SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

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

September 05, 2025 ***via email: Michael.Squire@dec.ny.gov***

Mr. Michael Squire, Assistant Engineer
New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau C
625 Broadway
Albany, NY 12233

RE: Remedial Action Work Plan – Addendum (Groundwater)
Sun Valley Nursery Filling Station
136-140 Croton Avenue
Ossining, Westchester County, New York
NYSDEC BCP Site #C360207
SESI Project No. 12060

Dear Mr. Squire:

On behalf of 136-140 Croton Avenue LLC c/o MacQuesten Development LLC, (the Volunteer), SESI Consulting Engineers (SESI) has prepared this plan to remediate the groundwater for the referenced Site to supplement the RAWP that was submitted in October 2024 and approved by the New York State Department of Environmental Conservation (NYSDEC) in October 2024. The initial RAWP was submitted to address groundwater remediation through soil excavation and application of oxygen releasing compound (ORC) powder to the open excavation, however, groundwater was not encountered during remedial excavation activities. This plan is submitted for approval remediate groundwater at the Site through the application of ORC directly via the existing monitoring wells.

Introduction

136-140 Croton Avenue LLC c/o MacQuesten Development LLC ("Volunteer") entered into a Brownfield Cleanup Agreement (BCA) with the NYSDEC on March 8, 2022, to investigate and remediate the property at 136-140 Croton Avenue, Ossining, Westchester County, New York (Site), designated NYSDEC Brownfield Cleanup Program (BCP) Site No. C360207. A Site Location Map is presented as **Figure 1.1** and a Site Layout Map is presented as **Figure 1.2**.

As noted above, a RAWP was submitted to NYSDEC in October 2024 and approved in October 2024. The RAWP summarized data collected during due diligence at the Site as well as Remedial Investigation (RI) data for soil, groundwater and soil vapor and detailed the approach to remediate soil, groundwater, and soil vapor contamination on the Site. The initial RAWP for this Site included

installation of support of excavation (SOE), soil removal and offsite disposal of contaminated soils above the Unrestricted Use Soil Cleanup Objectives (USCOs) to achieve a Track 1 cleanup remedy. Remedial excavation to depths ranging from 8.0 to 13.0 feet below ground surface (ft bgs) has been completed in select areas of the Site. The initial RAWP noted that groundwater contamination would be addressed through soil excavation and application of ORC powder to the open excavation, however, groundwater was not encountered during remedial excavation activities. This addendum provides an updated approach to remediate groundwater contamination at the Site.

Summary of Groundwater Findings at the Site

Two (2) rounds of groundwater samples were collected from six (6) monitoring wells, RI-MW-01 through RI-MW-06, in October and November 2023 during the RI. The depth of the wells ranged from 40 to 45 ft bgs and groundwater was encountered between approximately 9.5 and 29.4 feet bgs. Based on survey measurements, groundwater elevation across the Site is between 265 and 285 ft-amsl. Groundwater flows across the Site in a westerly direction (**Figure 2.1**). All samples were analyzed for the Target Compound List plus 30 Tentatively Identified Compounds (TICs) / Target Analyte List (TCL/TAL + 30) suite including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), TAL metals, pesticides, and polychlorinated biphenyls (PCBs), in addition to 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS) with NYSDEC Category B deliverables. The monitoring well locations and groundwater exceedances are presented on **Figure 2.2**. Sampling indicated that Site groundwater is impacted by VOCs, polycyclic aromatic hydrocarbons (PAHs), and metals at concentrations above the NYSDEC Technical and Operational Guidance Series (TOGS) Ambient Water Quality Standards and Guidance Values (AWQS) across the Site. VOCs were detected above their respective AWQS across all onsite wells. Monitoring wells RI-MW-01 and RI-MW-02, located in the northwestern and northeastern corners of the Site property, reported the greatest concentrations and distribution of VOCs. PAHs were detected above their respective AWQS in monitoring wells RI-MW-02, RI-MW-03 and RI-MW-06, located in the central, northeastern and eastern portions of the Site. The greatest concentrations and distributions of metals above their respective AWQS were detected in well RI-MW-03, which is centrally located. Select metal compounds were also reported in exceedance of AWQS in wells RI-MW-01, RI-MW-02 and RI-MW-05. A single PCB compound, arcolor 1242, was detected in exceedance of its respective AWQS during the November 2023 sampling event in monitoring well RI-MW-03. No pesticides or PFAS compounds were detected at concentrations in exceedance of their respective AWQS.

The primary contaminants of concern in groundwater are petroleum-related volatile organic compounds (VOCs) and the current concentrations of VOCs are indicative of a limited source of petroleum contamination within the Site. As reported in the Phase I and Phase II Environmental Site Assessments (ESAs) prepared for the Site, the suspected sources of discharge at the Site are primarily related to historical Site operations (i.e., retail gas station and automotive repair garage) and historic presence of underground storage tanks (USTs). Although the VOC concentrations are currently low, it is unlikely that monitored natural attenuation will be sufficient to achieve in the near future concentrations of VOCs that are below the regulatory levels (TOGS AWQS). Thus, an active in situ treatment approach will be necessary to achieve regulatory compliance. This addendum is focused on the remediation of the petroleum-related VOC contamination detected in the groundwater.

Remedial Approach

To address the petroleum-related VOC contamination at the Site, SESI proposes to conduct calcium peroxide treatment that slowly releases oxygen (approximately 17% by weight) to promote aerobic biodegradation of the target contaminants and their breakdown products. Specifically, SESI will install ORC Advanced® (ORC-A) socks within monitoring wells RI-MW-01,

RI-MW-02, and RI-MW-06. Upon contact with groundwater, this calcium peroxide-based material becomes hydrated producing a controlled release of molecular oxygen for periods up to 12 months on a single application. The socks come in one-foot sections. They are laced together to vertically span the target groundwater treatment interval. SESI will install fifteen (15) feet of ORC-A socks in each of the three (3) monitoring wells, RI-MW-01, RI-MW-02, and RI-MW-06, spanning the screened intervals of the wells (25 ft bgs to 40 ft bgs). The product specifications and safety data sheet (SDS) for the ORC-A socks are included as **Attachment 1**.

The groundwater treatment will be conducted by applying 17% oxygen by weight solution of calcium peroxide to the groundwater in monitoring wells RI-MW-01, RI-MW-02, and RI-MW-06. Fifteen (15) ORC-A socks containing 0.7 pounds of ORC-A (0.119 pounds of oxygen by weight) each will be installed into each monitoring well. Therefore, a total of 10.5 pounds of ORC-A containing 1.785 pounds of free oxygen will be applied to each monitoring well. On average, dissolved petroleum-related VOCs require approximately three (3) pounds of oxygen per pound of petroleum-related VOCs for aerobic biodegradation. Therefore, the biodegradation potential of each well containing 15 socks is 0.595 pounds of dissolved petroleum-related VOCs.

Groundwater Monitoring

Performance monitoring of the ORC-A treatment will be conducted to verify that the groundwater remedy is effective. The goal of the groundwater remedy is to achieve the TOGS AWQS or to reach asymptotic levels. Following the ORC-A sock installation, groundwater sampling events will be conducted to assess the reductions of petroleum-related VOC concentrations achieved in the contaminated areas. Groundwater will be tested for VOCs and SVOCs at the six (6) Site monitoring wells. The ORC-A socks may be replaced if sampling results indicate that replacement is required.

Baseline groundwater sampling for VOCs and SVOCs will be conducted prior to the ORC-A sock installation. Groundwater parameters such as pH, ORP, DO and specific conductance will also be recorded during the baseline sampling event. Post-installation groundwater monitoring will be performed after two (2) weeks, and then quarterly for up to two years after the injection, or until compliance with the AWQS is achieved. Groundwater monitoring results will be assessed using a multiple lines of evidence approach. The primary indicator of ORC-A effectiveness will be a reduction in petroleum-related VOC concentrations over time. Further groundwater treatment may be conducted if the desired contaminant reductions are not achieved.

Governing Documents and Other Considerations

The governing documents included with the October 2024 RAWP approved by the NYSDEC in October 2024 will be used during the groundwater treatment program. In particular, the Health and Safety Plan (HASP) will be adhered to during all groundwater treatment and monitoring activities.

Materials used for groundwater treatment will be stored in accordance with the manufacturer's recommendations (i.e., on pallets, in secure totes, etc.) and a SDS will be provided from the manufacturer prior to initiating work. The product specifications and SDS for the ORC-A socks are included as **Attachment 1**.

If there are any significant changes to the groundwater treatment plan as result of the baseline or continued sampling events, the NYSDEC will be notified. Acknowledgement of these changes will be communicated prior to the implementation of any proposed changes.

Finally, the NYSDEC Project Manager will be notified at least one week prior to the implementation of the groundwater treatment program. Should you have any questions regarding this workplan, please do not hesitate to contact me at 973-808-9050.

Sincerely,

SESI CONSULTING ENGINEERS

Fuad Dahan, PhD, PE
Principal

Enclosures:
Figure 1.1 – Site Location Map
Figure 1.2 – Site Layout Map
Figure 2.1 – Groundwater Contour Map
Figure 2.2 – Remaining Groundwater Sample Exceedances
Attachment 1 – ORC-A Product Specifications and Safety Data Sheet

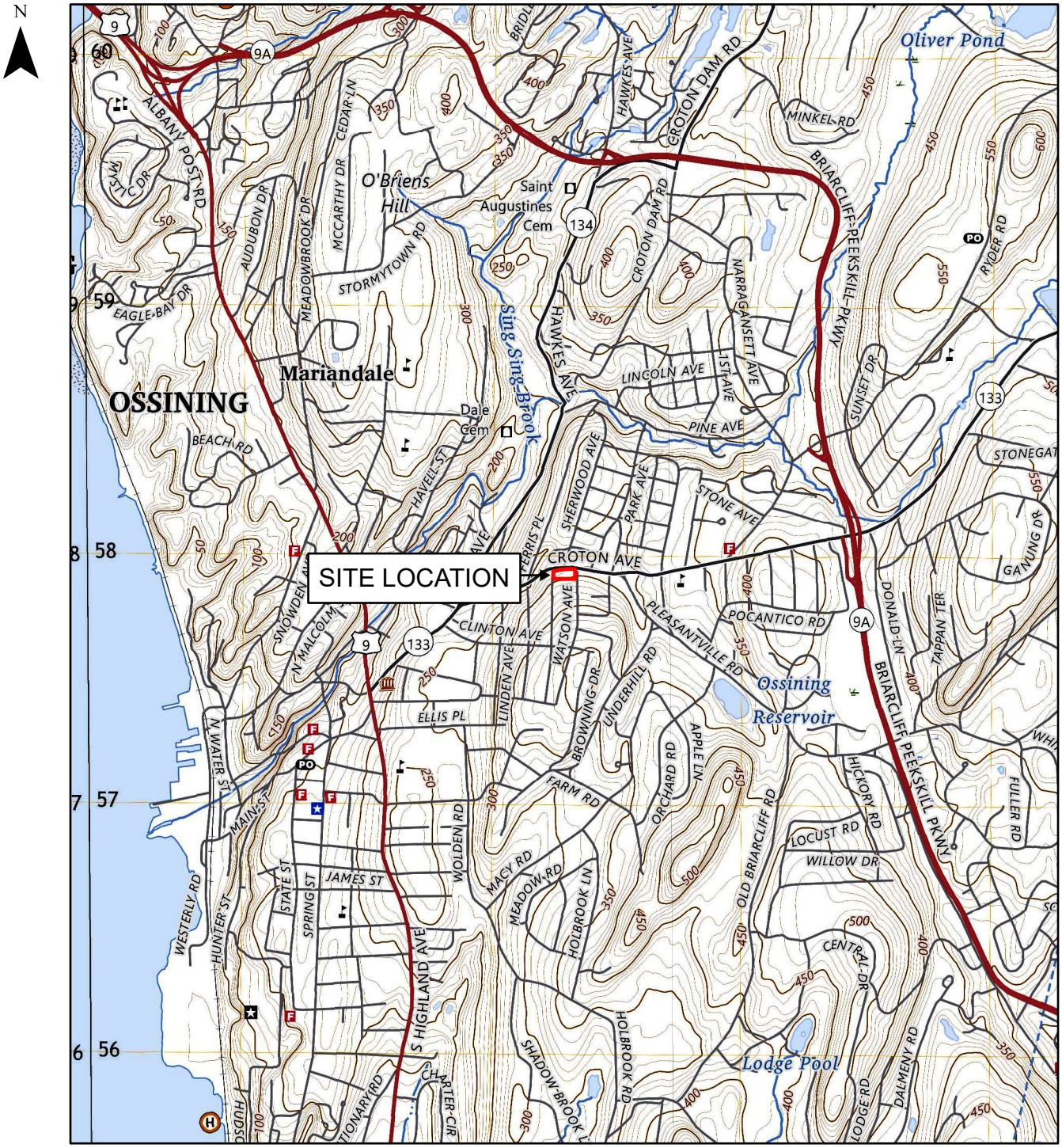
CERTIFICATIONS

I, Anthony Raposo, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Remedial Action Work Plane – Addendum (Groundwater) 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).

Fuad Dahan	9/5/2025	
NYS Professional Engineer (# 105387)	Date	Signature

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education.

Figures



REFERENCE:

UNITED STATES GEOLOGICAL SURVEY (USGS)
OSSINING, NY USGS QUADRANGLE - 2023

LEGEND:

SITE LOCATION

SCALE: 1" = 2,000'

0 1,000 2,000 4,000 FEET

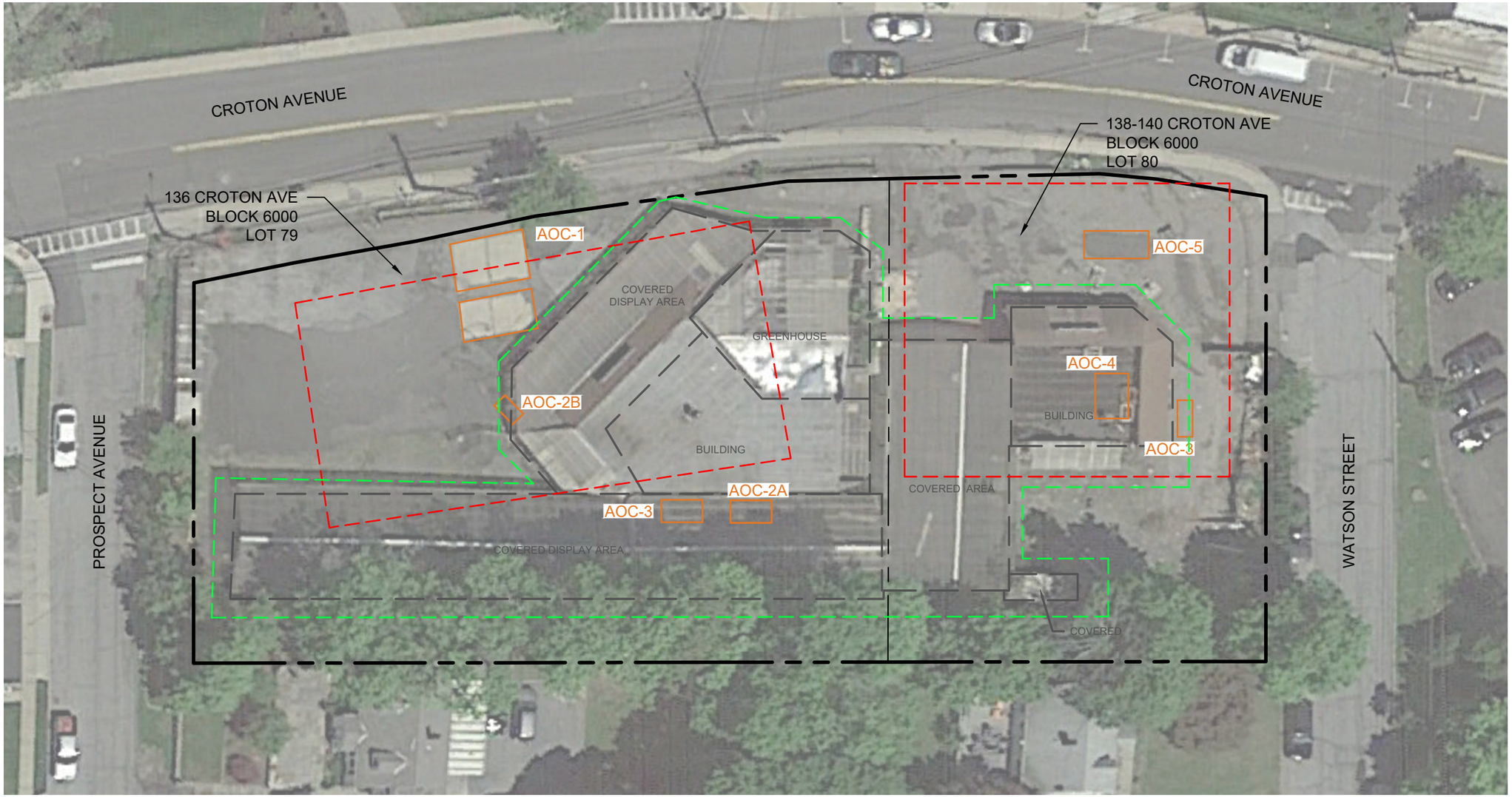
136-140 CROTON AVENUE
OSSINING, NEW YORK, 10652

SITE LOCATION MAP

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

FIG-1.1	
DRAWN BY:	KBV
CHECKED BY:	CM
SCALE:	AS NOTED
DATE:	7/16/2025
JOB NO:	12060

Y:\GIS\Project_Numbers\12060\FINAL_MAPS, 7/16/2025 12:13 PM, Kim Vanderklein, LAYOUT: FIG-1.1



NOTE:
1. BUILDING LINES DEPICT FORMER FEATURES. SITE CURRENTLY VACANT.
2. AREAS OF CONCERN (AOC's) ARE NOTED BASED ON BORINGS COLLECTED IN THE BERKSHIRE ENVIRONMENTAL SERVICES TECHNOLOGY LLC PHASE II INVESTIGATION IN 2017.
3. AOC's ARE APPROXIMATE LOCATIONS AND NOT CLEARLY IDENTIFIED IN 2017.

LEGEND:
- SITE BOUNDARY
- FORMER BUILDING OUTLINE
- APPROX. LOCATION OF AOC
- APPROXIMATE LOCATION OF REC-1
- APPROXIMATE LOCATION OF REC-2

AREA OF CONCERN (AOC) LEGEND:
AOC-1 - HISTORIC FILLING STATION PADS AND UNDERGROUND STORAGE TANK (UST) REMOVAL AREA
AOC-2A - POTENTIAL UST GPR ANOMOLY 1
AOC-2B - POTENTIAL UST GPR ANOMOLY 2
AOC-3 - HISTORIC ABOVEGROUND STORAGE TANK (AST)
AOC-4 - HISTORIC HYDRAULIC LIFT AREA
AOC-5 - HISTORIC UST REMOVAL AREA

RECOGNIZED ENVIRONMENTAL CONDITIONS (REC) LEGEND:
REC-1 - FORMER GASOLINE STATION AND AUTOMOBILE REPAIR GARAGE
REC-2 - FORMER NURSERY OPERATIONS
REC-3 - FORMER POTENTIAL UST's AND/OR AST's (SITE-WIDE)
REC-4 - HISTORICAL SPILL #9613901 (NOT DEPICTED)

Scale 1"=30'
0 30 60

REFERENCE
AERIAL IMAGE TAKEN FROM GOOGLE MAPS, IMAGE DATED 2019.

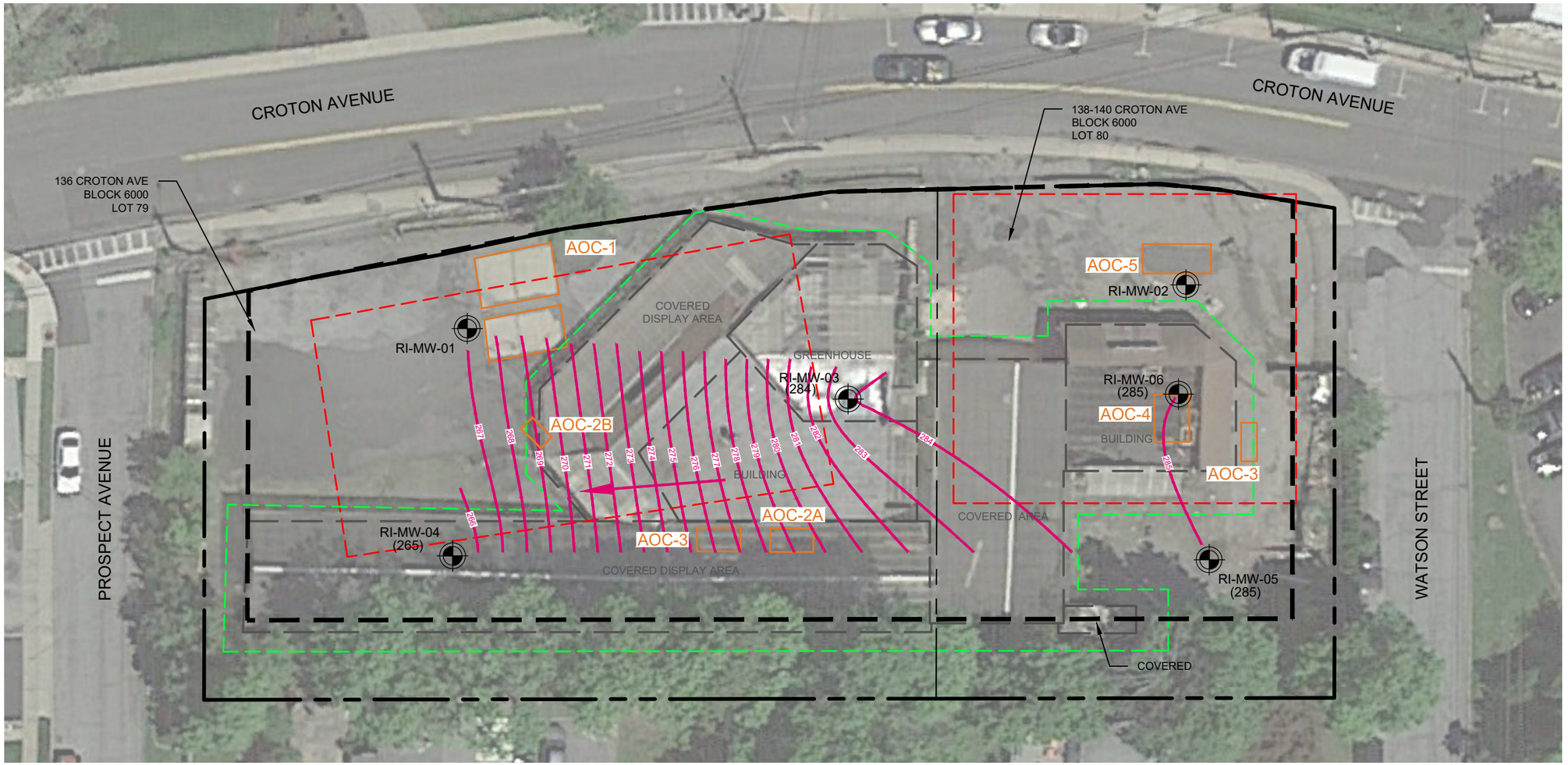
dwg by: aas
chk by: CM
scale: AS NOTED
date: 07/16/2025

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

project: 136-140 CROTON AVENUE OSSINING, NEW YORK 10652

title: SITE LAYOUT MAP

job no: 12060
drawing no: FIG-1.2



LEGEND:

- SITE BOUNDARY
- FORMER BUILDING OUTLINE
- RI-MW-04 — RI MONITORING WELL NUMBER AND APPROX. LOCATION
- APPROXIMATE LOCATION OF AOC
- APPROXIMATE LOCATION OF REC-1
- APPROXIMATE LOCATION OF REC-2
- (285) — GROUNDWATER ELEVATION
- 281 — GROUNDWATER CONTOUR
- INFERRED GROUNDWATER DIRECTION

NOTE:
1. THIS PLAN IS FOR LOCATING SOIL BORINGS, MONITORING WELLS, SOIL VAPOR BORINGS AND AMBIENT AIR LOCATIONS ONLY. OTHER SITE WORK SHOWN HERE IS NOT INTENDED FOR CONSTRUCTION.
2. BUILDING LINES DEPICT FORMER FEATURES. SITE CURRENTLY VACANT.

REFERENCE
AERIAL IMAGE TAKEN FROM GOOGLE MAPS, IMAGE DATED 2019.

AREA OF CONCERN (AOC) LEGEND:
AOC-1 - HISTORIC FILLING STATION PADS AND UNDERGROUND STORAGE TANK (UST) REMOVAL AREA
AOC-2A - POTENTIAL UST GPR ANOMOLY 1
AOC-2B - POTENTIAL UST GPR ANOMOLY 2
AOC-3 - HISTORIC ABOVEGROUND STORAGE TANK (AST)
AOC-4 - HISTORIC HYDRAULIC LIFT AREA
AOC-5 - HISTORIC UST REMOVAL AREA

RECOGNIZED ENVIRONMENTAL CONDITIONS (REC) LEGEND:
REC-1 - FORMER GASOLINE STATION AND AUTOMOBILE REPAIR GARAGE
REC-2 - FORMER NURSERY OPERATIONS
REC-3 - FORMER POTENTIAL UST's AND/OR AST's (SITE-WIDE)
REC-4 - HISTORICAL SPILL #9613901 (NOT DEPICTED)

Scale 1"=30'
0 30 60

dwg by: AW
chk by: CM
scale: AS NOTED
date: 07/16/2025

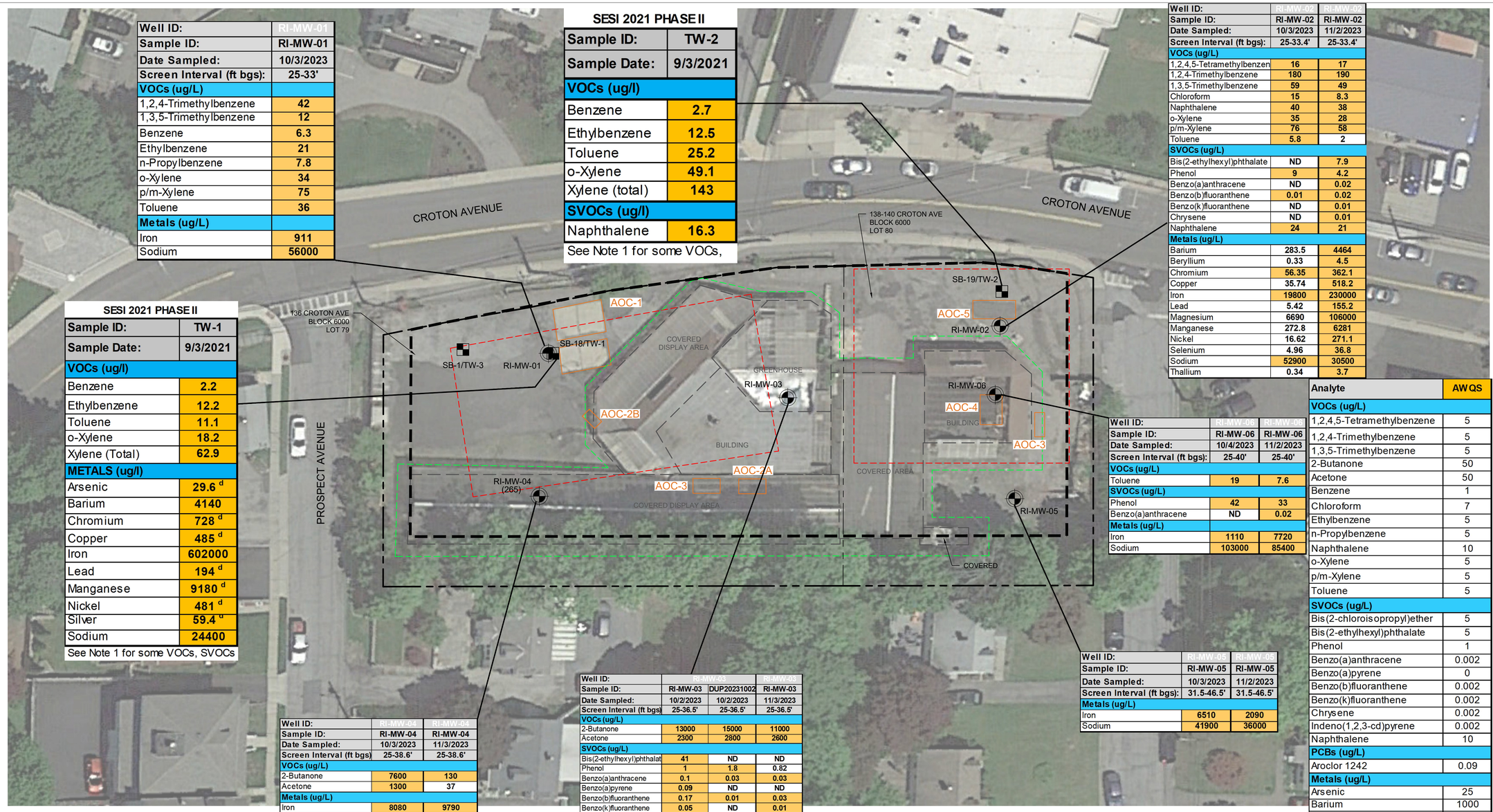
SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL
959 ROUTE 46E, 3RD FLOOR, PARSIPPANY, NJ 07054 PH: 973.808.9050

project: 136-140 CROTON AVENUE OSSINING, NEW YORK 10652

title: GROUNDWATER CONTOUR MAP

job no: 12060
drawing no: FIG-2.1

N:\ACAD\12060\CAD\SMP\12060.DWG_SAMPLE_LOCATION_PLAN.DWG 07/16/25 12:12:33PM, kim.vanderklein, LAYOUT:GW CONTOUR MAP



Well ID:	RI-MW-01
Sample ID:	RI-MW-01
Date Sampled:	10/3/2023
Screen Interval (ft bgs):	25-33'
VOCs (ug/L)	
1,2,4-Trimethylbenzene	42
1,3,5-Trimethylbenzene	12
Benzene	6.3
Ethylbenzene	21
n-Propylbenzene	7.8
o-Xylene	34
p/m-Xylene	75
Toluene	36
Metals (ug/L)	
Iron	911
Sodium	56000

SESI 2021 PHASE II

Sample ID:	TW-2
Sample Date:	9/3/2021
VOCs (ug/l)	
Benzene	2.7
Ethylbenzene	12.5
Toluene	25.2
o-Xylene	49.1
Xylene (total)	143
SVOCs (ug/l)	
Naphthalene	16.3

See Note 1 for some VOCs,

Well ID:	RI-MW-02	RI-MW-02
Sample ID:	RI-MW-02	RI-MW-02
Date Sampled:	10/3/2023	11/2/2023
Screen Interval (ft bgs):	25-33.4'	25-33.4'
VOCs (ug/L)		
1,2,4,5-Tetramethylbenzen	16	17
1,2,4-Trimethylbenzene	180	190
1,3,5-Trimethylbenzene	59	49
Chloroform	15	8.3
Naphthalene	40	38
o-Xylene	35	28
p/m-Xylene	76	58
Toluene	5.8	2
SVOCs (ug/L)		
Bis(2-ethylhexyl)phthalate	ND	7.9
Phenol	9	4.2
Benzo(a)anthracene	ND	0.02
Benzo(b)fluoranthene	0.01	0.02
Benzo(k)fluoranthene	ND	0.01
Chrysene	ND	0.01
Naphthalene	24	21
Metals (ug/L)		
Barium	283.5	4464
Beryllium	0.33	4.5
Chromium	56.35	362.1
Copper	35.74	518.2
Iron	19800	230000
Lead	5.42	155.2
Magnesium	6690	106000
Manganese	272.8	6281
Nickel	16.62	271.1
Selenium	4.96	36.8
Sodium	52900	30500
Thallium	0.34	3.7

SESI 2021 PHASE II

Sample ID:	TW-1
Sample Date:	9/3/2021
VOCs (ug/l)	
Benzene	2.2
Ethylbenzene	12.2
Toluene	11.1
o-Xylene	18.2
Xylene (Total)	62.9
METALS (ug/l)	
Arsenic	29.6 [d]
Barium	4140
Chromium	728 [d]
Copper	485 [d]
Iron	602000
Lead	194 [d]
Manganese	9180 [d]
Nickel	481 [d]
Silver	59.4 [d]
Sodium	24400

See Note 1 for some VOCs, SVOCs

Well ID:	RI-MW-06	RI-MW-06
Sample ID:	RI-MW-06	RI-MW-06
Date Sampled:	10/4/2023	11/2/2023
Screen Interval (ft bgs):	25-40'	25-40'
VOCs (ug/L)		
Toluene	19	7.6
SVOCs (ug/L)		
Phenol	42	33
Benzo(a)anthracene	ND	0.02
Metals (ug/L)		
Iron	1110	7720
Sodium	103000	85400

Well ID:	RI-MW-04	RI-MW-04
Sample ID:	RI-MW-04	RI-MW-04
Date Sampled:	10/3/2023	11/3/2023
Screen Interval (ft bgs)	25-38.6'	25-38.6'
VOCs (ug/L)		
2-Butanone	7600	130
Acetone	1300	37
Metals (ug/L)		
Iron	8080	9790
Magnesium	40600	35700
Sodium	23300	23300

Well ID:	RI-MW-03		RI-MW-03
Sample ID:	RI-MW-03	DUP20231002	RI-MW-03
Date Sampled:	10/2/2023	10/2/2023	11/3/2023
Screen Interval (ft bgs)	25-36.5'	25-36.5'	25-36.5'
VOCs (ug/L)			
2-Butanone	13000	15000	11000
Acetone	2300	2800	2600
SVOCs (ug/L)			
Bis(2-ethylhexyl)phthalat	41	ND	ND
Phenol	1	1.8	0.82
Benzo(a)anthracene	0.1	0.03	0.03
Benzo(a)pyrene	0.09	ND	ND
Benzo(b)fluoranthene	0.17	0.01	0.03
Benzo(k)fluoranthene	0.05	ND	0.01
Chrysene	0.12	0.01	0.02
Indeno(1,2,3-cd)pyrene	0.08	ND	ND
PCBs (ug/L)			
Aroclor 1242	ND	ND	0.093
Metals (ug/L)			
Arsenic	31.48	33.69	2.68
Barium	10990	10640	3420
Beryllium	12.38	12.1	3.73
Chromium	780.9	776.9	189.3
Copper	1567	1408	202
Iron	490000	480000	152000
Lead	293.3	317.8	71.98
Magnesium	217000	209000	63000
Manganese	18400	17310	4089
Nickel	544.4	548.2	119.3
Selenium	66.6	67	49.9
Sodium	28000	27400	19400
Thallium	4.14	4.24	1.69

Well ID:	RI-MW-05	RI-MW-05
Sample ID:	RI-MW-05	RI-MW-05
Date Sampled:	10/3/2023	11/2/2023
Screen Interval (ft bgs):	31.5-46.5'	31.5-46.5'
Metals (ug/L)		
Iron	6510	2090
Sodium	41900	36000

Analyte	AWQS
VOCs (ug/L)	
1,2,4,5-Tetramethylbenzene	5
1,2,4-Trimethylbenzene	5
1,3,5-Trimethylbenzene	5
2-Butanone	50
Acetone	50
Benzene	1
Chloroform	7
Ethylbenzene	5
n-Propylbenzene	5
Naphthalene	10
o-Xylene	5
p/m-Xylene	5
Toluene	5
SVOCs (ug/L)	
Bis(2-chloroisopropyl)ether	5
Bis(2-ethylhexyl)phthalate	5
Phenol	1
Benzo(a)anthracene	0.002
Benzo(a)pyrene	0
Benzo(b)fluoranthene	0.002
Benzo(k)fluoranthene	0.002
Chrysene	0.002
Indeno(1,2,3-cd)pyrene	0.002
Naphthalene	10
PCBs (ug/L)	
Aroclor 1242	0.09
Metals (ug/L)	
Arsenic	25
Barium	1000
Beryllium	3
Chromium	50
Copper	200
Iron	300
Lead	25
Magnesium	35000
Manganese	300
Nickel	100
Silver	50
Selenium	10
Sodium	20000
Thallium	0.5

AREA OF CONCERN (AOC) LEGEND:
AOC-1 - HISTORIC FILLING STATION PADS AND UNDERGROUND STORAGE TANK (UST) REMOVAL AREA
AOC-2A - POTENTIAL UST GPR ANOMOLY 1
AOC-2B - POTENTIAL UST GPR ANOMOLY 2
AOC-3 - HISTORIC ABOVEGROUND STORAGE TANK (AST)
AOC-4 - HISTORIC HYDRAULIC LIFT AREA
AOC-5 - HISTORIC UST REMOVAL AREA

RECOGNIZED ENVIRONMENTAL CONDITIONS (REC) LEGEND:
REC-1 - FORMER GASOLINE STATION AND AUTOMOBILE REPAIR GARAGE
REC-2 - FORMER NURSERY OPERATIONS
REC-3 - FORMER POTENTIAL UST's AND/OR AST's (SITE-WIDE)
REC-4 - HISTORICAL SPILL #9613901 (NOT DEPICTED)

NOTE:
1. THIS PLAN IS FOR LOCATING SOIL BORINGS, MONITORING WELLS, SOIL VAPOR BORINGS AND AMBIENT AIR LOCATIONS ONLY. OTHER SITE WORK SHOWN HERE IS NOT INTENDED FOR CONSTRUCTION.
2. BUILDING LINES DEPICT FORMER FEATURES. SITE CURRENTLY VACANT.

REFERENCE
AERIAL IMAGE TAKEN FROM GOOGLE MAPS, IMAGE DATED 2019.

LEGEND:
- ORC TREATMENT AREAS
- SITE BOUNDARY
- FORMER BUILDING OUTLINE
- RI MONITORING WELL NUMBER AND APPROX. LOCATION
- 2021 APPROX. LOCATION OF TEMPORARY WELL & SOIL BORING
- APPROXIMATE LOCATION OF AOC
- APPROXIMATE LOCATION OF REC-1
- APPROXIMATE LOCATION OF REC-2
- CONCENTRATION OF COMPOUND EXCEEDS THE NY TOG's CLASS GA GW OR ASSOCIATED GUIDANCE (NOTED AS AWQS)

NOTES:
NYSDEC = New York State Department of Environmental Conservation
AWQS = Ambient Water Quality Standards
ug/l = Micrograms per liter
= Concentration of compound exceeds the AWQS
1 = Detection limit exceeds AWQS for some VOCs, SVOCs and Metals.
[d] = Elevated detection limit due to dilution required for high interfering element.

Scale: 1"= 20'
0 10 20 40 60 80

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

dwg by: KBV
chk by: AF
scale: AS NOTED
date: 07/16/2025

no.	description	date	by

136-140 CROTON AVENUE
OSSINING, NEW YORK 10652

title: REMAINING GROUNDWATER SAMPLE EXCEEDANCES

job no. 12060
drawing no. FIG-2.2

1 of 1

Attachment A

ORC Advanced Technical Description

ORC Advanced® is an engineered, oxygen release compound designed specifically for enhanced, *in situ* aerobic bioremediation of petroleum hydrocarbons in ground-water and saturated soils. Upon contact with groundwater, this calcium peroxide based material becomes hydrated producing a controlled release of molecular oxygen (17% by weight) for periods of up to 12 months on a single application.

Example of ORC Advanced

ORC Advanced decreases time to site closure and accelerates degradation rates up to 100 times faster than natural degradation rates. A single ORC Advanced application can support aerobic biodegradation for up to 12 months with minimal site disturbance, no permanent or emplaced above ground equipment, piping, tanks, power sources, etc are needed. There is no operation or maintenance required. ORC Advanced provides lower costs, greater efficiency and reliability compared to engineered mechanical systems, oxygen emitters and bubblers.

ORC Advanced provides remediation practitioners with a significantly faster and highly effective means of treating petroleum contaminated sites. Petroleum hydrocarbon contamination is often associated with retail petroleum service stations resulting from leaking underground storage tanks, piping and dispensers. As a result, ORC Advanced technology and applications have been tailored around the remediation needs of the retail petroleum industry and include: tank pit excavations, amending and mixing with backfill, direct-injection, bore-hole backfill, ORC Advanced Pellets for waterless and dustless application, combined ISCO and bioremediation applications, etc. For a list of treatable contaminants with the use of ORC Advanced, view the Range of Treatable Contaminants Guide

Chemical Composition

- Calcium peroxide
- Calcium hydroxide
- Dipotassium phosphate
- Monopotassium phosphate

Properties

Physical State	Solid
Form	Powder
Color	White to pale yellow
Odor	Odorless
pH	12.5 (3% suspension/water)

Storage and Handling Guidelines

Storage

- Store in a cool, dry place out of direct sunlight
- Store in original tightly closed container
- Store in a well-ventilated place
- Do not store near combustible materials
- Store away from incompatible materials
- Provide appropriate exhaust ventilation in places where dust is formed

Handling

- Minimize dust generation and accumulation
- Keep away from heat
- Routine housekeeping should be instituted to ensure that dust does not accumulate on surfaces
- Observe good industrial hygiene practices
- Take precaution to avoid mixing with combustibles
- Keep away from clothing and other combustible materials
- Avoid contact with water and moisture
- Avoid contact with eyes, skin, and clothing
- Avoid prolonged exposure
- Wear appropriate personal protective equipment

Applications

- Slurry mixture direct-push injection through hollow rods or direct-placement into boreholes
- *In Situ* or *ex situ* slurry mixture into contaminated backfill or contaminated soils in general
- Slurry mixture injections in conjunction with chemical oxidants like RegenOx® or PersulfOx®
- Filter sock applications in groundwater for highly localized treatment
- *Ex Situ* biopiles

Health and Safety

Wash thoroughly after handling. Wear protective gloves, eye protection, and face protection. Please review the ORC Advanced Safety Data Sheet for additional storage, usage, and handling requirements.

REGENESIS

Oxygen Release Compound (ORC®) Installation Instructions

(Replaceable Filter-Sock Application)

ORC Filter Socks are used to enhance bioremediation of petroleum hydrocarbons in groundwater. The filter sock contains ORC and an inert carrier matrix. The socks come in one foot sections. They are laced together to span the vertical polluted saturated zone in monitoring type wells. Once the socks are laced together and lowered into the wells, they become hydrated and begin releasing oxygen. The following instructions are vital to proper installation and subsequent removal of the socks.

SAFETY PRECAUTIONS:

- ORC is completely non-toxic, but is composed of ultra-fine particles.
- Wear dust masks and goggles to prevent soft tissue irritation
- Reference the Material Safety Data Sheet for specific technical and physical information.

CONDITION OF SOURCE WELL:

- Test for well deviation and smoothness before ORC installation.
- For the test, use a 5 foot section of pipe with an outside diameter 1/2 inch smaller than the source well's inside diameter.

KEY REQUIREMENTS FOR INSTALLATION:

- **SOCKS MUST BE INSTALLED WITH BLACK GROMMETS ON TOP**
- Wrap Socks as independent units (see page 3, figure 5)
- A maximum of **20** ea. 2-inch socks per section.
- A maximum of **8** ea. 4-inch socks per section.
- A maximum of **6** ea. 6-inch socks per section.
- Make sure each sock is properly shaped (cylindrical and without bends) to facilitate ease of installation and removal.

HELPFUL HINTS:

- ORC matrix hardens into a cement once hydrated
- Minimize slack between each sock, by periodically pulling up slack while lacing
- Tie off ORC retrieval lines to the well cap. Regenesis recommends the use of a 3/8" diameter x 6" long eyebolt.

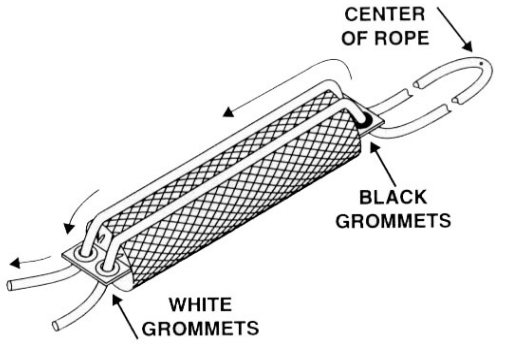
- The ORC Socks should be wetted to prevent excessive dusting prior to installation
- Make sure your work area is clean to avoid oil and dirt deposits on the socks.

FILTER-SOCK REMOVAL:

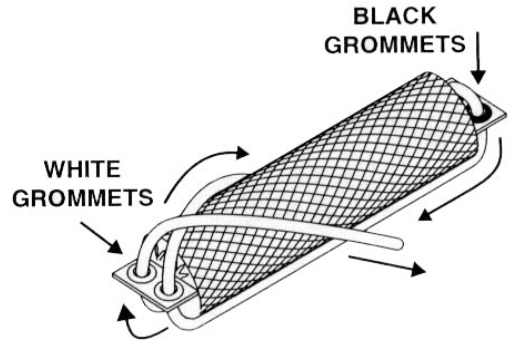
- ORC Socks will be approximately 20% heavier after water saturation
- Static friction from screened casing may cause difficulty in removal
- A winch and stanchion (or comparable equipment) may be necessary to help remove the socks due to increased weight, friction, etc.

LACING DIAGRAMS FOR SOCK INSTALLATION:

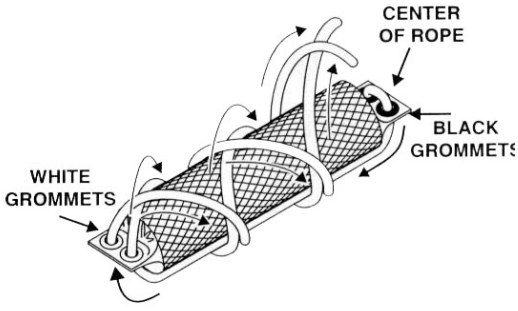
4 INCH AND 6 INCH SOCK LACING DIAGRAM:



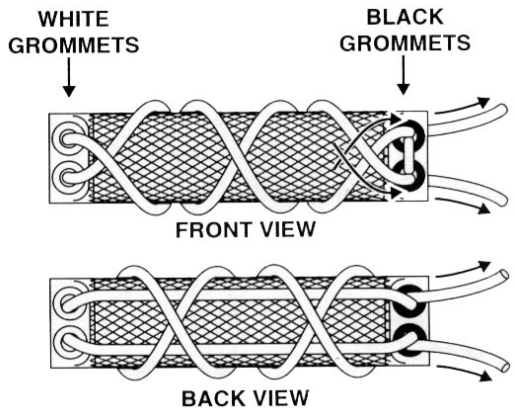
1. Find the center of the rope. Begin lacing the ORC Socks by threading the two ends of the installation rope through the black grommets and then through the white grommets at the bottom of the same side of the bottom sock



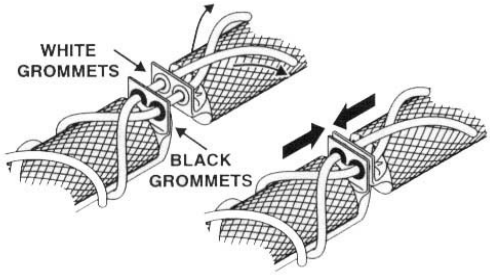
2. Pull the rope through the bottom sock, making sure the center of the rope is between the black grommets. Cross the ropes over each other.



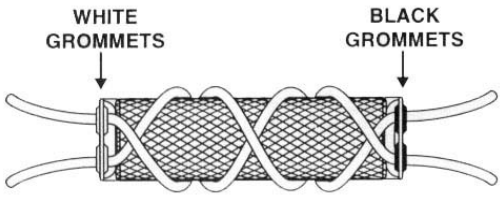
3. Loop the ends of the rope around the back of the sock and cross them. Repeat this step once again, so the rope is wrapped around the sock with two full turns.



4. Bring the ends of the rope around from the back, cross them, and thread them into the black grommets. The rope ends should be inserted into the black grommets diagonally from the white ones they started from. Threading the black grommets will be tight only on the bottom sock due to the unique lacing pattern.



5. To avoid the ORC Sock slipping past each other, the socks must be laced with the grommet flaps of the bottom sock and second sock butting against each other (as shown)

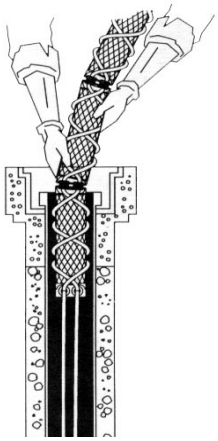


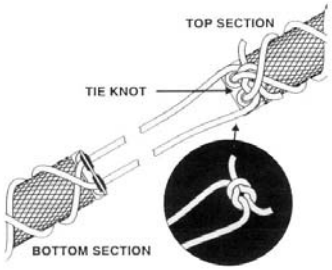
6. The remaining socks on the rope section are laced up according to Figure 6. Make sure that the rope is turned around the sock two full turns, with the grommets of each sock butting up against the next sock as shown in Figure 5.

7. Lace each subsequent ORC Sock exactly the same as in Figure 5 and 6.

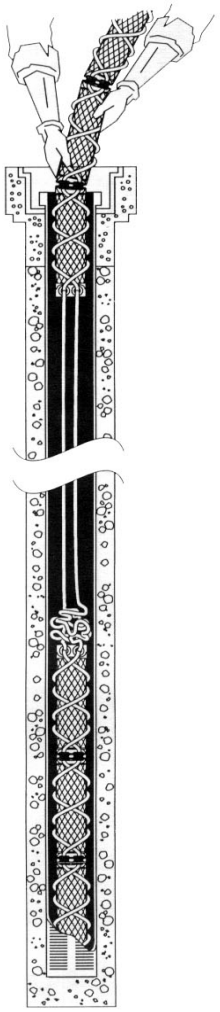
IMPORTANT: *Do not exceed the maximum number of socks per section (see "Key Requirements D & E" on page 1).*

Minimize the slack between the socks



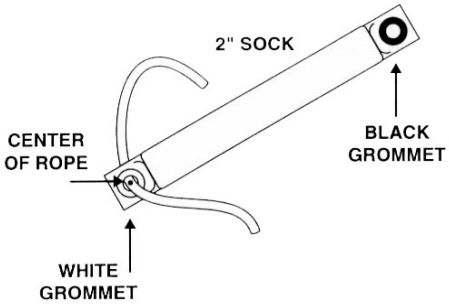


8. If you need to install more ORC Socks than the maximum allowed per well size (see "Key Requirements D & E on page 1), then multiple sections must be installed. Each section is laced exactly the same, but they should be tied off to each other. Tie the end of the rope from the lower section to the bottom sock of the upper section; this allows each section to be installed and removed independently (see well diagram)

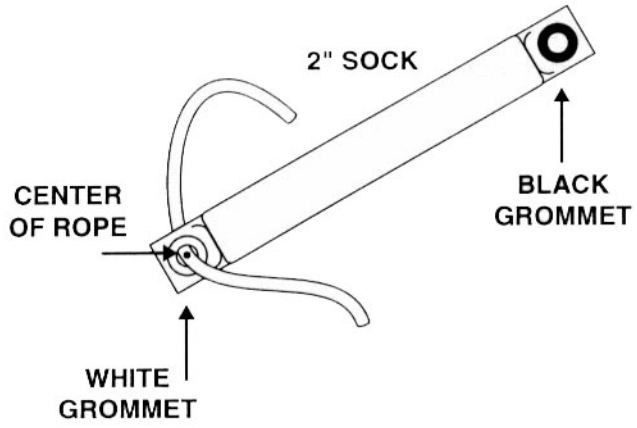


Well Diagram

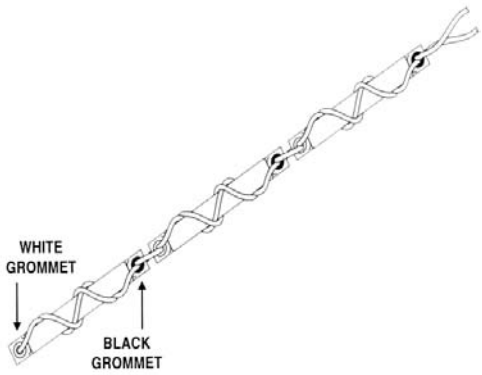
2 INCH SOCK LACING DIAGRAM:



9. Find the center of the rope. Begin lacing the ORC Socks by threading one end of the installation rope through the white grommet. Make sure that the center of the rope is pulled through to the center of the white grommet on the bottom sock.



10. Wrap each end of the installation rope around the sock twice and then cross them through the black grommet.



11. Lace each subsequent sock using the same method ad describe in Figure 2 above.

IMPORTANT:

Do not exceed the maximum number of socks per section (see "Key requirements B" on Page 1) Minimize the slack between socks

For direct assistance or answers to any questions you may have regarding these instructions, contact Regenesis Technical Services at 949-366-8000.

REGENESIS®

Range of Treatable Contaminants

REGENESIS®

Range of Treatable Contaminants

REGENESIS® Products have been used to effectively treat a broad range of contaminants from petroleum hydrocarbons, to chlorinated solvents, pesticides, and metals. Contact us to discuss the treatability of your contaminant of concern and site details so that we can recommend the most effective REGENESIS solution.

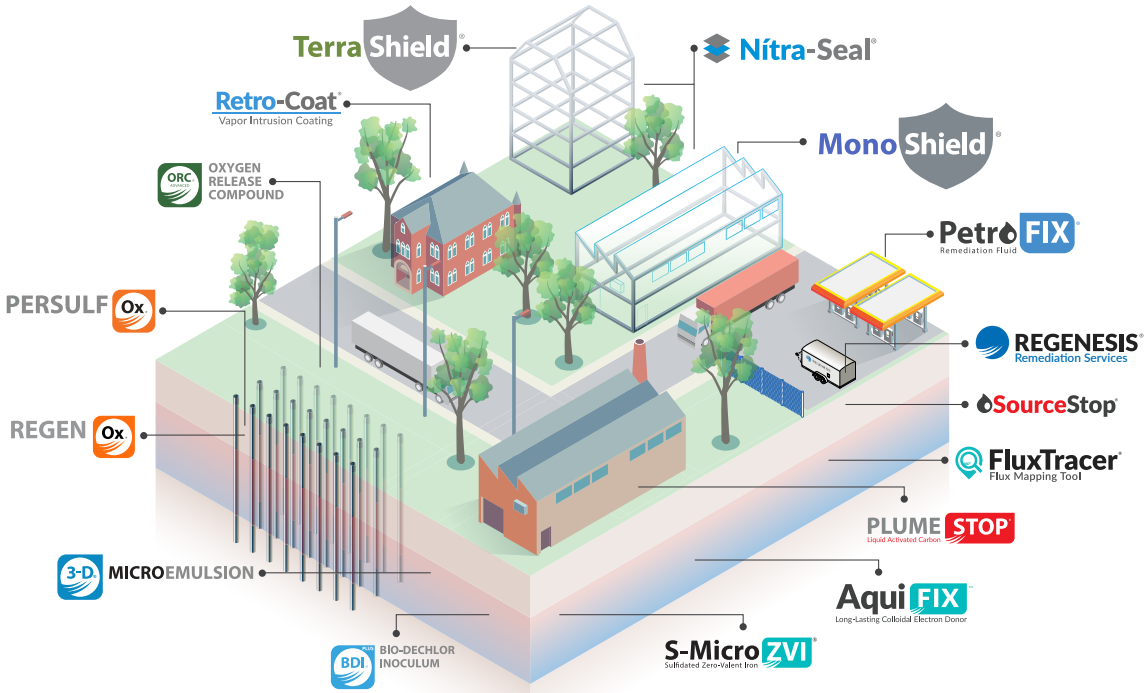
● = Contaminant treatable with REGENESIS Products

	Sorption			ISCO		Aerobic Bio	Anaerobic Bio			ISCR
Range of Treatable Contaminants	PlumeStop	SourceStop	PetroFix	RegenOx	PersulfOx	ORC Advanced	3DME	AquiFix	BDI Plus	S-MicroZVI
PFAS										
Perfluoroalkyl carboxylates (PFCAs)	●	●								
Perfluoroalkane sulfonates (PFSAs)	●	●								
Chlorinated Solvents										
Tetrachloroethylene (PCE)	●			●	●		●	●	●	●
Trichloroethene (TCE)	●			●	●		●	●	●	●
Dichloroethene (DCE)	●			●	●		●	●	●	●
Vinyl chloride (VC)	●			●	●	●	●	●	●	
Bis(2-chlorethoxy)methane	●			●	●		●	●		●
Bis(2-chloroethyl)ether	●			●	●		●	●		●
Carbon tetrachloride	●			●	●		●	●		●
Chloroethane	●			●	●	●	●	●		
Chloroform	●			●	●		●	●		●
Chloromethane	●			●	●		●	●		
Dichloroethane (DCA)	●			●	●	●	●	●	●	●*
Dichloropropane	●			●	●		●	●		
Dichloropropene	●			●	●		●	●		
Hexachlorobutadiene	●			●	●		●	●		●
Methylene chloride	●			●	●		●	●		
Tetrachloroethane	●			●	●		●	●	●	●
Trichloroethane (TCA)	●			●	●		●	●	●	●
Trichloropropane	●			●	●		●	●		
Petroleum Hydrocarbons										
Benzene	●		●	●	●	●				
Toluene	●		●	●	●	●				
Ethylbenzene	●		●	●	●	●				
Xylene	●		●	●	●	●				
Creosote (coal tar)	●		●	●	●	●				
Diesel range organics (DRO)	●		●	●	●	●				
Gasoline range organics (GRO)	●		●	●	●	●				
Oil range organics (ORO)	●		●	●	●	●				
Oxygenates										
Methyl tert butyl ether (MTBE)	●		●	●	●	●				
Tert-butyl alcohol (TBA)				●	●	●				

For additional questions or for a site review please call (949) 366-8000

	Sorption			ISCO		Aerobic Bio	Anaerobic Bio			ISCR
Range of Treatable Contaminants	PlumeStop	SourceStop	PetroFix	RegenOx	PersulfOx	ORC Advanced	3DME	AquiFix	BDI Plus	S-MicroZVI
Aromatics										
2-chlorophenol	●			●	●	●				
2,4-dichlorophenol	●			●	●	●				
2,4-dinitrophenol	●			●	●	●				
4-chloro-3-methyl phenol	●			●	●	●				
4-iso-propyltoluene	●			●	●	●				
4-nitrophenol	●			●	●	●				
Chlorobenzene	●			●	●	●				
Chlorotoluene	●			●	●	●	●	●		●
Dichlorobenzene	●			●	●	●				
N-butylbenzene	●			●	●	●				
Nitrobenzene	●			●	●	●				
Polycyclic aromatic hydrocarbons (PAHs)	●		●	●	●	●				
Pentachlorophenol	●				●	●	●	●		●
Phenol	●			●	●	●				
Propylbenzene	●			●	●	●				
Styrene	●			●	●	●				
Trichlorobenzene	●			●	●	●				
Trimethylbenzene	●			●	●	●				
Haloalkanes										
Dichlorodifluoromethane (Freon 12)	●						●	●		●
Trichlorofluoromethane (Freon 11)	●						●	●		●
Trichlorotrifluoroethane (Freon 113)	●						●	●		●
Pesticides and Herbicides										
2,4-D	●						●	●		●
2,4,5-T	●						●	●		●
Chlorodane	●						●	●		●
DDT, DDD, DDE	●						●	●		●
Dieldrin	●						●	●		●
Endrin	●						●	●		●
Heptachlor epoxide	●						●	●		●
Lindane (hexachlorocyclohexane)	●						●	●		●
Toxaphene	●						●	●		●
Energetics										
DNT	●			●			●	●		●
HMX	●			●			●	●		●
Nitroglycerine	●			●			●	●		●
RDX	●			●			●	●		●
TNT	●			●			●	●		●
Miscellaneous										
1,4-Dioxane					●					
4-methyl-2-pentanone	●			●	●	●				
Acetone	●			●	●	●				
Bis(2-ethylhexyl)phthalate	●			●	●	●				
Carbon disulfide (CS_2)				●	●		●	●		
Nitrates							●	●		●
Perchlorate							●	●		
Polychlorinated biphenyls (PCBs)	●						●	●		
Heavy Metals										
Chromium (VI)							●	●		●

Results will depend on specific site conditions, please discuss your site with a REGENESIS technical manager to determine which technology is most optimal for your site. The information provided is for guidance only. It is recommended that a pilot test or treatability study be performed to verify applicability to your specific contaminant and site conditions. REGENESIS makes no warranty or representation, expressed or inferred, and nothing herein should be construed as to guaranteeing actual results in field use, or permission or recommendation to infringe any patent.



PlumeStop® Liquid Activated Carbon™ is composed of very fine (1-2 micron-size) activated particles suspended in water through a unique, organic polymeric dispersion chemistry that resists clumping and allows permeation through aquifer materials. PlumeStop sorbs to the aquifer matrix soon after injection, rapidly removing contaminants from the groundwater to eliminate risk. It can be co-applied with electron donors, electron acceptors, or used as a stand-alone amendment to treat most organic groundwater contaminants.

SourceStop® prevents leaching of PFAS from soils and halts further migration in groundwater to eliminate the risk to downgradient receptors. Available in Liquid and Solid formulations, SourceStop's colloidal activated carbon (CAC) technology provides unsurpassed distribution, penetrating adn permanently coating impacted soils. Engineered for easy application, rapid results and long-term treatment, SourceStop is an adaptable and affordable solution for PFAS sites.

PetroFix® is a colloidal activated carbon technology used to remediate total petroleum hydrocarbons (TPHs) from contaminated environments. Petrofix uses a proprietary formula of activated carbon to adsorb total petroleum hydrocarbons. It then adds electron acceptors to stimulate hydrocarbon biodegradation.

RegenOx® is an *in situ* chemical oxidation (ISCO) reagent used to directly oxidize contaminants. Its unique catalytic component generates a range of highly oxidizing free radicals that rapidly and effectively destroy a range of target contaminants including both petroleum hydrocarbons and chlorinated compounds. RegenOx is an injectable, two-part ISCO reagent combining a solid sodium percarbonate based alkaline oxidant (Part A), with a liquid mixture of sodium silicates, silica gel and ferrous sulfate (Part B), resulting in a powerful contaminant destroying technology.

PersulfOx® is an advanced *in situ* chemical oxidation (ISCO) reagent that destroys organic contaminants found in groundwater and soil through abiotic chemical oxidation reactions. It is an all-in-one product with a built-in catalyst which activates the sodium persulfate component and generates contaminant-destroying free radicals without the costly and potentially hazardous addition of a separate activator.

ORC Advanced® is an engineered, oxygen-release compound developed for enhanced, *in situ* aerobic bioremediation of petroleum hydrocarbon contaminants in groundwater and saturated soils. Containing 17% by weight molecular oxygen, ORC Advanced provides a controlled release of molecular oxygen-an electron acceptor that optimizes microbial utilization in a treatment zone for up to 12 months post-application.

3-D Microemulsion® is an easy-to-apply remedial amendment for the *in situ* treatment of chlorinated solvent-contaminated aquifers. The patented technology, applied as a micellar suspension, provides a controlled, self-distributing hydrogen source to facilitate biologically mediated enhanced reductive dechlorination. 3-D Microemulsion's unique chemistry enables its distribution by naturally flowing groundwater while persisting for years after injection, resulting in much greater treatment coverage and faster degradation rates than other electron donor amendments.

AquiFix™ is a solid, colloidal remediation amendment for the *in situ* treatment of chlorinated solvent-contaminated aquifers, designed for direct mixing and co-application with PlumeStop. The novel formulation, patent-pending, includes a nutrient-enriched, solid-phase, fatty acid source that quickly establishes and sustains enhanced reductive dechlorination over long timeframes (e.g., ten years post-injection). AquiFix's optimized hydrogen release profile significantly improves remediation efficacy and reduces life-cycle costs to treat these contaminants.

BDI PLUS® (Bio-Dechlor INOCULUM Plus) is an enriched natural consortium containing *Dehalococcoides sp.* and other dechlorinating microbes for biologically augmenting enhanced reductive dechlorination remedies. Co-applied with electron donor amendments such as 3-D Microemulsion and AquiFix, BDI PLUS has proven to improve chlorinated solvent remediation efficiency.

S-MicroZVI® is a colloidal suspension of sulfidated zero-valent iron that promotes the destruction of a wide range of organic pollutants including chlorinated solvents, pesticides, haloalkanes and energetics. S-MicroZVI is engineered to promote rapid contamination degradation through multiple pathways which leads to faster cleanup while minimizing daughter product formation. Compared to larger particle size ZVI products, S-MicroZVI's 2-3 micron-sized particles, suspended in a proprietary polymer, make it easy to handle and simple to inject, leading to significantly better reagent distribution.

REGENESIS®
www.REGENESIS.com

SAFETY DATA SHEET

1. Identification

Product identifier	**Oxygen Release Compound Advanced (ORC Advanced®)**
Other means of identification	None.
Recommended use	Soil and Groundwater Remediation.
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name	REGENESIS
Address	1011 Calle Sombra San Clemente, CA 92673 USA
General information	949-366-8000
E-mail	CustomerService@regenesis.com

Emergency phone number	For Dangerous Goods Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC 24/7 at:
USA, Canada	1-800-424-9300
International	+1 703-741-5970

2. Hazard(s) identification

Physical hazards	Oxidizing solids	Category 2
Health hazards	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation

OSHA defined hazards Not classified.

Label elements

Signal word	Danger
Hazard statement	May intensify fire; oxidizer. Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation.

Precautionary statement

Prevention	Keep away from heat. Keep/Store away from clothing/combustible materials. Take any precaution to avoid mixing with combustibles. Do not breathe dust. Avoid breathing vapors. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective 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/doctor. Wash contaminated clothing before reuse. In case of fire: Use appropriate media to extinguish.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.

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

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Calcium peroxide	1305-79-9	≥ 75
Calcium hydroxide	1305-62-0	≤ 25
Dipotassium Phosphate	7758-11-4	< 5
Monopotassium Phosphate	7778-77-0	< 5

Composition comments All concentrations are in percent by weight unless otherwise indicated.

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 If on clothing: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes. 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 Do not rub eyes. 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.

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 under observation. Symptoms may be delayed.

General information Take off all contaminated clothing immediately. Contact with combustible material may cause fire. 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. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media Water spray, fog (flooding amounts). 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 Greatly increases the burning rate of combustible materials. Containers may explode when heated. During fire, gases hazardous to health may be formed. Combustion products may include: metal oxides.

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 In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers.

Specific methods Cool containers exposed to flames with water until well after the fire is out.

General fire hazards May intensify fire; oxidizer. Contact with combustible material may cause fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep away from clothing and other combustible materials. Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of dust. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. 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

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Ventilate the contaminated area. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Minimize dust generation and accumulation. Collect dust using a vacuum cleaner equipped with HEPA filter. Wear appropriate protective equipment and clothing during clean-up. Stop the flow of material, if this is without risk.

Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Clean surface thoroughly to remove residual contamination.

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

Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Keep away from heat. Provide appropriate exhaust ventilation at places where dust is formed. Take any precaution to avoid mixing with combustibles. Keep away from clothing and other combustible materials. Do not get this material in contact with eyes. Avoid breathing dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Avoid contact with water and moisture.

Conditions for safe storage, including any incompatibilities

Store locked up. Keep away from heat. Store in a cool, dry place out of direct sunlight. Store in tightly closed container. Store in a well-ventilated place. Do not store near combustible materials. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

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

Components	Type	Value	Form
Calcium hydroxide (CAS 1305-62-0)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. ACGIH Threshold Limit Values

Components	Type	Value
Calcium hydroxide (CAS 1305-62-0)	TWA	5 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Calcium hydroxide (CAS 1305-62-0)	TWA	5 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. If engineering measures are not sufficient to maintain concentrations of dust particulates below the Occupational Exposure Limit (OEL), suitable respiratory protection must be worn. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. Provide eyewash station and safety shower.

Individual protection measures, such as personal protective equipment

Eye/face protection

Use dust-tight, unvented chemical safety goggles when there is potential for eye contact.

Skin protection

Hand protection

Recommended gloves include rubber, neoprene, nitrile or viton. Frequent change is advisable.

Other

Wear appropriate chemical resistant clothing.

Respiratory protection	If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Recommended use: Wear respirator with dust filter.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Keep from contact with clothing and other combustible materials. Remove and wash contaminated clothing promptly. 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	
Physical state	Solid.
Form	Powder.
Color	White to pale yellow.
Odor	Odorless.
Odor threshold	Not available.
pH	12.5 (3% suspension/water)
Melting point/freezing point	Not applicable, material is a solid.
Initial boiling point and boiling range	Not applicable, material is a solid.
Flash point	Property has not been measured.
Evaporation rate	Not available.
Flammability (solid, gas)	Oxidizer.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not applicable, material is a solid.
Vapor density	Not applicable, material is a solid.
Relative density	Property has not been measured.
Solubility(ies)	
Solubility (water)	Slightly soluble
Partition coefficient (n-octanol/water)	Not applicable, product is a mixture. Not applicable, product is a mixture.
Auto-ignition temperature	Property has not been measured.
Decomposition temperature	527 °F (275 °C)
Viscosity	Not applicable, material is a solid.
Other information	
Bulk density	0.5 - 0.9 g/ml
Density	Property has not been measured.
Explosive limit	Non-explosive.
Explosive properties	Not explosive.
Kinematic viscosity	Not applicable, material is a solid.
Oxidizing properties	May intensify fire; oxidizer.

10. Stability and reactivity

Reactivity	Greatly increases the burning rate of combustible materials.
Chemical stability	Decomposes on heating. Product may be unstable at temperatures above: 275°C/527°F.
Possibility of hazardous reactions	Reacts slowly with water.
Conditions to avoid	Moisture. Heat. Avoid temperatures exceeding the decomposition temperature. Contact with incompatible materials.
Incompatible materials	Acids. Bases. Combustible material. Reducing agents. Salts of heavy metals.

Hazardous decomposition products Oxygen. Hydrogen peroxide (H2O2). Steam. Heat.

11. Toxicological information

Information on likely routes of exposure

Inhalation Dust may irritate respiratory system.

Skin contact Causes severe skin burns.

Eye contact Causes serious eye damage.

Ingestion Causes digestive tract burns.

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. Dusts may irritate the respiratory tract, skin and eyes.

Information on toxicological effects

Acute toxicity Not known.

Components	Species	Test Results
Calcium hydroxide (CAS 1305-62-0)		
Acute		
Dermal		
LD50	Rabbit	> 2500 mg/kg, 24 Hours
Inhalation		
LC50	Rat	6.04 mg/l, 4 hours
Oral		
LD50	Rat	> 2000 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 Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

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

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

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.

Components		Species	Test Results
Calcium hydroxide (CAS 1305-62-0)			
Aquatic			
Algae	EC50	Algae	184.57 mg/l, 72 hours

Persistence and degradability	Decomposes in the presence of water. The product contains inorganic compounds which are not biodegradable.
Bioaccumulative potential	The product does not contain any substances expected to be bioaccumulating.
Mobility in soil	This product has very low solubility in water and low mobility in the environment.
Other adverse effects	None known.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
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.
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number	UN1457
UN proper shipping name	Calcium peroxide
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Label(s)	5.1
Packing group	II
Environmental hazards	
Marine pollutant	No.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	IB6, IP2, T3, TP33, W100
Packaging exceptions	152
Packaging non bulk	212
Packaging bulk	242

IATA

UN number	UN1457
UN proper shipping name	Calcium peroxide
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Packing group	II
Environmental hazards	No.
ERG Code	5L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1457
UN proper shipping name	CALCIUM PEROXIDE
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-G, S-Q
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 applicable.

15. Regulatory information

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

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

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

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

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Classified hazard categories
Oxidizer (liquid, solid, or gas)
Skin corrosion or irritation
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Calcium hydroxide (CAS 1305-62-0)

US. New Jersey Worker and Community Right-to-Know Act

Calcium hydroxide (CAS 1305-62-0)
Calcium peroxide (CAS 1305-79-9)

US. Pennsylvania Worker and Community Right-to-Know Law

Calcium hydroxide (CAS 1305-62-0)

US. Rhode Island RTK

Calcium hydroxide (CAS 1305-62-0)

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.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Industrial Chemicals (AICIS)	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

Country(s) or region	Inventory name	On inventory (yes/no)*
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 14-February-2020

Revision date 15-July-2022

Version # 02

HMIS® ratings
Health: 3
Flammability: 0
Physical hazard: 2

NFPA ratings

Disclaimer Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.