January 15, 2026

Attn: Wendi Zheng
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

Re: Treatability Study Work Plan
Willets Point Development L-Parcel
Queens, New York
BCP Site No. C241146H
Langan Project No. 170197605

Dear Ms. Zheng,

This Treatability Study Work Plan (TSWP) was prepared by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) on behalf of Queens Development Group, LLC; QDG Hotel Partners, LLC; QDG 126th Street Partners, LLC; QDG Parking Partners, LLC; and, QDG Retail Partners, LLC (the Volunteers) for the Willets Point Development L-Parcel Site (Site No. C241146H, herein referred to as "the Site"). Per a September 25, 2025 conference call and October 2, 2025 correspondence, this TSWP describes the scope of a treatability study to support the design of a supplemental groundwater treatment program required by the New York State Department of Environmental Conservation (NYSDEC). The treatability study will evaluate groundwater treatment feasibility and determine preliminary design parameters for the supplemental groundwater treatment of target volatile organic compounds (VOC) and semivolatile organic compounds (SVOC). The treatability study objectives are to:

- Evaluate the efficacy of the proposed treatment(s);
- Demonstrate reduction in VOC and SVOC concentration in soil;
- Demonstrate reduction in VOC and SVOC concentration in groundwater;
- Identify site-specific dosages of reagents; and
- Develop recommendations for field application.

This TSWP describes the scope of work required for the collection of soil and groundwater samples from within the most impacted areas. The samples will be submitted to treatability or analytical laboratories for the completion of bench-scale treatability studies. The results of the treatability studies will be documented in a forthcoming remedial design document.

CERTIFICATION

I, Gerald Nicholls, certify that I am currently a New York State (NYS) registered professional engineer and that this Treatability Study Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and Green Remediation (DER-31).

Name	Date	Signature
	01/15/2026	Gerry Nicholls

SITE BACKGROUND

The Willets Point Development L-Parcel Brownfield Cleanup Program (BCP) Site, encompasses a total area of about 1.120 acres. The Site was accepted into the BCP as part of the larger 22.868-acre Willets Point Development BCP Site (Site No. C241146), which was subsequently split into eight separate BCP sites, including this Site (C241146H; BCA Index No. C241146H-09-23) and BCP sites C241146 and C241146B through C241146G in October 2023. The Site is located in a former industrial zone in the Borough of Queens, New York and is identified as Queens Borough Tax Block 1833, Lots 158 and 172. The Site is bounded by automotive repair and wrecking facilities to the north, by Evergreen Recycling of Corona (EROC) to the east, by the Willets Point Development SCA School BCP Site (Site No. C241146D) to the south, and by automotive repair and wrecking facilities and Willets Point Boulevard, followed by the Willets Point development Stadium BCP Site (Site No. C241146C) to the west. A site location plan is included as Figure 1.

To address petroleum-related target compounds identified in groundwater above NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water (herein referred to the NYSDEC SGVs) during the Operable Unit 2 (OU-2) Remedial Investigation (RI), an in-situ groundwater treatment program was implemented in the eastern part of the Site. The in-situ groundwater treatment program was implemented in accordance with the NYSDEC-approved June 7, 2022 Remedial Action Work Plan (RAWP) and the NYSDEC-approved March 30, 2023 RAWP Modification Memorandum. The in-situ groundwater treatment program included direct in-situ mixing of chemical reagents within a 12,000-square-foot area to about 7 to 9 feet below grade surface (bgs) (about elevation [el]. 2 to 4) within the Site (shown on Figure 2) after excavation and disposal of non-native fill to about one to two feet below the observed groundwater table (about el. 4). The reagent selected for mixing in the June 7, 2022 RAWP was PetroFix™ (a water-based colloidal suspension of micron-scale activated carbon) and an electron acceptor blend supplied by REGENESIS of San Clemente, California. Subsequent to RAWP approval, the in-situ remedial approach was augmented by the addition of ORC Advanced® (an engineered oxygen release compound) within a 4,100-square-foot section of the PetroFix™ treated area, as documented in the March 30, 2023 RAWP Modification Memorandum.

The in-situ groundwater treatment field implementation began on April 8, 2023 and was completed by April 13, 2023. The treatment area was backfilled with NYSDEC-approved ¾-inch quarry stone at the water table (about el. 4), followed by installation of a demarcation layer, and then a 2-foot composite cover system consisting of NYSDEC-approved clean fill and ¾-inch quarry stone, to a final grade of about el. 12 to el. 13.

Analytical results from the post remediation performance sampling events indicate that VOCs and SVOCs in groundwater remain above the NYSDEC SGVs. The post remediation groundwater

analytical sample results are shown on Figure 2. The bench-scale treatability studies discussed in this TSWP will evaluate alternative remedies to address the residual VOC and SVOC concentrations in groundwater above the NYSDEC SGVs.

Soil and Groundwater Analytical Data

The on-site groundwater treatment objective is to treat remaining impacts to soil and further reduce concentrations of petroleum-related compounds in groundwater, consistent with the NYSDEC Program Policy DER-10: Technical Guidance for Site Investigation and Remediation (DER-10).

Based on review of the May 2025 soil sample analytical results and the October 2025 groundwater sample analytical results, the following contaminants of concern were detected in Site soil above Protection of Groundwater (PGW SCOs) and in groundwater above NYSDEC SGVs:

- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene
- Acetone
- Benzene
- Ethylbenzene
- n-Propylbenzene
- Tert-Butyl Methyl Ether (MTBE)
- Toluene
- Total xylenes

FIELD INVESTIGATION

The proposed bench-scale treatability studies will require the advancement of soil borings and the collection of soil and groundwater samples. The field investigation will be performed in accordance with this section and samples will be submitted to treatability and analytical laboratories, as applicable. The bench-scale treatability study is anticipated to be completed by Langan's Treatability Facility at New Jersey Institute of Technology (NJIT), located in Newark, New Jersey.

In addition, temporary monitoring wells will be installed and sampled to delineate groundwater contamination, support establishing the western treatment area boundary, and investigate whether the western-adjoining buildings are a source of contamination.

The field investigation will be performed in accordance with this TSWP and the draft June 2025 Site Management Plan (SMP), including the Quality Assurance Project Plan (QAPP) included as Appendix H and the Construction Health and Safety Plan (CHASP) included as Appendix F of the draft SMP.

Treatability Study Sample Collection

The bench-scale treatability studies will require the collection of bulk soil and groundwater samples as described in this section. The proposed sample locations are shown on Figure 3.

Soil Investigation

An environmental drilling contractor will advance soil borings (TS01, TS02, and TS03) from surface grade to depths between about 15 and 20 feet bgs (between about el. -3 and el. -8) using a Geoprobe 8140LS® Sonic drill rig.

Additional borings may be advanced adjacent to the proposed sample locations until a minimum of 9 kilogram (Kg) of soil is collected for each sample interval or soil type. A Langan field representative will log the soil borings, screen the soil for environmental impacts, and collect soil samples. Soil will be screened continuously to the boring termination depth for VOCs using a photoionization detector (PID) equipped with a 10.6 eV bulb, and for visual and olfactory indications of environmental impacts. Each soil boring log will include a soil description, a description of environmental impacts (if encountered), and the depth intervals where bulk soil samples are collected for the bench-scale treatability study.

A minimum of three bulk soil samples will be collected for the treatability study as follows:

- Within the interval where PetroFix™ was implemented.
- Within the interval where PetroFix™ and ORC Advanced® was implemented.
- Within the interval where neither PetroFix™ nor ORC Advanced® was implemented.

To the extent practicable, bulk soil samples will be biased to intervals exhibiting the greatest degree of environmental impacts (based on visual, and olfactory indications, and PID readings).

Gravel and/or cobbles measuring greater than 0.5 inches in diameter and anthropogenic material (i.e., concrete, brick, metal pieces, etc.) will be removed from the bulk soil samples. The bulk soil samples will be homogenized by manual mixing, placed into labeled Ziploc® bags, secured in coolers and transported to Langan's Treatability Facility at NJIT, or sent to a New York State Department of Health Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory via courier service. Soil samples will be analyzed for Part 375 List and target compound list (TCL) VOCs, SVOCs, and total organic carbon (TOC). The analytical data generated from the soil samples will serve as a baseline for the treatability study.

The documentation endpoint soil sample analytical results from immediately following remediation and soil samples recollected in May 2025 are shown on Figures 4 and 5.

Groundwater Treatability Investigation

The existing permanent monitoring wells J-MW118 and J-MW205 will be used to collect bulk groundwater samples. The locations of the existing permanent monitoring wells are shown on Figure 3.

A minimum of 40 liters (L) of groundwater will be collected using low-flow sampling methods and stored in 5 or 10 L Labtainer™ bags. The bulk groundwater samples will be transported to Langan's treatability facility at NJIT and stored at 4° degrees Celsius (°C). Prior to sampling, each monitoring well will be gauged for static water levels, headspace PID readings, and purged. The bulk groundwater sample will also be collected and sent to an ELAP-certified analytical laboratory for analysis of Part 375/TCL VOCs, SVOCs, and TOC. The analytical data that will be generated from the groundwater samples will serve as a baseline for the treatability study.

Groundwater Delineation

An environmental drilling contractor will install and develop up to four temporary, 2-inch groundwater monitoring wells with prepacked well screens (TMW01 through TMW04) from surface grade to depths between about 12 and 20 feet bgs (between about el. 0 and el. -8) using a Geoprobe 8140LS® Sonic drill rig. The locations of the temporary monitoring wells are shown on Figure 3.

The temporary monitoring wells will be installed to delineate groundwater contamination to the west of the treatment area and to investigate whether the western-adjoining buildings are a source of contamination. One groundwater sample will be collected from each temporary monitoring well (plus quality assurance/ quality control [QA/QC] samples). Groundwater samples will be analyzed for NYSDEC Part 375 List and TCL VOCs at standard turnaround time and samples will be picked up via courier and delivered to an NYSDOH ELAP-certified laboratory.

Community Air Monitoring Plan (CAMP)

Air monitoring will be implemented during ground-intrusive activities in accordance with the site-specific CAMP included as Attachment 1. The CAMP will include one upwind and one downwind CAMP station.

Management of Investigation-Derived Waste

Investigation-derived waste (IDW), including soil cuttings, purged groundwater, and decontamination fluids, will be containerized in properly labeled and sealed United Nations (UN)/Department of Transportation (DOT)-approved 55-gallon drums for future waste characterization and off-site disposal at a facility permitted to accept the waste. The drums will be staged in a secure area on-site, pending receipt of laboratory data and off-site disposal to an appropriate facility.

BENCH-SCALE TREATABILITY STUDY

Bench-scale treatability studies will be conducted to determine the feasibility of the following two remedial options and for the development of a full-scale remedial design.

- In-situ chemical oxidation (ISCO) treatment
- pH neutralization to support biodegradation

ISCO Treatment

This section provides the methodology for deriving alkali demand for persulfate activation, total oxidant demand (TOD) tests, and effectiveness test.

Alkali Demand

A titration test will be performed to determine the alkali demand of groundwater and soil collected from the Site. Titrations will be performed with 10 Normal (N) sodium hydroxide (NaOH) solution to reach a pH >10.5 standard units (S.U.), which is essential for the activation of persulfate. Titrations will be performed using soil collected form the following intervals.

- Within the interval where PetroFix™ was implemented.
- Within the interval where PetroFix™ and ORC Advanced® was implemented.
- Within the interval where neither PetroFix™ nor ORC Advanced® was implemented.

TOD Test

The TOD test will be set up in duplicates to determine oxidant dosage that would be needed to set up the effectiveness test, using groundwater, homogenized soil, the sodium or potassium persulfate reagent Klozur® SP or Klozur® KP (products of Evonik Active Oxygens, LLC in Philadelphia, PA), and an alkali reagent, 10N sodium hydroxide (NaOH). The specification and safety data sheets (SDS) for the reagents that will be used in the treatability study are provided in Attachment 2. At two and seven days post-setup, aqueous phase samples from the TOD test jars will be monitored for pH and oxidation reduction potential (ORP) and analyzed for residual persulfate concentration using a spectrophotometric method. All analyses will be performed at Langan's treatability facility at NJIT.

Effectiveness Test

The effectiveness test will be set up to determine the effectiveness of ISCO treatment in decreasing VOC and SVOC concentrations in soil and groundwater. The set up will be conducted in wide-mouth glass jars containing groundwater, homogenized soil, sodium persulfate reagent, Klozur® SP or Klozur® KP and alkali reagent, 10N NaOH. The soil used for the effectiveness test will be from within the interval where neither PetroFix™ nor ORC Advanced® remedy was implemented. The effectiveness test will be setup as follows:

- Controls – replicate controls with only soil and groundwater
- Treatments – replicate treatments with soil, groundwater, Klozur® SP or Klozur® KP and NaOH.

The dosage of Klozur® SP or Klozur® KP used for the effectiveness test will be based on the results of the TOD test described previously. Aqueous-phase samples from the effectiveness test jars will be monitored periodically for pH and ORP and analyzed for residual persulfate concentration using a spectrophotometric method. Additionally, aqueous phase and soil phase analytical samples will be collected from the effectiveness test jars and sampled for VOCs, SVOCs, and TOC. pH, ORP, and residual persulfate analysis will be performed at Langan's treatability facility at NJIT, and the analytical samples will be sent to ELAP-certified analytical laboratory for analysis.

pH Neutralization to Support Biodegradation

This section provides the methodology for a groundwater pH neutralization using acid treatment.

Titration

A test for groundwater pH neutralization will be performed to reduce groundwater pH to neutral conditions from alkaline conditions (pH of about 9 to 10.5 S.U.) observed during previous groundwater monitoring events. Acid titrations will be performed to determine demand for groundwater and soil collected from the Site. Titrations will be performed with organic/inorganic acid solution to reach a pH of about 7 S.U., which is essential for microbial degradation of VOCs and SVOCs in soil and groundwater. Titrations will be performed using soil collected from the following intervals.

- Within the interval where PetroFix™ was implemented.
- Within the interval where PetroFix™ and ORC Advanced® was implemented.
- Within the interval where neither PetroFix™ nor ORC Advanced® was implemented.

REPORTING

A summary of drilling activities, soil and groundwater sampling, and CAMP implementation will be documented in daily reports, which will be submitted to the NYSDEC by the end of the following day. The results of the treatability study will be described in a treatability study report, which will describe the completed scope of work and present the field and analytical results of the treatability study sampling. The treatability study report will be included as an appendix to the forthcoming remedial design work plan, which will detail proposed remedial design based on the results of the treatability study.

SCHEDULE

The treatability study is being conducted to establish a treatment for VOC- and SVOC-impacted soil and groundwater at the Site. Previous environmental and geotechnical investigations and any supplemental remedial design investigations will be used to inform feasibility of supplemental remediation methods in the forthcoming remedial design document. Table 1 presents an estimated schedule for the proposed investigations and reporting.

CLOSING

We respectfully request approval of this TSWP. Please contact us with any questions or comments.

Sincerely,
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.

Elizabeth Burgess, PE
Senior Project Manager

Gerald Nicholls, PE, CHMM
Principal

Enclosure(s):

Figure 1	Site Location Map and Site Plan
Figure 2	Post Remediation Groundwater Analytical Results Map
Figure 3	Proposed Sample Location Map
Figure 4	Post-Remediation and Documentation Sample Analytical Results
Figure 5	Documentation Sample Analytical Results
Table 1	Treatability Study Schedule
Attachment 1	Community Air Monitoring Plan
Attachment 2	Material Specification and Safety Data Sheets

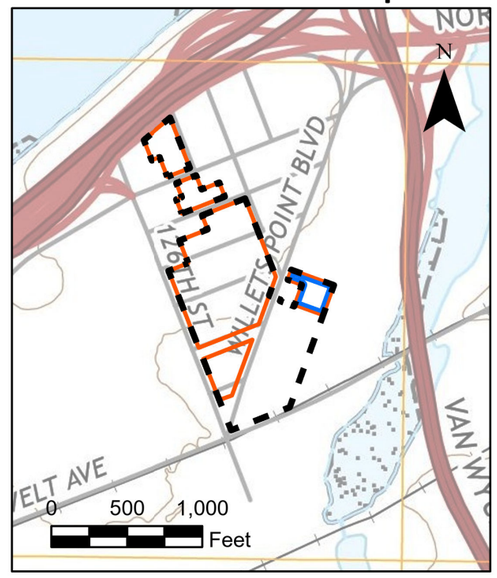
cc: J. Strobel, A Lipman, E. Saretsky, S Bernstein – Queens Development Group (QDG)
E. Seery, P. Krishnaswamy, A. Oka, C. Abou-khalil – Langan

FIGURES

Legend

- Approximate BCP Site Boundary
- Former Willets Point Development BCP Site Boundary
- Former OU-2 Boundary
- Tax Lot

Reference Map



Notes:
1. Light Gray Canvas basemap provided through Langan's Esri and ArcGIS software licensing and ArcGIS Online.
2. Topographic basemap adapted from United States Geological Survey (USGS) 7.5-Minute Series Topographical Maps, Flushing, New York, Quadrangle.
3. Tax parcel data provided by the New York City Department of City Planning, MapPLUTO 23v2, and a survey prepared by Langan, July 28, 2023.
4. BCP - Brownfield Cleanup Program

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SCALE IN FEET

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Project
WILLETS POINT DEVELOPMENT L-PARCEL
BCP SITE NO. C241146H
QUEENS NEW YORK

Figure Title
SITE LOCATION PLAN

Project No. 170197601	Figure No. 1
Date 11/12/2025	
Scale 1"=250'	
Drawn By GS	

Path: \\langan.com\data\NYC\data6\170197601\ArcGIS\APRX\170197601_SMP_FER\170197601_SMP_FER_SiteH.aprx Date: 11/12/2025 User: Gsajbel Time: 12:38 PM

Location	J-MW205	J-MW205	J-MW205
Sample Name	J-MW205_053025	J-MW205_072325	J-MW205_102025
Sample Date	05/30/2025	07/23/2025	10/20/2025
VOCs			
1,2,4,5-Tetramethylbenzene	NA	<20 U	<40 U
1,2,4-Trimethylbenzene	**55.3**	**44**	**72**
1,2-Dichlorobenzene	<0.5 U	<25 U	<50 U
1,2-Dichloroethane	<0.5 U	<5 U	<12 U
1,2-Dichloropropane	<0.5 U	<10 U	<20 U
1,3,5-Trimethylbenzene (Mesitylene)	**13.2 J**	**14 J**	**24 J**
1,4-Dichlorobenzene	<0.5 U	<25 U	<50 U
Acetone	26.5	**330**	**470**
Benzene	**28.1**	**36**	**55**
Bromomethane	<2 U	<25 U	<50 U
Chlorobenzene	<0.5 U	<25 U	<50 U
Chloroethane	<0.5 U	<25 U	<50 U
Chloromethane	<0.5 U	<25 U	<50 U
Cumene	2.87	<25 U	<50 U
Ethylbenzene	**5.78**	**26**	**40 J**
Hexachlorobutadiene	<0.5 U	<25 U	<50 U
Isopropylbenzene (Cumene)	2.61	<25 U	<50 U
M,P-Xylene	**116**	**500**	**550**
Methyl Ethyl Ketone (2-Butanone)	<0.5 UJ	26 J	<100 U
Methylene Chloride	**6.05 J**	<25 U	<50 U
n-Butylbenzene	<0.5 U	<25 U	<50 U
n-Propylbenzene	**5.39**	<25 U	<50 U
o-Xylene (1,2-Dimethylbenzene)	**59.8**	**59**	**79**
Sec-Butylbenzene	<0.5 U	**32**	<50 U
Styrene	<0.5 U	<25 U	<50 U
Tert-Butyl Methyl Ether (MTBE)	**842 D**	**2,600**	**1,800**
Toluene	**175 D**	**150**	**250**
Total Xylenes	**175**	**160**	**230**
SVOCs			
1,2-Dichlorobenzene	NA	<2 U	<10 U
1,2-Diphenylhydrazine	<5 U	NA	NA
1,4-Dichlorobenzene	NA	<2 U	<10 U
1,4-Dioxane (P-Dioxane)	NA	**12.4**	NA
2,4-Dichlorophenol	<5 U	**5.8**	<25 U
2,4-Dimethylphenol	**11.3**	**28**	**29**
2,4-Dinitrotoluene	<5 U	<5 U	<25 U
3,3'-Dichlorobenzidine	3.63 J	<5 U	<25 U
Acenaphthene	0.8 D	1.2	2
Benzo(a)anthracene	**0.7 D**	**3.7**	**2.2**
Benzo(a)pyrene	<0.5 U	<0.1 U	**0.12**
Benzo(b)fluoranthene	<0.5 U	<0.1 U	**0.18**
Benzo(k)fluoranthene	<0.5 U	<0.1 U	**0.05 J**
Biphenyl (Diphenyl)	<5 U	2 J	<10 U
Bis(2-ethylhexyl) phthalate	<5 U	8.7	<15 U
Chrysene	<0.5 U	**0.22**	**0.19**
Diethyl phthalate	<5 U	<5 U	<25 U
Hexachlorobutadiene	<5 U	<5 U	<25 U
Indeno(1,2,3-cd)pyrene	<0.5 U	<0.1 U	<0.1 U
Naphthalene	**14.5 D**	**25**	**30**
Pentachlorophenol	<2.5 U	**72**	**3.6**
Phenol	**173**	**280**	**130**

Location	J-MW203	J-MW203	J-MW203
Sample Name	J-MW203_052925	J-MW203_072325	J-MW203_102025
Sample Date	05/29/2025	07/23/2025	10/20/2025
VOCs			
1,2,4,5-Tetramethylbenzene	NA	<4 U	<10 U
1,2,4-Trimethylbenzene	**18.7**	1.6 J	**7.2**
1,2-Dichlorobenzene	<0.5 U	<5 U	<12 U
1,2-Dichloroethane	<0.5 U	<1 U	<2.5 U
1,2-Dichloropropane	<0.5 U	<2 U	<5 U
1,3,5-Trimethylbenzene (Mesitylene)	**5.47**	<5 U	<12 U
1,4-Dichlorobenzene	<0.5 U	<5 U	<12 U
Acetone	**53.5**	<10 U	<25 U
Benzene	**7.87**	**2.5**	**7.7**
Bromomethane	<2 U	<5 U	<12 U
Chlorobenzene	<0.5 U	<5 U	<12 U
Chloroethane	<0.5 U	<5 U	<12 U
Chloromethane	1.33	<5 U	<12 U
Cumene	<0.5 U	<5 U	<12 U
Ethylbenzene	**16.6**	<5 U	4.9 J
Hexachlorobutadiene	<0.5 U	<5 U	<12 U
Isopropylbenzene (Cumene)	0.95	<5 U	<12 U
M,P-Xylene	**33.2**	2.5 J	**17**
Methyl Ethyl Ketone (2-Butanone)	3.13	<10 U	<25 U
Methylene Chloride	**13.2 J**	<5 U	<12 U
n-Butylbenzene	<0.5 U	<5 U	<12 U
n-Propylbenzene	2.05	<5 U	<12 U
o-Xylene (1,2-Dimethylbenzene)	**11.6**	<5 U	**6.1 J**
Sec-Butylbenzene	<0.5 U	<5 U	<12 U
Styrene	2.09	<5 U	<12 U
Tert-Butyl Methyl Ether (MTBE)	**105**	**140**	**130**
Toluene	4.99	<5 U	3.9 J
Total Xylenes	**44.7**	2.5 J	**23 J**
SVOCs			
1,2-Dichlorobenzene	NA	<2 U	<2 U
1,2-Diphenylhydrazine	<5 U	NA	NA
1,4-Dichlorobenzene	NA	<2 U	<2 U
1,4-Dioxane (P-Dioxane)	NA	**2.9 J**	**2.7B**
2,4-Dichlorophenol	<5 U	<5 U	<5 U
2,4-Dimethylphenol	<5 U	<5 U	**2.8 J**
2,4-Dinitrotoluene	<5 U	<5 U	<5 U
3,3'-Dichlorobenzidine	<5 U	<5 U	<5 U
Acenaphthene	<0.05 U	0.36	0.92
Benzo(a)anthracene	<0.05 U	**0.13**	**0.2 J**
Benzo(a)pyrene	<0.01 U	<0.01 U	**0.04 J**
Benzo(b)fluoranthene	<0.05 U	**0.03 J**	**0.05 J**
Benzo(k)fluoranthene	<0.05 U	<0.01 U	<0.1 U
Biphenyl (Diphenyl)	<5 U	<2 U	<2 U
Bis(2-ethylhexyl) phthalate	0.78	<3 U	1.9 J
Chrysene	**0.18**	**0.06 J**	**0.04 J**
Diethyl phthalate	<5 U	<5 U	<5 U
Hexachlorobutadiene	<0.5 U	<0.5 U	<0.5 U
Indeno(1,2,3-cd)pyrene	<0.05 U	<0.1 U	**0.02 J**
Naphthalene	0.11	12	3.2
Pentachlorophenol	<0.25 U	<0.8 U	<0.8 U
Phenol	<5 U	<5 U	<5 U

Location	J-MW118	J-MW118	J-MW118	J-MW118	J-MW118	J-MW118	J-MW118	J-MW118	J-MW118
Sample Name	J-MW118_062623	J-MW118_092723	J-MW118_122823	J-MW118_040424	J-MW118_071624	J-MW118_020725	J-MW118_053025	J-MW118_072325	J-MW118_102025
Sample Date	06/26/2023	09/27/2023	12/27/2023	04/04/2024	07/16/2024	02/07/2025	05/30/2025	07/23/2025	10/20/2025
VOCs									
1,2,4,5-Tetramethylbenzene	NA	NA	NA	NA	NA	NA	NA	**16 J**	**23 J**
1,2,4-Trimethylbenzene	**19.6**	**9.29**	<0.5 U	<0.5 U	**12.5**	**14.2**	**293 D**	**300 J**	**186**
1,2-Dichlorobenzene	0.37 J	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	**4.17**	<12 UJ	<25 U
1,2-Dichloroethane	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<2.5 UJ	<5 U
1,2-Dichloropropane	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 UJ	<10 U
1,3,5-Trimethylbenzene (Mesitylene)	**6.3**	2.91	<0.5 U	<0.5 U	3.9	3.41	**73 J**	**79 J**	**48**
1,4-Dichlorobenzene	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<12 UJ	<25 U
Acetone	5.95 J	<4.35 U	3.61 J	<2.96 U	2.3 J	6.07 J	**58.7 J**	**100 J**	**83**
Benzene	**4.07**	**3.79**	0.52 J	**1.67**	**3.42**	**7.5**	**142 J**	**81 J**	**80**
Bromomethane	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<2 U	<12 UJ	<25 U
Chlorobenzene	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<12 UJ	<25 U
Chloroethane	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<12 UJ	<25 U
Chloromethane	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<12 UJ	<25 U
Cumene	NA	NA	NA	NA	NA	<0.5 U	1.64	<12 UJ	<25 U
Ethylbenzene	**16**	**7.64**	<0.5 U	<0.5 U	**8.06**	**10.1**	**423 D**	**160 J**	**110**
Hexachlorobutadiene	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<12 UJ	<25 U
Isopropylbenzene (Cumene)	0.62	0.42 J	<0.5 U	<0.5 U	0.56	0.69	**13 D**	**10 J**	<25 U
M,P-Xylene	**56.5**	**28.5**	<1 U	<1 U	**28.8**	**38.2**	**846 D**	**700 J**	**490**
Methyl Ethyl Ketone (2-Butanone)	0.75	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 UJ	<50 U
Methylene Chloride	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U	**9.05 J**	<12 UJ	<25 U
n-Butylbenzene	0.93	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	2.66	<12 UJ	<25 U
n-Propylbenzene	2.4	0.91	<0.5 U	<0.5 U	1.36	1.56	**29.9**	**26 J**	**16 J**
o-Xylene (1,2-Dimethylbenzene)	**23.2**	**14.5**	0.42 J	0.61	**14**	**18.6**	**426 D**	**320 J**	**228**
Sec-Butylbenzene	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	2.21	<12 UJ	<25 U
Styrene	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	**6.3 J**	<25 U
Tert-Butyl Methyl Ether (MTBE)	**38**	**160**	**539 D**	**150**	**292 D**	**292 D**	**504 D**	**530 J**	**770**
Toluene	**20.8**	2.27	<0.5 U	<0.5 U	**18.2**	**33.1**	**696 D**	**500 J**	**329**
Total Xylenes	**89.8**	**43**	<1.5 U	0.86 J	**42.8**	**56.8**	**1,270 D**	**1,000 J**	**718**
SVOCs									
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	2.4	19 J
1,2-Diphenylhydrazine	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	<5 U	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	<2 U	<2 U
1,4-Dioxane (P-Dioxane)	**0.528**	**0.784**	**0.64**	**0.864**	**1.15**	**1.26**	NA	**3.3**	**4.99**
2,4-Dichlorophenol	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	<5 U	**2.4 J**	<5 U
2,4-Dimethylphenol	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	<5 U	**8.4**	**4.8 J**
2,4-Dinitrotoluene	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	**15.3**	<5 U	<5 U
3,3'-Dichlorobenzidine	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	<5 U	<5 U	<5 U
Acenaphthene	0.0689	<0.05 U	<0.05 U	0.06	0.09	<0.0556 U	<0.5 U	0.85	0.73
Benzo(a)anthracene	**0.0667**	<0.05 U	<0.05 U	**0.08**	**0.22**	**0.0889**	<0.5 U	**0.57**	**0.6**
Benzo(a)pyrene	<0.0556 U	<0.05 U	<0.05 U	<0.05 U	<0.05 U	<0.0556 U	<0.5 U	**0.17**	**0.06 J**
Benzo(b)fluoranthene	<0.0556 U	<0.05 U	<0.05 U	<0.05 U	<0.05 U	<0.0556 U	<0.5 U	**0.34**	**0.09 J**
Benzo(k)fluoranthene	<0.0556 U	<0.05 U	<0.05 U	<0.05 U	<0.05 U	<0.0556 U	<0.5 U	**0.06 J**	**0.05 J**
Biphenyl (Diphenyl)	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	<5 U	<2 U	<2 U
Bis(2-ethylhexyl) phthalate	4.47 J	<0.5 U	0.6	<0.5 U	<0.5 U	<0.556 U	<5 U	4.9	<3 U
Chrysene	<0.0556 U	<0.05 U	<0.05 U	<0.05 U	**0.07**	**0.23**	**0.1**	**0.17**	**0.08 J**
Diethyl phthalate	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	<5 U	<5 U	<5 U
Hexachlorobutadiene	<0.556 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.556 U	<0.5 U	<0.5 U	<0.5 U
Indeno(1,2,3-cd)pyrene	<0.0556 U	<0.05 U	<0.05 U	<0.05 U	<0.05 U	<0.0556 U	<0.5 U	**0.13**	**0.07 J**
Naphthalene	0.267	<0.05 U	0.14	0.6 J	2.06	5.06	**36.2 D**	**49**	**75**
Pentachlorophenol	<0.278 U	<0.25 U	<0.26 U	<0.25 U	<0.278 U	<2.5 U	**3.2**	**3.2**	0.34 J
Phenol	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	**11.2**	**47**	**11**

Location	J-MW204	J-MW204	J-MW204
Sample Name	J-MW204_052925	J-MW204_072325	J-MW204_102025
Sample Date	05/29/2025	07/23/2025	10/20/2025
VOCs			
1,2,4,5-Tetramethylbenzene	NA	<20 U	<40 U
1,2,4-Trimethylbenzene	**52.3**	**27**	**34 J**
1,2-Dichlorobenzene	<0.5 U	<25 U	<50 U
1,2-Dichloroethane	<0.5 U	<5 U	<10 U
1,2-Dichloropropane	<0.5 U	<10 U	<20 U
1,3,5-Trimethylbenzene (Mesitylene)	**9.52**	**9 J**	<50 U
1,4-Dichlorobenzene	<0.5 U	<25 U	<50 U
Acetone	**83**	**55**	**310**
Benzene	**20.7**	**7**	**27**
Bromomethane	<2 U	<25 U	<50 U
Chlorobenzene	<0.5 U	<25 U	<50 U
Chloroethane	<0.5 U	<25 U	<50 U
Chloromethane	<0.5 U	<25 U	<50 U
Cumene	0.83	<25 U	<50 U
Ethylbenzene	**50.3**	**11 J**	**29 J**
Hexachlorobutadiene	<0.5 U	<25 U	<50 U
Isopropylbenzene (Cumene)	3.43	<25 U	<50 U
M,P-Xylene	**101**	**33**	**88**
Methyl Ethyl Ketone (2-Butanone)	<0.5 U	<50 U	<100 U
Methylene Chloride	<2 U	<25 U	<50 U
n-Butylbenzene	<0.5 U	<25 U	<50 U
n-Propylbenzene	4.34	<25 U	<50 U
o-Xylene (1,2-Dimethylbenzene)	**64.4**	**19 J**	**48 J**
Sec-Butylbenzene	0.55	<25 U	<50 U
Styrene	<0.5 U	<25 U	<50 U
Tert-Butyl Methyl Ether (MTBE)	**144**	**88**	**85**
Toluene	**46.6**	**12 J**	**48 J**
Total Xylenes	**165**	**52 J**	**140 J**
SVOCs			
1,2-Dichlorobenzene	NA	<2 U	<10 U
1,2-Diphenylhydrazine	<5 UJ	NA	NA
1,4-Dichlorobenzene	NA	<2 U	<10 U
1,4-Dioxane (P-Dioxane)	NA	**2.92 J**	**5.67**
2,4-Dichlorophenol	<5 U	<5 U	<25 U
2,4-Dimethylphenol	<5 U	**6.6**	**34**
2,4-Dinitrotoluene	<5 U	<5 U	<25 U
3,3'-Dichlorobenzidine	<5 U	<5 U	<25 U
Acenaphthene	<2.5 U	0.76	0.64
Benzo(a)anthracene	**3.53 D**	**0.58**	**0.95**
Benzo(a)pyrene	<2.5 U	**0.32**	**0.26**
Benzo(b)fluoranthene	<2.5 U	**0.44**	**0.31**
Benzo(k)fluoranthene	<2.5 U	**0.12**	**0.1**
Biphenyl (Diphenyl)	<5 UJ	<5 U	<10 U
Bis(2-ethylhexyl) phthalate	<25 U	4.3	<15 U
Chrysene	**2.5 D**	**0.32**	**0.2**
Diethyl phthalate	<5 UJ	<5 U	<25 U
Hexachlorobutadiene	<25 U	<0.5 U	<0.5 U
Indeno(1,2,3-cd)pyrene	<2.5 U	**0.22**	**0.17**
Naphthalene	**12 D**	9.3	10
Pentachlorophenol	<12.5 U	**1.5**	0.44 J
Phenol	**2.5 J**	**23**	**50**

Location	J-MW202	J-MW202	J-MW202	J-MW202
Sample Name	J-MW202_052925	DUP01_052925	J-MW202_072325	J-MW202_102025
Sample Date	05/29/2025	05/29/2025	07/23/2025	10/20/2025
VOCs				
1,2,4,5-Tetramethylbenzene	NA	NA	<10 U	<40 U
1,2,4-Trimethylbenzene	**43**	**49**	**41**	**52**
1,2-Dichlorobenzene	0.82	0.84	<12 U	<50 U
1,2-Dichloroethane	<0.5 U	<0.5 U	<2.5 U	<10 U
1,2-Dichloropropane	<0.5 U	<0.5 U	<5 U	<20 U
1,3,5-Trimethylbenzene (Mesitylene)	**8.33**	**12**	**13**	**19 J**
1,4-Dichlorobenzene	0.65	0.98 J	0.73	<50 U
Acetone	**111**	**141**	**91**	**520**
Benzene	**27**	**30.5**	**20**	**40**
Bromomethane	<2 U	<2 U	<12 U	<50 U
Chlorobenzene	<0.5 U	<0.5 U	<12 U	<50 U
Chloroethane	<0.5 U	<0.5 U	<12 U	<50 U
Chloromethane	<0.5 U	<0.5 U	<12 U	<50 U
Cumene	0.94	<0.5 U	<12 U	<50 U
Ethylbenzene	0.77	0.78	<12 U	<50 U
Hexachlorobutadiene	**54**	**61.1**	**30**	**42 J**
Isopropylbenzene (Cumene)	<0.5 U	<0.5 U	<12 U	<50 U
M,P-Xylene	2.84	3.2	<12 U	<50 U
Methyl Ethyl Ketone (2-Butanone)	**101**	**122**	**120**	**150**
Methylene Chloride	34.8	37.6	18 J	**89 J**
n-Butylbenzene	**13.6 J**	**11.1 J**	<12 U	<50 U
n-Propylbenzene	<0.5 U	<0.5 U	<12 U	<50 U
o-Xylene (1,2-Dimethylbenzene)	4.87	**5.49**	4 J	<50 U
Sec-Butylbenzene	**68.9**	**77**	**64**	**90**
Styrene	<0.5 U	<0.5 U	<12 U	<50 U
Tert-Butyl Methyl Ether (MTBE)	**15.1**	**20.1**	7.7 J	6.3 J
Toluene	**101**	**113**	**98**	**170**
Total Xylenes	**177**	**199**	**180**	**230**
SVOCs				
1,2-Dichlorobenzene	NA	NA	<2 U	<10 U
1,2-Diphenylhydrazine	<5 U	<5 U	NA	NA
1,4-Dichlorobenzene	NA	NA	<2 U	<10 U
1,4-Dioxane (P-Dioxane)	NA	NA	**8.87**	**16.1**
2,4-Dichlorophenol	<5 U	<5 U	<5 U	<25 U
2,4-Dimethylphenol	**28 J**	**19 J J**	**22**	**47**
2,4-Dinitrotoluene	<5 U	<5 U	<5 U	<25 U
3,3'-Dichlorobenzidine	<5 U	<5 U	<5 U	<25 U
Acenaphthene	<2.5 U	<2.5 U	<0.1 U	<1 U
Benzo(a)anthracene	<2.5 U	<2.5 U	**0.59**	**1.8**
Benzo(a)pyrene	<2.5 U	<2.5 U	<0.1 U	**0.84 J**
Benzo(b)fluoranthene	<2.5 U	<2.5 U	<0.1 U	**1.1**
Benzo(k)fluoranthene	<2.5 U	<2.5 U	<0.1 U	<1 U
Biphenyl (Diphenyl)	<5 U	<5 U	<2 U	<10 U
Bis(2-ethylhexyl) phthalate	<25 U	<25 U	<3 U	<15 U
Chrysene	<2.5 U	<2.5 U	**0.23**	**0.95 J**
Diethyl phthalate	<5 U	<5 U	8	<25 U
Hexachlorobutadiene	<25 U	<25 U	<0.5 U	<5 U
Indeno(1,2,3-cd)pyrene	<2.5 U	<2.5 U	<0.1 U	**0.62 J**
Naphthalene	**11.5 J**	8 J	**18**	**14**
Pentachlorophenol	<12.5 U	<12.5 U	0.69 J	<8 U
Phenol	<5 U	**19.2 J**	**22**	**94**

Location	J-MW117	J-MW117	J-MW117	J-MW117	J-MW117	J-MW117	J-MW117	J-MW117	J-MW117
Sample Name	J-MW117_062623	J-MW117_112923	J-MW117_122823	J-MW117_040824	J-MW117_071524	J-MW117_011625	J-MW117_042125	J-MW117_072325	J-MW117_102125
Sample Date	06/26/2023	11/29/2023	12/27/2023	04/08/2024	07/15/2024	01/16/2025	04/21/2025	07/23/2025	10/21/2025
VOCs									
1,2,4,5-Tetramethylbenzene	NA	**11**	NA	NA	NA	NA	<40 U	**8.1 J**	**6.4**
1,2,4-Trimethylbenzene	**36.3**	**54**	**35**	**38.1**	**29.4**	**28.7**	**26 J**	**46 J**	**33**
1,2-Dichlorobenzene	0.42 J	<2.5 U	0.38 J	0.37 J	0.44 J	0.37 J	<50 U	<2.5 UJ	<2.5 U
1,2-Dichloroethane	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	<0.5 UJ	<0.5 U
1,2-Dichloropropane	<0.5 U	<1 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<20 U	<1 UJ	<1 U
1,3,5-Trimethylbenzene (Mesitylene)	**8.33**	**12**	**7.8**	**8.19**	**6.8**	**5.92**	<20 U	**6.3 J**	**7.2**
1,4-Dichlorobenzene	0.65	0.96 J	0.73	0.73	0.92	0.75	<50 U	0.84 J	<2.5 U
Acetone	13.5 J	4.2 J	21.5	8.5 J	14.3	<9.13 U	30 J	19 J	27
Benzene	**73.6**	**72**	**66.8**	**43.7**	**61.9**	**47.1**	**53**	**53 J**	**49**
Bromomethane	<2 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Chlorobenzene	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Chloroethane	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Chloromethane	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Cumene	NA	4.6	NA	NA	NA	3.16	<50 U	2.8 J	2.4 J
Ethylbenzene	**21.3**	**24**	**18.2**	**18.8**	**19.2**	**14.5**	**14 J**	**16 J**	**16**
Hexachlorobutadiene	<0.5 U	<2.5 U	<0.8 U	<0.5 U	<0.5 U	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Isopropylbenzene (Cumene)	**11.2**	**12**	**8.53**	**8.99**	**11.3**	**8.81**	<50 U	**9.3 J**	**7.3**
M,P-Xylene	**48.9**	**57**	**38.1**	**41**	**28.7**	**28.1**	**26 J**	**34 J**	**36**
Methyl Ethyl Ketone (2-Butanone)	2.72	<5 U	2.44	<0.5 U	<0.5 U	<0.5 U	<100 U	1.9 J	<5 U
Methylene Chloride	<2 U	<2.5 U	<2 U	<2 U	<2 U	<2 U	<50 U	<2.5 UJ	<2.5 U
n-Butylbenzene	3.98	2.7	2.11	2.67 J	3.46	2	<50 U	1.8 J	1.4 J
n-Propylbenzene	**23.6**	**25**	**16.5**	**18.7**	**25.6**	**17.1**	**17 J**	**19 J**	**14**
o-Xylene (1,2-Dimethylbenzene)	**27.6**	**33**	**21.9**	**22.9**	**16.4**	**19.4**	**16 J**	**21 J**	**22**
Sec-Butylbenzene	1.83	1.7 J	1.17	1.38	1.76	1.23	<50 U	1.3 J	1.1 J
Styrene	<0.5 U	0.76 J	<0.5 U	<0.5 U	1.05	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Tert-Butyl Methyl Ether (MTBE)	**135**	**160**	**122**	**115**	**93**	**95.8**	**85**	**87 J**	**100**
Toluene	**12.8**	**8.7**	**5.27**	3.96	3.43	1.85	<50 U	2.1 J	2.1 J
Total Xylenes	**76.5**	**90**	**60**	**63.8**	**471**	**474**	**42 J**	**55 J**	**58**
SVOCs									
1,2-Dichlorobenzene	NA	<2 U	NA	NA	NA	NA	<2 U	<2 U	<2 U
1,2-Diphenylhydrazine	<6.67 U	NA	<50 U	<25 U	<5.26 U	<5 U	NA	NA	NA
1,4-Dichlorobenzene	NA	<2 U	NA	NA	NA	NA	<2 U	<2 U	<2 U
1,4-Dioxane (P-Dioxane)	**5.07**	**3.91**	**5.17**	**4.06**	**5.79**	**8.46**	**9.89**	**9.24**	**11**
2,4-Dichlorophenol	<6.67 U	<5 U	<50 U	<25 U	<5.26 U	<5 U	<5 U	<5 U	<5 U
2,4-Dimethylphenol	<6.67 U	**44**	**52.1 D**	<25 U	**23.9**	<5 U	**28**	**44**	**39**
2,4-Dinitrotoluene	<6.67 U	<5 U	<50 U	<25 U	<5.26 U	<5 U	<5 U	<5 U	<5 U
3,3'-Dichlorobenzidine	<6.67 U	<5 U	<50 U	<25 U	<5.26 U	<5 U	<5 U	<5 U	<5 U
Acenaphthene	0.333 D	1	0.14	<5 U	<0.0526 U	<0.25 U	0.6	1	<0.1 U
Benzo(a)anthracene	<0.333 U	<0.2 U	<0.05 U	<5 U	<0.0526 U	<0.25 U	<0.1 U	<0.1 U	<0.1 U
Benzo(a)pyrene	<0.333 U	<0.2 U	<0.05 U	<5 U	<0.0526 U	<0.25 U	<0.1 U	<0.1 U	**0.53**
Benzo(b)fluoranthene	<0.333 U	<0.2 U	<0.05 U	<5 U	<0.0526 U	<0.25 U	<0.1 U	<0.1 U	**0.6**
Benzo(k)fluoranthene	<0.333 U	<0.2 U	<0.05 U	<5 U	<0.0526 U	<0.25 U	<0.1 U	<0.1 U	**0.23**
Biphenyl (Diphenyl)	<6.67 U	<2 U	<50 U	<25 U	<5.26 U	<5 U	<2 U	<2 U	<2 U
Bis(2-ethylhexyl) phthalate	**15.7**	<3 U	<0.5 U	<50 U	<0.526 U	<2.5 U	<3 U	<3 U	**15**
Chrysene	<0.333 U	<0.2 U	<0.05 U	<5 U	<0.0526 U	<0.25 U	<0.1 U	<0.1 U	**0.61**
Diethyl phthalate	<6.67 U	<5 U	<50 U	<25 U	<5.26 U	<5 U	<5 U	<5 U	<5 U
Hexachlorobutadiene	<3.33 U	<3 U	<0.5 U	<50 U	<0.526 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U
Indeno(1,2,3-cd)pyrene	<0.333 U	**0.05 J**	<0.05 U	<5 U	<0.0526 U	<0.25 U	<0.1 U	<0.1 U	**0.38**
Naphthalene	**11.2 D**	**31**	1.57	**32 D**	**13.8 BD**	**14.2 D**	**17**	**39**	**23**
Pentachlorophenol	<1.67 U	<1.6 U	<0.25 U	<25 U	<0.263 U	<1.25 U	0.24 J	<0.8 U	<0.8 U
Phenol	<6.67 U	<5 U	<50 U	<25 U	**1.57 J**	<5 U	<5 U	<5 U	<5 U

Analyte	NYSDEC SGVs
VOCs	
1,2,4,5-Tetramethylbenzene	5
1,2,4-Trimethylbenzene	5
1,2-Dichlorobenzene	3
1,2-Dichloroethane	0.6
1,2-Dichloropropane	1
1,3,5-Trimethylbenzene (Mesitylene)	5
1,4-Dichlorobenzene	3
Acetone	50
Benzene	1
Bromomethane	5
Chlorobenzene	5
Chloroethane	5
Chloromethane	5
Cumene	5
Ethylbenzene	5
Hexachlorobutadiene	0.5
Isopropylbenzene (Cumene)	5
M,P-Xylene	5
Methyl Ethyl Ketone (2-Butanone)	50
Methylene Chloride	5
n-Butylbenzene	5
n-Propylbenzene	5
o-Xylene (1,2-Dimethylbenzene)	5
Sec-Butylbenzene	5
Styrene	5
Tert-Butyl Methyl Ether (MTBE)	10
Toluene	5
Total Xylenes	5
SVOCs	
1,2-Dichlorobenzene	3
1,2-Diphenylhydrazine	0
1,4-Dichlorobenzene	3
1,4-Dioxane (P-Dioxane)	0.35
2,4-Dichlorophenol	1
2,4-Dimethylphenol	1
2,4-Dinitrotoluene	5
3,3'-Dichlorobenzidine	5
Acenaphthene	20
Benzo(a)anthracene	0.002
Benzo(a)pyrene	0
Benzo(b)fluoranthene	0.002
Benzo(k)fluoranthene	0.002
Biphenyl (Diphenyl)	5
Bis(2-ethylhexyl) phthalate	5
Chrysene	0.002
Diethyl phthalate	50
Hexachlorobutadiene	0.5
Indeno(1,2,3-cd)pyrene	0.002
Naphthalene	10
Pentachlorophenol	1
Phenol	1

Exceedance Summary:
10 - Result exceeds NYSDEC SGVs

Legend

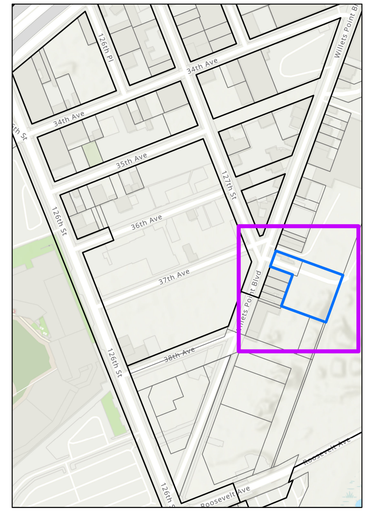
- Tax Parcel
- Approximate BCP Site Boundary
- Post-Excavation In-Situ Treatment with PetroFix™ via Direct Mixing
- Oxygen Release Compound (ORC) Advanced® Treatment Area via Direct Mixing
- Approximate Location of Previously Installed Monitoring Well to be Sampled for Treatability Study
- Approximate Location of Previously Installed Monitoring Well Not to be Sampled for Treatability Study

Notes:
1. Imagery provided through Langan's subscription to Nearmap.com. Flown on 07/03/2025.
2. Tax parcel data provided by the New York City Department of City Planning, MapPLUTO 23v2, and a survey prepared by Langan, July 28, 2023.
3. NYSDEC SGVs - New York State Department of Environmental Conservation Ambient Water Quality Standards and Guidance Values for Class GA Water
4. BCP - Brownfield Cleanup Program
5.

Legend

- Approximate BCP Site Boundary
- Tax Parcel
- Post-Excavation In-Situ Treatment with PetroFix™ via Direct Mixing
- Oxygen Release Compound (ORC) Advanced® Treatment Area via Direct Mixing
- Approximate Location of Previously Installed Monitoring Well to be Sampled for Treatability Study
- Approximate Location of Previously Installed Monitoring Well Not to be Sampled for Treatability Study
- Approximate Location of Temporary Monitoring Well to be Sampled for Treatability Study
- Approximate Location of Soil Boring for Treatability Study

Notes:
1. Imagery provided through Langan's subscription to Nearmap.com. Flown on 07/03/2025.
2. Tax parcel data provided by the New York City Department of City Planning, MapPLUTO 23v2, and a survey prepared by Langan, July 28, 2023.
3. BCP - Brownfield Cleanup Program



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SCALE IN FEET

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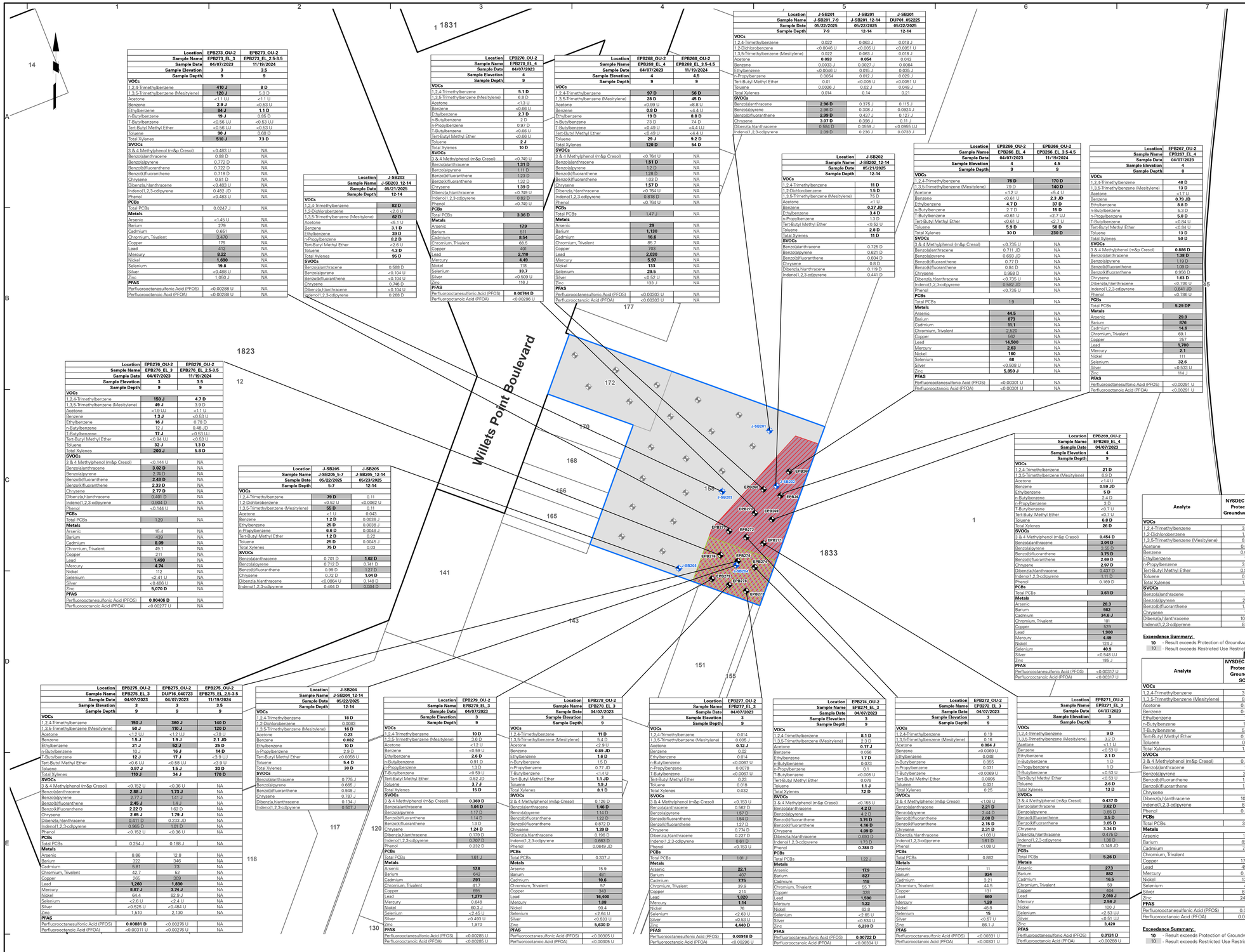
Project
WILLETS POINT DEVELOPMENT L-PARCEL
BCP SITE NO. C241146H
QUEENS NEW YORK

Figure Title
TREATABILITY STUDY SAMPLE LOCATION MAP

Project No.	170197601
Date	11/25/2025
Scale	1" = 30 feet
Drawn By	MG
Submission Date	
Figure.	3

Path: \\langan.com\data\NY\C\data6\170197601\AcGIS\APRX\170197601_SMP_FER\170197601_SMP_FER_SiteH.aprx Date: 11/25/2025 User: Gsajbel Time: 3:08 PM



Location	EPB273_OU-2	EPB273_OU-2
Sample Name	EPB273_EL_3	EPB273_EL_2.5-3.5
Sample Date	04/07/2023	11/19/2024
Sample Elevation	3	3.5
Sample Depth	9	9
VOCs		
1,2,4-Trimethylbenzene	**410 J**	**8 D**
1,3,5-Trimethylbenzene (Mesitylene)	**120 J**	5.8 D
Acetone	<1.1 UJ	<1.1 U
Benzene	**2.9 J**	<0.53 U
Ethylbenzene	**84 J**	**1.1 D**
n-Butylbenzene	**19 J**	0.85 D
T-Butylbenzene	<0.56 UJ	<0.53 U
Tert-Butyl Methyl Ether	<0.56 UJ	<0.53 U
Toluene	**90 J**	0.68 D
Total Xylenes	**510 J**	**7.3 D**
SVOCs		
3 & 4 Methylphenol (m&p Cresol)	<0.483 U	NA
Benzo(a)anthracene	0.88 D	NA
Benzo(a)pyrene	0.772 D	NA
Benzo(b)fluoranthene	0.722 D	NA
Benzo(k)fluoranthene	0.718 D	NA
Chrysene	0.81 D	NA
Dibenz(a,h)anthracene	<0.483 U	NA
Indeno(1,2,3-cd)pyrene	0.482 JD	NA
Phenol	<0.483 U	NA
PCBs		
Total PCBs	0.0247 J	NA
Metals		
Arsenic	<1.45 U	NA
Barium	279	NA
Cadmium	0.651	NA
Chromium, Trivalent	3,470	NA
Copper	176	NA
Lead	412	NA
Mercury	**0.22**	NA
Nickel	**1,690**	NA
Selenium	**19.8**	NA
Silver	<0.488 U	NA
Zinc	1,050 J	NA
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	<0.00288 U	NA
Perfluorooctanoic Acid (PFOA)	<0.00288 U	NA

Location	EPB270_OU-2
Sample Name	EPB270_EL_4
Sample Date	04/07/2023
Sample Elevation	4
Sample Depth	9
VOCs	
1,2,4-Trimethylbenzene	**5.1 D**
1,3,5-Trimethylbenzene (Mesitylene)	6.8 D
Acetone	<1.3 U
Benzene	<0.66 U
Ethylbenzene	**2.7 D**
n-Butylbenzene	2 D
n-Propylbenzene	0.97 D
T-Butylbenzene	<0.66 U
Tert-Butyl Methyl Ether	<0.66 U
Toluene	**2 J**
Total Xylenes	**10 D**
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.749 U
Benzo(a)anthracene	**1.31 D**
Benzo(a)pyrene	1.11 D
Benzo(b)fluoranthene	1.23 D
Benzo(k)fluoranthene	1.32 D
Chrysene	**1.39 D**
Dibenz(a,h)anthracene	<0.749 U
Indeno(1,2,3-cd)pyrene	0.82 D
Phenol	<0.749 U
PCBs	
Total PCBs	**3.36 D**
Metals	
Arsenic	**179**
Barium	511
Cadmium	**8.54**
Chromium, Trivalent	68.5
Copper	601
Lead	**2,110**
Mercury	**4.49**
Nickel	118
Selenium	**33.7**
Silver	<0.509 U
Zinc	116 J
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00744 D**
Perfluorooctanoic Acid (PFOA)	<0.00296 U

Location	EPB268_OU-2
Sample Name	EPB268_EL_4
Sample Date	04/07/2023
Sample Elevation	4
Sample Depth	9
VOCs	
1,2,4-Trimethylbenzene	**97 D**
1,3,5-Trimethylbenzene (Mesitylene)	**28 D**
Acetone	<0.99 U
Benzene	**0.8 D**
Ethylbenzene	**19 D**
n-Butylbenzene	7.3 D
T-Butylbenzene	<0.49 U
Tert-Butyl Methyl Ether	<0.49 U
Toluene	**29 J**
Total Xylenes	**120 D**
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.764 U
Benzo(a)anthracene	**1.51 D**
Benzo(a)pyrene	1.2 D
Benzo(b)fluoranthene	1.28 D
Benzo(k)fluoranthene	1.03 D
Chrysene	**1.57 D**
Dibenz(a,h)anthracene	<0.764 U
Indeno(1,2,3-cd)pyrene	0.818 D
Phenol	<0.764 U
PCBs	
Total PCBs	1.47 J
Metals	
Arsenic	**29**
Barium	**1,130**
Cadmium	**16.6**
Chromium, Trivalent	85.7
Copper	703
Lead	**2,030**
Mercury	**5.97**
Nickel	**133**
Selenium	**29.5**
Silver	<0.52 U
Zinc	133 J
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	<0.00303 U
Perfluorooctanoic Acid (PFOA)	<0.00303 U

Location	J-SB201	J-SB201	J-SB201
Sample Name	J-SB201_7-9	J-SB201_12-14	DUP01_052225
Sample Date	05/22/2025	05/22/2025	05/22/2025
Sample Depth	7-9	12-14	12-14
VOCs			
1,2,4-Trimethylbenzene	0.022	0.063 J	0.018 J
1,2-Dichlorobenzene	<0.0046 U	<0.005 U	<0.0051 U
1,3,5-Trimethylbenzene (Mesitylene)	0.022	0.063 J	0.018 J
Acetone	**0.093**	**0.054**	0.043
Benzene	0.0033 J	0.0027 J	0.0064
Ethylbenzene	<0.0046 U	0.015 J	0.035 J
n-Propylbenzene	0.0054	0.012 J	0.029 J
Tert-Butyl Methyl Ether	0.01	<0.005 U	<0.0051 U
Toluene	0.0026 J	0.02 J	0.049 J
Total Xylenes	0.014	0.14	0.21
SVOCs			
Benzo(a)anthracene	**2.96 D**	0.375 J	0.115 J
Benzo(a)pyrene	2.96 D	0.308 J	0.0924 J
Benzo(b)fluoranthene	**2.99 D**	0.437 J	0.127 J
Chrysene	**3.07 D**	0.398 J	0.11 J
Dibenz(a,h)anthracene	0.584 D	0.0559 J	<0.0955 UJ
Indeno(1,2,3-cd)pyrene	2.09 D	0.230 J	0.0733 J

Location	J-SB202
Sample Name	J-SB202_12-14
Sample Date	05/21/2025
Sample Depth	12-14
VOCs	
1,2,4-Trimethylbenzene	**11 D**
1,2-Dichlorobenzene	**1.5 D**
1,3,5-Trimethylbenzene (Mesitylene)	7.5 D
Acetone	<1 U
Benzene	**0.37 JD**
Ethylbenzene	**3.4 D**
n-Propylbenzene	1.3 D
Tert-Butyl Methyl Ether	<0.92 U
Toluene	**2.8 D**
Total Xylenes	**11 D**
SVOCs	
Benzo(a)anthracene	0.725 D
Benzo(a)pyrene	0.621 D
Benzo(b)fluoranthene	0.604 D
Chrysene	0.8 D
Dibenz(a,h)anthracene	0.119 D
Indeno(1,2,3-cd)pyrene	0.441 D

Location	EPB266_OU-2	EPB266_OU-2
Sample Name	EPB266_EL_4	EPB266_EL_3.5-4.5
Sample Date	04/07/2023	11/19/2024
Sample Elevation	4	4.5
Sample Depth	9	9
VOCs		
1,2,4-Trimethylbenzene	**76 D**	**170 D**
1,3,5-Trimethylbenzene (Mesitylene)	79 D	**140 D**
Acetone	<1.2 U	<5.4 U
Benzene	<0.61 U	**2.3 JD**
Ethylbenzene	**4.7 D**	**37 D**
n-Butylbenzene	2.7 D	**15 D**
T-Butylbenzene	<0.61 U	<2.7 UJ
Tert-Butyl Methyl Ether	<0.61 U	<2.7 U
Toluene	**5.9 D**	**58 D**
Total Xylenes	**30 D**	**230 D**
SVOCs		
3 & 4 Methylphenol (m&p Cresol)	<0.735 U	NA
Benzo(a)anthracene	0.711 JD	NA
Benzo(a)pyrene	0.693 JD	NA
Benzo(b)fluoranthene	0.77 D	NA
Benzo(k)fluoranthene	0.84 D	NA
Chrysene	0.958 D	NA
Dibenz(a,h)anthracene	<0.735 U	NA
Indeno(1,2,3-cd)pyrene	0.582 JD	NA
Phenol	<0.735 U	NA
PCBs		
Total PCBs	1.9	NA
Metals		
Arsenic	**44.5**	NA
Barium	**873**	NA
Cadmium	**11.1**	NA
Chromium, Trivalent	2,520	NA
Copper	662	NA
Lead	**14,500**	NA
Mercury	**2.63**	NA
Nickel	**160**	NA
Selenium	**88**	NA
Silver	<0.508 U	NA
Zinc	**5,850 J**	NA
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	<0.00301 U	NA
Perfluorooctanoic Acid (PFOA)	<0.00301 U	NA

Location	EPB267_OU-2
Sample Name	EPB267_EL_4
Sample Date	04/07/2023
Sample Elevation	4
Sample Depth	8
VOCs	
1,2,4-Trimethylbenzene	**48 D**
1,3,5-Trimethylbenzene (Mesitylene)	**13 D**
Acetone	<1.7 U
Benzene	**0.79 JD**
Ethylbenzene	**8.8 D**
n-Butylbenzene	5.3 D
n-Propylbenzene	**5.8 D**
T-Butylbenzene	<0.84 U
Tert-Butyl Methyl Ether	<0.84 U
Toluene	**13 D**
Total Xylenes	**50 D**
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	**0.886 D**
Benzo(a)anthracene	**1.38 D**
Benzo(a)pyrene	1.18 D
Benzo(b)fluoranthene	1.09 D
Benzo(k)fluoranthene	0.956 D
Chrysene	**1.63 D**
Dibenz(a,h)anthracene	<0.700 U
Indeno(1,2,3-cd)pyrene	0.641 JD
Phenol	<0.786 U
PCBs	
Total PCBs	**5.29 DP**
Metals	
Arsenic	**29.9**
Barium	**876**
Cadmium	**14.6**
Chromium, Trivalent	69.1
Copper	257
Lead	**1,700**
Mercury	**2.1**
Nickel	111
Selenium	**32.6**
Silver	<0.533 U
Zinc	114 J
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	<0.00291 U
Perfluorooctanoic Acid (PFOA)	<0.00291 U

Location	EPB269_OU-2
Sample Name	EPB269_EL_4
Sample Date	04/07/2023
Sample Elevation	4
Sample Depth	9
VOCs	
1,2,4-Trimethylbenzene	**21 D**
1,3,5-Trimethylbenzene (Mesitylene)	6.9 D
Acetone	<1.4 U
Benzene	**0.59 JD**
Ethylbenzene	**5 D**
n-Butylbenzene	2.4 D
n-Propylbenzene	3 D
T-Butylbenzene	<0.7 U
Tert-Butyl Methyl Ether	<0.7 U
Toluene	**6.8 D**
Total Xylenes	**26 D**
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	**0.454 D**
Benzo(a)anthracene	**3.04 D**
Benzo(a)pyrene	3.55 D
Benzo(b)fluoranthene	**3.75 D**
Benzo(k)fluoranthene	**2.69 D**
Chrysene	**2.97 D**
Dibenz(a,h)anthracene	0.437 D
Indeno(1,2,3-cd)pyrene	1.11 D
Phenol	0.169 D
PCBs	
Total PCBs	**3.61 D**
Metals	
Arsenic	**28.3**
Barium	**982**
Cadmium	**34.6 J**
Chromium, Trivalent	101
Copper	529
Lead	**1,900**
Mercury	**4.49**
Nickel	124 J
Selenium	**40.9**
Silver	<0.548 UJ
Zinc	185 J
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	<0.00317 U
Perfluorooctanoic Acid (PFOA)	<0.00317 U

Location	J-SB205	J-SB205
Sample Name	J-SB205_5-7	J-SB205_12-14
Sample Date	05/22/2025	05/23/2025
Sample Depth	5-7	12-14
VOCs		
1,2,4-Trimethylbenzene	**79 D**	0.11
1,2-Dichlorobenzene	<0.52 U	<0.0062 U
1,3,5-Trimethylbenzene (Mesitylene)	**55 D**	0.11
Acetone	<1 U	0.043
Benzene	**1.2 D**	0.0036 J
Ethylbenzene	**25 D**	0.0038 J
n-Propylbenzene	**6.6 D**	0.0048 J
Tert-Butyl Methyl Ether	**1.2 D**	0.22
Toluene	**25 D**	0.0045 J
Total Xylenes	**75 D**	0.03
SVOCs		
Benzo(a)anthracene	0.701 D	**1.02 D**
Benzo(a)pyrene	0.712 D	0.741 D
Benzo(b)fluoranthene	0.99 D	**1.27 D**
Chrysene	0.72 D	**1.04 D**
Dibenz(a,h)anthracene	<0.0864 U	0.148 D
Indeno(1,2,3-cd)pyrene	0.464 D	0.594 D

Location	J-SB203
Sample Name	J-SB203_12-14
Sample Date	05/21/2025
Sample Depth	12-14
VOCs	
1,2,4-Trimethylbenzene	**82 D**
1,2-Dichlorobenzene	<2.6 U
1,3,5-Trimethylbenzene (Mesitylene)	**62 D**
Acetone	<5.1 U
Benzene	**3.1 D**
Ethylbenzene	**39 D**
n-Propylbenzene	**8.2 D**
Tert-Butyl Methyl Ether	<2.6 U
Toluene	**4.3 D**
Total Xylenes	**95 D**
SVOCs	
Benzo(a)anthracene	0.588 D
Benzo(a)pyrene	<0.104 U
Benzo(b)fluoranthene	<0.104 U
Chrysene	0.746 D
Dibenz(a,h)anthracene	<0.104 U
Indeno(1,2,3-cd)pyrene	0.268 D

Location	EPB276_OU-2	EPB276_OU-2
Sample Name	EPB276_EL_3	EPB276_EL_2.5-3.5
Sample Date	04/07/2023	11/19/2024
Sample Elevation	3	3.5
Sample Depth	9	9
VOCs		
1,2,4-Trimethylbenzene	**150 J**	**4.7 D**
1,3,5-Trimethylbenzene (Mesitylene)	**49 J**	3.9 D
Acetone	<1.9 UJ	<1.1 U
Benzene	**1.3 J**	<0.53 U
Ethylbenzene	**16 J**	0.78 D
n-Butylbenzene	12 J	0.48 JD
T-Butylbenzene	**17 J**	<0.63 UJ
Tert-Butyl Methyl Ether	<0.94 UJ	<0.53 U
Toluene	**32 J**	**1.3 D**
Total Xylenes	**200 J**	**5.8 D**
SVOCs		
3 & 4 Methylphenol (m&p Cresol)	<0.144 U	NA
Benzo(a)anthracene	**3.02 D**	NA
Benzo(a)pyrene	2.74 D	NA
Benzo(b)fluoranthene	**2.43 D**	NA
Benzo(k)fluoranthene	**2.33 D**	NA
Chrysene	**2.77 D**	NA
Dibenz(a,h)anthracene	0.401 D	NA
Indeno(1,2,3-cd)pyrene	0.904 D	NA
Phenol	<0.144 U	NA
PCBs		
Total PCBs	1.29	NA
Metals		
Arsenic	15.4	NA
Barium	439	NA
Cadmium	**8.09**	NA
Chromium, Trivalent	49.1	NA
Copper	211	NA
Lead	**1,490**	NA
Mercury	**4.74**	NA
Nickel	112	NA
Selenium	<2.41 U	NA
Silver	<0.486 U	NA
Zinc	**5,070 D**	NA
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	**0.00406 D**	NA
Perfluorooctanoic Acid (PFOA)	<0.00277 U	NA

Location	EPB275_OU-2	EPB275_OU-2	EPB275_OU-2
Sample Name	EPB275_EL_3	DUP16_040723	EPB275_EL_2.5-3.5
Sample Date	04/07/2023	04/07/2023	11/19/2024
Sample Elevation	3	3	3.5
Sample Depth	9	9	9
VOCs			
1,2,4-Trimethylbenzene	**150 J**	**360 J**	**140 D**
1,3,5-Trimethylbenzene (Mesitylene)	**50 J**	**110 J**	**120 D**
Acetone	<1.2 UJ	<1.2 UJ	<7.8 U
Benzene	**1.5 J**	**1.9 J**	**2.1 JD**
Ethylbenzene	**21 J**	**52 J**	**25 D**
n-Butylbenzene	10 J	**16 J**	**14 D**
T-Butylbenzene	**12 J**	**17 J**	<3.9 UJ
Tert-Butyl Methyl Ether	<0.6 UJ	<0.58 UJ	<3.9 U
Toluene	**0.97 J**	**1.5 J**	**30 D**
Total Xylenes	**110 J**	**34 J**	**170 D**
SVOCs			
3 & 4 Methylphenol (m&p Cresol)	<0.152 U	<0.36 U	NA
Benzo(a)anthracene	**2.88 J**	**1.73 J**	NA
Benzo(a)pyrene	2.77 J	1.41 J	NA
Benzo(b)fluoranthene	**2.45 J**	1.4 J	NA
Benzo(k)fluoranthene	**2.22 D**	1.62 D	NA
Chrysene	**2.65 J**	**1.79 J**	NA
Dibenz(a,h)anthracene	0.411 D	0.233 JD	NA
Indeno(1,2,3-cd)pyrene	0.965 D	1.01 D	NA
Phenol	<0.152 U	<0.36 U	NA
PCBs			
Total PCBs	0.254 J	0.188 J	NA
Metals			
Arsenic	8.86	12.8	NA
Barium	322	346	NA
Cadmium	5.81	73	NA
Chromium, Trivalent	42.7	52	NA
Copper	265	309	NA
Lead	**1,260**	**1,830**	NA
Mercury	**8.87 J**	**3.74 J**	NA
Nickel	64.4	82.9 J	NA
Selenium	<2.6 U	<2.4 U	NA
Silver	<0.525 U	<0.484 U	NA
Zinc	1,510	2,130	NA
PFAS			
Perfluorooctanesulfonic Acid (PFOS)	**0.00881 D**	<0.00276 U	NA
Perfluorooctanoic Acid (PFOA)	<0.00311 U	<0.00276 U	NA

Location	J-SB204
Sample Name	J-SB204_12-14
Sample Date	05/22/2025
Sample Depth	12-14
VOCs	
1,2,4-Trimethylbenzene	**18 D**
1,2-Dichlorobenzene	0.0083
1,3,5-Trimethylbenzene (Mesitylene)	**16 D**
Acetone	**0.23**
Benzene	**0.082**
Ethylbenzene	**10 D**
n-Propylbenzene	2.9 D
Tert-Butyl Methyl Ether	<0.0058 U
Toluene	**5.4 D**
Total Xylenes	**30 D**
SVOCs	
Benzo(a)anthracene	0.775 J
Benzo(a)pyrene	0.665 J
Benzo(b)fluoranthene	0.949 J
Chrysene	0.787 J
Dibenz(a,h)anthracene	0.134 J
Indeno(1,2,3-cd)pyrene	0.507 J

Location	EPB279_OU-2
Sample Name	EPB279_EL_3
Sample Date	04/07/2023
Sample Elevation	3
Sample Depth	9
VOCs	
1,2,4-Trimethylbenzene	**10 D**
1,3,5-Trimethylbenzene (Mesitylene)	3.6 D
Acetone	<1.2 U
Benzene	<0.59 U
Ethylbenzene	**2.6 D**
n-Butylbenzene	0.91 D
n-Propylbenzene	1.3 D
T-Butylbenzene	<0.59 U
Tert-Butyl Methyl Ether	0.52 JD
Toluene	**3.7 J**
Total Xylenes	**15 D**
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	**0.369 D**
Benzo(a)anthracene	**1.04 D**
Benzo(a)pyrene	1.17 D
Benzo(b)fluoranthene	1.14 D
Benzo(k)fluoranthene	1.3 D
Chrysene	**1.24 D**
Dibenz(a,h)anthracene	0.179 D
Indeno(1,2,3-cd)pyrene	0.707 D
Phenol	0.232 D
PCBs	
Total PCBs	1.61 J
Metals	
Arsenic	**17.8**
Barium	642
Cadmium	**7.91**
Chromium, Trivalent	41.7
Copper	695
Lead	**1,270**
Mercury	0.648
Nickel	60.3 J
Selenium	<2.45 U
Silver	<0.493 U
Zinc	1,970
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	<0.00285 U
Perfluorooctanoic Acid (PFOA)	<0.00285 U

Location	EPB278_OU-2
Sample Name	EPB278_EL_3
Sample Date	04/07/2023
Sample Elevation	3
Sample Depth	9
VOCs	
1,2,4-Trimethylbenzene	**11 D**
1,3,5-Trimethylbenzene (Mesitylene)	5.4 D
Acetone	<2.9 U
Benzene	**0.89 JD**
Ethylbenzene	**1.6 D**
n-Butylbenzene	1.5 D
n-Propylbenzene	0.77 JD
T-Butylbenzene	<1.4 U
Tert-Butyl Methyl Ether	**1.1 JD**
Toluene	**1.9 J**
Total Xylenes	**8.1 D**
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	0.126 D
Benzo(a)anthracene	**1.46 D**
Benzo(a)pyrene	1.14 D
Benzo(b)fluoranthene	1.22 D
Benzo(k)fluoranthene	0.872 D
Chrysene	**1.39 D**
Dibenz(a,h)anthracene	0.196 D
Indeno(1,2,3-cd)pyrene	0.663 D
Phenol	0.0649 JD
PCBs	
Total PCBs	0.337 J
Metals	
Arsenic	15.9
Barium	481
Cadmium	**10.6**
Chromium, Trivalent	57
Copper	343
Lead	**16,400**
Mercury	**1.08**
Nickel	90.4
Selenium	<2.64 U
Silver	<0.533 U
Zinc	**5,630 D**
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	<0.00305 U
Perfluorooctanoic Acid (PFOA)	<0.00305 U

Location	EPB277_OU-2
Sample Name	EPB277_EL_3
Sample Date	04/07/2023
Sample Elevation	3
Sample Depth	9
VOCs	
1,2,4-Trimethylbenzene	0.014
1,3,5-Trimethylbenzene (Mesitylene)	0.005 J
Acetone	**0.12 J**
Benzene	0.02
Ethylbenzene	0.014
n-Butylbenzene	<0.0067 U
n-Propylbenzene	0.0078
T-Butylbenzene	<0.0067 U
Tert-Butyl Methyl Ether	0.23
Toluene	0.018
Total Xylenes	0.032
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.153 U
Benzo(a)anthracene	0.662 D
Benzo(a)pyrene	1.57 D
Benzo(b)fluoranthene	1.54 D
Benzo(k)fluoranthene	1.27 D
Chrysene	0.734 D
Dibenz(a,h)anthracene	0.227 D
Indeno(1,2,3-cd)pyrene	**0.61 D**
Phenol	<0.153 U
PCBs	
Total PCBs	1.01 J
Metals	
Arsenic	**22.1**
Barium	407
Cadmium	**7.75**
Chromium, Trivalent	39.9
Copper	214
Lead	**1,020**
Mercury	**1.14**
Nickel	76
Selenium	<2.65 U
Silver	<0.53 U
Zinc	**4,440 D**
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00918 D**
Perfluorooctanoic Acid (PFOA)	<0.00304 U

Location	EPB274_OU-2
Sample Name	EPB274_EL_3
Sample Date	04/07/2023
Sample Elevation	3
Sample Depth	9
VOCs	
1,2,4-Trimethylbenzene	**8.1 D**
1,3,5-Trimethylbenzene (Mesitylene)	2.3 D
Acetone	**0.17 J**
Benzene	0.056
Ethylbenzene	**1.7 D**
n-Butylbenzene	0.673
n-Propylbenzene	0.1
T-Butylbenzene	<0.005 U
Tert-Butyl Methyl Ether	0.076
Toluene	**1.1 J**
Total Xylenes	**7.2 D**
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.155 U
Benzo(a)anthracene	**4.2 D**
Benzo(a)pyrene	4.2 D
Benzo(b)fluoranthene	**3.74 D**
Benzo(k)fluoranthene	**4.16 D**
Chrysene	**4.09 D**
Dibenz(a,h)anthracene	0.693 D
Indeno(1,2,3-cd)pyrene	1.73 D
Phenol	**0.788 D**
PCBs	
Total PCBs	1.22 J
Metals	
Arsenic	**17.9**
Barium	**827**
Cadmium	**11.8**
Chromium, Trivalent	55.7
Copper	308
Lead	**1,590**
Mercury	**1.22**
Nickel	63.8
Selenium	<2.65 U
Silver	<0.534 U
Zinc	**6,230 D**
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00722 D**
Perfluorooctanoic Acid (PFOA)	<0.00304 U

Location	EPB272_OU-2
Sample Name	EPB272_EL_3
Sample Date	04/07/2023
Sample Elevation	3
Sample Depth	9
VOCs	
1,2,4-Trimethylbenzene	0.19
1,3,5-Trimethylbenzene (Mesitylene)	0.16
Acetone	**0.084 J**
Benzene	<0.0069 U
Ethylbenzene	0.048
n-Butylbenzene	0.055
n-Propylbenzene	0.031
T-Butylbenzene	<0.0069 U
Tert-Butyl Methyl Ether	0.0095
Toluene	0.031
Total Xylenes	0.25
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<1.08 U
Benzo(a)anthracene	**2.21 D**
Benzo(a)pyrene	2.44 D
Benzo(b)fluoranthene	**2.08 D**
Benzo(k)fluoranthene	**2.15 D**
Chrysene	**2.31 D**
Dibenz(a,h)anthracene	<1.08 U
Indeno(1,2,3-cd)pyrene	1.61 D
Phenol	<1.08 U
PCBs	
Total PCBs	0.862
Metals	
Arsenic	11
Barium	**934**
Cadmium	3.21
Chromium, Trivalent	44.5
Copper	131
Lead	**660**
Mercury	**1.28**
Nickel	48.8
Selenium	**15**
Silver	<0.57 U
Zinc	861 J
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	<0.00331 U
Perfluorooctanoic Acid (PFOA)	<0.00331 U

Location	EPB271_OU-2
Sample Name	EPB271_EL_3
Sample Date	04/07/2023
Sample Elevation	3
Sample Depth	9
VOCs	
1,2,4-Trimethylbenzene	**9 D**
1,3,5-Trimethylbenzene (Mesitylene)	2.2 D
Acetone	<1.1 U
Benzene	<0.53 U
Ethylbenzene	**2.1 D**
n-Butylbenzene	1 D
n-Propylbenzene	1 D
T-Butylbenzene	<0.53 U
Tert-Butyl Methyl Ether	<0.53 U
Toluene	**2.6 D**
Total Xylenes	**13 D**
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	**0.437 D**
Benzo(a)anthracene	**3.62 D**
Benzo(a)pyrene	3.86 D
Benzo(b)fluoranthene	**3.5 D**
Benzo(k)fluoranthene	**3.05 D**
Chrysene	**3.34 D**
Dibenz(a,h)anthracene	0.475 D
Indeno(1,2,3-cd)pyrene	1.38 D
Phenol	0.146 JD
PCBs	
Total PCBs	**5.26 D**
Metals	
Arsenic	**27.3**
Barium	**882**
Cadmium	**16.5**
Chromium, Trivalent	59
Copper	404
Lead	**2,010 J**
Mercury	**2.56 J**
Nickel	100 J
Selenium	<2.53 UJ
Silver	<0.51 UJ
Zinc	**3,420**
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.0131 D**
Perfluorooctanoic Acid (PFOA)	<0.00288 U

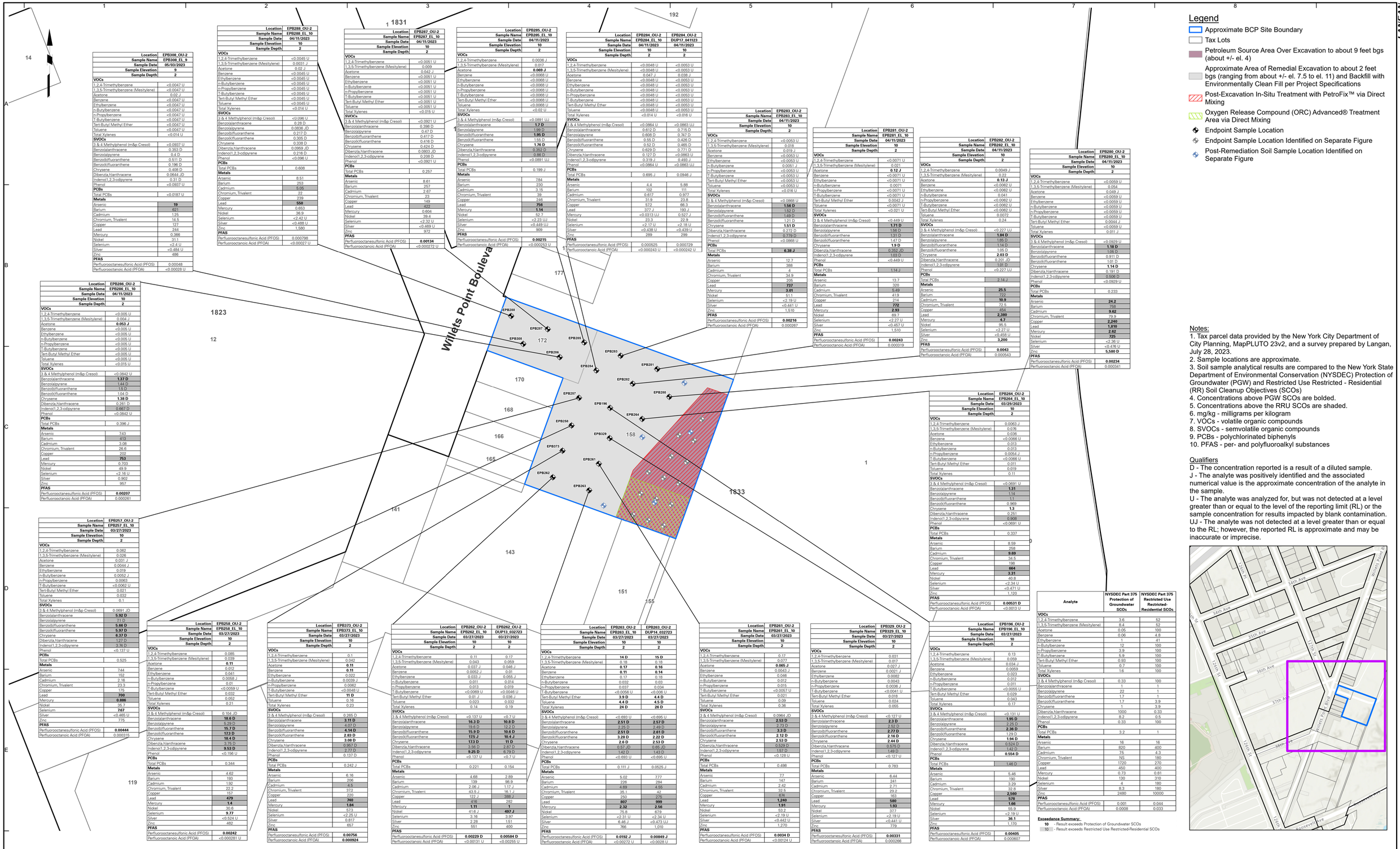
Analyte	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs
VOCs		
1,2,4-Trimethylbenzene	3.6	52
1,2-Dichlorobenzene	1.1	100
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52
Acetone	0.05	100
Benzene	0.06	4.8
Ethylbenzene	1	41
n-Butylbenzene	12	100
T-Butylbenzene	5.9	100
Tert-Butyl Methyl Ether	0.93	100
Toluene	0.7	100
Total Xylenes	1.6	100
SVOCs		
3 & 4 Methylphenol (m&p Cresol)	0.33	100
Benzo(a)anthracene	1	1
Benzo(a)pyrene	22	1
Benzo(b)fluoranthene	1.7	1
Benzo(k)fluoranthene	1.7	3.9
Chrysene	1	3.9
Dibenz(a,h)anthracene	1000	0.33
Indeno(1,2,3-cd)pyrene	8.2	0.5
Phenol	0.33	100
PCBs		
Total PCBs	3.2	1
Metals		
Arsenic	16	16
Barium	820	400
Cadmium	7.5	4.3
Chromium, Trivalent		180
Copper	1720	270
Lead	450	400
Mercury	0.73	0.81
Nickel	130	310
Selenium	4	180
Silver	8.3	180
Zinc	2480	10000
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	0.001	0.044
Perfluorooctanoic Acid (PFOA)	0.0008	0.033

Exceedance Summary:

10 - Result exceeds Protection of Groundwater SCOs

10 - Result exceeds Restricted Use Restricted-Residential SCOs

Analyte	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs
VOCs		
1,2,4-Trimethylbenzene	3.6	52
1,2-Dichlorobenzene	1.1	100
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52
Acetone	0.05	100
Benzene	0.06	4.8
Ethylbenzene	1	41
n-Butylbenzene	12	100
T-Butylbenzene	5.9	100
Tert-Butyl Methyl Ether	0.93	100
Toluene	0.7	100
Total Xylenes	1.6	100
SVOCs		
3 & 4 Methylphenol (m&p Cresol)	0.



Location	EPB308_OU-2
Sample Name	EPB308_EL_9
Sample Date	05/03/2023
Sample Elevation	9
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	<0.0047 U
1,3,5-Trimethylbenzene (Mesitylene)	<0.0047 U
Acetone	0.02 J
Benzene	<0.0047 U
Ethylbenzene	<0.0047 U
n-Butylbenzene	<0.0047 U
n-Propylbenzene	<0.0047 U
T-Butylbenzene	<0.0047 U
Tert-Butyl Methyl Ether	<0.0047 U
Toluene	<0.0047 U
Total Xylenes	<0.014 U
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.0937 U
Benzo(a)anthracene	0.353 D
Benzo(a)pyrene	0.4 D
Benzo(b)fluoranthene	0.511 D
Benzo(k)fluoranthene	0.196 D
Chrysene	0.408 D
Dibenz(a,h)anthracene	0.0644 JD
Indeno(1,2,3-cd)pyrene	0.31 D
Phenol	<0.0937 U
PCBs	
Total PCBs	<0.0187 U
Metals	
Arsenic	**19**
Barium	621
Cadmium	1.25
Chromium, Trivalent	14.5
Copper	127
Lead	244
Mercury	0.396
Nickel	31.1
Selenium	<2.4 U
Silver	<0.484 U
Zinc	486
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	0.00048
Perfluorooctanoic Acid (PFOA)	<0.00028 U

Location	EPB288_OU-2
Sample Name	EPB288_EL_10
Sample Date	04/11/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	<0.0045 U
1,3,5-Trimethylbenzene (Mesitylene)	0.0031 J
Acetone	0.02 J
Benzene	<0.0045 U
Ethylbenzene	<0.0045 U
n-Butylbenzene	<0.0045 U
n-Propylbenzene	<0.0045 U
T-Butylbenzene	<0.0045 U
Tert-Butyl Methyl Ether	<0.0045 U
Toluene	<0.0045 U
Total Xylenes	<0.014 U
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.096 U
Benzo(a)anthracene	0.28 D
Benzo(a)pyrene	0.0836 JD
Benzo(b)fluoranthene	0.217 D
Benzo(k)fluoranthene	0.305 D
Chrysene	0.338 D
Dibenz(a,h)anthracene	0.0969 JD
Indeno(1,2,3-cd)pyrene	0.216 D
Phenol	<0.096 U
PCBs	
Total PCBs	0.608
Metals	
Arsenic	8.51
Barium	253
Cadmium	5.05
Chromium, Trivalent	22
Copper	239
Lead	549
Mercury	0.653
Nickel	36.9
Selenium	<2.42 U
Silver	<0.488 U
Zinc	1,580
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	0.000798
Perfluorooctanoic Acid (PFOA)	<0.00027 U

Location	EPB287_OU-2
Sample Name	EPB287_EL_10
Sample Date	04/11/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	<0.0051 U
1,3,5-Trimethylbenzene (Mesitylene)	0.009
Acetone	0.042 J
Benzene	<0.0051 U
Ethylbenzene	<0.0051 U
n-Butylbenzene	<0.0051 U
n-Propylbenzene	<0.0051 U
T-Butylbenzene	<0.0051 U
Tert-Butyl Methyl Ether	<0.0051 U
Toluene	<0.0051 U
Total Xylenes	<0.015 U
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.0921 U
Benzo(a)anthracene	0.398 D
Benzo(a)pyrene	0.417 D
Benzo(b)fluoranthene	0.417 D
Benzo(k)fluoranthene	0.416 D
Chrysene	0.424 D
Dibenz(a,h)anthracene	0.0803 JD
Indeno(1,2,3-cd)pyrene	0.208 D
Phenol	<0.0921 U
PCBs	
Total PCBs	0.257
Metals	
Arsenic	8.61
Barium	267
Cadmium	3.67
Chromium, Trivalent	23
Copper	149
Lead	422
Mercury	0.604
Nickel	39.4
Selenium	<2.32 U
Silver	<0.469 U
Zinc	972
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00134**
Perfluorooctanoic Acid (PFOA)	<0.000272 U

Location	EPB285_OU-2
Sample Name	EPB285_EL_10
Sample Date	04/11/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	0.0036 J
1,3,5-Trimethylbenzene (Mesitylene)	0.017
Acetone	**0.069 J**
Benzene	<0.0068 U
Ethylbenzene	<0.0068 U
n-Butylbenzene	<0.0068 U
n-Propylbenzene	<0.0068 U
T-Butylbenzene	<0.0068 U
Tert-Butyl Methyl Ether	<0.0068 U
Toluene	<0.0068 U
Total Xylenes	<0.02 U
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.0891 UJ
Benzo(a)anthracene	**1.7 D**
Benzo(a)pyrene	1.99 D
Benzo(b)fluoranthene	**1.95 D**
Benzo(k)fluoranthene	1.55 D
Chrysene	**1.76 D**
Dibenz(a,h)anthracene	0.352 D
Indeno(1,2,3-cd)pyrene	0.86 D
Phenol	<0.0891 UJ
PCBs	
Total PCBs	0.199 J
Metals	
Arsenic	7.84
Barium	230
Cadmium	3.15
Chromium, Trivalent	39
Copper	246
Lead	**756**
Mercury	**1.14**
Nickel	52.7
Selenium	<2.23 UJ
Silver	<0.449 UJ
Zinc	909
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00215**
Perfluorooctanoic Acid (PFOA)	<0.000263 U

Location	EPB284_OU-2	EPB286_OU-2
Sample Name	EPB284_EL_10	DUP17_041123
Sample Date	04/11/2023	04/11/2023
Sample Elevation	10	10
Sample Depth	2	2
VOCs		
1,2,4-Trimethylbenzene	<0.0048 U	<0.0053 U
1,3,5-Trimethylbenzene (Mesitylene)	<0.0048 U	<0.0053 U
Acetone	0.047 J	0.038 J
Benzene	<0.0048 U	<0.0053 U
Ethylbenzene	<0.0048 U	<0.0053 U
n-Butylbenzene	<0.0048 U	<0.0053 U
n-Propylbenzene	<0.0048 U	<0.0053 U
T-Butylbenzene	<0.0048 U	<0.0053 U
Tert-Butyl Methyl Ether	<0.0048 U	<0.0053 U
Toluene	<0.0048 U	<0.0053 U
Total Xylenes	<0.014 U	<0.016 U
SVOCs		
3 & 4 Methylphenol (m&p Cresol)	<0.0864 U	<0.0863 UJ
Benzo(a)anthracene	0.612 D	0.715 D
Benzo(a)pyrene	0.608 D	0.747 D
Benzo(b)fluoranthene	0.55 D	0.426 D
Benzo(k)fluoranthene	0.52 D	0.465 D
Chrysene	0.629 D	0.771 D
Dibenz(a,h)anthracene	0.127 D	<0.0863 U
Indeno(1,2,3-cd)pyrene	0.319 J	0.493 J
Phenol	<0.0864 U	<0.0863 UJ
PCBs		
Total PCBs	0.695 J	0.0946 J
Metals		
Arsenic	4.4	5.88
Barium	102	111
Cadmium	0.617	0.977
Chromium, Trivalent	31.9	23.8
Copper	572	66.3
Lead	377 J	193 J
Mercury	<0.0313 UJ	0.527 J
Nickel	23.3	22.9
Selenium	<2.17 U	<2.18 U
Silver	<0.438 U	<0.439 U
Zinc	289	299
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	0.000525	0.000729
Perfluorooctanoic Acid (PFOA)	<0.000243 U	<0.000242 U

Location	EPB283_OU-2
Sample Name	EPB283_EL_10
Sample Date	04/11/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	<0.0053 U
1,3,5-Trimethylbenzene (Mesitylene)	0.018
Acetone	0.019 J
Benzene	<0.0053 U
Ethylbenzene	<0.0053 U
n-Butylbenzene	0.0051 J
n-Propylbenzene	<0.0053 U
T-Butylbenzene	<0.0053 U
Tert-Butyl Methyl Ether	<0.0053 U
Toluene	<0.0053 U
Total Xylenes	<0.016 U
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.0868 U
Benzo(a)anthracene	**1.56 D**
Benzo(a)pyrene	1.62 D
Benzo(b)fluoranthene	1.49 D
Benzo(k)fluoranthene	1.21 D
Chrysene	**1.51 D**
Dibenz(a,h)anthracene	0.272 D
Indeno(1,2,3-cd)pyrene	0.779 D
Phenol	<0.0868 U
PCBs	
Total PCBs	**6.38 J**
Metals	
Arsenic	12.7
Barium	388
Cadmium	4
Chromium, Trivalent	34.9
Copper	205
Lead	**737**
Mercury	**3.01**
Nickel	51.1
Selenium	<2.19 U
Silver	<0.441 U
Zinc	1,510
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00216**
Perfluorooctanoic Acid (PFOA)	0.000267

Location	EPB281_OU-2
Sample Name	EPB281_EL_10
Sample Date	04/11/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	<0.0071 U
1,3,5-Trimethylbenzene (Mesitylene)	0.021
Acetone	**0.12 J**
Benzene	<0.0071 U
Ethylbenzene	<0.0071 U
n-Butylbenzene	0.0071
n-Propylbenzene	<0.0071 U
T-Butylbenzene	<0.0071 U
Tert-Butyl Methyl Ether	0.0042 J
Toluene	<0.0071 U
Total Xylenes	<0.021 U
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.0449 U
Benzo(a)anthracene	**1.71 D**
Benzo(a)pyrene	1.56 D
Benzo(b)fluoranthene	1.31 D
Benzo(k)fluoranthene	1.47 D
Chrysene	**1.9 D**
Dibenz(a,h)anthracene	0.352 JD
Indeno(1,2,3-cd)pyrene	1.03 D
Phenol	<0.449 U
PCBs	
Total PCBs	1.14 J
Metals	
Arsenic	13.7
Barium	320
Cadmium	5.49
Chromium, Trivalent	41.9
Copper	214
Lead	**772**
Mercury	**2.93**
Nickel	69.7
Selenium	<2.27 U
Silver	<0.457 U
Zinc	1,510
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00243**
Perfluorooctanoic Acid (PFOA)	0.000319

Location	EPB282_OU-2
Sample Name	EPB282_EL_10
Sample Date	04/11/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	0.0049 J
1,3,5-Trimethylbenzene (Mesitylene)	0.22
Acetone	**0.13 J**
Benzene	<0.0062 U
Ethylbenzene	<0.0062 U
n-Butylbenzene	0.041
n-Propylbenzene	<0.0062 U
T-Butylbenzene	<0.0062 U
Tert-Butyl Methyl Ether	<0.0062 U
Toluene	0.0072
Total Xylenes	0.24
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.227 UJ
Benzo(a)anthracene	**1.94 D**
Benzo(a)pyrene	1.85 D
Benzo(b)fluoranthene	1.14 D
Benzo(k)fluoranthene	1.05 D
Chrysene	**2.03 D**
Dibenz(a,h)anthracene	0.201 JD
Indeno(1,2,3-cd)pyrene	1.01 D
Phenol	<0.227 UJ
PCBs	
Total PCBs	2.14 J
Metals	
Arsenic	**25.5**
Barium	722
Cadmium	**10.9**
Chromium, Trivalent	72.5
Copper	454
Lead	**2,380**
Mercury	**4.7**
Nickel	95.5
Selenium	<2.27 U
Silver	<0.458 U
Zinc	**3,200**
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.0043**
Perfluorooctanoic Acid (PFOA)	0.000543

Location	EPB280_OU-2
Sample Name	EPB280_EL_10
Sample Date	04/11/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	<0.0059 U
1,3,5-Trimethylbenzene (Mesitylene)	0.054
Acetone	0.049 J
Benzene	<0.0059 U
Ethylbenzene	<0.0059 U
n-Butylbenzene	<0.0059 U
n-Propylbenzene	<0.0059 U
T-Butylbenzene	<0.0059 U
Tert-Butyl Methyl Ether	0.0044 J
Toluene	0.0059 U
Total Xylenes	0.011 J
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.0929 U
Benzo(a)anthracene	**1.18 D**
Benzo(a)pyrene	1.06 D
Benzo(b)fluoranthene	0.911 D
Benzo(k)fluoranthene	1.01 D
Chrysene	**1.14 D**
Dibenz(a,h)anthracene	0.191 D
Indeno(1,2,3-cd)pyrene	0.506 D
Phenol	<0.0929 U
PCBs	
Total PCBs	0.233
Metals	
Arsenic	**24.2**
Barium	758
Cadmium	**9.62**
Chromium, Trivalent	79.9
Copper	**2,240**
Lead	**1,810**
Mercury	**2.62**
Nickel	**725**
Selenium	<2.36 U
Silver	<0.476 U
Zinc	**5,580 D**
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00234**
Perfluorooctanoic Acid (PFOA)	0.000341

Location	EPB257_OU-2
Sample Name	EPB257_EL_10
Sample Date	03/27/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	0.062
1,3,5-Trimethylbenzene (Mesitylene)	0.026
Acetone	0.031 J
Benzene	0.0044 J
Ethylbenzene	0.019
n-Butylbenzene	0.0052 J
n-Propylbenzene	0.0063
T-Butylbenzene	<0.0062 U
Tert-Butyl Methyl Ether	0.021
Toluene	0.032
Total Xylenes	0.1
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	0.0691 JD
Benzo(a)anthracene	**5.92 D**
Benzo(a)pyrene	7.1 D
Benzo(b)fluoranthene	**5.66 D**
Benzo(k)fluoranthene	**5.97 D**
Chrysene	**6.37 D**
Dibenz(a,h)anthracene	1.27 D
Indeno(1,2,3-cd)pyrene	3.74 D
Phenol	<0.137 U
PCBs	
Total PCBs	0.525
Metals	
Arsenic	7.44
Barium	152
Cadmium	2.16
Chromium, Trivalent	23.3
Copper	175
Lead	**709**
Mercury	**0.886**
Nickel	35.7
Selenium	**7.67**
Silver	<0.465 U
Zinc	775
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00444**
Perfluorooctanoic Acid (PFOA)	0.000315

Location	EPB258_OU-2
Sample Name	EPB258_EL_10
Sample Date	03/27/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	0.085
1,3,5-Trimethylbenzene (Mesitylene)	0.039
Acetone	**0.11**
Benzene	0.012
Ethylbenzene	0.041
n-Butylbenzene	0.0058 J
n-Propylbenzene	0.01
T-Butylbenzene	<0.0059 U
Tert-Butyl Methyl Ether	0.032
Toluene	0.052
Total Xylenes	0.21
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	0.104 JD
Benzo(a)anthracene	**18.6 D**
Benzo(a)pyrene	5.29 D
Benzo(b)fluoranthene	**15.7 D**
Benzo(k)fluoranthene	**17.3 D**
Chrysene	**18.4 D**
Dibenz(a,h)anthracene	3.76 D
Indeno(1,2,3-cd)pyrene	**9.53 D**
Phenol	<0.156 U
PCBs	
Total PCBs	0.344
Metals	
Arsenic	4.62
Barium	193
Cadmium	1.92
Chromium, Trivalent	22.2
Copper	157
Lead	**479**
Mercury	**1.4**
Nickel	30.6
Selenium	**9.77**
Silver	<0.524 U
Zinc	482
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00242**
Perfluorooctanoic Acid (PFOA)	<0.000291 U

Location	EPB373_OU-2
Sample Name	EPB373_EL_10
Sample Date	03/27/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	0.1
1,3,5-Trimethylbenzene (Mesitylene)	0.042
Acetone	**0.11**
Benzene	**0.11**
Ethylbenzene	0.022
n-Butylbenzene	0.0039 J
n-Propylbenzene	0.0062
T-Butylbenzene	<0.0048 U
Tert-Butyl Methyl Ether	**11 D**
Toluene	0.16
Total Xylenes	0.23
PCBs	
Total PCBs	0.265 D
Benzo(a)anthracene	**3.11 D**
Benzo(a)pyrene	4.07 D
Benzo(b)fluoranthene	**4.14 D**
Benzo(k)fluoranthene	**2.83 D**
Chrysene	**3.08 D**
Dibenz(a,h)anthracene	0.957 D
Indeno(1,2,3-cd)pyrene	2.77 D
Phenol	0.137 D
PCBs	
Total PCBs	0.242 J
Metals	
Arsenic	6.16
Barium	206
Cadmium	4.5
Chromium, Trivalent	37.2
Copper	220
Lead	**749**
Mercury	**1.84**
Nickel	57.3
Selenium	<2.25 U
Silver	0.817
Zinc	657
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00756**
Perfluorooctanoic Acid (PFOA)	**0.000924**

Location	EPB262_OU-2	EPB262_OU-2
Sample Name	EPB262_EL_10	DUP15_032723
Sample Date	03/27/2023	03/27/2023
Sample Elevation	10	10
Sample Depth	2	2
VOCs		
1,2,4-Trimethylbenzene	0.11	0.17
1,3,5-Trimethylbenzene (Mesitylene)	0.043	0.059
Acetone	0.037 J	0.046 J
Benzene	0.0052 J	0.01
Ethylbenzene	0.033 J	0.055 J
n-Butylbenzene	0.011	0.014
n-Propylbenzene	0.013	0.019
T-Butylbenzene	<0.0069 U	<0.0046 U
Tert-Butyl Methyl Ether	0.01 J	0.036 J
Toluene	0.023	0.032
Total Xylenes	0.14	0.19
SVOCs		
3 & 4 Methylphenol (m&p Cresol)	<0.137 U	<0.7 U
Benzo(a)anthracene	**16.3 D**	**10.8 D**
Benzo(a)pyrene	19.6 D	12.2 D
Benzo(b)fluoranthene	**15.9 D**	**10.6 D**
Benzo(k)fluoranthene	**17.5 J**	**10.4 J**
Chrysene	**17.3 D**	**11 D**
Dibenz(a,h)anthracene	3.56 D	2.87 D
Indeno(1,2,3-cd)pyrene	**9.25 D**	6.79 D
Phenol	<0.137 U	<0.7 U
PCBs		
Total PCBs	0.221	0.154
Metals		
Arsenic	4.68	2.89
Barium	139	98.9
Cadmium	2.06 J	1.17 J
Chromium, Trivalent	43.5 J	16.1 J
Copper	122 J	388 J
Lead	416	282
Mercury	**1.11**	**1**
Nickel	41.6 J	**497 J**
Selenium	3.16	3.97
Silver	2.28	1.51
Zinc	551	400
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	**0.00229 D**	**0.00584 D**
Perfluorooctanoic Acid (PFOA)	<0.00131 U	<0.00255 U

Location	EPB263_OU-2	EPB263_OU-2
Sample Name	EPB263_EL_10	DUP14_032723
Sample Date	03/27/2023	03/27/2023
Sample Elevation	10	10
Sample Depth	2	2
VOCs		
1,2,4-Trimethylbenzene	**14 D**	**15 D**
1,3,5-Trimethylbenzene (Mesitylene)	0.18	0.18
Acetone	**0.17**	**0.16**
Benzene	**0.11**	**0.14**
Ethylbenzene	0.17	0.18
n-Butylbenzene	0.032	0.03
n-Propylbenzene	0.037	0.034
T-Butylbenzene	<0.0056 U	<0.006 U
Tert-Butyl Methyl Ether	**3.9 D**	**4.4 D**
Toluene	**4.4 D**	**4.5 D**
Total Xylenes	**24 D**	**26 D**
SVOCs		
3 & 4 Methylphenol (m&p Cresol)	<0.693 U	<0.695 U
Benzo(a)anthracene	**2.51 D**	**2.57 D**
Benzo(a)pyrene	2.25 D	2.49 D
Benzo(b)fluoranthene	**2.51 D**	**2.61 D**
Benzo(k)fluoranthene	**3.28 D**	**2.22 D**
Chrysene	**2.6 D**	**2.53 D**
Dibenz(a,h)anthracene	0.57 JD	0.65 JD
Indeno(1,2,3-cd)pyrene	1.42 D	1.43 D
Phenol	<0.693 U	<0.695 U
PCBs		
Total PCBs	0.111 J	0.0625 J
Metals		
Arsenic	5.02	7.77
Barium	226	294
Cadmium	4.69	4.55
Chromium, Trivalent	35.1	42
Copper	250	275
Lead	**807**	**999**
Mercury	**2.32**	**2.56**
Nickel	75.8	67.9
Selenium	<2.31 U	<2.34 U
Silver	6.46 J	<0.473 UJ
Zinc	766	1,010
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	**0.0192 J**	**0.00849 J**
Perfluorooctanoic Acid (PFOA)	<0.00272 U	<0.0028 U

Location	EPB261_OU-2
Sample Name	EPB261_EL_10
Sample Date	03/27/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	0.17
1,3,5-Trimethylbenzene (Mesitylene)	0.077
Acetone	**0.065 J**
Benzene	0.0043 J
Ethylbenzene	0.046
n-Butylbenzene	0.012
n-Propylbenzene	0.015
T-Butylbenzene	<0.0057 U
Tert-Butyl Methyl Ether	0.021
Toluene	0.09
Total Xylenes	0.36
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	0.0964 JD
Benzo(a)anthracene	**2.53 D**
Benzo(a)pyrene	2.73 D
Benzo(b)fluoranthene	**3.3 D**
Benzo(k)fluoranthene	**2.12 D**
Chrysene	**2.53 D**
Dibenz(a,h)anthracene	0.529 D
Indeno(1,2,3-cd)pyrene	1.82 D
Phenol	<0.128 U
PCBs	
Total PCBs	0.498
Metals	
Arsenic	77
Barium	147
Cadmium	2.42
Chromium, Trivalent	32.6
Copper	674
Lead	**1,240**
Mercury	**1.91**
Nickel	53.2
Selenium	<2.19 U
Silver	<0.442 U
Zinc	1,270
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.0034 D**
Perfluorooctanoic Acid (PFOA)	<0.00124 U

Location	EPB329_OU-2
Sample Name	EPB329_EL_10
Sample Date	03/27/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	0.031
1,3,5-Trimethylbenzene (Mesitylene)	0.017
Acetone	0.027 J
Benzene	0.0021 J
Ethylbenzene	0.0082
n-Butylbenzene	0.0043
n-Propylbenzene	0.0038 J
T-Butylbenzene	<0.0041 U
Tert-Butyl Methyl Ether	0.018
Toluene	0.024
Total Xylenes	0.055
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.127 U
Benzo(a)anthracene	**2.3 D**
Benzo(a)pyrene	2.62 D
Benzo(b)fluoranthene	**2.77 D**
Benzo(k)fluoranthene	**2.16 D**
Chrysene	**2.44 D**
Dibenz(a,h)anthracene	0.575 D
Indeno(1,2,3-cd)pyrene	1.49 D
Phenol	<0.127 U
PCBs	
Total PCBs	0.783
Metals	
Arsenic	6.44
Barium	241
Cadmium	2.71
Chromium, Trivalent	29.2
Copper	163
Lead	**580**
Mercury	**1.93**
Nickel	377
Selenium	<2.19 U
Silver	<0.441 U
Zinc	779
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00331**
Perfluorooctanoic Acid (PFOA)	0.000266

Location	EPB264_OU-2
Sample Name	EPB264_EL_10
Sample Date	03/29/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	0.0063 J
1,3,5-Trimethylbenzene (Mesitylene)	0.076
Acetone	0.036
Benzene	<0.0066 U
Ethylbenzene	0.013
n-Butylbenzene	0.013
n-Propylbenzene	0.0054 J
T-Butylbenzene	<0.0066 U
Tert-Butyl Methyl Ether	0.011
Toluene	0.019
Total Xylenes	0.11
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.0691 U
Benzo(a)anthracene	**1.31**
Benzo(a)pyrene	1.14
Benzo(b)fluoranthene	1.1
Benzo(k)fluoranthene	0.969
Chrysene	**1.3**
Dibenz(a,h)anthracene	0.251
Indeno(1,2,3-cd)pyrene	0.908
Phenol	<0.0691 U
PCBs	
Total PCBs	0.337
Metals	
Arsenic	8.59
Barium	258
Cadmium	**9.69**
Chromium, Trivalent	34.5
Copper	186
Lead	**664**
Mercury	**3.31**
Nickel	40.8
Selenium	<2.34 U
Silver	<0.471 U
Zinc	1,120
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00531 D**
Perfluorooctanoic Acid (PFOA)	<0.0013 U

Location	EPB196_OU-2
Sample Name	EPB196_EL_10
Sample Date	03/27/2023
Sample Elevation	10
Sample Depth	2
VOCs	
1,2,4-Trimethylbenzene	0.13
1,3,5-Trimethylbenzene (Mesitylene)	0.059
Acetone	0.034 J
Benzene	0.0059
Ethylbenzene	0.023
n-Butylbenzene	0.012
n-Propylbenzene	0.011
T-Butylbenzene	<0.0055 U
Tert-Butyl Methyl Ether	0.029
Toluene	0.043
Total Xylenes	0.17
SVOCs	
3 & 4 Methylphenol (m&p Cresol)	<0.131 U
Benzo(a)anthracene	**1.95 D**
Benzo(a)pyrene	2.23 D
Benzo(b)fluoranthene	**2.36 D**
Benzo(k)fluoranthene	1.29 D
Chrysene	**1.94 D**
Dibenz(a,h)anthracene	0.524 D
Indeno(1,2,3-cd)pyrene	1.42 D
Phenol	**0.554 D**
PCBs	
Total PCBs	1.46 D
Metals	
Arsenic	5.46
Barium	190
Cadmium	3.29
Chromium, Trivalent	32.8
Copper	**2,550**
Lead	**578**
Mercury	**1.66**
Nickel	55.9
Selenium	<2.19 U
Silver	**36.1**
Zinc	1,170
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	**0.00405**
Perfluorooctanoic Acid (PFOA)	0.000607

Analyte	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs
VOCs		
1,2,4-Trimethylbenzene	3.6	52
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52
Acetone	0.05	100
Benzene	0.06	4.8
Ethylbenzene	1	41
n-Butylbenzene	12	100
n-Propylbenzene	3.9	100
T-Butylbenzene	5.9	100
Tert-Butyl Methyl Ether	0.93	100
Toluene	0.7	100
Total Xylenes	1.6	100
SVOCs		
3 & 4 Methylphenol (m&p Cresol)	0.33	100
Benzo(a)anthracene	1	1
Benzo(a)pyrene	22	1
Benzo(b)fluoranthene	1.7	1
Benzo(k)fluoranthene	1.7	3.9
Chrysene	1	3.9
Dibenz(a,h)anthracene	1000	0.33
Indeno(1,2,3-cd)pyrene	8.2	0.5
Phenol	0.33	100
PCBs		
Total PCBs	3.2	1
Metals		
Arsenic	16	16
Barium	820	400
Cadmium	7.5	4.3
Chromium, Trivalent	NS	180
Copper	1720	270
Lead	450	400
Mercury	0.73	0.81
Nickel	130	310
Selenium	4	180
Silver	8.3	180
Zinc	2480	10000
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	0.001	0.044
Perfluorooctanoic Acid (PFOA)	0.0008	0.033

Exceedance Summary:
10 - Result exceeds Protection of Groundwater SCOs
10 - Result exceeds

TABLES

Table 1
Treatability Study Work Plan
Treatability Study Schedule

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Task/Milestone	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26
Treatability Study Work Plan Preparation												
Treatability Study Work Plan (NYSDEC Review)												
Treatability Study (Field/Lab Analysis)												
Treatability Study (Reporting and Design Documents)												
Treatability Study and Design (NYSDEC Review)												
Treatment Design Bidding												
Treatment Implementation + First Round Sampling												
Receive and Process Data												
Data Submission and Review by NYSDEC												
SMP and FER Revisions												
DEC Review, Approval, and COC												

Notes:

NYSDEC - New York State Department of Environmental Conservation

COC - Certification of Completion

FER - Final Engineering Report

SMP - Site Management Plan

ATTACHMENT 1

Community Air Monitoring Plan

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Attachment 1
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.

ATTACHMENT 2

Material Specification and Safety Data Sheets

LANGAN

SAFETY DATA SHEET
Klozur ® KP

SDS # : 7727-21-1-12
Revision date: 2018-07-13
Format: NA
Version 1.01

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name Klozur ® KP

CAS-No 7727-21-1

Synonyms Potassium Peroxydisulfate; Dipotassium Peroxydisulfate; Peroxydisulfuric acid, dipotassium salt; Peroxydisulfuric acid, potassium salt.

Recommended use of the chemical and restrictions on use

Recommended Use: In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications

Restrictions on Use No uses to be advised against were identified.

Manufacturer/Supplier

PeroxyChem LLC
2005 Market Street
Suite 3200
Philadelphia, PA 19103
Phone: +1 267/ 422-2400 (General Information)
E-Mail: sdsinfo@peroxychem.com

Emergency telephone numbers

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)
4001 - 204937 (CHEMTREC - PRC)
1 303/ 389-1409 (Medical - U.S. - Call Collect)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2B
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Specific target organ toxicity (single exposure)	Category 3
Oxidizing Solids	Category 3

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Danger

Hazard Statements
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335 - May cause respiratory irritation
H320 - Causes eye irritation
H315 - Causes skin irritation
H317 - May cause an allergic skin reaction
H302 - Harmful if swallowed
H272 - May intensify fire; oxidizer

Precautionary Statements - Prevention
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
P285 - In case of inadequate ventilation wear respiratory protection
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/ protective clothing
P264 - Wash face, hands and any exposed skin thoroughly after handling
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P220 - Keep/Store away from clothing/combustible materials
P221 - Take any precaution to avoid mixing with combustibles

Precautionary Statements - Response
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/ attention
P302 + P352 - IF ON SKIN: Wash with plenty of water.
P333 + P313 - If skin irritation or rash occurs: Get medical advice/ attention
P304 + P341 - IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing
P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
P330 - Rinse mouth
P370 + P378 - In case of fire: Use water for extinction

Precautionary Statements - Storage
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other Information
Risk of decomposition by heat or by contact with incompatible materials

Unknown acute toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula K2O8S2 and $K_2 S_2 O_8$

Chemical name	CAS-No	Weight %
Potassium Persulfate	7727-21-1	> 98
Potassium Sulfate	7778-80-5	< 2

4. FIRST AID MEASURES

General Advice Remove from exposure, lie down. Show this material safety data sheet to the doctor in attendance.

Eye Contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids intermittently. Consult a physician. In case of contact, immediately flush eyes with plenty of water. If symptoms persist, call a physician.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention if irritation develops and persists.

Inhalation Remove from exposure, lie down. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately. Rinse mouth. Drink 1 or 2 glasses of water.

Most important symptoms and effects, both acute and delayed Itching; Redness; Coughing and/ or wheezing.

Indication of immediate medical attention and special treatment needed, if necessary Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Water. Cool containers with flooding quantities of water until well after fire is out.

Unsuitable extinguishing media Do not use carbon dioxide or other gas filled fire extinguishers; they will have little effect on decomposing persulfate.

Specific Hazards Arising from the Chemical Decomposes under fire conditions to release oxygen that intensifies the fire.

Explosion data
Sensitivity to Mechanical Impact Not sensitive.
Sensitivity to Static Discharge Not sensitive.

Protective equipment and precautions for firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Keep off any unprotected persons. Avoid contact with the skin and the eyes. Avoid breathing dust. Wear personal protective equipment.

Other Never add other substances or combustible waste to product residues.

Environmental Precautions Knock down dust with water spray. Avoid penetration into waterways, sewers, soil or

groundwater. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment Vacuum, shovel or pump waste into a drum and label contents for disposal. Avoid dust formation. Store in closed container.

Methods for cleaning up Clean up spill area and treat as special waste. Dispose of waste as indicated in Section 13.

7. HANDLING AND STORAGE

Handling Wear personal protective equipment. Avoid breathing dust. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Avoid contact with skin and eyes. Remove and wash contaminated clothing before re-use.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat. Do not store near combustible materials. Avoid contamination of opened product. Keep away from food, drink and animal feedingstuffs. Avoid formation and deposition of dust.

Incompatible products Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .

Chemical name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
Potassium Persulfate 7727-21-1	TWA: 0.1 mg/m³	-	-	-
Chemical name	**British Columbia**	**Quebec**	**Ontario TWAEV**	**Alberta**
Potassium Persulfate 7727-21-1	TWA: 0.1 mg/m³	-	TWA: 0.1 mg/m³	TWA: 0.1 mg/m³

Appropriate engineering controls

Engineering measures Provide local exhaust or general ventilation adequate to maintain exposures below permissable exposure limits.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Eye protection recommended. Chemical goggles consistent with EN 166 or equivalent.

Skin and Body Protection Wear long-sleeved shirt, long pants, socks, and shoes.

Hand Protection Protective gloves: Neoprene gloves, Polyvinylchloride, Natural Rubber.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn: particulate filtering facepiece respirators.

Hygiene measures Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Wash hands before breaks and after shifts. Keep work clothes separate, remove contaminated clothing - launder after open handling of product.

General information Protective engineering solutions should be implemented and in use before personal protective equipment is considered.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance Crystalline solid

Physical State	Solid
Color	White
Odor	odorless
Odor threshold	Not applicable
pH	6.4 (1% solution)
Melting point/freezing point	> 100 °C (Decomposes)
Boiling Point/Range	Decomposes upon heating
Flash point	Not applicable
Evaporation Rate	No information available
Flammability (solid, gas)	Not flammable
Flammability Limit in Air	Not applicable
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	6.07E-30 mm Hg at 25ºC
Vapor density	No information available
Density	2.48 g/cm³ (crystal density)
Specific gravity	No information available
Water solubility	5.6 % @ 25 °C
Solubility in other solvents	No information available
Partition coefficient	No information available (inorganic)
Autoignition temperature	No evidence of combustion up to 600 °C
Decomposition temperature	> 100 °C (assume)
Viscosity, kinematic	No information available (Solid)
Viscosity, dynamic	No information available
Explosive properties	Not explosive
Oxidizing properties	oxidizer
Molecular weight	270.31
Bulk density	1.30 g/cm³ (loose)

10. STABILITY AND REACTIVITY

Reactivity Strong oxidizer. Oxidizer. Contact with other material may cause fire.

Chemical Stability Decomposition can occur on exposure to heat or moisture.

Possibility of Hazardous Reactions Use of persulfates in chemical reactions requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid Moisture; Heat. (decomposes at temperatures >100 °C).

Incompatible materials Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

Hazardous Decomposition Products Incomplete combustion and thermolysis may produce gases of varying toxicity such as carbon monoxide, carbon dioxide, various hydrocarbons, aldehydes and soot.

11. TOXICOLOGICAL INFORMATION

Product Information

Unknown acute toxicity 0% of the mixture consists of ingredient(s) of unknown toxicity

LD50 Oral	1130 mg/kg (rat) (Potassium Persulfate)
LD50 Dermal	> 10000 10,000 mg/kg (rat) (Potassium Persulfate)

LC50 Inhalation > 42.9 mg/L (rat) (Potassium Persulfate)

Serious eye damage/eye irritation Irritating to eyes.
Skin corrosion/irritation Not irritating in animal studies.

Sensitization Sensitizing to skin and respiratory system.

Component Information

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation	NOAEL Oral Value
Potassium Persulfate (7727-21-1)	1130 mg/kg (rat)	>10,000 kg/kg (rat)	> 42.9 mg/L (rat)	
Potassium Sulfate (7778-80-5)	= 6600 mg/kg (Rat)			

Information on toxicological effects

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Carcinogenicity Did not show carcinogenic effects in animal experiments.

Mutagenicity In vivo tests did not show mutagenic effects.

Reproductive toxicity This product is not recognized as reprotox by Research Agencies.

STOT - single exposure May cause respiratory irritation.
STOT - repeated exposure Not classified.
Subchronic toxicity Oral (NOAEL) = 131.5 mg/kg bw (Potassium Persulfate)
Inhalation (NOAEC) = 10.3 mg/m^3 (Ammonium Persulfate)
Dermal: No data available

Target organ effects Eyes, Skin, Respiratory System.

Aspiration hazard No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects Not expected to have significant environmental effects, based on data for similar substances.

Potassium Persulfate (7727-21-1)				
Active Ingredient(s)	Duration	Species	Value	Units
Potassium persulfate	96 h LC50	Onchorhyncus mykiss	76.3	mg/L
Potassium persulfate	48 h EC50	Water flea	120	mg/L
Potassium persulfate	72 h EC50	Marine algae (Phaeodacttylum tricornutum)	136	mg/L
Potassium persulfate	96 h LC50	Turbot (Scophthalmus maximus)	107.6	mg/L
Potassium persulfate	18 h EC10	Pseudonomas putida	36	mg/L
Potassium persulfate	5 d	Abra Alba	11	mg/L
Potassium persulfate	96 h LC50	Grass shrimp	391	mg/L
Potassium persulfate	24 h EC50	Daphnia magna	635.7	mg/L

Persistence and degradability Biodegradability does not pertain to inorganic substances.

Bioaccumulation Does not bioaccumulate.

Mobility Dissociates into ions.

Other Adverse Effects None known.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261). It must undergo special treatment, e.g. at suitable disposal site, to comply with local regulations.

US EPA Waste Number D001.

Contaminated Packaging Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

DOT

UN/ID no 1492
Proper Shipping Name Potassium persulfate
Hazard class 5.1
Packing Group III

TDG

UN/ID no 1492
Proper Shipping Name Potassium persulfate
Hazard class 5.1
Packing Group III

ICAO/IATA

UN/ID no 1492
Proper Shipping Name Potassium persulfate
Hazard class 5.1

Packing Group	III

IMDG/IMO

UN/ID no	1492
Proper Shipping Name	Potassium persulfate
Hazard class	5.1
Packing Group	III

ADR/RID

UN/ID no	1492
Proper Shipping Name	Potassium persulfate
Hazard class	5.1
Packing Group	III

ADN

Proper Shipping Name	Potassium persulfate
Hazard class	5.1
Packing Group	III

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories
This product is not subject to reporting under the Emergency Planning and Community Right-to-Know rule.

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA/EPCRA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

U.S. State Right-to-Know Regulations
This product contains the following substances regulated under state Right-to-Know laws:

Chemical name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Potassium Persulfate	X	X	X		X

California Proposition 65
This product does not contain any Proposition 65 chemicals

CANADA

Environmental Emergencies
This product contains no substances listed under Canada's Environmental Emergency regulations.

Canadian National Pollutant Release Inventory
This product contains no substances reportable under Canada's National Pollutant Release Inventory regulations.

International Inventories

Component	TSCA (United States)	DSL (Canada)	EINECS/ELINCS (Europe)	ENCS (Japan)	China (IECSC)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)	NZIoC (New Zealand)
Potassium Persulfate 7727-21-1 (> 98)	X	X	X	X	X	X	X	X	X
Potassium Sulfate 7778-80-5 (< 2)	X	X	X	X	X	X	X	X	X

Mexico

Mexico - Grade Slight risk, Grade 1

16. OTHER INFORMATION

NFPA	**Health Hazards** 1	**Flammability** 0	**Stability** 1	**Special Hazards** OX
HMIS	**Health Hazards** 1	**Flammability** 0	**Physical hazard** 1	**Special precautions** J

NFPA/HMIS Ratings Legend Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0
Protection=J (Safety goggles, gloves, apron, combination dust and vapor respirator)

Revision date: 2018-07-13
Revision note SDS sections updated: 3

Disclaimer

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Prepared By:

PeroxyChem

End of Safety Data Sheet

SAFETY DATA SHEET
Klozur® SP

SDS # : 7775-27-1-12
Revision date: 2021-10-14
Format: NA
Version 1.06

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name Klozur® SP

CAS-No 7775-27-1

Synonyms Sodium Peroxydisulfate; Disodium Peroxydisulfate; Peroxydisulfuric acid, disodium salt; Peroxydisulfuric acid, sodium salt.

Recommended use of the chemical and restrictions on use

Recommended Use: In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications

Restrictions on Use No uses to be advised against were identified.

Manufacturer/Supplier

Evonik Active Oxygens, LLC
2005 Market Street
Suite 3200
Philadelphia, PA 19103
Phone: +1 267/ 422-2400 (General Information)
E-Mail: Product-regulatory-services@evonik.com

Emergency telephone numbers

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)
+1 303/ 389-1409 (Medical - U.S. - Call Collect)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2B
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Specific target organ toxicity (single exposure)	Category 3
Oxidizing Solids	Category 3

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Danger

Hazard Statements
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335 - May cause respiratory irritation
H320 - Causes eye irritation
H315 - Causes skin irritation
H317 - May cause an allergic skin reaction
H302 - Harmful if swallowed
H272 - May intensify fire; oxidizer

Precautionary Statements - Prevention
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
P285 - In case of inadequate ventilation wear respiratory protection
P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
P264 - Wash face, hands and any exposed skin thoroughly after handling
P272 - Contaminated work clothing should not be allowed out of the workplace
P270 - Do not eat, drink or smoke when using this product
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P220 - Keep away from clothing and other combustible materials

Precautionary Statements - Response
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/ attention
P302 + P352 - IF ON SKIN: Wash with plenty of water.
P333 + P313 - If skin irritation or rash occurs: Get medical advice/ attention
P362 + P364 - Take off all contaminated clothing and wash it before reuse
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
P330 - Rinse mouth

P370 + P378 - In case of fire: Use water for extinction

Precautionary Statements - Storage
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up

Precautionary Statements - Disposal
P501 - Dispose of contents/ container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other Information
Risk of decomposition by heat or by contact with incompatible materials

Unknown acute toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula Na2O8S2

Chemical name	CAS-No	Weight %
Sodium Persulfate	7775-27-1	> 99
Sodium sulfate	7757-82-6	< 1

4. FIRST AID MEASURES

General Advice Remove from exposure, lie down. Show this material safety data sheet to the doctor in attendance.

Eye Contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids intermittently. Consult a physician. In case of contact, immediately flush eyes with plenty of water. If symptoms persist, call a physician.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention if irritation develops and persists.

Inhalation Remove from exposure, lie down. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately. Rinse mouth. Drink 1 or 2 glasses of water.

Most important symptoms and effects, both acute and delayed Itching; Redness; Coughing and/ or wheezing.

Indication of immediate medical attention and special treatment needed, if necessary Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Water. Cool containers with flooding quantities of water until well after fire is out.

Unsuitable extinguishing media Do not use carbon dioxide or other gas filled fire extinguishers; they will have little effect on decomposing persulfate.

Specific Hazards Arising from the Chemical Decomposes under fire conditions to release oxygen that intensifies the fire.

Explosion data
Sensitivity to Mechanical Impact Not sensitive.
Sensitivity to Static Discharge Not sensitive.

Protective equipment and precautions for firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Keep off any unprotected persons. Avoid contact with the skin and the eyes. Avoid breathing dust. Wear personal protective equipment.

Other Never add other substances or combustible waste to product residues.

Environmental Precautions Knock down dust with water spray. Avoid penetration into waterways, sewers, soil or groundwater. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment Vacuum, shovel or pump waste into a drum and label contents for disposal. Avoid dust formation. Store in closed container.

Methods for cleaning up Clean up spill area and treat as special waste. Dispose of waste as indicated in Section 13.

7. HANDLING AND STORAGE

Handling Wear personal protective equipment. Avoid breathing dust. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Avoid contact with skin and eyes. Remove and wash contaminated clothing before re-use.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat. Do not store near combustible materials. Avoid contamination of opened product. Keep away from food, drink and animal feedingstuffs. Avoid formation and deposition of dust.

Incompatible products Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .

Chemical name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
Sodium Persulfate 7775-27-1	TWA: 0.1 mg/m³	-	-	-
Chemical name	**British Columbia**	**Quebec**	**Ontario TWAEV**	**Alberta**
Sodium Persulfate 7775-27-1	TWA: 0.1 mg/m³	-	TWA: 0.1 mg/m³	TWA: 0.1 mg/m³

Appropriate engineering controls

Engineering measures Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Eye protection recommended. Chemical goggles consistent with EN 166 or equivalent.

Skin and Body Protection Wear long-sleeved shirt, long pants, socks, and shoes.

Hand Protection Protective gloves: Neoprene gloves, Polyvinylchloride, Natural Rubber.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn: particulate filtering facepiece respirators.

Hygiene measures Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Wash hands before breaks and after shifts. Keep work clothes separate, remove contaminated clothing - launder after open handling of product.

General information Protective engineering solutions should be implemented and in use before personal protective equipment is considered.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Crystalline solid
Physical State	Solid
Color	White
Odor	odorless
Odor threshold	Not applicable
pH	6.0 (1% solution)
Melting point/freezing point	180 °C (Decomposes)
Boiling Point/Range	Decomposes on heating
Flash point	Not flammable
Evaporation Rate	Not applicable
Flammability (solid, gas)	Not flammable
Flammability Limit in Air	Not applicable
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	6.07E-30 mm Hg at 25ºC
Vapor density	No information available
Density	2.59 g/cm³ (crystal density)
Specific gravity	No information available
Water solubility	42 % @ 25 °C
Solubility in other solvents	No information available
Partition coefficient	No information available
Autoignition temperature	No evidence of combustion up to 600°C
Decomposition temperature	> 100 °C (assume)
Viscosity, kinematic	No information available (Solid)
Viscosity, dynamic	No information available
Explosive properties	Not explosive
Oxidizing properties	oxidizer

Other Information

Molecular weight	238.1
VOC content (%)	Not applicable
Bulk density	1.12 g/cm³ (loose)

10. STABILITY AND REACTIVITY

Reactivity Strong oxidizer. Oxidizer. Contact with other material may cause fire.

Chemical Stability Decomposition can occur on exposure to heat or moisture.

Possibility of Hazardous Reactions Use of persulfates in chemical reactions requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid Heat. (decomposes at 275 °C); Moisture.

Incompatible materials Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

Hazardous Decomposition Products Oxygen which supports combustion; Sulfur oxides.

11. TOXICOLOGICAL INFORMATION

Product Information

Unknown acute toxicity 0% of the mixture consists of ingredient(s) of unknown toxicity

LD50 Oral 895 mg/kg (rat) (Sodium Persulfate)
LD50 Dermal > 10,000 mg/kg (rabbit) (Sodium Persulfate)
LC50 Inhalation > 5.1 mg/L (rat) (4-hr) (Sodium Persulfate)

Serious eye damage/eye irritation Irritating to eyes.
Skin corrosion/irritation Minimally irritating.

Sensitization Sensitizing to skin and respiratory system.

Component Information

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation	NOAEL Oral Value
Sodium sulfate (7757-82-6)	> 10000 mg/kg (Rat)			

Information on toxicological effects

Symptoms Symptoms of allergic reaction may include rash, itching, swelling and trouble breathing.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin.
corrosivity None.

Carcinogenicity Did not show carcinogenic effects in animal experiments.

Mutagenicity In vivo tests did not show mutagenic effects.

Reproductive toxicity This product is not recognized as reprotox by Research Agencies.

STOT - single exposure May cause respiratory irritation.
STOT - repeated exposure Not classified.
Subchronic toxicity Oral (NOAEL) = 131.5 mg/kg bw (Sodium Persulfate)
Inhalation (NOAEC) = 10.3 mg/m³ (Ammonium Persulfate) Dermal: No data available

Target organ effects Eyes, Skin, Respiratory System.

Aspiration hazard Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects

Sodium Persulfate (7775-27-1)				
Active Ingredient(s)	Duration	Species	Value	Units
Sodium Persulfate	96 h LC50	Rainbow trout	163	mg/L
Sodium Persulfate	48 h LC50	Daphnia magna	133	mg/L
Sodium Persulfate	96 h LC50	Grass shrimp	519	mg/L
Sodium Persulfate	72 h EC50	Algae Selenastrum capricornutum	116	mg/L

Persistence and degradability Biodegradability does not pertain to inorganic substances.

Bioaccumulation Does not bioaccumulate.

Mobility Dissociates into ions.

Other Adverse Effects None known.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261). It must undergo special treatment, e.g. at suitable disposal site, to comply with local regulations.

US EPA Waste Number D001.

Contaminated Packaging Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

DOT

UN/ID no UN 1505
Proper Shipping Name SODIUM PERSULFATE
Hazard class 5.1
Packing Group III

TDG

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

MEX

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ICAO/IATA

UN/ID no	1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

IMDG/IMO

UN/ID no	1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ADR/RID

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ADN

Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

This product has the following hazards that are reportable under The Emergency Planning and Community Right-to-Know rule (EPCRA Tier II):

- Oxidizer
- Acute toxicity
- Skin corrosion/irritation
- Serious eye damage/eye irritation
- Respiratory/skin sensitization
- Specific Target Organ Toxicity (STOT) - Single Exposure

Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA/EPCRA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level

pertaining to releases of this material

US State Regulations

U.S. State Right-to-Know Regulations
This product contains the following substances regulated under state Right-to-Know laws:

Chemical name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium sulfate	X		X		
Sodium Persulfate		X			

California Proposition 65
This product does not contain any Proposition 65 chemicals

CANADA

Environmental Emergencies
This product contains no substances listed under Canada's Environmental Emergency regulations.

Canadian National Pollutant Release Inventory
This product contains no substances reportable under Canada's National Pollutant Release Inventory regulations.

International Inventories

Chemical name	TSCA (United States)	DSL (Canada)	EINECS/ELINCS (Europe)	ENCS (Japan)	China (IECSC)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)	NZIoC (New Zealand)
Sodium sulfate 7757-82-6	X	X	231-820-9	X	X	X	X	X	X
Sodium Persulfate 7775-27-1	X	X	231-892-1	X	X	X	X	X	X

All ingredients are directly listed on the active TSCA Inventory

Mexico

Mexico - Grade Slight risk, Grade 1

16. OTHER INFORMATION

NFPA	**Health Hazards** 1	**Flammability** 0	**Stability** 1	**Special Hazards** OX
HMIS	**Health Hazards** 1	**Flammability** 0	**Physical hazard** 1	**Special precautions** J

NFPA/HMIS Ratings Legend Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0
OX = Oxidizer
Protection=J (Safety goggles, gloves, apron, combination dust and vapor respirator)

Revision date: 2021-10-14
Revision note Manufacturer name changed.

Issuing Date: 2021-10-14

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Prepared By:

Evonik

End of Safety Data Sheet

SAFETY DATA SHEET

1. Identification

Product identifier	**Caustic Soda (7 - 32%) Membrane**
Other means of identification	
SDS Number	327574-01
Recommended use	For industrial and manufacturing use only.
Recommended restrictions	It is not recommended to create aerosols or mists with this product.
Manufacturer/Importer/Supplier/Distributor information	
Company name	Harcros Chemicals Inc
Address	5200 Speaker Rd. Kansas City, KS 66106 United States
Main Telephone Number	1-913-321-3131
Website	www.harcros.com
E-mail	custserv@harcros.com
Emergency #: CHEMTREC	1-800-424-9300
Emergency #: CHEMTREC	1-703-741-5970 (International Number - Call collect)

2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
Environmental hazards	Not classified.	
OSHA defined hazards	Not classified.	

Label elements

Signal word	Danger
Hazard statement	May be corrosive to metals. Harmful if swallowed. Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation.
Precautionary statement	
Prevention	Keep only in original container. Do not breathe mist or vapors. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear eye protection/face protection. Wear protective impervious gloves,protective clothing,eye protection/face protection.
Response	If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor. Call a poison center/doctor if you feel unwell. Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.
Storage	Store away from incompatible materials. Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in accordance with local,regional,national, and international regulations.
Disposal	Dispose of contents and container in accordance with local, regional, national, and international regulations.

Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Sodium Hydroxide		1310-73-2	7 - 32
Other components below reportable levels			68 - 93

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
Skin contact	Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Most important symptoms/effects, acute and delayed	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist/vapors. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Absorb/clean with appropriate and compatible material. Stop flow of material if without risk. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Do not breathe mist or vapors. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Avoid breathing mist/vapors. Avoid prolonged exposure. When using, do not eat, drink or smoke. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store locked up. Store in a cool, dry place out of direct sunlight. Store in corrosive resistant container with a resistant inner liner. Store in tightly closed container. Keep only in the original container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Sodium Hydroxide (CAS 1310-73-2)	PEL	2 mg/m3

US. ACGIH Threshold Limit Values

Components	Type	Value
Sodium Hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Sodium Hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

General It is recommended that users of this product perform a risk assessment to determine the appropriate PPE.

Eye/face protection Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection Wear appropriate chemical resistant, impervious gloves. Wear protective gloves. For prolonged or repeated skin contact use suitable protective and impervious gloves.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment. Chemical respirator with organic vapor cartridge.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance Clear

Physical state Liquid.

Form Liquid.

Color Colorless.

Odor Odorless.

Odor threshold Not available.

pH >= 14

pH temperature 68 °F (20 °C)

Melting point/freezing point -18.4 °F (-28 °C) (20%)
24.8 °F (-4 °C) (7 %)
46.4 °F (8 °C) (32%)

Initial boiling point and boiling range 215.6 °F (102 °C) (7%)
226.4 °F (108 °C) (20%)
248 °F (120 °C) (32%)

Flash point Not available.

Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	42 - 84 mm Hg (approx)
Vapor pressure temp.	122 °F (50 °C)
Vapor density	Not available.
Relative density	1.065 - 1.087 g/cm³ (7 - 8%) 1.109 - 1.131 g/cm³ (10 - 12%) 1.153 - 1.175 g/cm³ (14 - 16%) 1.197 - 1.219 g/cm³ (18 - 20%) 1.241 - 1.263 g/cm³ (22 - 24%) 1.285 - 1.306 g/cm³ (26 - 28%) 1.328 - 1.349 g/cm³ (30 - 32%)
Relative density temperature	68 °F (20 °C)
Solubility(ies)	
Solubility (water)	Soluble
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Dynamic viscosity	1.51 - 16.844 mPa·s
Dynamic viscosity temperature	68 °F (20 °C)
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
VOC	0 %

10. Stability and reactivity

Reactivity	Reacts violently with strong acids. This product may react with oxidizing agents. May be corrosive to metals.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. Do not mix with other chemicals.
Incompatible materials	Acids. Strong oxidizing agents. Oxidizing agents. Metals.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns. Harmful if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.

Information on toxicological effects

Acute toxicity In high concentrations, vapors are anesthetic and may cause headache, fatigue, dizziness and central nervous system effects. Harmful if swallowed.

Product	Species	Test Results
Caustic Soda (7 - 32%) Membrane		
Acute		
ip		
LD50	Mouse	205 mg/kg estimated
Other		
LD50	Mouse	205 mg/kg estimated

Components	Species	Test Results
Sodium Hydroxide (CAS 1310-73-2)		
Acute		
Dermal		
LD50	Rat	1350 mg/kg
Oral		
LD50	Rat	140 - 340 mg/kg

Skin corrosion/irritation Causes severe skin burns and eye damage.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization Due to partial or complete lack of data the classification is not possible.

Skin sensitization Due to partial or complete lack of data the classification is not possible.

Germ cell mutagenicity Due to partial or complete lack of data the classification is not possible.

Carcinogenicity Due to partial or complete lack of data the classification is not possible.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity Due to partial or complete lack of data the classification is not possible.

Specific target organ toxicity - single exposure May cause respiratory irritation.

Specific target organ toxicity - repeated exposure Due to partial or complete lack of data the classification is not possible.

Aspiration hazard Due to partial or complete lack of data the classification is not possible.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Product		Species	Test Results
Caustic Soda (7 - 32%) Membrane			
Aquatic			
Crustacea	EC50	Water flea (Ceriodaphnia dubia)	108.09 - 494.14 mg/l, 48 hours estimated
	LC50	Common shrimp, sand shrimp (Crangon crangon)	103.13 - 471, 48 estimated
Fish	LC50	Bony fish superclass (Osteichthyes)	103.13 - 471 mg/l, 48 hours estimated

Components		Species	Test Results
Sodium Hydroxide (CAS 1310-73-2)			
Aquatic			
Crustacea	EC50	Water flea (Ceriodaphnia dubia)	34.59 - 47.13 mg/l, 48 hours
	LC50	Common shrimp, sand shrimp (Crangon crangon)	33 - 100 mg/l, 48 hours
Fish	LC50	Bony fish superclass (Osteichthyes)	33 - 100 mg/l, 48 hours
		Western mosquitofish (Gambusia affinis)	125 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of any ingredients in the mixture.

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN1824
UN proper shipping name Sodium hydroxide solution
Transport hazard class(es)
Class 8
Subsidiary risk -
Label(s) 8
Packing group II
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Special provisions B2, IB2, N34, T7, TP2
Packaging exceptions 154
Packaging non bulk 202
Packaging bulk 242
Reportable Quantity for Sodium Hydroxide = 1000 lbs.

IATA

UN number UN1824
UN proper shipping name Sodium hydroxide solution
Transport hazard class(es)
Class 8
Subsidiary risk -
Packing group II
Environmental hazards No.
ERG Code 8L
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Other information
Passenger and cargo aircraft Allowed with restrictions.
Cargo aircraft only Allowed with restrictions.

IMDG

UN number UN1824
UN proper shipping name SODIUM HYDROXIDE SOLUTION
Transport hazard class(es)
Class 8

Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not established.

DOT

IATA; IMDG

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA) All components of the mixture on the TSCA 8(b) inventory are designated “active”.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Sodium Hydroxide (CAS 1310-73-2) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	Yes
Classified hazard categories	Corrosive to metal Acute toxicity (any route of exposure) Skin corrosion or irritation Serious eye damage or eye irritation Specific target organ toxicity (single or repeated exposure)

SARA 313 (TRI reporting)

Not regulated.

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Sodium Hydroxide (CAS 1310-73-2)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 01-10-2020

Material ID 8686

Version # 01

HMIS® ratings
Health: 3
Flammability: 0
Physical hazard: 1

NFPA ratings
Health: 3
Flammability: 0
Instability: 1

Disclaimer

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Safety Data Sheet

Hydrated Lime

Revision date:
July 11, 2019

1. Identification

Product Name: Hydrated Lime

Synonyms:
Chemical Hydrate
Commercial Hydrate
Hyd Chem SS,
Hyd Lime Chem,
Hydrate Tailings,
Hydrated Lime Kiln Dust,
Industrial Hydrate,
Pink Hydrate,

Recommended Uses: Water treatment, steel flux, caustic agent, pH adjustment, acid gas absorption, construction

Manufacturer: Carmeuse Americas

US Office
11 Stanwix Street, 21st Floor
Pittsburgh, PA 15222
Phone: (412) 995-5500
Fax: (412) 995-5594

Canadian Office
PO Box 190
Ingersoll, ON N5C 3K5
Phone: (519) 423-6283
Fax: (519) 423-6545

Emergency Contact: Infotrac: (800) 535-5053 (24 hrs a day, 7 days a week)

2. Hazards Identification

GHS classification

Physical Hazards

None

Health Hazards

Skin Irritation	Category 2
Eye Damage	Category 1
Carcinogenicity	Category 1A
Specific Target Organ Toxicity – Single Exposure	Category 3

GHS Label Elements:

Signal Word: Danger

Hazard Statements:
Causes skin irritation.
Causes serious eye damage.
May cause respiratory irritation.
May cause cancer through inhalation

Precautionary Statements:
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep container tightly closed
Do not breathe dust.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in well-ventilated area
Wear protective gloves, clothing and eye protection

Pictograms:

3. Composition

Chemical name	% by weight	CAS#
Calcium hydroxide	> 85	1305-62-0
Silica-crystalline quartz	< 1	14808-60-7

4. First Aid Measures

Eyes: Immediately flush eyes with generous amounts of water for at least 15 minutes. Pull back the eyelid to ensure that all lime dust has been washed out. Seek medical attention immediately. Do not rub eyes.

Skin: Wash exposed area with large amounts of water. Seek medical attention immediately.

Ingestion: Do not induce vomiting. Seek medical attention immediately. Never give anything by mouth unless instructed to do so by medical personnel.

Inhalation: Move victim to fresh air. Seek medical attention if necessary. If breathing has stopped, give artificial respiration

Most Important Symptoms: Irritation of skin, eyes, gastrointestinal tract or respiratory tract.

Immediate medical attention / special treatment? See first aid information above. Note to Physicians: Provide general supportive measures and treat symptomatically.

5. Fire Fighting Measures

Suitable (and unsuitable) fire extinguishing media: Use dry chemical fire extinguisher. Do not use water or halogenated compounds, except that large amounts of water may be used to deluge small quantities of this product.

Specific hazards arising from the product	Inhalation, skin or eye contact, can result in serious injury. This product is not combustible or flammable. This product is not considered to be an explosion hazard, although reaction with water or other incompatible materials may rupture containers. When this product is wet, it can be very slippery and can result in a slip hazard. Hazardous Combustion Products: None.
Special protective equipment and precautions for fire fighters	Wear full fire-fighting turn-out gear (full Bunker gear), and respiratory protection (SCBA) to prevent inhalation, skin or eye contact.

6. Accidental Release Measures

Personal precautions, protective equipment, emergency procedures:

Avoid inhalation, eye and skin contact. Avoid generating airborne dust. Wear appropriate protective clothing as described in section 8.

Methods and materials for containment and clean up:

Utilize cleanup methods that minimize generating dust: vacuum. Avoid dry sweeping. Residue on surfaces may be removed with copious amount of water or vinegar.

7. Handling & Storage

Safe Handling: Avoid inhalation, skin and eye contact. Avoid generating airborne dust. An eye wash station should be readily available when this product is handled.

Safe Storage: Keep in tightly closed containers. Protect containers from physical damage. Store in a cool, dry, and well-ventilated location. Do not store near incompatible materials (see Section 10 below). Keep away from moisture. Long-term storage in aluminum containers is not recommended, as calcium oxide may corrode aluminum over long periods of time

8. Exposure Controls/Personal Protection

Occupational Exposure Limits

	OSHA PEL (mg/m^3)	ACGIH TLV (mg/m^3)	Ont. Reg. 833 TWAEV (mg/m^3)
Calcium hydroxide	15 (total) 5 (respirable)	5	5
Silica, *crystalline quartz, cristobalite and tridymite*	0.05 (respirable)	0.025 (respirable)	0.1

Engineering Controls: Use with adequate general or local exhaust ventilation and to maintain exposure below occupational exposure limits.

Individual Protection Measures (Personal Protective Equipment):

Specific Eye / Face Protection:	Safety glasses with side shields. In windy conditions, or if work activity generates elevated airborne dust levels, dust proof or chemical goggles are recommended. Contact lenses should not be worn.
Specific Skin Protection:	When there is a risk of skin contact, wear appropriate clothing and gloves to prevent contact.
Specific Respiratory Protection:	If exposure limits are exceeded, an approved particulate respirator, or supplied air respirator, appropriate for the airborne concentrations, should be used. Selection and use of the respiratory protective equipment must be in accordance with applicable regulations and good industrial hygiene practices.
Other:	An emergency eye wash fountain and shower are recommended.

9. Physical & Chemical Properties

Appearance:	White powder
Odor:	Odorless
Odor threshold:	Not Applicable
pH at 25 degrees C:	12.45
Melting Point:	1076 °F (580 °C)
Boiling Point and range:	5162 °F (2850 °C)
Flash Point:	Not Applicable
Evaporation Rate:	Not Applicable
Flammability:	Not Applicable
Upper/lower flammability or explosive limits	Not Applicable
Vapor pressure/density:	Non Volatile
Relative density:	2.24
Solubility:	Slightly soluble in water: 0.2% @ 0 °C. Soluble in acids, glycerin, and sugar solutions
Partition coefficient: n-octanol/water	Not applicable
Auto-ignition temperature:	Not Available
Decomposition temperature:	Not available
Viscosity:	Not Applicable

10. Stability & Reactivity

Reactivity: Reacts with acids to form calcium salts, releasing heat. Reacts with carbon dioxide in air to form calcium carbonate. See also Incompatibility below.

Chemical stability: Stable under normal storage and handling conditions.

Possibility of Hazardous Reactions: See "reactivity" above.

Conditions to avoid: Vicinity of incompatible materials.

Incompatibility: This product should not be mixed or stored with the following materials, due to the potential for violent reaction and release of heat:

- acids
- reactive fluoridated compounds
- reactive brominated compounds
- reactive powdered metals
- reactive phosphorous compounds
- aluminum powder
- organic acid anhydrides
- nitro-organic compounds
- interhalogenated compounds

Hazardous decomposition products: None

11. Toxicological Information

Likely routes of exposure & symptoms:

Eyes: Contact can cause severe irritation or burning of eyes, including permanent damage.

Skin: Contact can cause severe irritation or burning of skin, especially in the presence of moisture.

Ingestion: This product can cause severe irritation or burning of gastrointestinal tract if swallowed.

Inhalation: This product can cause severe irritation of the respiratory system.

Chronic health effects: This product contains trace amounts of crystalline silica. Prolonged or repeated inhalation of respirable crystalline silica can cause silicosis, as serious lung disease.

Respiratory or skin sensitization: This material is not known to cause sensitization

Germ cell mutagenicity: No data available.

Carcinogenicity:	This product is not listed as carcinogenic by OSHA, IARC, NTP, ACGIH, or the EU Directives. This product may contain trace amounts of crystalline silica quartz which is listed by IARC as “Carcinogenic to Humans” (Group 1) and “Known to be a Human Carcinogen" by NTP (National Toxicology Program).
Reproductive toxicity:	No Data Available.
Numerical Measures of Toxicity	Crystalline Silica: Oral Rat LD_{50} > 22,500 mg/kg Calcium Hydroxide: Oral (rat) LD_{50}: 7340 mg/kg

12. Ecological Information

Because of the elevated pH of this product, it might be expected to produce some ecotoxicity upon exposure to certain aquatic organisms and aquatic systems in high concentrations
This material shows no bioaccumulation effect or food chain concentration toxicity.

13. Disposal Considerations

Dispose of contents in accordance with federal, state, provincial and local regulations.

14. Transport Information

Not regulated by Department of Transportation, Transport of Dangerous Goods

15. Regulatory Information

CERCLA Hazardous Substances	Not listed
SARA Toxic Chemical (40 CFR 372.65)	Not listed
SARA Section 302 Extremely Hazardous Substances (40 CFR 355)	Not listed
SARA 311/312	Not listed
SARA Section 313 Toxic Chemicals reporting requirements	None
Threshold planning quantity (TPQ)	Not listed
RCRA Hazardous Waste Classification (40 CFR 261)	Not Classified
EPA Toxic Substances Control Act (TSCA) Status	The components of this product are each listed on the TSCA Inventory List in the “active” status.
California Proposition 65	Airborne crystalline silica particulates of respirable size are known to the State of California to cause cancer.
NFPA ratings	Health: 3 Fire: 0 Reactivity: 0
HMIS Ratings	Health: 3 Fire: 0 Reactivity: 0 Personal protection: E
OSHA Specifically regulated substance (29 CFR 1910)	Not listed
OSHA Air contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A)	Listed
MSHA	Not listed
Canada DSL	Listed

Canadian WHMIS Classification	D2A, Materials Causing other toxic effects. E, Corrosive Material

Canada CPR This product has been classified in accordance with the hazard criteria of the Controlled Products Regulation of a Canada and this SDS contains all the required information.

16. Other Information

List of GHS Hazard Statements:	H315: Causes skin irritation H318: Causes serious eye damage H335: May cause respiratory irritation. H350: May cause cancer through inhalation
List of GHS Precautionary Statements:	P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P233: Keep container tightly closed P260: Do not breathe dust. P264: Wash thoroughly after handling. P270: Do not eat, drink or smoke when using this product. P271: Use only outdoors or in well-ventilated area P280: Wear protective gloves, clothing and eye protection

Abbreviations

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act	RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act	IARC	International Agency for Research on Cancer
NTP	National Toxicology Program		

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