Y/N)[4]
Precipitation	Potentially	N/A – Based on the Resilience Analysis and Planning Tool (RAPT)	N	Y – During construction, best management practices will be followed, and enhanced measures will be taken before, during and after extreme weather events. In the long term, the redevelopment of the site will include improvement of the site drainage which will help to mitigate the effects of flooding.
Temperature (Extreme Heat or Cold Weather Impacts)	Y	N/A – Based on RAPT	N	Y
Sea Level Rise	N	N/A	N	Y
Flooding	Y – Based on FEMA National Flood Hazard Layer	1 percent Annual Chance Flood Hazard – Based on RAPT	N	Y – During construction best management practices will be followed and enhanced measures will be taken before, during and after extreme weather events. In the long term, the redevelopment of the site will include improvement of the site drainage which will help to mitigate the effects of flooding.
Storm Surge	Y – Based on RAPT	At least 40 percent risk of rainfall exceeding flash flood guidance	N	Y – Erosion and sedimentation controls will be followed during construction, and the future building will incorporate resiliency measures.
Wildfire	N – Based on RAPT	N/A	N/A	N/A
Drought	N	N/A	N/A	N/A
Storm Severity	N	N/A	N/A	N/A
Landslides	N	N/A	N/A	N/A
Other Hazards:	N	N/A	N/A	N/A

[1] If the first column is N --> The rest of the columns will be N/A, the hazard is not applicable to the site.

[2] Extreme Heat: periods of three or more days above 90°F- Extreme Cold: Individual days with

minimum temperatures at or below 0 degrees F (NYSERDA ClimAID report)

[3] List the projected change in specific terms or units e.g. inches of rain fall, feet of sea level rise, etc.

[4] If final column is Y, provide reasoning, if the final column is N --> Climate Vulnerability Assessment (CVA) required.

Required Next Steps (If no further action is required, provide justification):

No further actions are required. The vulnerability that was assessed is covered by the stormwater best management practices and the current development plans.

Potential Data Sources (not an exhaustive list)- from Superfund Climate Resilience: Vulnerability Assessment | US EPA

NYSERDA ClimAID report- Responding Climate Change in New York State (ClimAID) - NYSERDA

FEMA- National Flood Hazard Layer | FEMA.gov

NOAA- National Storm Surge Risk Maps - Version 3 (noaa.gov)

Department of Agriculture Forest Service Wildfire Risk to Communities
EPA Climate Change Indicators in the United States
EPA Climate Resilience Evaluation & Awareness Tool (CREAT) | U.S. Climate Resilience Toolkit

EPA National Stormwater Calculator
National Integrated Drought Information System U.S. Drought Portal
National Interagency Coordination Center National Interagency Fire Center
National Oceanic and Atmospheric Administration Coastal Services Digital Coast

- Resources to help communities assess coastal hazards, such as the Sea Level Rise Viewer for visualizing community-level impacts of flooding or sea level rise and downloadable LIDAR data National Oceanic and Atmospheric Administration National Centers for Environmental Information website

National Oceanic and Atmospheric Administration Sea Level Trends
National Weather Service Climate Prediction Center
National Weather Service National Hurricane Center
National Weather Service Sea, Lake, and Overland Surges from Hurricanes (SLOSH)
National Weather Service Storm Surge Hazard Maps
U.S. Federal Government Climate Resilience Toolkit: The Climate Explorer
U.S. Army Corps of Engineers Climate Prepardness and Resilience
U.S. Geological Survey Coastal Change Hazards Portal
U.S. Geological Survey Landslide Hazards Program
U.S. Geological Survey National Ground-water Monitoring Network Data Portal
U.S. Geological Survey National Climate Change Viewer
U.S. Geological Survey National Water Dashboard
U.S. Geological Survey StreamStats
NYS Department of State- Assess | Department of State (ny.gov)

NYSERDA NY Costal Floodplain Mapper- Home Page (ny.gov)

NYSDEC Costal Erosion Hazards- Coastal Areas Regulated By The CEHA Permit Program - NYDEC

NYSDOH Heat Index- health.ny.gov/environmental/weather/vulnerability_index/county_maps.htm

APPENDIX H
QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

for

THE BEACON
413 East 120th Street
New York, New York

Prepared For:

TCB Beacon East Harlem Limited Partnership
8 West 38th Street, Suite 1102
New York, NY 10018

Prepared By:

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

January 2026
Langan Project No. 170745301

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1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) was prepared on behalf of TCB Beacon East Harlem Limited Partnership (the Volunteer), for the property located at 413 East 120th Street in the Borough of Manhattan, New York, New York (the site). The Volunteer entered the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) to remediate the site in accordance with a Brownfield Cleanup Agreement (BCA), Index No. C231155-02-24 executed on April 3, 2024, for Site No. C231155.

This QAPP specifies analytical methods to be used to ensure that data collected during the Remedial Action (RA) are precise, accurate, representative, comparable, complete, and meet the sensitivity requirements of the project.

1.2 PROJECT OBJECTIVES

The environmental objective of the RAWP is to achieve a split Track 1/Track 4 remedy under the NYSDEC BCP which includes the following:

A split Track 1 (Unrestricted Use)/Track 4 (Restricted Use – Restricted Residential [RURR]) remedy is proposed and will include implementation of the following remedial elements:

- Development and implementation of a Construction Health and Safety Plan (CHASP) and CAMP for the protection of on-site workers, visitors, the community, and the environment, including during remediation and construction
- To facilitate site remediation:
    - Abatement of regulated building materials prior to demolition in the northern and western parts of the current building and renovations in remaining portions of the building
    - Removal of subsurface obstructions (e.g., remnant foundation elements) and surficial asphalt cover by the Contractor
    - Management of removed asphalt/foundation elements as construction and demolition (C&D) debris in accordance with Part 360 and 361 regulations. Review and certification of C&D debris transport and disposal methodologies would be the responsibility of contractors performing off-site transportation and disposal of C&D debris. The Remedial Engineer (RE) is responsible for documenting that C&D debris is not commingled with contaminated site soil and fill.

- Decommissioning of existing groundwater monitoring wells in accordance with NYSDEC Commissioners Policy (CP)-43
- Construction of the support of excavation (SOE) system to facilitate the Track 1 portion of the recommended remedy
- Excavation and stockpiling of soil/fill exceeding Part 375 UU SCOs throughout the Track 1 area as follows:
    - About 14,492 square feet to 2 feet bsg in southern and northern parts of the site;
    - About 565 square feet to 5 feet bsg in the central parts of the site;
    - About 6,398 square feet to 8 feet bsg in the eastern part of the site;
    - About 7,859 square feet to 10 feet bsg (about 2 feet below cellar slab) in the central and western parts of the site;
    - About 100 square feet to 11 feet bsg (about 3 feet below cellar slab) in the central part of the site; and
    - About 100 square feet to 12 feet bsg in the eastern part of the site.
- Excavation and stockpiling of soil/fill exceeding Site-Specific SCOs in an about 646 square foot portion of the Track 4 area

  Excavation is not proposed for the remainder of the Track 4 area, as the existing slab will be enhanced with a topping slap as an engineering control to prevent exposure to residual contaminants.
- Screening for indications of contamination source areas during any intrusive site work by visual, olfactory, or instrumental methods
- Appropriate off-site disposal of removed fill and soil in accordance with federal, state, and local rules and regulations for handling, transport, and disposal
- Decommissioning and removal of any encountered underground storage tanks (USTs) in accordance with 6 NYCRR Part 613 and NYSDEC DER-10 Section 5.5
- Localized dewatering, as necessary, to accommodate remedial excavation completed within the Track 1 area
- Collection and analysis of post-excavation confirmation soil samples in the Track 1 area in accordance with DER-10 to evaluate the performance of the remedy with respect to attainment of Track 1 SCOs

- Collection and analysis of post-excavation documentation endpoint soil samples in the portion of the Track 4 area to be excavated in accordance with DER-10 to document post-remediation conditions.
- Installation of a sub-membrane depressurization system (SMDS) and a continuous waterproofing/vapor barrier membrane between the existing slab and a topping slab within the portion of the building to remain (majority of Track 4 area) as an engineering control. As a general construction element continuous waterproofing/vapor barrier membrane will be installed under the slab and along subsurface foundation walls throughout the new residential building
- Import and backfill of soil meeting the UU SCOs or virgin crushed stone, as needed to backfill over-excavated areas to development depth within the Track 1 area. Import requests are subject to NYSDEC review and approval and would include a Request to Import/Reuse Soil Form.
- Green remediation principles and techniques would be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31.
- Completion of a post-construction soil vapor intrusion (SVI) evaluation
- Recording of an Environmental Easement (EE) for the Track 4 area to memorialize the remedial action and the ICs to ensure that future owners of the site continue to maintain these controls as required
- Preparation of a Site Management Plan (SMP) for the Track 4 area that describes management of the institutional and engineering controls (ICs and ECs) – Implementation of the SMP following completion of the remedy will be stipulated by the EE

1.3 SCOPE OF WORK

The scope of work is described in detail in the RAWP. Disturbed soil will be sampled for laboratory analysis per disposal facility requirements, and visually examined, screened, and characterized for disposal at an approved facility. A dust, odor and organic vapor control and monitoring plan will be implemented during ground intrusive activities.

2.0 DATA QUALITY OBJECTIVES AND PROCESS

Data Quality Objectives (DQO) are qualitative and quantitative statements to help ensure that data of known and appropriate quality are obtained during the project. The DQO process is an iterative process where various options for implementing a project are explored, dissected, and recombined. The feasibility and costs of various options are estimated, and then the most advantageous option is selected and developed into project work plans that will be implemented.

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, based on comparison to Title 6 of the Official Compilation of New York Codes, Rules and Regulations Part 375 NYSDEC Restricted-Use Restricted Residential (RURR) Soil Cleanup Objectives (SCO) for soil samples, the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water (collectively the NYSDEC SGV) for groundwater samples, and to the October 2006 (updated in May 2017) New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York Air Guideline Values and Decision Matrices for soil vapor samples.
- 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 field duplicate samples and analytical precision will be determined by analyzing laboratory duplicates, laboratory control sample 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. For soil vapor or air samples, analytical accuracy will be assessed by examining the percent recoveries that are added to each sample, internal standards, laboratory method blanks, and instrument calibration.

- **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 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. 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 accomplished by following all applicable methods, laboratory-issued standard operating procedures (SOP), the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.
- **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 as documented in the QAPP, 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

Any future remedial activities and investigations will be overseen by Langan or another environmental consultant for the Volunteer or a future owner. The environmental consultant will arrange data analysis and reporting tasks. The analytical services will be performed by an Environmental Laboratory Approval Program (ELAP)-certified laboratory. Data validation services will be performed by approved data validation contractor(s).

The required sampling will be conducted by Langan; the analytical services will be performed by York Analytical Laboratories, Inc. of Stratford, Connecticut (NYSDOH ELAP certification numbers 10854 and 12058). Data validation services will be performed by Joe Conboy of Langan.

Resumes for Langan personnel can be found in Attachment A. Key contacts for this project are as follows:

The Community Builders:	Mr. Brian Backscheider Telephone: (646) 783-3727
Engineer of Record:	Mr. Gerald Nicholls, P.E., CHMM Telephone: (609) 933-5330
Langan Project Manager:	Ms. Jennifer Armstrong Telephone: (212) 479-5537
Qualified Environmental Professional (QEP):	Mr. Ryan Manderbach, CHMM Telephone: (212) 479-5582
Langan Field Team Leader:	Ms. Kristen Wexler Telephone: (203) 784-3009
Langan Quality Assurance Officer (QAO):	Mr. Gerald Nicholls, P.E., CHMM Telephone: (609) 933-5330
Langan Health and Safety Manager:	Mr. Tony Moffa, CHMM, COS, CSP Telephone: (215) 491-6500
Langan Health and Safety Officer (H&SO):	Mr. Bill Bohrer, PG Telephone: (410) 984-3068
Data Validator:	Mr. Joe Conboy Telephone: (602) 790-6052

Laboratory Representative:	Ms. Allison Bennett (York) Telephone: (203) 325-1371
Field Personnel:	TBD

4.0 QUALITY ASSURANCE 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 subsurface conditions 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 5x the reporting limit (RL) meet the precision criteria if the absolute difference is less than ±2x the RL for soils (and ±1x the RL for water) and acceptable based on professional judgement. For results greater than 2x the RL for soils (and 1x the RL for water), the acceptance criteria is a relative percent difference (RPD) of ≤50% (soil), <30% (water and air). RLs and method detection limits (MDL) are provided in Attachment B.

Laboratory precision is assessed through the analysis of matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicates (LCS/LCSD) and subsequent calculation of RPD. For outliers, if additional sample volume is present, the MS/MSD should be reanalyzed and the RPD recomputed. If additional volume is not present, an evaluation will be performed to determine the extent of potential matrix interference.

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 field and trip blanks and through compliance to all sample handling, preservation, and holding time requirements. All field and trip blanks should be non-detect when analyzed by the laboratory. Any contaminant detected in an associated field 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.

Laboratory accuracy is assessed by evaluating the percent recoveries of MS/MSD samples, LCS/LCSD, surrogate compound recoveries, internal standard area counts, initial and continuing calibration, and the results of method, initial and continuing calibration blanks. MS/MSD, LCS/LCSD, 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.

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 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 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 manager 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 field blanks, trip

blanks and field duplicate samples will be based on the recommendations listed in DER-10, and as described in Section 5.3.

Site-specific MS and MSD samples will be prepared and analyzed by the analytical laboratory by spiking an aliquot of submitted sample volume with analytes of interest. Additional sample volume is not required by the laboratory for this purpose. An MS/MSD analysis will be analyzed at a rate of 1 out of every 20 samples, or one per analytical batch. MS/MSD samples are only required for soil and groundwater samples.

5.0 SAMPLE COLLECTION AND FIELD DATA ACQUISITION PROCEDURES

Soil and groundwater sampling will be conducted in accordance with the established NYSDEC protocols contained in DER-10/Technical Guidance for Site Investigation and Remediation (May 2010). Soil vapor sampling will be conducted in accordance with the established NYSDOH protocols contained in the Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). 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 field data sheets, 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, collect pre- and post-sample readings for air samples, screen soil samples, and collect monitoring well headspace readings. Field calibration and/or field checking of the PID will be the responsibility of the field team leader and the site H&S 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

A water quality meter (YSI 6820 or similar) will be used during purging of groundwater to measure pH, specific conductance, temperature, dissolved oxygen, turbidity and oxidation-reduction-potential (ORP), every five minutes. A portable turbidity meter (LaMotte or similar) may also be used to measure turbidity. Water-quality meters should be calibrated and the results documented before use each day using standardized field calibration procedures and calibration checks.

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 have been 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 volatile organic compounds (VOC) 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.

Soil sampling for per- and polyfluoroalkyl substances (PFAS) will be conducted in accordance with United States Environmental Protection Agency (USEPA) Draft Method 1633 Field Sampling Guidelines. PFAS samples will be collected first in High Density Polyethylene (HDPE)/polypropylene containers using sampling equipment either made with stainless steel, HDPE, or polypropylene. Food and beverages will be prohibited near the sampling equipment. Additionally, no cosmetics, moisturizers, hand cream, sun screen or clothing materials containing Gore-Tex™ or Tyvek® will be worn during sampling.

Soil samples will be analyzed for PFAS by USEPA Draft Method 1633 Modified and 1,4-dioxane by USEPA Method 8270 selective ion monitoring (SIM). Both methods listed above will be able to meet the reporting limits for PFAS (0.5 microgram per kilogram [µg/kg]) and 1,4-dioxane (0.1 milligram per kilogram [mg/kg]) in soil.

After collection, 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 and 5.6. Analysis and/or extraction and digestion of collected soil samples will meet the holding times required for each analyte as specified in Attachment E. In addition, analysis of collected soil sample will meet all quality assurance criteria set forth by this QAPP and DER-10.

Groundwater Samples

Groundwater sampling will be conducted using low-flow sampling procedures following USEPA guidance ("Low Stress [low flow] Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells", EQASOP-GW4, dated July 30, 1996, revised September 19, 2017).

During purging, field parameters should be measured, including water level drawdown, purge rate, pH, specific conductance, temperature, dissolved oxygen, turbidity and ORP, every five minutes using a water quality meter (YSI 6820 or similar) and a depth-to-water interface probe that should be decontaminated between wells. Samples should generally not be collected until the field parameters have stabilized. Field parameters will be considered stable once three sets of measurements are within ±0.1 standard units for pH, ±3% for conductivity and temperature, ±10 millivolts for ORP, and ±10% for turbidity and dissolved oxygen. Purge rates should be adjusted to keep the drawdown in the well to less than 0.3 feet, as practical. Additionally, an attempt should be made to achieve a stable turbidity reading of less than 5 Nephelometric Turbidity Units (NTU) prior to sampling. If the turbidity reading does not stabilize at a reading of less than 5 NTU for a given well, then both filtered and unfiltered samples should be collected from that well.

If necessary, field filtration should be performed using a 0.45-micron disposable in-line filter. Groundwater samples should be collected after parameters have stabilized as noted above or the readings are within the precision of the meter. Deviations from the stabilization and drawdown criteria, if any, should be noted on the sampling logs.

Groundwater sampling for PFAS and 1,4-dioxane will be performed in accordance with the NYSDEC-approved Groundwater Monitoring Plan, dated August 27, 2004, which specifies purging three to five well volumes prior to sample collection. The pump will be decontaminated with Alconox and water. Field personnel will wear nitrile gloves while collecting and handing groundwater samples.

Groundwater sampling for PFAS will be conducted in accordance with EPA Method 537 Field Sampling Guidelines. PFAS samples will be collected first in HDPE/polypropylene containers using sampling equipment either made with stainless steel, HDPE, or polypropylene. Food and beverages will be prohibited near the sampling equipment. Additionally, no cosmetics, moisturizers, hand cream, sun screen or clothing materials containing Gore-Tex™ or Tyvek® will be worn during sampling.

Groundwater samples will be analyzed for PFAS by USEPA Draft Method 1633 Modified and 1,4-dioxane by USEPA Method 8270 SIM. Both methods listed above will be able to meet the reporting limits for PFAS (2 nanograms per liter [ng/L]) and 1,4-dioxane (0.35 micrograms per liter [µg/L]) in groundwater.

Samples should be collected directly into laboratory-supplied 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 and 5.6. Analysis and/or extraction and digestion of collected groundwater samples will meet the holding times required for each analyte as specified in Attachment C. In addition, analysis of collected groundwater sample will meet all quality assurance criteria set forth by this QAPP and DER-10.

A list of the PFAS is provided in Attachment B. Groundwater samples collected for analysis of PFAS will be collected in accordance with the specialized protocols outlined in Attachment E.

Sample Field Blanks and Field Duplicates

Field blanks will be collected for quality assurance purposes at a rate of one per 20 investigative samples per matrix (soil and groundwater only). Field blanks will be obtained by pouring laboratory-demonstrated analyte-free water on or through a decontaminated sampling device following use and implementation of decontamination protocols. The

water will be collected off of the sampling device into a laboratory-provided sample container for analysis. Field blank samples will be analyzed for the complete list of analytes on the day of sampling. To assess contamination resulting from sample transport, trip blanks will be collected at a rate of one per day if soil samples are analyzed for VOCs during that day. Equipment blanks will be collected at a minimum frequency of one per day per matrix for PFAS.

Field duplicate soil and groundwater samples will be collected and analyzed for quality assurance purposes. Field duplicate samples will be collected at a frequency of 1 per 20 investigative samples per matrix and will be submitted to the laboratory as "blind" samples. If less than 20 samples are collected during a particular sampling event, one field duplicate sample will be collected. Field duplicates will be collected from the same sample volume as the parent sample.

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 and/or groundwater 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. Blue ice will not be used to cool PFAS samples. 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 SPECIAL CONSIDERATIONS FOR PFAS SAMPLE COLLECTION

The following special considerations apply to the collection of groundwater 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, silicon, or polypropylene
- 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 and the laboratories SOP for PFAS analysis are provided in Attachment E.

5.6 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.

5.7 SAMPLE SHIPMENT

5.7.1 Packaging

Soil vapor samples canisters can be stored and transported without additional packaging. Soil and groundwater 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.

5.7.2 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.

5.8 DECONTAMINATION PROCEDURES

Decontamination procedures will be used for non-dedicated sampling equipment. Decontamination of field personnel is discussed in the CHASP appended to the RAWP. Field sampling equipment that is to be reused will be decontaminated in the field in accordance with the following procedures:

1. Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
2. Generous tap water rinse
3. Distilled/de-ionized water rinse

Any field sampling equipment that is to be reused for PFAS sampling will be decontaminated in the field in accordance with the following procedures:

1. Alconox detergent and "PFAS-free" water scrub to remove visual contamination
2. Generous PFAS-free" water rinse

5.9 RESIDUALS MANAGEMENT

Debris (e.g., paper, plastic and disposable personal protective equipment) 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. All drums will be properly labeled, sealed, and characterized as necessary. The residual materials will be 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 to purge water or other residual fluids.

5.10 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:

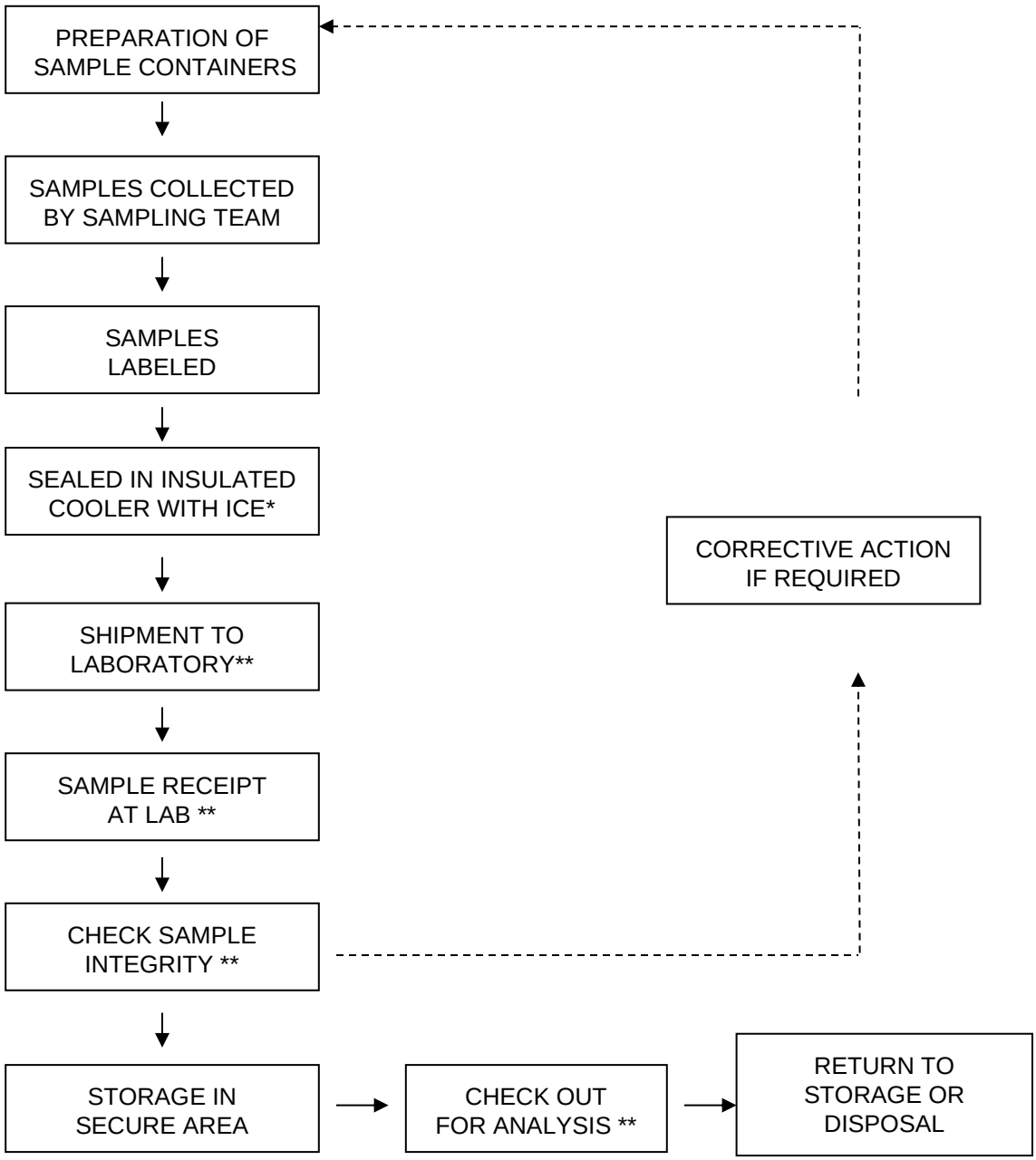
- Chain-of-custody will be initiated by the laboratory supplying the pre-cleaned and prepared sample containers. Chain-of-custody forms will accompany the sample containers.
- Following sample collection, the chain-of-custody form will be completed for the sample collected. The sample identification 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.

When soil and/or groundwater samples are collected, 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 example chain-of-custody forms are included as Figures 5.2 and 5.3.

Figure 5.1 Sample Custody



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

Figure 5.3 Sample Chain-of-Custody Form – Soil and Groundwater Samples

YORK
ANALYTICAL LABORATORIES INC

Field Chain-of-Custody Record

York Analytical Laboratories, Inc. (YORK)'s Standard Terms & Conditions are listed on the back side of this document.
This document serves as your written authorization for YORK to proceed with the analyses requested below.
Your signature binds you to YORK's Standard Terms & Conditions.

YORK Project No.

120 Research Drive Stratford, CT 06615 132-02 89th Ave Queens, NY 11418 56 Church Hill Rd. #2 Newtown, CT 06470 clientservices@yorklab.com www.yorklab.com 800-306-YORK Page _____ of _____

YOUR Information	Report To:	Invoice To:	YOUR Project Number	Turn-Around Time
Company:	Company:	Company:		RUSH - Next Day
Address:	Address:	Address:		RUSH - Two Day
Phone.:	Phone.:	Phone.:	YOUR Project Name	RUSH - Three Day
Contact:	Contact:	Contact:		RUSH - Four Day
E-mail:	E-mail:	E-mail:	YOUR PO#:	RUSH - Five Day
				Standard (6-9 Day)
				PFAS Standard is 7-10 Days

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by YORK are resolved.

Samples Collected by: (print AND sign your name)

Matrix Codes	Samples From	Report / EDD Type (circle selections)			YORK Reg. Comp.
S - soil / solid	New York	Summary Report	CT RCP	EQuIS (Standard)	Compared to the following Regulation(s): (please fill in)
GW - groundwater	New Jersey	QA Report	CT RCP DQA/DUE	NYSDEC EQuIS	
DW - drinking water	Connecticut	CMDP	NJDEP Reduced Deliverables	NJDKQP	
WW - wastewater	Pennsylvania	Standard Excel EDD		NJDEP SRP HazSite	
O - Oil / Other	Other:	NY ASP B Package	Other:		

Sample Identification	Sample Matrix	Date/Time Sampled	Analyses Requested	Container Type	No.

Comments:

Samples iced/chilled at time of lab pickup? circle Yes or No

Preservation: (check all that apply)
HCl ____ MeOH ____ HNO3 ____ H2SO4 ____ NaOH ____
ZnAc ____ Ascorbic Acid ____ Other: _____

Special Instruction
Field Filtered
Lab to Filter

1. Samples Relinquished by / Company	Date/Time	1. Samples Received by / Company	Date/Time	2. Samples Relinquished by / Company	Date/Time
2. Samples Received by / Company	Date/Time	3. Samples Relinquished by / Company	Date/Time	3. Samples Received by / Company	Date/Time
4. Samples Relinquished by / Company	Date/Time	4. Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time Temperature Degrees C

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.

5.11 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 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.

6.0 DATA REDUCTION, VALIDATION, AND REPORTING

6.1 INTRODUCTION

Data collected during the RA 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.

6.2 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 Environmental Quality Information System (EQuIS). To avoid transcription errors, data will be loaded directly into the American Standard Code (ASC)II format from the 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 or Task 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 has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

6.3 DATA VALIDATION

Data validation will be performed in accordance with the USEPA Region 2 SOPs for data validation and USEPA's National Functional Guidelines for Organic and Inorganic Data Review. Tier 1 data validation (the equivalent of USEPA's Stage 2A validation) will be performed to evaluate data quality. Tier 1 data validation is based on completeness and compliance checks of sample-related QC results including:

- Holding times;
- Sample preservation;
- Blank results (method, trip, and field blanks);
- Surrogate recovery compounds and isotope dilution standards (as applicable);
- LCS/LCSD recoveries and RPDs;
- MS/MSD recoveries and RPDs;
- Laboratory duplicate RPDs; and
- Field duplicate RPDs.

A Data Usability Summary Report (DUSR) will be prepared by the data validator and reviewed by the QAO before issuance. The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain-of-custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.

Based on the results of data validation, the validated analytical results reported by the laboratory may be assigned the following validation qualification:

- "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. The reporting limit may be inaccurate or imprecise;
- "J" - 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. Analyte is considered present in the sample;
- "R" – Unreliable result; data is rejected or unusable. Analyte may or may not be present in the sample; and

- No Flag - Result accepted without qualification.

7.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

7.1 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.

7.2 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.

7.3 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.

7.4 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.

8.0 CORRECTIVE ACTION

8.1 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.

8.2 PROCEDURE DESCRIPTION

When a significant condition adverse to quality is noted at a site, laboratory, or subcontractor location, 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 involved contractor 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 personnel, field investigation teams, remedial response planning personnel, and laboratory groups monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at project sites, laboratories, or contractor locations. Activities, or documents 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 Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 8.1 or similar by email). 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.

Figure 8.1 Corrective Action Request

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

C.A. FOLLOWUP:

CORRECTIVE ACTION VERIFIED BY: _____ DATE:_____

9.0 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. USEPA, 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- USEPA, 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, 2016. Low/Medium Volatile Data Validation. SOP No. HW-33A, Revision 1, dated September 2016. USEPA Region II.

USEPA, 2015. PCB Aroclor Data Validation. SOP No. HW-37A, Revision 0, dated July 2015. USEPA Region II.

USEPA, 2016. ICP-AES Data Validation. SOP No. HW-3a, Revision 1, dated September 2016. USEPA Region II.

USEPA, 2016. Mercury and Cyanide Data Validation. SOP No. HW-3c, Revision 1, dated September 2016. USEPA Region II.

USEPA, 2016. Pesticide Data Validation. SOP No. HW-36A, Revision 1, dated October 2016. USEPA Region II.

USEPA, 2016. Semivolatile Data Validation. SOP No. HW-35A, Revision 1, dated September 2016. USEPA Region II.

USEPA 2020a. National Functional Guidelines for Organic Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation, EPA-540-R-20-005, November 2020.

USEPA 2020b. National Functional Guidelines for Inorganic Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation, EPA-540-R-20-006, November 2020

ATTACHMENT A

RESUMES

WILLIAM BOHRER, PG

SENIOR 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

RYAN MANDERBACH, CHMM

ASSOCIATE PRINCIPAL

ENVIRONMENTAL ENGINEERING & SITE ASSESSMENTS

Mr. Manderbach has experience in New York, New Jersey, Massachusetts, Maine, Rhode Island, New Hampshire, and Connecticut. His recent experience includes New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup, Voluntary Cleanup and Spill Programs, and New York City Office of Environmental Remediation (OER) E-designated site investigation, and remediation. He has managed and performed Phase I and II Environmental Site Assessments; Underground Storage Tank (UST) removals and closures; soil vapor intrusion investigations; and site investigations and remediation. He also has extensive experience with Hazard Ranking System (HRS) evaluations, site assessments, removal actions, and emergency response activities under the EPA Regions I and II Superfund program.



EDUCATION

B.A., Environmental Analysis and Policy
Boston University

PROFESSIONAL REGISTRATION

Certified Hazardous Materials Manager (CHMM)

40 Hour HAZWOPER

AFFILIATIONS

New York Building Congress (NYBC), Young Professionals Committee

American Council of Engineering Companies of New York (ACEC NY) – Emerging Leaders Committee

SELECTED PROJECTS

- Brownfield Redevelopment, 520 West 41st Street, New York, NY
- Waterline Square, Mixed-Use Development, New York, NY
- Brownfield Redevelopment, 267-273 West 87th Street, New York, NY
- Brownfield Redevelopment, 225 33rd Street, Brooklyn, NY
- River Place Residential, SMP Implementation, New York, NY
- Mixed-Use Educational/Residential Development, New York, NY
- Public Safety Answering Center (PSAC) II, Bronx, NY
- American Copper Buildings (616 First Avenue), New York, NY
- Environmental Assessments at 430 East 92nd Street, New York, NY
- Environmental Assessments at 125th Street and Lenox, New York, NY
- Hotel at 70 Park Avenue, New York, NY
- Environmental Due Diligence at Mixed-Use Development, 85 Jay Street, Brooklyn, NY
- 346 Broadway Due Diligence, New York, NY
- Liberty Brass Site, 38-01 Queens Boulevard, Long Island City, NY
- Environmental Remediation, 42 West Street Residential, Brooklyn, NY
- Brownfield Redevelopment, 335 Bond Street, Brooklyn, NY
- Residences at 540 West 21st Street, New York, NY
- International Leadership Bronx Charter School, Bronx, NY
- President Street Properties, Brooklyn, NY
- Residential Development, 43-30 24th Street, Long Island City, NY
- Mixed-Use Condominium, 505-513 West 43rd Street, New York, NY
- 685 First Avenue, New York, NY
- Columbia University, Manhattanville Development, New York, NY
- The Shops at Atlas Park, Glendale, NY
- 536 West 41st Street, New York, NY
- 100 West 125th Street, New York, NY
- 11 North Moore Street, New York, NY
- 290 West Street, New York, NY

- City University of New York (CUNY), John Jay College Expansion, New York, NY
- Queens West Development, Long Island City, NY
- United Nations Capital Master Plan, New York, NY
- Former Air Products and Chemicals, Inc. Facility, Middlesex, NJ
- Lower Manhattan Indoor Dust Test and Clean Program, New York, NY
- Former Buckbee-Mears Facility, Cortland, NY
- Old Landfill, Norton, MA
- Boulter Farm Area, Cumberland, RI
- Hollingsworth & Vose Co., Walpole, MA
- Chlor-Alkali Facility (Former), Berlin, NH
- Limerick Mill Complex, Limerick, ME
- Danielson Pike Chlorinated Solvent Sites, Scituate, RI
- Tiogue Lake Sediment Contamination Site, Coventry, RI
- Atlas Copco Sites, Holyoke, MA
- Fisherville Mill, Grafton MA
- Hurricane Katrina Federal Disaster Response, New Orleans, LA
- Hurricane Ike Federal Disaster Response, Pasadena, TX
- 1752 Shore Parkway, Brooklyn, NY
- 27 Wooster Street, Residential Building, New York, NY
- Innovation QNS, Mixed-Use Development, Astoria, NY
- 42 West Street, Brooklyn, NY

JENNIFER ARMSTRONG, LEED AP

SENIOR PROJECT SCIENTIST

ENVIRONMENTAL SCIENTIST & REMEDIAL OVERSIGHT

Ms. Armstrong has experience working on environmental projects in New York. She has conducted Phase I and II Environmental Site Assessments, remedial investigations, soil vapor and indoor air quality surveys, and waste characterization investigations. She has also developed remedial investigation and remedial action work plans and managed groundwater monitoring programs. Her field experience includes soil, soil vapor, and groundwater sampling, indoor air investigations, remedial excavation oversight, and Community Air Monitoring Program (CAMP) management. Ms. Armstrong also has several years of experience in evaluating asbestos consultants and contractors.



SELECTED PROJECTS

- Highline 131410, Phase I ESA and Phase II ESI, Hotel Development, New York, NY
- NYC School Construction Authority, Phase I ESAs for Various Sites, New York, NY
- Freshkills Landfill, Public Relations, and Operations and Maintenance Plan Preparation Staten Island, NY
- Distribution Facility, Phase I & Phase II ESA and Regulatory Compliance, Bohemia, 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
- Huntington Station Superfund Due Diligence, Huntington Station, NY
- 144-150 Barrow Street, BCP Management, New York, NY
- 538-540 Hudson Street, BCP Management, New York, NY
- 572 Eleventh Avenue, City VCP Management, New York, NY
- 156-162 Perry Street, BCP Program Management, New York, NY
- Mail Distribution Facility at 57th Avenue, Capping Plan and Implementation, Long Island City, NY
- SJM Storage, 607 West 47th Street, E-designated Site Management, New York, NY
- Con Edison, Spill Delineation and Product Recovery, Governors Island, NY
- Consolidated Edison, Groundwater Sampling and Monitoring Reports, Governors Island, New York, NY
- Gowanus Village, Various Locations, Brooklyn, NY
- West & Watts Development, Phase I and II Environmental, Waste Characterization, and BCP Management, New York, NY
- ACME Greenpoint, Various Locations, Brooklyn, NY
- Consolidated Edison, Atlantic Ave Station, Brooklyn, NY
- CUNY John Jay College Expansion, CAMP Management, New York, NY
- Pelham Plaza, MGP Remediation Oversight, Pelham Manor, NY

EDUCATION

B.S., Environmental Science
Marist College

PROFESSIONAL REGISTRATION

LEED Accredited Professional (LEED AP)

Certified Hazardous Materials Manager

AFFILIATIONS

United States Green Building Council

Urban Land Institute

- Con Edison East 74th Street Steam Generation Plant, Remediation Investigations, New York, NY
- MODA Apartments, Waste Characterization, and Remediation Oversight, Jamaica, NY
- Bronx Terminal Market, Oversight for Remedial Excavation and Backfilling Bronx, NY
- Pier 4, Spill Remediation Oversight, Bronx, NY
- 40 Bond Street, Site Management Planning, New York, NY
- Bronx Mental Health Redevelopment, Phase I ESA, Bronx, NY
- Silvercup West, Brownfield Program Application and Waste Characterization Investigation, Long Island City, NY
- Foxgate/MREC, Due Diligence and Solid Waste Compliance, Central Islip, NY
- Garvies Point Bulkhead, Glen Cove, NY
- Johnson & Hoffman Metal Stamping Facility, Environmental Compliance, Carle Place, NY

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

- NYCDPR Bushwick Inlet Park (Phase I ESA, Approvals for NYC E-Designation), Brooklyn, NY
- WCS New York Aquarium, Shark Tank and Animal Care Facility (Environmental Remediation), Coney Island, 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
- 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
- 627 Smith Street (RI and Report), Brooklyn, NY



EDUCATION

M.S., Environmental Engineering
Columbia University

B.S., Chemistry, Environmental Toxicology (Business Administration minor)
Humboldt State University

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

LEED Accredited Professional (LEED AP)

Troxler Certification for Nuclear Densometer Training

OSHA 40-Hour HAZWOPER

OSHA HAZWOPER Site Supervisor

AFFILIATIONS

US Green Building Council, NYC Chapter, Communications Committee

Urban Land Institute (ULI), member

Commercial Real Estate Development Associations (NAIOP), member

LANGAN

- 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
- 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
- Greenpoint Terminal Market (BCP), Brooklyn, NY
- 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 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

GERALD F. NICHOLLS, PE, CHMM

ASSOCIATE PRINCIPAL

ENVIRONMENTAL ENGINEERING & HAZARDOUS MATERIALS MANAGMENT

Mr. Nicholls' 20 years of expertise includes management of remediation and site investigations, litigation support, expert services, brownfield cleanups, remedial design, industrial hygiene, for projects throughout New York and New Jersey. He works closely with various private, state, commercial, industrial, and municipal clients, acting as a liaison between the client and project team.

In 2019, Real Estate Weekly named Mr. Nicholls one of the Rising Stars of Real Estate.

SELECTED PROJECTS

- Willets Point Development, Brownfield Cleanup Program, Flushing, NY
- 491 Wortman Ave, Air Sparge/Soil Vapor Extraction Design and Implementation, Brownfield Cleanup Program, Bid Documents, Construction Administration, Brooklyn, NY
- Whitehead Realty, Acme Sites, DNAPL Delineation, Site Characterization, Remedial Investigation and Reporting, Brooklyn, NY
- West 17th Street Development, DNAPL Assessment, DNAPL Recovery, Remedial Design, Closure through Brownfield Cleanup Program, Remediation Oversight, Bid Documents, ISS and Containment Wall Design, Construction Administration, New York, NY
- 2 Ingraham Street, Brooklyn, NY
- New York City School Construction Authority On-Call Contract for Hazmat Consulting Services, Various Locations, Five Boroughs of New York, NY
- G4 Capital third party due diligence reviews and environmental risk evaluations, Various Locations, New York, NY
- 140 6th Avenue, Sub-Membrane Depressurization System Design, Spill Remediation, Subslab Remediation and Monitoring Well Piping Design, Remediation Oversight, and Construction Administration, New York, NY
- Gowanus Canal Northside, Demolition and Decommissioning of MOSF, Remediation Investigation, Brownfield Cleanup Program, Brooklyn, NY
- 23-01 42nd Road, Phase I, Phase II Remedial Investigation, Remedial Action Work Plan, Sub-Membrane Depressurization System Design, Underground Storage Tank Closure and Remediation, Brownfield Cleanup Program, Remediation Oversight, Construction Administration, Long Island City, NY
- 23-10 Queens Plaza South, Phase I, Phase II Remedial Investigation, Remedial Action Work Plan, Sub-Membrane Depressurization System Design, Underground Storage Tank Closure and



EDUCATION

M.S., Environmental Engineering
New Jersey Institute of Technology

B.S., Chemistry and Environmental Studies (Double Major)
Ursinus College

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

Certified Hazardous Materials Manager (CHMM)

AFFILIATIONS

Real Estate Board New York

City of Jersey City Environmental Commission, Former Commissioner, Vice Chair and Chair

Alliance of Hazardous Materials Professionals

American Chemical Society

New York League of Conservation Voters

New York City Brownfield Partnership

LANGAN

Remediation, Brownfield Cleanup Program, Remediation Oversight, Construction Administration, Long Island City, NY
- 163 6th Street, Phase I and Phase II Due Diligence, Spill Response, Remedial Action Work Plan, Brooklyn, NY
- 170 Amsterdam Avenue, Remedial Action Work Plan, Voluntary Cleanup Program, Remediation Oversight, Construction Administration, New York, NY
- Urban Health Plan, Medical Building, DNAPL Delineation, Remedial Action Work Plan, Hazardous Waste Management and Minimization, Brownfield Cleanup Program, Bronx, NY
- Second Avenue Subway, Air Monitoring and Ventilated Air Treatment Program, New York, NY
- New York University Spill Sites, 4 Washington Square Village, 7-13, Washington Square North, and 251 Mercer Street, Fuel Oil Spill Cleanup and Closure, New York, NY
- Dormitory Authority of New York (DASNY), City College of New York, Fuel Protection and Leak Detection System Repair and Upgrades, New York, NY
- 45 Broad Street, Waste Characterization, Construction Documents, New York, NY
- 241 West 28th Street, New York, NY
- Surfactant Remediation Project, In-Situ Chemical Oxidation Design and Implementation and Site Closure, Margate City, NJ
- Koppers Site, Trans-Hudson Express Project, Kearny, NJ
- Former Cornell Manufacturing Site, Orangeburg, NY
- Horse Pasture Site, Robins Air Force Base, GA
- Williams Air Force Base, Thermal Enhanced Extraction, Mesa, AZ
- New Jersey Transit, 32nd Street Station Stop (former Hicor Site), Bayonne, NJ
- Nikolski Radio Relay Station, Umnak Island, AK
- Middletown Post Office, Due Diligence, Middletown, NY
- Lower Manhattan Construction Command Center, Environmental Services Contract, New York, NY
- Da Nang International Airport, Da Nang, Vietnam
- 22nd to 8th Street Station Light Rail Extension, Bayonne, NJ
- 69th Street Grade Separation Project, North Bergen, NJ
- Dukes Parkway Landfill, Hillsboro/Manville, NJ
- NYU Langone Medical Center, New Science Building, Remediation Oversight and Construction Administration, Voluntary Cleanup Program, New York, NY
- 86 Warren Street, Waste Characterization and Construction Documents, New York, NY
- 459 Smith Street and Gowanus Green, Due Diligence and Cost Estimating, Brooklyn, NY
- 111 Leroy Street, New York, NY
- 411 Broadway, Phase I, Remedial Investigation, Air/Noise Coordination for E-Designation, New York, NY
- Modera on the Hudson, Remediation Oversight, Remedial Action Work Plan, Submembrane Depressurization System Design, Yonkers, NY
- Honeywell Quanta, Remedial Design Peer Review, Edgewater, NJ
- New York University Tandon School of Engineering (Spill 1009933), Remediation, Laser-Induced Fluorescence Investigation, Remedial System Optimization, Product Recovery, Spill Cleanup, Brooklyn, NY

- 237-261 North 9th Street, Peer Review and Due Diligence, Brooklyn, 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.

”Biodegradation Pathways and End Products of Sodium Dioctyl Sulfosuccinate/Sodium Hexadecyl Diphenyl Oxide Disulfonate Surfactant Solution.” Florida Remediation Conference, Orlando, Florida, November 2005.

JOSEPH CONBOY

SENIOR STAFF CHEMIST

ENVIRONMENTAL ENGINEERING

Joseph has 7 years of experience in environmental consulting, specializing in chemical data validation, data quality assessments, data usability evaluations, and EQuIS database management.



SELECTED PROJECTS

- 23-30 Borden Avenue, Long Island City, NY
- 25-01 Queens Plaza North, Long Island City, NY
- 37-11 30th Street, Long Island City, NY
- 266 West 96th Street, New York, NY
- 414 Gerard Avenue, Bronx, NY
- 445 Gerard Avenue, Bronx, NY
- 475 Bay Street, Staten Island,
- 538-544 Hudson Street, New York, NY
- 805-825 Atlantic Avenue, Brooklyn, NY
- 1400 Ferris Place, Bronx, NY
- 1607 Surf Avenue, Coney Island, NY
- 1900 River Road, Burlington, NJ
- 2447 Third Avenue, New York, NY
- ABC - Block 27, Long Island City, NY
- American Dream Meadowlands, East Rutherford, NJ
- Bedford Armory, Brooklyn, NY
- Former Ballantine Brewery, Newark, NJ
- Former Curtiss-Wright Facility, Wood-Ridge, NJ
- Former Duane Marine Site, Perth Amboy, NJ
- Former Perth Amboy Gas Works, Perth Amboy, NJ
- Former Plessey Dynamics Site, Hillside, NJ
- Former MGP Site, Wildwood, NJ
- Gowanus Canal Northside, Brooklyn, NY
- JCP&L Union Beach District Office, Keyport, NJ
- K-8 School, New Brunswick, NJ
- Linden Terminal, Linden, NJ
- Paulsboro Packaging Site, Paulsboro, NJ
- President Street Properties, New York, NY
- Suffolk Street, New York, NY
- Willets Point, Queens, NY

EDUCATION

B.S., Chemistry
Rowan University

ATTACHMENT B

LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

APPENDIX B
LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1,1,2-Tetrachloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1,1-Trichloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1,2,2-Tetrachloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1,2-Trichloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1-Dichloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1-Dichloroethylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1-Dichloropropylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2,3-Trichlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2,3-Trichloropropane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2,4,5-Tetramethylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2,4-Trichlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2,4-Trimethylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2-Dibromo-3-chloropropane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2-Dibromoethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2-Dichlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2-Dichloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2-Dichloropropane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,3,5-Trimethylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,3-Dichlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,3-Dichloropropane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,4-Dichlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,4-Dioxane	50	100	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	2,2-Dichloropropane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	2-Butanone	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	2-Chlorotoluene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	2-Hexanone	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	4-Chlorotoluene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	4-Methyl-2-pentanone	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Acetone	5	10	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Acrolein	5	10	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Acrylonitrile	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Benzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Bromobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Bromochloromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Bromodichloromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Bromoform	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Bromomethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Carbon disulfide	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Carbon tetrachloride	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Chlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Chloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Chloroform	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Chloromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	cis-1,2-Dichloroethylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	cis-1,3-Dichloropropylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Cyclohexane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Dibromochloromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Dibromomethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Dichlorodifluoromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Ethyl Benzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Hexachlorobutadiene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Isopropylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Methyl acetate	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Methyl tert-butyl ether (MTBE)	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Methylcyclohexane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Methylene chloride	5	10	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Naphthalene	2.5	10	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	n-Butylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	n-Propylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	o-Xylene	2.5	5	ug/kg

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	p- & m- Xylenes	5	10	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	p-Diethylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	p-Ethyltoluene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	p-Isopropyltoluene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	sec-Butylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Styrene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	tert-Butyl alcohol (TBA)	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	tert-Butylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Tetrachloroethylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Toluene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	trans-1,2-Dichloroethylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	trans-1,3-Dichloropropylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	trans-1,4-dichloro-2-butene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Trichloroethylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Trichlorofluoromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Vinyl acetate	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Vinyl Chloride	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Xylenes, Total	7.5	15	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Chlorodifluoromethane (Freon 22)	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1,1,2-Tetrachloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1,1-Trichloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1,2,2-Tetrachloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1,2-Trichloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1-Dichloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1-Dichloroethylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1-Dichloropropylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2,3-Trichlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2,3-Trichloropropane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2,4,5-Tetramethylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2,4-Trichlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2,4-Trimethylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2-Dibromo-3-chloropropane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2-Dibromoethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2-Dichlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2-Dichloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2-Dichloropropane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,3,5-Trimethylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,3-Dichlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,3-Dichloropropane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,4-Dichlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,4-Dioxane	40	40	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	2,2-Dichloropropane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	2-Butanone	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	2-Chlorotoluene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	2-Hexanone	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	4-Chlorotoluene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	4-Methyl-2-pentanone	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Acetone	1	2	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Acrolein	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Acrylonitrile	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Benzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Bromobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Bromochloromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Bromodichloromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Bromoform	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Bromomethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Carbon disulfide	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Carbon tetrachloride	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Chlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Chloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Chloroform	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Chloromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	cis-1,2-Dichloroethylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	cis-1,3-Dichloropropylene	0.2	0.5	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Cyclohexane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Dibromochloromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Dibromomethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Dichlorodifluoromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Ethyl Benzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Hexachlorobutadiene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Isopropylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Methyl acetate	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Methyl tert-butyl ether (MTBE)	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Methylcyclohexane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Methylene chloride	1	2	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Naphthalene	1	2	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	n-Butylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	n-Propylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	o-Xylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	p- & m- Xylenes	0.5	1	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	p-Diethylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	p-Ethyltoluene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	p-Isopropyltoluene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	sec-Butylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Styrene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	tert-Butyl alcohol (TBA)	0.5	1	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	tert-Butylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Tetrachloroethylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Toluene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	trans-1,2-Dichloroethylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	trans-1,3-Dichloropropylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	trans-1,4-dichloro-2-butene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Trichloroethylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Trichlorofluoromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Vinyl acetate	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Vinyl Chloride	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Xylenes, Total	0.6	1.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Chlorodifluoromethane (Freon 22)	0.2	0.5	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Semivolatile Organic Compounds						
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,1-Biphenyl	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,2,4,5-Tetrachlorobenzene	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,2,4-Trichlorobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,2-Dichlorobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,2-Diphenylhydrazine (as Azobenzene)	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,3-Dichlorobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,4-Dichlorobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,3,4,6-Tetrachlorophenol	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4,5-Trichlorophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4,6-Trichlorophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4-Dichlorophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4-Dimethylphenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4-Dinitrophenol	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4-Dinitrotoluene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,6-Dinitrotoluene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Chloronaphthalene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Chlorophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Methylnaphthalene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Methylphenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Nitroaniline	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Nitrophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	3- & 4-Methylphenols	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	3,3-Dichlorobenzidine	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	3-Nitroaniline	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4,6-Dinitro-2-methylphenol	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Bromophenyl phenyl ether	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Chloro-3-methylphenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Chloroaniline	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Chlorophenyl phenyl ether	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Nitroaniline	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Nitrophenol	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Acenaphthene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Acenaphthylene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Acetophenone	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Aniline	83.5	167	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Anthracene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Atrazine	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzaldehyde	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzidine	83.5	167	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(a)anthracene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(a)pyrene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(b)fluoranthene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(g,h,i)perylene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(k)fluoranthene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzoic acid	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzyl alcohol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzyl butyl phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Bis(2-chloroethoxy)methane	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Bis(2-chloroethyl)ether	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Bis(2-chloroisopropyl)ether	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Bis(2-ethylhexyl)phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Caprolactam	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Carbazole	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Chrysene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Dibenzo(a,h)anthracene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Dibenzofuran	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Diethyl phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Dimethyl phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Di-n-butyl phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Di-n-octyl phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Diphenylamine	41.7	83.3	ug/kg

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Semivolatile Organic Compounds						
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Fluoranthene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Fluorene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Hexachlorobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Hexachlorobutadiene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Hexachlorocyclopentadiene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Hexachloroethane	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Indeno(1,2,3-cd)pyrene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Isophorone	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Naphthalene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Nitrobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	N-Nitrosodimethylamine	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	N-nitroso-di-n-propylamine	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	N-Nitrosodiphenylamine	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Pentachlorophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Phenanthrene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Phenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Pyrene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Pyridine	83.5	167	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(a)pyrene (BAP) Equivalent-BAPE	146	292	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,1-Biphenyl	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,2,4,5-Tetrachlorobenzene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,2,4-Trichlorobenzene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,2-Dichlorobenzene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,2-Diphenylhydrazine (as Azobenzene)	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,3-Dichlorobenzene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,4-Dichlorobenzene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,3,4,6-Tetrachlorophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4,5-Trichlorophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4,6-Trichlorophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4-Dichlorophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4-Dimethylphenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4-Dinitrophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4-Dinitrotoluene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,6-Dinitrotoluene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Chloronaphthalene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Chlorophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Methylnaphthalene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Methylphenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Nitroaniline	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Nitrophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	3- & 4-Methylphenols	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	3,3-Dichlorobenzidine	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	3-Nitroaniline	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4,6-Dinitro-2-methylphenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Bromophenyl phenyl ether	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Chloro-3-methylphenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Chloroaniline	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Chlorophenyl phenyl ether	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Nitroaniline	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Nitrophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Acenaphthene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Acenaphthylene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Acetophenone	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Aniline	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Anthracene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Atrazine	0.5	0.5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzaldehyde	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzidine	10	20	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzo(a)anthracene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzo(a)pyrene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzo(b)fluoranthene	0.05	0.05	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Semivolatile Organic Compounds						
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzo(g,h,i)perylene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzo(k)fluoranthene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzoic acid	25	50	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzyl alcohol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzyl butyl phthalate	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Bis(2-chloroethoxy)methane	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Bis(2-chloroethyl)ether	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Bis(2-chloroisopropyl)ether	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Bis(2-ethylhexyl)phthalate	0.5	0.5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Caprolactam	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Carbazole	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Chrysene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Dibenzo(a,h)anthracene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Dibenzofuran	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Diethyl phthalate	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Dimethyl phthalate	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Di-n-butyl phthalate	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Di-n-octyl phthalate	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Diphenylamine	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Fluoranthene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Fluorene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Hexachlorobenzene	0.02	0.02	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Hexachlorobutadiene	0.5	0.5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Hexachlorocyclopentadiene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Hexachloroethane	0.5	0.5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Indeno(1,2,3-cd)pyrene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Isophorone	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Naphthalene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Nitrobenzene	0.25	0.25	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	N-Nitrosodimethylamine	0.5	0.5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	N-nitroso-di-n-propylamine	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	N-Nitrosodiphenylamine	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Pentachlorophenol	0.25	0.25	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Phenanthrene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Phenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Pyrene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Pyridine	2.5	5	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Pesticides						
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDD	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDD [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDE	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDE [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDT	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDT [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Aldrin	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Aldrin [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	alpha-BHC	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	alpha-BHC [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	alpha-Chlordane	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	alpha-Chlordane [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	beta-BHC	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	beta-BHC [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Chlordane, total	6.6	6.6	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Chlordane, total [2C]	6.6	6.6	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	delta-BHC	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	delta-BHC [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Dieldrin	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Dieldrin [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan I	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan I [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan II	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan II [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan sulfate	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan sulfate [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin aldehyde	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin aldehyde [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin ketone	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin ketone [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	gamma-BHC (Lindane)	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	gamma-BHC (Lindane) [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	gamma-Chlordane	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	gamma-Chlordane [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Heptachlor	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Heptachlor [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Heptachlor epoxide	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Heptachlor epoxide [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Methoxychlor	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Methoxychlor [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Toxaphene	33	33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Toxaphene [2C]	33	33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Mirex	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDD	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDD [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDE	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDE [2C]	0.004	0.004	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Pesticides						
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDT	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDT [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Aldrin	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Aldrin [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	alpha-BHC	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	alpha-BHC [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	alpha-Chlordane	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	alpha-Chlordane [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	beta-BHC	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	beta-BHC [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Chlordane, total	0.02	0.02	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Chlordane, total [2C]	0.02	0.02	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	delta-BHC	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	delta-BHC [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Dieldrin	0.002	0.002	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Dieldrin [2C]	0.002	0.002	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan I	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan I [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan II	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan II [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan sulfate	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan sulfate [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin aldehyde	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin aldehyde [2C]	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin ketone	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin ketone [2C]	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	gamma-BHC (Lindane)	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	gamma-BHC (Lindane) [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	gamma-Chlordane	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	gamma-Chlordane [2C]	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Heptachlor	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Heptachlor [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Heptachlor epoxide	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Heptachlor epoxide [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Methoxychlor	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Methoxychlor [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Toxaphene	0.1	0.1	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Toxaphene [2C]	0.1	0.1	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Mirex	0.004	0.004	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Polychlorinated Biphenyls						
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1016	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1016 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1221	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1221 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1232	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1232 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1242	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1242 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1248	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1248 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1254	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1254 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1260	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1260 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1262	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1262 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1268	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1268 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Total PCBs	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Total PCBs [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1016	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1016 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1221	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1221 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1232	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1232 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1242	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1242 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1248	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1248 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1254	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1254 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1260	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1260 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1262	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1262 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1268	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1268 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Total PCBs	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Total PCBs [2C]	0.05	0.05	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Herbicides						
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4,5-T	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4,5-T [2C]	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4,5-TP (Silvex)	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4,5-TP (Silvex) [2C]	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4-D	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4-D [2C]	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4,5-T	5	5	ug/L
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4,5-T [2C]	5	5	ug/L
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4,5-TP (Silvex)	5	5	ug/L
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4,5-TP (Silvex) [2C]	5	5	ug/L
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4-D	5	5	ug/L
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4-D [2C]	5	5	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Metals						
EPA 6010D	Metals, Target Analyte	Soil	Aluminum	4.17	4.17	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Antimony	2.08	2.08	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Arsenic	1.25	1.25	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Barium	2.08	2.08	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Beryllium	0.042	0.042	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Cadmium	0.25	0.25	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Calcium	4.17	4.17	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Chromium	0.417	0.417	mg/kg
EPA 7196A	Metals, Target Analyte	Soil	Hexavalent Chromium	0.35	0.5	mg/kg
EPA 7196A	Metals, Target Analyte	Soil	Trivalent Chromium	0.25	0.5	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Cobalt	0.333	0.333	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Copper	1.67	1.67	mg/kg
EPA 9013A	Metals, Target Analyte	Soil	Cyanide	0.5	0.5	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Iron	20.8	20.8	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Lead	0.417	0.417	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Magnesium	4.17	4.17	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Manganese	0.417	0.417	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Nickel	0.83	0.83	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Potassium	4.17	4.17	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Selenium	2.08	2.08	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Silver	0.42	0.42	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Sodium	41.7	41.7	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Thallium	2.08	2.08	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Vanadium	0.83	0.83	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Zinc	2.08	2.08	mg/kg
EPA 6010D	Metals, Target Analyte	Water	Aluminum	0.05	0.05	mg/L
EPA 6010D	Metals, Target Analyte	Water	Antimony	0.025	0.025	mg/L
EPA 6010D	Metals, Target Analyte	Water	Arsenic	0.015	0.015	mg/L
EPA 6010D	Metals, Target Analyte	Water	Barium	0.025	0.025	mg/L
EPA 6010D	Metals, Target Analyte	Water	Beryllium	0.0005	0.0005	mg/L
EPA 6010D	Metals, Target Analyte	Water	Cadmium	0.003	0.003	mg/L
EPA 6010D	Metals, Target Analyte	Water	Calcium	0.05	0.05	mg/L
EPA 6010D	Metals, Target Analyte	Water	Chromium	0.005	0.005	mg/L
EPA 7196A	Metals, Target Analyte	Water	Hexavalent Chromium	0.01	0.01	mg/L
EPA 7196A	Metals, Target Analyte	Water	Trivalent Chromium	0.008	0.01	mg/L
EPA 6010D	Metals, Target Analyte	Water	Cobalt	0.004	0.004	mg/L
EPA 6010D	Metals, Target Analyte	Water	Copper	0.02	0.02	mg/L
EPA 9013A	Metals, Target Analyte	Water	Cyanide	0.01	0.01	mg/L
EPA 6010D	Metals, Target Analyte	Water	Iron	0.25	0.25	mg/L
EPA 6010D	Metals, Target Analyte	Water	Lead	0.005	0.005	mg/L
EPA 6010D	Metals, Target Analyte	Water	Magnesium	0.05	0.05	mg/L
EPA 6010D	Metals, Target Analyte	Water	Manganese	0.005	0.005	mg/L
EPA 6010D	Metals, Target Analyte	Water	Nickel	0.01	0.01	mg/L
EPA 6010D	Metals, Target Analyte	Water	Potassium	0.05	0.05	mg/L
EPA 6010D	Metals, Target Analyte	Water	Selenium	0.025	0.025	mg/L
EPA 6010D	Metals, Target Analyte	Water	Silver	0.005	0.005	mg/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Metals						
EPA 6010D	Metals, Target Analyte	Water	Sodium	0.5	0.5	mg/L
EPA 6010D	Metals, Target Analyte	Water	Thallium	0.025	0.025	mg/L
EPA 6010D	Metals, Target Analyte	Water	Vanadium	0.01	0.01	mg/L
EPA 6010D	Metals, Target Analyte	Water	Zinc	0.025	0.025	mg/L

Analysis	Matrix	Analyte	MDL	RL	Units
PFAS Compounds					
PFAS, EPA 1633 Target List	Soil	Perfluorobutanesulfonic acid (PFBS)	0.111	0.177	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorohexanoic acid (PFHxA)	0.053	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoroheptanoic acid (PFHpA)	0.105	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorohexanesulfonic acid (PFHxS)	0.179	0.183	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorooctanoic acid (PFOA)	0.172	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorooctanesulfonic acid (PFOS)	0.167	0.186	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorononanoic acid (PFNA)	0.189	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorodecanoic acid (PFDA)	0.191	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoroundecanoic acid (PFUnA)	0.198	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorododecanoic acid (PFDoA)	0.163	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorotridecanoic acid (PFTrDA)	0.125	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorotetradecanoic acid (PFTA)	0.103	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	N-MeFOSAA	0.148	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	N-EtFOSAA	0.194	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoropentanoic acid (PFPeA)	0.109	0.4	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-1-octanesulfonamide (FOSA)	0.146	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-1-heptanesulfonic acid (PFHpS)	0.155	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-1-decanesulfonic acid (PFDS)	0.191	0.193	ug/kg
PFAS, EPA 1633 Target List	Soil	1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	0.595	0.76	ug/kg
PFAS, EPA 1633 Target List	Soil	1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	0.755	0.768	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-n-butanoic acid (PFBA)	0.109	0.8	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	0.139	0.356	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-3,6-dioxaheptanoic acid (NFDHA)	0.193	0.4	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-4-oxapentanoic acid (PFMPA)	0.062	0.4	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-5-oxahexanoic acid (PFMBA)	0.096	0.4	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-1-pentanesulfonate (PFPeS)	0.157	0.188	ug/kg
PFAS, EPA 1633 Target List	Soil	1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	0.595	0.75	ug/kg
PFAS, EPA 1633 Target List	Soil	HFPO-DA (Gen-X)	0.608	0.8	ug/kg
PFAS, EPA 1633 Target List	Soil	11CL-PF3OUdS	0.311	0.756	ug/kg
PFAS, EPA 1633 Target List	Soil	9CL-PF3ONS	0.246	0.748	ug/kg
PFAS, EPA 1633 Target List	Soil	ADONA	0.174	0.756	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorododecanesulfonic acid (PFDoS)	0.169	0.194	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-1-nonanesulfonic acid (PFNS)	0.124	0.192	ug/kg
PFAS, EPA 1633 Target List	Soil	3-Perfluoropropyl propanoic acid (FPrPA)	0.634	1	ug/kg
PFAS, EPA 1633 Target List	Soil	3-Perfluoropentyl propanoic acid (FPePA)	2.1	5	ug/kg
PFAS, EPA 1633 Target List	Soil	3-Perfluoroheptyl propanoic acid (FHpPA)	1.5	5	ug/kg
PFAS, EPA 1633 Target List	Soil	N-MeFOSE	0.611	2	ug/kg
PFAS, EPA 1633 Target List	Soil	N-MeFOSA	0.18	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	N-EtFOSE	0.697	2	ug/kg
PFAS, EPA 1633 Target List	Soil	N-EtFOSA	0.198	0.2	ug/kg
PFAS, EPA 1633 Target List	Water	Perfluorobutanesulfonic acid (PFBS)	0.47	1.77	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorohexanoic acid (PFHxA)	0.35	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoroheptanoic acid (PFHpA)	0.71	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorohexanesulfonic acid (PFHxS)	0.68	1.83	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorooctanoic acid (PFOA)	0.42	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorooctanesulfonic acid (PFOS)	0.82	1.86	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorononanoic acid (PFNA)	0.52	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorodecanoic acid (PFDA)	0.75	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoroundecanoic acid (PFUnA)	1.13	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorododecanoic acid (PFDoA)	0.88	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorotridecanoic acid (PFTrDA)	0.74	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorotetradecanoic acid (PFTA)	0.69	2	ng/L

Analysis	Matrix	Analyte	MDL	RL	Units
PFAS Compounds					
PFAS, EPA 1633 Target List	Water	N-MeFOSAA	0.79	2	ng/L
PFAS, EPA 1633 Target List	Water	N-EtFOSAA	1.03	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoropentanoic acid (PFPeA)	0.23	4	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-1-octanesulfonamide (FOSA)	0.88	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-1-heptanesulfonic acid (PFHpS)	0.91	1.91	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-1-decanesulfonic acid (PFDS)	1.32	1.93	ng/L
PFAS, EPA 1633 Target List	Water	1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	1.06	7.6	ng/L
PFAS, EPA 1633 Target List	Water	1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	2.05	7.68	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-n-butanoic acid (PFBA)	0.33	8	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	0.5	3.56	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-3,6-dioxaheptanoic acid (NFDHA)	2.14	4	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-4-oxapentanoic acid (PFMPA)	0.25	4	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-5-oxahexanoic acid (PFMBA)	0.37	4	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-1-pentanesulfonate (PFPeS)	0.76	1.88	ng/L
PFAS, EPA 1633 Target List	Water	1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	1.79	7.5	ng/L
PFAS, EPA 1633 Target List	Water	HFPO-DA (Gen-X)	3.23	8	ng/L
PFAS, EPA 1633 Target List	Water	11CL-PF3OUdS	1.38	7.56	ng/L
PFAS, EPA 1633 Target List	Water	9CL-PF3ONS	0.7	7.48	ng/L
PFAS, EPA 1633 Target List	Water	ADONA	0.53	7.56	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorododecanesulfonic acid (PFDoS)	0.93	1.94	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-1-nonanesulfonic acid (PFNS)	0.86	1.92	ng/L
PFAS, EPA 1633 Target List	Water	3-Perfluoropropyl propanoic acid (FPrPA)	2.03	5	ng/L
PFAS, EPA 1633 Target List	Water	3-Perfluoropentyl propanoic acid (FPePA)	7.33	25	ng/L
PFAS, EPA 1633 Target List	Water	3-Perfluoroheptyl propanoic acid (FHpPA)	9.47	25	ng/L
PFAS, EPA 1633 Target List	Water	N-MeFOSE	3.99	20	ng/L
PFAS, EPA 1633 Target List	Water	N-MeFOSA	1.58	2	ng/L
PFAS, EPA 1633 Target List	Water	N-EtFOSE	3.99	20	ng/L
PFAS, EPA 1633 Target List	Water	N-EtFOSA	1.8	2	ng/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1,1,2-Tetrachloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1,1-Trichloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1,2,2-Tetrachloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1,2-Trichloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1-Dichloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1-Dichloroethylene	0.025	0.025	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2,4-Trichlorobenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2,4-Trimethylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2-Dibromoethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2-Dichlorobenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2-Dichloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2-Dichloropropane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2-Dichlorotetrafluoroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,3,5-Trimethylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,3-Butadiene	0.3	0.3	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,3-Dichlorobenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,3-Dichloropropane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,4-Dichlorobenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,4-Dioxane	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	2-Butanone	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	2-Hexanone	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	3-Chloropropene	0.5	0.5	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	4-Methyl-2-pentanone	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Acetone	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Acrolein	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Acrylonitrile	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Benzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Benzyl chloride	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Bromodichloromethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Bromoform	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Bromomethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Carbon disulfide	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Carbon tetrachloride	0.025	0.025	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Chlorobenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Chloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Chloroform	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Chloromethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	cis-1,2-Dichloroethylene	0.025	0.025	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	cis-1,3-Dichloropropylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Cyclohexane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Dibromochloromethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Dichlorodifluoromethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Ethanol	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Ethyl acetate	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Ethyl Benzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Hexachlorobutadiene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Isopropanol	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Isopropylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Methyl Methacrylate	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Methyl tert-butyl ether (MTBE)	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Methylene chloride	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Naphthalene	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	n-Butylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	n-Heptane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	n-Hexane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	n-Propylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	o-Xylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	p- & m- Xylenes	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	p-Ethyltoluene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	p-Isopropyltoluene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Propylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	sec-Butylbenzene	0.1	0.1	ppbv

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Styrene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	tert-Butylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Tetrachloroethylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Tetrahydrofuran	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Toluene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	trans-1,2-Dichloroethylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	trans-1,3-Dichloropropylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Trichloroethylene	0.025	0.025	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Trichlorofluoromethane (Freon 11)	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Vinyl acetate	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Vinyl bromide	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Vinyl Chloride	0.05	0.05	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Xylenes, Total	0.3	0.3	ppbv

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA TO-15	VOA, TO15 Isooctane (2,2,4-TMP) Add On	Air	2,2,4-Trimethylpentane	0.025	0.05	ppbv

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	8270D 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 6020B, EPA 7470A	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/9012B	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					
		Part 375 + TCL PCBs	EPA 8082A	Cool to 4°C		7 days to extract, 40 days after extraction to analysis					
		Per- and polyfluoroalykl substances (PFAS)	EPA 537(M) Rev 1.1	Cool to 4°C, Trizma	One 8-oz pre-certified PFAS-free plastic container	14 days	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	NA	NA	1 per 20 samples (minimum 1)

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 En Core Samplers (separate container for % solids)	48 hours after sampling if samples are not frozen to -7° C, 14 days after extraction to analysis	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			NA		
		Part 375 + TAL Metals	EPA 6010D, EPA 7471B, EPA 7196A, EPA 9010C/9012B	Cool to 4°C	2 oz. amber glass jar	6 months, except mercury 28 days					
		Hexavalent Chromium	EPA 7196A	Cool to 4°C	4 oz. amber glass jar	30 days					
		Cyanide	EPA 9010C/9012B	Cool to 4°C	8 oz. amber glass jar	14 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	8 oz. amber glass jar	14 days					
		Part 375 + TCL PCBs	EPA 8082A	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Per- and polyfluoroalykl substances (PFAS)	EPA 537(M) Rev 1.1	Cool to 4°C, Trizma	Two 250 mL high density polyethylene (HDPE) bottles	14 days					
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)	NA	NA	1 per 10 samples (minimum 1)	NA
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)	NA	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
6. ORP - Oxidation-reduction-potential
7. NA - Not applicable

ATTACHMENT D

SAMPLE NOMENCLATURE STANDARD OPERATING PROCEDURE

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

PERFLUORINATED COMPOUND SAMPLING
PROTOCOL AND SOP

SOP #19: BEST PRACTICES FOR PFAS SAMPLING OF GROUNDWATER – APRIL 2019

This discussion is about best practices to assist you in groundwater sampling for Per- and Poly-Fluoro Alkyl Substances (PFAS). The current discussion surrounding PFAS sampling is long on assumption and short on research. As such, the best guidance is a discussion of best practices. Please review PFAS Sampling Best Practices (PFAS-SBP) in planning and implementing PFAS sampling activities. As more information becomes available, this best practices document will be updated. Be sure you are reviewing the most recent version when planning PFAS sampling activities. Copies of best practices will be stored on the server at \\langan.com\data\NYC\other\environmental group\SOPs\12 Low Flow Groundwater Sampling\PFAS Best Practices.

This version of PFAS-SBP will briefly discuss field safety and personal protection equipment (PPE), clothing and personal hygiene, sampling equipment, sampling documentation and labeling, and sampling procedure:

Safety:

Staff safety is still paramount. The following equipment must be donned at PFAS sampling events – no exceptions.

- All sites
  - Safety Glasses
  - Powderless Nitrile (no latex)
  - Safety Shoes – Note that safety shoes are commonly treated to be water-resistant or water proof with a PFAS type material, therefore, staff must don natural rubber overboots.



Figure 1 ONGUARD Disposable Natural Rubber Overshoe (Part No. 97591LG00 [large])[1]

[1] Available in the environmental closet

- Construction Sites
    - Langan Hardhat
    - Langan reflective vest (yellow reflective jacket not permitted for PFAS sampling)
    - Hearing protection as required.

Clothing and Personal Hygiene

As a first approximation, any clothing advertised as waterproof, water-repellant, or dirt and/or stain resistant should not be donned for PFAS sampling activities. In addition, clothing designed to block ultraviolet protection should also be avoided. Fabric Softeners and ant-static ingredients in clothing detergents should also be avoided.

Clothing from synthetic and natural fibers (cotton) are acceptable, as a precaution, do not wear new clothing into the field. Plain uncoated Tyvek™ is acceptable for use when sampling as it does not contain PFAS. Coated Tyvek™ is not acceptable as the suits are usually treated with PFAS type material unless deemed necessary with no alternative PPE from a health and safety perspective.

When sampling in cold weather, consider layers for warmth since most jackets are treated with waterproofing material. However, in the event of wet weather, please use the PVC rain gear (e.g. River City Garment 3-piece Rain Gear 35mm PVC/polyester suits [Part no. 5500009600 {large}]).[2]

The literature abounds with differing recommendations regarding personal hygiene products. In general, avoid hair and body wash products that include conditioning agents. Most important, if you have long hair, pin it back to avoid having to touch your hair with your hands during sampling activities.

There is a limited number of products available to meet field insect repellent (insect repellent with Deet or derived from100% organic ingredients) and sunscreen requirement when sampling for PFAS. A list of suitable products will be provided as they become available. When using approved insect repellent and sunscreen products, be sure to apply away from the sampling area and to wash your hands after applying.

As a side note, do not eat or consume beverages during sampling activities. When drinking beverages to avoid dehydration, do so away from the sampling area and remove your nitrile gloves. Don a new set of gloves after consuming the beverage. Consume all meals away from the sampling area, use wax paper where possible to wrap your meal. If purchasing your meal,

[2] Available in the environmental closet

consume off-site and wash your hand thoroughly after your meal to prevent transference of potential PFAS compounds from food packaging.

Sampling Equipment

- Pumps – In general, pumps (and other sampling equipment including the Solinst interface probe) having parts containing fluoropolymer and should be avoided where possible. The following pumps are acceptable.
    - Peristaltic is the best option when depth to water is less than 20-feet.
    - Bladder pumps (QED Sample Pro, or equivalent[3]) are the only currently available option to sample for PFAS when depth to water is greater than 20-feet.
    - Inertial pumps (Waterra, or equivalent) while suitable for PFAS sampling are not to be used because they are very difficult to operate within the proscribed flow rate defined in low flow sampling guidances. They also are unsuitable for VOC sampling if the sampling plan is coupled with traditional analytes.
    - *Three are no other submersible pumps (including Monsoon pumps) that have preliminary data to substantiate being PFAS-free and are readily available*.
- Tubing – In general, tubing containing fluoropolymers are prohibited.
    - Silicon tubing if permitted
    - High-density polyethylene (HDPE) tubing is permitted
    - Low-density polyethylene (LDPE) tubing is permissible by the US Navy and a limited number of other agencies (Michigan) but is still considered questionable by many state and local authorities including the NYSDEC. Therefore, its use should only be considered when an alternative is not available and prior approval from project managers and potentially regulators may be necessary. Further additional QA/QC samples are suggested when using this material.
- Note passive samples such as HydraSleeve samplers (made from LDPE) may be an option; however, regulatory approval should be obtained prior to sampling and may require additional QA/QC to prove they do not bias or effect sample results.
- If a piece of equipment containing fluoropolymer parts must be used (depth to water probes or interface probes (e.g. Solinst) or an acceptable alternative cannot be found, an equipment blank of that piece of equipment should be submitted for analysis as a QA/QC measure.

Sampling Documentation and Labeling

Documentation remains extremely important. There are general rules that apply to PFAS sampling:

[3] QED has provided company run test results demonstrating the Sample Pro is PFAS-free, currently there is no independent testing on sampling equipment. Only use pumps that have some laboratory basis for being PFAS-free.

- Use ballpoint pens and pencils to complete labels and record field notes. There is no consensus of Sharpie® markers, therefore, avoid completing labels with anything but ballpoint pens.
- Aluminum, Masonite and polypropylene (including Langan) clipboards are suitable for holding loose papers.
- There is no consensus around the suitability of "Rite-in-Rain"™ notebooks on PFAS sampling sites. Some states including Michigan do permit them but not the U.S. Navy. Until further information is available, do not use any types of waterproof field books during PFAS sampling. If you have a field map anointed with post-its, transfer the information to the map. Post-it, or any other adhesive paper pad is not suitable for PFAS sampling sites. Only use loose paper for written note taking.
- Standard practice should be to use a Langan tablet with the low flow sampling spreadsheet preloaded. It is recommended that you print out a number of hard copies of the spreadsheet should the tablet fail.
- Use lab supplied labels only.

Sampling Procedure

Langan will follow standard low flow procedures and stability criteria when sampling for PFAS. This applies to those sampling events where only PFAS is being evaluated as well as when traditional sampling follows PFAS sampling. Note that when doing combined sampling events (PFAS and traditional analytes), sample for PFAS first. Where possible every effort should be made to use disposal and dedicated equipment for each sample location to avoid potential cross contamination and limit errors and issues from inadequate decontamination between samples.

Gauging

Gauging data will not be collected on monitoring wells subject to PFAS sampling. As stated, the Solinst interface probe is not suitable for gauging depth to water during PFAS sampling. However, prior to the field event, field staff, senior staff and the PM will discuss an alternative strategy to collect site wide synoptic groundwater gauging data after PFAS sampling is completed.

Decon Station

Use the three bucket procedure for decontaminating the bladder pump prior to sampling the first monitoring well and directly before each subsequent well. All the buckets should be filled with DI water supplied by the lab and confirmed to be PFAS-free. In some instances, the lab may be unable or unwilling to supply the quantities of PFAS-free water necessary for

decontamination. If the lab will not supply the volume required, use the DI water supplied by Pine and submit a blank analysis of the decon water with your QA/QC samples. Alconox®, Liquinox® or Citranox® are the only decontamination solutions currently cleared for sampling PFAS. On sites where PFAS sampling is scheduled over multiple days, have enough proper decon water to mix a new solution each day. Decontaminating the night before is not acceptable.

Ideally, the decon station should be set up on thin plastic sheeting; but the only material available is LDPE. As such, the best practice is to lay out the LDPE sheet, then cover the work area with clean cotton rags (environmental closet) to place the decontaminated bladder pump on. Avoid placing the pump or any of its parts directly on the plastic. Also submit a rinse sample - separate from the field blank, with your QA/QC samples.

Sampling Set Up

At each step during set up and sampling, best practices require changing nitrile gloves between each step. Remember, any time you do something out of procedure such as writing a field note, answering the phone or pushing your hair aside, you risk transference unless you change gloves.

Stage the pump supporting equipment (compressor, battery, etc.), buckets, water quality meter (Horiba), lab coolers and other equipment at least 5-feet away from the open wellhead. Do not stage any unnecessary equipment or cases near the wellhead during sampling. If it isn't directly related to sampling the well in question, leave it staged in a central area away from the wellheads.

When inserting the tubing into the well, it's important to keep the tubing that will come in contact with the water table from coming into contact with the surrounding platform (concrete/asphalt/soil apron around the well) which can serve as a source of transference. This is especially difficult when using HDPE tubing. The best method is to patiently unroll off your arm into the well. Use PVC cutters to cut the tubing.

Connect the tubing to the water quality meter through a bridge of silicon tubing. This will give a bit of extra flexibility in setting up, especially on cold days.

Stability

There are two important items to remember during the period when you are tracking stability:

- Do not allow the pump to stop, backflow from the water quality meter can pose a

significant risk of cross contamination. If you must shut down, disconnect the pump to water quality meter feed line before turning off the pump.

- While you can fill out the labels (remember to change gloves), do not set up the sample bottles until you are ready to sample.

Sampling

- Once stability is achieved (or an hour has passed), change gloves again, then pull the pump to water quality meter tubing from the water quality meter, change gloves and begin collecting the samples.
- At a minimum, the PFAS sample bottles must be filled to container neck. Do not under fill.



- After sampling groundwater, you can allow the tubing to discharge to a bucket while you set up for PFAS field blanks. Change gloves, then prepare the field blanks.
    - Transfer the reagent water from the filled plastic container to the field blank container;
    - Both the empty Reagent Water container and the filled Field Blank container must be returned to the lab along with the samples taken.
- If the work plan is for sampling the standard suite of analytes (VOCs, SVOCs, etc.), then commence collecting those samples after completing the PFAS and PFAS field blank sampling.

Post Sampling

Place all disposable sampling material (tubing, discarded gloves, etc.) in a heavy duty garbage bag (environmental closet). Move pump to decon area. If using a bladder pump, decontaminate per instructions above. If using a peristaltic pump, change the silicon pump tubing using a new set of nitrile gloves. Then proceed to the next monitoring well location.

SOP 18 – BEST PRACTICES FOR PFAS SAMPLING IN SOIL – APRIL 2019

This discussion is about best practices to assist you in soil sampling for Per- and Poly-Fluoro Alkyl Substances (PFAS). Similar to groundwater sampling for PFAS, the current discussion surrounding PFAS sampling is long on assumption and short on research. As such, the best guidance is a discussion of best practices. Please review PFAS Sampling Best Practices (PFAS-SBP) in planning and implementing PFAS sampling activities. As more information becomes available, this best practices document will be updated. Be sure you are reviewing the most recent version when planning PFAS sampling activities. Copies of best practices will be stored on the server at \\langan.com\data\NYC\other\environmental group\SOPs\19 Best Practices for PFAS Sampling Soil.

This version of PFAS-SBP will briefly discuss field safety and personal protection equipment (PPE), clothing and personal hygiene, sampling equipment, sampling documentation and labeling, and sampling procedure:

Safety:

Staff safety is still paramount. The following equipment must be donned at PFAS sampling events – no exceptions.

- All sites
  - Safety Glasses
  - Powderless Nitrile (no latex)
  - Safety Shoes – Note that safety shoes are commonly treated to be water-resistant or water proof with a PFAS type material, therefore, staff must don natural rubber overboots.



Figure 1 ONGUARD Disposable Natural Rubber Overshoe (Part No. 97591LG00 [large])

- Construction Sites

[1] Available in the environmental closet

- Langan Hardhat
- Langan reflective vest, avoid yellow reflective jacket)
- Hearing protection as required.

Daily field notes should list the PPE donned when soil sampling.

Clothing and Personal Hygiene

As a first approximation, any clothing advertised as waterproof, water-repellant, or dirt and/or stain resistant should not be donned for PFAS sampling activities. In addition, clothing designed to block ultraviolet protection should also be avoided. Fabric Softeners and ant-static ingredients in clothing detergents should also be avoided.

Clothing from synthetic and natural fibers (cotton) are acceptable, as a precaution, do not wear new clothing into the field. Plain uncoated Tyvek™ is acceptable for use when sampling as it does not contain PFAS. Coated Tyvek™ is not acceptable as the suits are usually treated with PFAS type material unless deemed necessary with no alternative PPE from a health and safety perspective.

When sampling in cold weather, consider layers for warmth since most jackets are treated with waterproofing material. However, in the event of wet weather, please use the PVC rain gear (e.g. River City Garment 3-piece Rain Gear 35mm PVC/polyester suits [Part no. 5500009600 {large}]).[2]

The literature abounds with differing recommendations regarding personal hygiene products. In general, avoid hair and body wash products that include conditioning agents. Most important, if you have long hair, pin it back to avoid having to touch your hair with your hands during sampling activities.

There is a limited number of insect repellent and sunscreen products available in the marketplace that are suitable to don when sampling for PFAS. As of now, insect repellent with Deet or derived from100% organic ingredients material and water repellent sunscreen (as opposed to those advertised as withstanding a dip in a pool or will not succumb to sweat) are suitable for field work. A list of suitable products will be provided as they become available. When using approved insect repellent and sunscreen products, be sure to apply away from the sampling area and to wash your hands after applying.

As a side note, do not eat or consume beverages during sampling activities. When drinking

[2] Available in the environmental closet

beverages to avoid dehydration, do so away from the sampling area and remove your nitrile gloves. Don a new set of gloves after consuming the beverage. Consume all meals away from the sampling area, use wax paper where possible to wrap your meal. If purchasing your meal, consume off-site and wash your hand thoroughly after your meal to prevent transference of potential PFAS compounds from food packaging.

Drilling/Excavation Equipment

The principal of preventing cross contamination and the greatest challenge to sampling soil for PFAS compounds is the field practices of the drilling or excavation contractor. Currently, literature searches have not yielded insights into soil sampling for PFAS compounds. There is an equally lack of information on potential interference drilling and excavation practices can impact on PFAS analytical data. As such, the approach with regards to the drilling or excavation contractor is to insure they rigorously follow the approved decontamination practice. Attempting to implement additional controls on the drillers and excavation contractor at this time without significant independent assessment or refereed literature will undoubtable added significant additional cost with little substantiated benefit. Langan should modify the quality assurance/quality control (QA/QC) sampling to provide a context for assessing the resulting analytical PFAS soil data.

Sampling Equipment

When sampling soil for PFAS compounds, Langan's responsibility is to initiate a soil sampling protocol that prevents the cross contamination of soil from the moment the open direct push liner or split spoon is put under the field staff's preview. The bullets below specify several key components:

- Langan field staff should change out nitrile gloves with each liner;
- The putty knife or other tool being used in assessing volatile organic compounds (VOCs) in soil by creating a slice in the sample soil column must be thoroughly decontaminated with each liner;
- Prior to further disturbance of the recovered soil column for soil description, the grab sample for volatile organic compounds (VOCs) should be collected from that segment of the soil sample column exhibiting the highest PID in accordance with the requirements of the work plan;
- In addition and also prior to further disturbance of the recovered soil compound, the soil samples being submitted for analysis of PFAS compounds should be collected in such a manner that it doesn't include samples previously disturbed for assessing PID or collecting the grab samples for VOCs. Remember to follow the requirements of the work plan. Note that the sampler should change out nitrile gloves between collected

the grab sample for VOCs and the collecting the sample for PFAS.

- After collecting the grab sample for VOCs and the sample for PFAS compounds, Langan staff may proceed with the detail soil identification following Langan standards outlined in the Langan Field Investigation and Sampling Manual and instructions given in the Soil Identification Practical training; and
- After completing the soil identification description, Langan staff may proceed with collecting the remaining require soil samples in accordance with the work plan.

Sampling Documentation and Labeling

Documentation remains extremely important. There are general rules that apply to PFAS sampling:

- Use ballpoint pens and pencils to complete labels and record field notes. There is no consensus of Sharpie® markers, therefore, avoid completing labels with anything but ballpoint pens;
- Aluminum, Masonite and polypropylene (including Langan) clipboards are suitable for holding loose papers;
- There is no consensus around the suitability of "Rite-in-Rain"™ notebooks on PFAS sampling sites. Some states including Michigan do permit them but not the U.S. Navy. Until further information is available, avoid completing filling out any types of waterproof field books in the vicinity of the PFAS sampling. If you have a field map anointed with post-its, transfer the information to the map. Post-it, or any other adhesive paper pad is not suitable for PFAS sampling sites. Only use loose paper for written note taking; and
- Use lab supplied labels only.

Quality Assurance/Quality Control Sampling

A critical factor in understanding the soil analytical PFAS data is to gauge the possibility of interference. As such, the QA/QC requirements as they pertain to soil sampling might require modification. Best practices recommends the following:

- Duplicate soil samples for PFAS should be collected at the same rate as duplicate sampling for other parameters;
- Spike Matrix Sampling and Duplicate Spiked Matrix sampling should be collected at the same rate as similar sampling for other parameters;
- Separate PFAS Field Blanks should be incorporated into the Soil Field Blank Sampling program;
- The source of the driller rinse water (truck mounted tank or local water supply faucet)

should be sampled for PFAS analysis;

- A rinse sample collected from the cutting head of the sampling equipment should be collected for PFAS analysis following decontamination;
- The source of rinse water for the Langan decontamination process should also be collected for PFAS analysis;
- A rinse sample collected from the tool used to manipulate soil samples during PID assessment should also be submitted for PFAS analysis; and
- When preparing the PFAS field blank sample, remember to change gloves, then prepare the field blanks.
    - Transfer the reagent water from the filled plastic container to the field blank container;
    - Both the empty Reagent Water container and the filled Field Blank container must be returned to the lab along with the samples taken.

Post Sampling

Place all disposable sampling material in a heavy duty garbage bag (environmental closet). Move reusable sampling equipment to the decon staging area. Decontaminate per instructions above. Then proceed to the next soil sampling location.

APPENDIX I
PROJECT PERSONNEL RESUMES

GERALD F. NICHOLLS, PE, CHMM

ASSOCIATE PRINCIPAL

ENVIRONMENTAL ENGINEERING & HAZARDOUS MATERIALS MANAGMENT

Mr. Nicholls' 20 years of expertise includes management of remediation and site investigations, litigation support, expert services, brownfield cleanups, remedial design, industrial hygiene, for projects throughout New York and New Jersey. He works closely with various private, state, commercial, industrial, and municipal clients, acting as a liaison between the client and project team.

In 2019, Real Estate Weekly named Mr. Nicholls one of the Rising Stars of Real Estate.

SELECTED PROJECTS

- Willets Point Development, Brownfield Cleanup Program, Flushing, NY
- 491 Wortman Ave, Air Sparge/Soil Vapor Extraction Design and Implementation, Brownfield Cleanup Program, Bid Documents, Construction Administration, Brooklyn, NY
- Whitehead Realty, Acme Sites, DNAPL Delineation, Site Characterization, Remedial Investigation and Reporting, Brooklyn, NY
- West 17th Street Development, DNAPL Assessment, DNAPL Recovery, Remedial Design, Closure through Brownfield Cleanup Program, Remediation Oversight, Bid Documents, ISS and Containment Wall Design, Construction Administration, New York, NY
- 2 Ingraham Street, Brooklyn, NY
- New York City School Construction Authority On-Call Contract for Hazmat Consulting Services, Various Locations, Five Boroughs of New York, NY
- G4 Capital third party due diligence reviews and environmental risk evaluations, Various Locations, New York, NY
- 140 6th Avenue, Sub-Membrane Depressurization System Design, Spill Remediation, Subslab Remediation and Monitoring Well Piping Design, Remediation Oversight, and Construction Administration, New York, NY
- Gowanus Canal Northside, Demolition and Decommissioning of MOSF, Remediation Investigation, Brownfield Cleanup Program, Brooklyn, NY
- 23-01 42nd Road, Phase I, Phase II Remedial Investigation, Remedial Action Work Plan, Sub-Membrane Depressurization System Design, Underground Storage Tank Closure and Remediation, Brownfield Cleanup Program, Remediation Oversight, Construction Administration, Long Island City, NY
- 23-10 Queens Plaza South, Phase I, Phase II Remedial Investigation, Remedial Action Work Plan, Sub-Membrane Depressurization System Design, Underground Storage Tank Closure and



EDUCATION

M.S., Environmental Engineering
New Jersey Institute of Technology

B.S., Chemistry and Environmental Studies (Double Major)
Ursinus College

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

Certified Hazardous Materials Manager (CHMM)

AFFILIATIONS

Real Estate Board New York

City of Jersey City Environmental Commission, Former Commissioner, Vice Chair and Chair

Alliance of Hazardous Materials Professionals

American Chemical Society

New York League of Conservation Voters

New York City Brownfield Partnership

LANGAN

Remediation, Brownfield Cleanup Program, Remediation Oversight, Construction Administration, Long Island City, NY

- 163 6th Street, Phase I and Phase II Due Diligence, Spill Response, Remedial Action Work Plan, Brooklyn, NY
- 170 Amsterdam Avenue, Remedial Action Work Plan, Voluntary Cleanup Program, Remediation Oversight, Construction Administration, New York, NY
- Urban Health Plan, Medical Building, DNAPL Delineation, Remedial Action Work Plan, Hazardous Waste Management and Minimization, Brownfield Cleanup Program, Bronx, NY
- Second Avenue Subway, Air Monitoring and Ventilated Air Treatment Program, New York, NY
- New York University Spill Sites, 4 Washington Square Village, 7-13, Washington Square North, and 251 Mercer Street, Fuel Oil Spill Cleanup and Closure, New York, NY
- Dormitory Authority of New York (DASNY), City College of New York, Fuel Protection and Leak Detection System Repair and Upgrades, New York, NY
- 45 Broad Street, Waste Characterization, Construction Documents, New York, NY
- 241 West 28th Street, New York, NY
- Surfactant Remediation Project, In-Situ Chemical Oxidation Design and Implementation and Site Closure, Margate City, NJ
- Koppers Site, Trans-Hudson Express Project, Kearny, NJ
- Former Cornell Manufacturing Site, Orangeburg, NY
- Horse Pasture Site, Robins Air Force Base, GA
- Williams Air Force Base, Thermal Enhanced Extraction, Mesa, AZ
- New Jersey Transit, 32nd Street Station Stop (former Hicor Site), Bayonne, NJ
- Nikolski Radio Relay Station, Umnak Island, AK
- Middletown Post Office, Due Diligence, Middletown, NY
- Lower Manhattan Construction Command Center, Environmental Services Contract, New York, NY
- Da Nang International Airport, Da Nang, Vietnam
- 22nd to 8th Street Station Light Rail Extension, Bayonne, NJ
- 69th Street Grade Separation Project, North Bergen, NJ
- Dukes Parkway Landfill, Hillsboro/Manville, NJ
- NYU Langone Medical Center, New Science Building, Remediation Oversight and Construction Administration, Voluntary Cleanup Program, New York, NY
- 86 Warren Street, Waste Characterization and Construction Documents, New York, NY
- 459 Smith Street and Gowanus Green, Due Diligence and Cost Estimating, Brooklyn, NY
- 111 Leroy Street, New York, NY
- 411 Broadway, Phase I, Remedial Investigation, Air/Noise Coordination for E-Designation, New York, NY
- Modera on the Hudson, Remediation Oversight, Remedial Action Work Plan, Submembrane Depressurization System Design, Yonkers, NY
- Honeywell Quanta, Remedial Design Peer Review, Edgewater, NJ
- New York University Tandon School of Engineering (Spill 1009933), Remediation, Laser-Induced Fluorescence Investigation, Remedial System Optimization, Product Recovery, Spill Cleanup, Brooklyn, NY

Gowanus Canal Conservancy, Board of Directors

- 237-261 North 9th Street, Peer Review and Due Diligence, Brooklyn, 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.

”Biodegradation Pathways and End Products of Sodium Dioctyl Sulfosuccinate/Sodium Hexadecyl Diphenyl Oxide Disulfonate Surfactant Solution.” Florida Remediation Conference, Orlando, Florida, November 2005.

RYAN MANDERBACH, CHMM

ASSOCIATE PRINCIPAL

ENVIRONMENTAL ENGINEERING & SITE ASSESSMENTS

Mr. Manderbach has experience in New York, New Jersey, Massachusetts, Maine, Rhode Island, New Hampshire, and Connecticut. His recent experience includes New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup, Voluntary Cleanup and Spill Programs, and New York City Office of Environmental Remediation (OER) E-designated site investigation, and remediation. He has managed and performed Phase I and II Environmental Site Assessments; Underground Storage Tank (UST) removals and closures; soil vapor intrusion investigations; and site investigations and remediation. He also has extensive experience with Hazard Ranking System (HRS) evaluations, site assessments, removal actions, and emergency response activities under the EPA Regions I and II Superfund program.



SELECTED PROJECTS

- Brownfield Redevelopment, 520 West 41st Street, New York, NY
- Waterline Square, Mixed-Use Development, New York, NY
- Brownfield Redevelopment, 267-273 West 87th Street, New York, NY
- Brownfield Redevelopment, 225 33rd Street, Brooklyn, NY
- River Place Residential, SMP Implementation, New York, NY
- Mixed-Use Educational/Residential Development, New York, NY
- Public Safety Answering Center (PSAC) II, Bronx, NY
- American Copper Buildings (616 First Avenue), New York, NY
- Environmental Assessments at 430 East 92nd Street, New York, NY
- Environmental Assessments at 125th Street and Lenox, New York, NY
- Hotel at 70 Park Avenue, New York, NY
- Environmental Due Diligence at Mixed-Use Development, 85 Jay Street, Brooklyn, NY
- 346 Broadway Due Diligence, New York, NY
- Liberty Brass Site, 38-01 Queens Boulevard, Long Island City, NY
- Environmental Remediation, 42 West Street Residential, Brooklyn, NY
- Brownfield Redevelopment, 335 Bond Street, Brooklyn, NY
- Residences at 540 West 21st Street, New York, NY
- International Leadership Bronx Charter School, Bronx, NY
- President Street Properties, Brooklyn, NY
- Residential Development, 43-30 24th Street, Long Island City, NY
- Mixed-Use Condominium, 505-513 West 43rd Street, New York, NY
- 685 First Avenue, New York, NY
- Columbia University, Manhattanville Development, New York, NY
- The Shops at Atlas Park, Glendale, NY
- 536 West 41st Street, New York, NY
- 100 West 125th Street, New York, NY
- 11 North Moore Street, New York, NY
- 290 West Street, New York, NY

EDUCATION

B.A., Environmental Analysis and Policy
Boston University

PROFESSIONAL REGISTRATION

Certified Hazardous Materials Manager (CHMM)

40 Hour HAZWOPER

AFFILIATIONS

New York Building Congress (NYBC), Young Professionals Committee

American Council of Engineering Companies of New York (ACEC NY) – Emerging Leaders Committee

- City University of New York (CUNY), John Jay College Expansion, New York, NY
- Queens West Development, Long Island City, NY
- United Nations Capital Master Plan, New York, NY
- Former Air Products and Chemicals, Inc. Facility, Middlesex, NJ
- Lower Manhattan Indoor Dust Test and Clean Program, New York, NY
- Former Buckbee-Mears Facility, Cortland, NY
- Old Landfill, Norton, MA
- Boulter Farm Area, Cumberland, RI
- Hollingsworth & Vose Co., Walpole, MA
- Chlor-Alkali Facility (Former), Berlin, NH
- Limerick Mill Complex, Limerick, ME
- Danielson Pike Chlorinated Solvent Sites, Scituate, RI
- Tiogue Lake Sediment Contamination Site, Coventry, RI
- Atlas Copco Sites, Holyoke, MA
- Fisherville Mill, Grafton MA
- Hurricane Katrina Federal Disaster Response, New Orleans, LA
- Hurricane Ike Federal Disaster Response, Pasadena, TX
- 1752 Shore Parkway, Brooklyn, NY
- 27 Wooster Street, Residential Building, New York, NY
- Innovation QNS, Mixed-Use Development, Astoria, NY
- 42 West Street, Brooklyn, NY

JENNIFER ARMSTRONG, LEED AP

SENIOR PROJECT SCIENTIST

ENVIRONMENTAL SCIENTIST & REMEDIAL OVERSIGHT

Ms. Armstrong has experience working on environmental projects in New York. She has conducted Phase I and II Environmental Site Assessments, remedial investigations, soil vapor and indoor air quality surveys, and waste characterization investigations. She has also developed remedial investigation and remedial action work plans and managed groundwater monitoring programs. Her field experience includes soil, soil vapor, and groundwater sampling, indoor air investigations, remedial excavation oversight, and Community Air Monitoring Program (CAMP) management. Ms. Armstrong also has several years of experience in evaluating asbestos consultants and contractors.



SELECTED PROJECTS

- Highline 131410, Phase I ESA and Phase II ESI, Hotel Development, New York, NY
- NYC School Construction Authority, Phase I ESAs for Various Sites, New York, NY
- Freshkills Landfill, Public Relations, and Operations and Maintenance Plan Preparation Staten Island, NY
- Distribution Facility, Phase I & Phase II ESA and Regulatory Compliance, Bohemia, 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
- Huntington Station Superfund Due Diligence, Huntington Station, NY
- 144-150 Barrow Street, BCP Management, New York, NY
- 538-540 Hudson Street, BCP Management, New York, NY
- 572 Eleventh Avenue, City VCP Management, New York, NY
- 156-162 Perry Street, BCP Program Management, New York, NY
- Mail Distribution Facility at 57th Avenue, Capping Plan and Implementation, Long Island City, NY
- SJM Storage, 607 West 47th Street, E-designated Site Management, New York, NY
- Con Edison, Spill Delineation and Product Recovery, Governors Island, NY
- Consolidated Edison, Groundwater Sampling and Monitoring Reports, Governors Island, New York, NY
- Gowanus Village, Various Locations, Brooklyn, NY
- West & Watts Development, Phase I and II Environmental, Waste Characterization, and BCP Management, New York, NY
- ACME Greenpoint, Various Locations, Brooklyn, NY
- Consolidated Edison, Atlantic Ave Station, Brooklyn, NY
- CUNY John Jay College Expansion, CAMP Management, New York, NY
- Pelham Plaza, MGP Remediation Oversight, Pelham Manor, NY

EDUCATION

B.S., Environmental Science
Marist College

PROFESSIONAL REGISTRATION

LEED Accredited Professional (LEED AP)

Certified Hazardous Materials Manager

AFFILIATIONS

United States Green Building Council

Urban Land Institute

- Con Edison East 74th Street Steam Generation Plant, Remediation Investigations, New York, NY
- MODA Apartments, Waste Characterization, and Remediation Oversight, Jamaica, NY
- Bronx Terminal Market, Oversight for Remedial Excavation and Backfilling Bronx, NY
- Pier 4, Spill Remediation Oversight, Bronx, NY
- 40 Bond Street, Site Management Planning, New York, NY
- Bronx Mental Health Redevelopment, Phase I ESA, Bronx, NY
- Silvercup West, Brownfield Program Application and Waste Characterization Investigation, Long Island City, NY
- Foxgate/MREC, Due Diligence and Solid Waste Compliance, Central Islip, NY
- Garvies Point Bulkhead, Glen Cove, NY
- Johnson & Hoffman Metal Stamping Facility, Environmental Compliance, Carle Place, NY

WILLIAM BOHRER, PG

SENIOR 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

KRISTEN WEXLER

PROJECT SCIENTIST

ENVIRONMENTAL ENGINEERING

Ms. Wexler is an environmental scientist with four years of experience working within the environmental consulting industry in New York City and throughout the state of New York. She is experienced in Phase I Environmental Site Assessments, field investigation implementation and coordination, spill delineation, construction oversight, CAMP, underground storage tank removals, erosion and sediment control inspections, on-site subcontractor management, and utilization of AutoCAD software. She holds experience working at commercial, industrial, municipal, and undeveloped sites within the state of New York.



SELECTED PROJECTS

- Alafia/Brooklyn Development Center, Brooklyn, NY
- 362 West 125th Street, Construction Oversight and CAMP, New York, NY
- 320 West Fordham Road, New York, NY
- NYU 181 Mercer Street, Construction Oversight and CAMP, New York, NY
- Bronx Point, Drilling/Sampling, Reporting, Construction Oversight, and CAMP, Bronx, NY
- 540 West 21st Street, Construction Oversight and CAMP, New York, NY
- 261 Walton Avenue, Brownfield Cleanup Program Investigation, Bronx, NY
- Confidential Projects, Phase I Environmental Site Assessments, Various Locations, NY
- 461 River Road, Underground Storage Tank Removal and Tank Closure, Glenmont, NY
- Warehouse Lane, Underground Tank Removal, Elmsford, NY
- 111 Washington Street, Remedial Investigation, Brownfield Cleanup Program, Spill Delineation, Remedial Reporting, New York, NY
- Confidential Project, GIS Data Mapping, Long Island, NY
- Jamaica Bay Landing, Remedial Action Plan, Construction Oversight, Brooklyn, NY

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

Wexler, K., "The invasive tunicate, Styela clava, as an ecosystem engineering Long Island Sound", Coastal and Estuarine Research Federation 24th Biennial Conference, 2017, Providence, RI

EDUCATION

M.S., Environmental Science
(Environmental Ecology Concentration)
University of New Haven

B.S., Marine Biology
B.S., Environmental Science
(Chemistry Minor)
University of New Haven

PROFESSIONAL REGISTRATION

40-Hour OSHA HAZWOPER

10-Hour OSHA

NYSDEC Erosion and Sediment Control (SWPPP Inspector)

FARIELLE BRAZIER

SENIOR STAFF ENGINEER

ENVIRONMENTAL ENGINEERING

Ms. Brazier is a senior staff engineer with experience in construction oversight, air quality screening, soil logging and characterization, ground water sampling, and sub-slab/soil vapor sampling. She also has experience assisting with the preparation of technical reports and specifications.



SELECTED PROJECTS

- 145 Wolcott Street, Brooklyn, NY
- 80 Flatbush Avenue, Brooklyn, NY
- 1525 Bedford Avenue, Brooklyn, NY
- 126 Nassau Street, New York, NY
- Astoria Steel, Astoria, NY
- 156-162 Perry Street, New York, NY
- Design of Southpoint Seawalls, Roosevelt Island, NY
- 64 Norfolk Street, New York, NY

EDUCATION

M.S., Bio-Environmental Engineering
Rutgers University

B.S., Bio-Environmental Engineering
Rutgers University

PROFESSIONAL REGISTRATIONS

OSHA 40-Hour HAZWOPER

OSHA 10-Hour Construction

APPENDIX J
REMEDIAL ACTION CONSTRUCTION SCHEDULE

Appendix J
Remedial Action Work Plan
Remediation Action Construction Schedule

The Beacon - 413 East 120th Street
New York, New York
NYSDEC BCP Site No. C231155
Langan Project No.: 170745301

		2025						2026												2027						
Item	**Action**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**
1	RAWP - Preparation and Submittal				■	■	■	■																		
2	RAWP - NYSDEC Review and Public Comment Period							■	■	■	■															
3	Issuance of Decision Document										■	■	■													
4	Preparation of Construction Drawings	■	■	■	■	■	■	■	■	■																
5	Partial Building Demolition													■	■											
6	Implement RAWP Concurrent with Construction													■	■	■	■	■	■	■						
7	Track 4 SMP Preparation and Submittal																		■	■	■	■				
8	FER Preparation and Submittal																		■	■	■	■				
9	Track 4 SMP Review and Approval																					■	■	■	■	
10	FER Review and Approval																					■	■	■	■	
10	Certificate of Completion																								■	■

Notes:
RAWP: Remedial Action Work Plan
NYSDEC: New York State Department of Environmental Conservation
FER: Final Engineering Report