PARKCHESTER CROSSING
BRONX, NEW YORK

Groundwater Remediation Work Plan

NYSDEC BCP Number: C203079

Prepared for:

ZP Realty, LLC
1 Penn Plaza, Suite 4000
New York, New York 10019

Prepared by:

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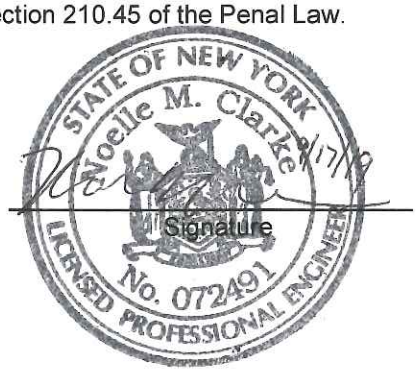
SEPTEMBER 2019

Certifications

I, Noelle M. Clarke, P.E., certify that I am currently a NYS registered professional engineer and that this Groundwater Remediation 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 that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

Noelle M. Clarke, P.E. NYS Professional Engineer #072491	September 17, 2019 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 145, New York State Education Law.

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Acronyms

µg/kg ..... Micrograms per Kilogram
µg/L ..... Micrograms per Liter
µg/m^3 ..... Micrograms per Cubic Meter
mg/kg..... Milligrams per Kilogram
AOCs..... Areas of Concern
ASP ..... Analytical Services Protocol
AWQSGVs ..... Ambient Water Quality Standards and Guidance Values
BCA..... Brownfield Cleanup Agreement
BCP ..... Brownfield Cleanup Program
bls..... Below Land Surface
CFR..... Code of Federal Regulations
CP-51 ..... Commissioner Policy-51
CPP ..... Citizen Participation Plan
CVOCs ..... Chlorinated Volatile Organic Compounds
DEC..... Department of Environmental Conservation
DER-10..... NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation
DO ..... Dissolved Oxygen
DUSR ..... Data Usability Summary Report
EDD..... Electronic Data Deliverable
ELAP ..... Environmental Laboratory Approval Program
ESA ..... Environmental Site Assessment
Ft ..... Feet/Foot
MW ..... Monitoring Well
NYSDEC ..... New York State Department of Environmental Conservation
NYSDOH..... New York State Department of Health
ORP..... Oxidation-Reduction Potential
PCE ..... Tetrachloroethene (Perchloroethene)
PDF ..... Portable Document Format
PVC ..... Polyvinyl Chloride
QAPP ..... Quality Assurance Project Plan
QA/QC..... Quality Assurance/Quality Control
RAWP..... Remedial Action Work Plan
RI..... Remedial Investigation
RIR ..... Remedial Investigation Report
RIR/RAWP ..... Remedial Investigation Report/Remedial Action Work Plan
SCG..... Standards, Criteria, and Guidance
SCOs..... Soil Cleanup Objectives
SOP..... Site Operations Plan
TAL..... Target Analyte List
TCE ..... Trichloroethene
TCL..... Target Compound List
TOGS ..... Technical and Operational Guidance Series
USEPA ..... United States Environmental Protection Agency
USGS ..... United States Geological Survey
VOC..... Volatile Organic Compounds

1. Introduction

Roux Environmental Engineering and Geology, D.P.C. (Roux), on behalf of ZP Realty LLC (the Volunteer), has prepared this Groundwater Remediation Work Plan (Work Plan) for the property identified as Parkchester Crossing, located at 1590 White Plains Road in the Borough of Bronx, City and State of New York (Site). The Site location is shown on Figure 1. The Site consists of five separate parcels identified as Lots 1, 7, 8, 17, and 23 of Block 3952 on the Bronx County Tax Map.

The Volunteer applied to the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) and was accepted as a volunteer in May 2015. The Volunteer entered into a Brownfield Cleanup Agreement (BCA) with the NYSDEC in May 2015 to investigate and remediate the 1.493-acre property. Site number C203079 was assigned. An amendment to modify the acreage of the Site based on the survey completed for the Environmental Easement was filed on August 6, 2019 and executed by the NYSDEC on August 23, 2019.

The Remedial Investigation Report / Remedial Action Work Plan (RIR/RAWP) was submitted to the NYSDEC in July 2019 and summarizes the Scope of Work (SOW) and data collected during the October and November 2018 Remedial Investigation (RI) and provides an evaluation of a Track 1 cleanup and a combination Track 1/Track 4 Restricted Residential Remedial Action alternative, their associated costs, and the recommended and preferred remedy.

A formal Remedial Design document for the soil remediation portion of the remedy will not be prepared, as the RIR/RAWP provides sufficient detail to implement the proposed soil remedy. This Work Plan provides a final design for the *in situ* groundwater treatment portion of the proposed remedy, as described in the RIR/RAWP.

1.1 Work Plan Organization

This Work Plan contains the following sections:

- Section 2 – Describes the Site, results of the RI activities and summary of the most recent groundwater sampling;
- Section 3 – Describes each element of the groundwater treatment remedial design;
- Section 4 – Describes the monitoring program; and
- Section 5 – Provides an implementation schedule.

2. Background

The following sections provide a brief summary of background information and results of the RI work conducted at the Site. Further details can be found in the RIR/RAWP.

2.1 Site Location and Description

The Site address is collectively referred to as 1590 White Plains Road in the Borough of Bronx, City and State of New York (Figure 1).

Additional information regarding the Site is provided in the tables below:

Property Location	
Property Name:	Parkchester Crossing
Property Address:	1590 White Plains Road
Property Town, County, State	Parkchester, Bronx, New York
Property Tax Identification	Tax Block 3952, Lots 1, 7, 8, 17 and 23
Property Topographic Quadrangle	USGS; Flushing, NY (2013) 7.5 Minute Topographic Quadrangles
Nearest Intersections:	(Northwest) East Tremont Avenue and White Plains Road (Southwest) Guerlain Street and White Plains Road (Southeast) Guerlain Street and Unionport Road (Northeast) Unionport Road and East Tremont Avenue
Area Description:	The Site is located in an urban and developed area. The surrounding properties are currently used for a combination of low- and high-density residential housing and commercial properties, including for an active Sunoco gas station and a car wash. The nearest residential properties are located to the south and east of the property (Parkchester North Condominiums and Parkchester South Condominiums).

Property Information	
Acreage (based on the BCA Amendment Submitted August 6, 2019):	1.4934 acres (total) • Lot 1 - 0.1628 acres; • Lot 7 - 0.1722 acres; • Lot 8 - 0.1703 acres; • Lot 17 - 0.4886 acres; and • Lot 23 – 0.4995 acres.
Shape:	Pentagonal
Property Use:	All five lots (Lots 1, 7, 8, 17, and 23) are vacant and all former buildings have been demolished. Several underground storage tanks (USTs) and underground piping were recently removed from Lot 8 (former gasoline filling station) as part of the approved Interim Remedial Measure (IRM).

2.2 Contemplated Redevelopment Plan

Although the redevelopment plan for the Site is not finalized, it is anticipated that when the development is completed, the Site usage will contain mixed-use development including housing, retail, and parking.

2.3 Local Geology and Stratigraphy

During the RI, a fill layer consisting of fine to coarse sand, gravel, concrete, and brick fragments was encountered across the Site to a maximum depth of 28 feet below land surface (ft bls) and in some locations, to bedrock surface. In the southern portion of the Site, this fill layer was generally underlain by a native, glacial silty and gravelly-sand stratum before weathered bedrock was encountered. In the northern areas of the site, the fill layer was generally underlain by a 4 to 9 ft thick native, clay stratum that began approximately 15 to 20 ft bls.

During the investigation at the Site, a weathered bedrock layer of variable thickness was observed to overlay competent bedrock. Bedrock at the Site is comprised of the Hartland Formation schistose members. Competent bedrock was identified at shallower depths around the northern, western and southern perimeter of the Site. Competent bedrock surfaces range from approximately 8 to 28 ft bls and ranges from approximately 23.39 ft NAVD88 to 38.31 ft NAVD88.

2.4 Site Hydrogeologic Setting

According to water-level data collected during the RI, the elevation of the water table surface at the Site ranges from approximately 47.94 ft NAVD 88 at the northeast portion of the Site to approximately 34.57 NAVD 88 in the southcentral portion of the Site. The variable nature of bedrock elevation at the Site appears to influence the occurrence and flow of the shallow groundwater table, which was encountered at some boring locations at the top of competent bedrock. Groundwater depth at the Site varied from 0.99 ft bls to 16.84 ft bls. Regional groundwater flow is generally to the south mimicking topography.

2.5 Volatile Organic Compounds in Groundwater

During the RI, VOCs were detected at concentrations above NYSDEC Protection of Groundwater Soil Cleanup Objectives (SCOs) in soil and also were detected in groundwater above the Ambient Water Quality Standards and Guidance Values (AWQSGVs), as discussed below. This data indicates soil in these localized areas of the Site are a source of groundwater impacts:

- 1,2,4-Trimethylbenzene was detected at concentrations exceeding its NYSDEC Protection of Groundwater SCO in five soil samples, ranging in concentration from 4.1 to an estimated 130 milligrams per kilogram (mg/kg). 1,2,4-Trimethylbenzene was detected at a concentration exceeding its NYSDEC AWQSGV in one sample, with a concentration of 18 microgram per liter (µg/L) in monitoring well RMW-7 (Plate 1).
- Benzene was detected at concentrations exceeding its NYSDEC Protection of Groundwater in six soil samples, ranging in concentration from estimated 0.13 J mg/kg to 7 mg/kg. Benzene was detected at a concentration exceeding its NYSDEC AWQSGV in one sample, with a concentration of 110 µg/L in monitoring well RMW-7.
- Ethylbenzene was detected at concentrations exceeding its NYSDEC Protection of Groundwater SCO in six soil samples, ranging in concentration from 1.3 mg/kg to 58 mg/kg. Ethylbenzene was detected at a concentration exceeding its NYSDEC AWQSGV in one sample, with a concentration of 97 µg/L in monitoring well RMW-7.

- Tetrachloroethene (PCE) was detected at a concentration exceeding its NYSDEC Protection of Groundwater in one soil sample, with a concentration of 20 mg/kg. PCE was detected at a concentration exceeding its NYSDEC AWQSGV in six samples, ranging in concentration from 12 µg/L to 330 µg/L, with the highest concentration in monitoring well RMW-11.
- Toluene was detected at concentrations exceeding its NYSDEC Protection of Groundwater SCO in one soil sample at a concentration an estimated 15 mg/kg. Toluene was detected at a concentration exceeding its NYSDEC AWQSGV in one sample, with a concentration of 18 µg/L in monitoring well RMW-7.
- Xylenes were detected at concentrations exceeding its NYSDEC Protection of Groundwater SCO in six soil samples, ranging in concentration from 2.6 mg/kg to an estimated 230 mg/kg. Xylenes were detected at a concentration exceeding its NYSDEC AWQSGV in one sample, with an estimated concentration of 140 µg/L in monitoring well RMW-7.

A summary of the groundwater exceedances is presented on Plate 1.

2.6 Confirmation Groundwater Sampling

Due to the AWQSGV exceedances detected in RMW-7 during the RI and its location upgradient of the Site with no known source, additional confirmation groundwater sampling was conducted to evaluate whether groundwater treatment within this area of the Site would be necessary. The groundwater samples were collected from RMW-7 on July 16, 2019 and three temporary points were installed and sampled downgradient of RMW-7 (AOC-1_TW-A, AOC-1_TW-C and AOC-1_TW-E) on July 12, 2019 (Plate 1). The samples were collected using low flow sampling techniques and submitted to Alpha Analytical of Westborough, Massachusetts for analysis of TCL VOCs via United States Environmental Protection Agency (USEPA) SW846 Method 8260. A summary of the results from the confirmation sampling are provided on Table 1 and Plate 1. No compounds were detected above their respective AWQSGVs.

2.7 Areas of Concern

Based on the results of the RI for soil and groundwater, four Areas of Concern (AOCs) were identified in the RIR/RAWP, as shown on Plate 2 (AOC-1 through AOC-4). However, based on the results of the July 2019 confirmation groundwater sampling, AOC-1 is no longer considered an AOC to be remediated as part of this Work Plan, as groundwater impacts were not observed on-Site or off-Site upgradient of this area. This area will be monitored as part of the groundwater monitoring program described in Section 4.

In situ groundwater remediation is proposed to treat the groundwater beneath Lots 1 and 23 (AOC-3 and AOC-4) that is impacted with chlorinated volatile organic compounds (CVOCs), and to treat the groundwater beneath Lot 8 (AOC-2) that is impacted with petroleum VOCs (only if required following completion of the IRM activities, excavation and dewatering activities). Further details of the *in situ* groundwater treatment for AOC-2, AOC-3, and AOC-4 are provided in Section 3.

3. In Situ Treatment Design

The proposed remedy as described in the RIR/RAWP includes the following groundwater treatment elements for the combined Track 1 Unrestricted Use/Track 4 Restricted Residential Use remedy:

1. Installation of dewatering and water treatment system during excavation of soil within Lot 8, if necessary;
2. *In situ* treatment for groundwater beneath Lots 1 and 23 that is impacted with CVOCs; and
3. *In situ* treatment for groundwater beneath Lot 8 that is impacted with petroleum-related VOCs (only if required) following completion of Interim Remedial Measures (IRMs), excavation and dewatering activities, as described in the RIR/RAWP).

The proposed treatment areas are shown on Plate 2.

3.1 AOC-3 and AOC-4

For AOC-3 and AOC-4, an evaluation of *in situ* injections was conducted and the recommended groundwater treatment will include injections of an in situ chemical oxidation (ISCO) reagent that will enhance the oxidative destruction of chlorinated compounds in the subsurface. The ISCO reagent selected was PersulfOx© manufactured by REGENESIS of San Clemente, California. PersulfOx© is a sodium persulfate-based technology with a built-in patented silica and silicate-based catalyst that activates the persulfate component, thereby, eliminating the need for separate activation chemistry. Once PersulfOx© was selected, Roux worked with REGENESIS to calculate an appropriate injection quantity for each AOC based on the Site information and groundwater concentrations. A breakdown of the proposed injection quantities is provided in Appendix A. Information sheets on PersulfOx© are provided in Appendix B.

The ISCO reagent will be injected via direct push methods as a 19% solution with water. The spacing between injection points and application depths were evaluated for each area to meet the required application volumes for effective CVOC reductions in groundwater. For AOC-3, 42 injections will be spaced 10 feet apart with an average injection volume of 143 gallons per point (256 pounds of PersulfOx©) to treat CVOCs present within the groundwater table down to bedrock, which varies from 4 ft bls to a depth of 12 ft bls to 20 ft bls. The total application volume will be 6,026 gallons (10,745 pounds of PersulfOx©). For AOC-4, 68 injections will be spaced 10 feet apart with an average injection volume of 101 gallons per point (181 pounds of PersulfOx©) to treat CVOCs present from 2 ft bls to 8 ft bls. The total application volume will be 6,892 gallons (12,287 pounds of PersulfOx©).

Following the injection applications in AOC-3 and AOC-4, if the groundwater monitoring results indicate that there has not been sufficient reduction in the CVOC concentrations, a second ISCO event will be conducted during the Site Monitoring Phase, utilizing the same scope and quantities as described above.

3.2 AOC-2

The proposed remedy for AOC-2 includes IRM activities (removal of USTs), excavation down to 23 ft bls and dewatering. Following these activities, if it is determined that further groundwater remediation is necessary, in situ groundwater treatment will be implemented. Similarly, as with AOC-3 and AOC-4, an evaluation of in situ treatment options was conducted for AOC-2 and the recommended groundwater treatment will include applications of an ISCO reagent along with an oxygen release compound (ORC) designed for enhanced *in situ* aerobic bioremediation that will enhance the oxidative destruction of petroleum compounds in the

subsurface. The ISCO reagent selected was PersulfOx© manufactured by REGENESIS, which is described above. The oxygen release compound selected was ORC Advanced© also manufactured by REGENESIS. ORC Advanced© is a calcium oxyhydroxide-based material that becomes hydrated upon contact with water, producing a controlled release of molecular oxygen for up to 12 months per application. Once these technologies were selected, Roux worked with REGENESIS to calculate appropriate application quantities for AOC-2 based on the Site information and groundwater concentrations. The ISCO reagent and oxygen release compound will be applied directly to the excavation bottom at 23 ft bls prior to backfill. The recommended application of PersulfOx© is 4,739 pounds and the recommended application of ORC Advanced© is 1,102 pounds. A breakdown of the proposed application quantities is provided in Appendix A. Information sheets on PersulfOx© and ORC Advanced© are provided in Appendix B.

3.3 Monitoring Well Installation

The installation of five monitoring wells (RMW-9R, RMW-11R, RMW-12R, RMW-13, and RMW-14) is proposed as part of the groundwater remediation monitoring. The new well locations are shown on Plate 2. These permanent monitoring wells will be constructed of 2-inch diameter Schedule 40 polyvinyl chloride (PVC) casing with 2-inch diameter, 20-slot (0.020 inches) PVC screen flush-threaded onto the PVC casing. The screened intervals of the wells will be based on field observations made during drilling, existing groundwater elevation data, and the targeted groundwater contamination zone. Preliminary groundwater levels will be measured by Roux during monitoring well installation.

At all permanent monitoring well locations, the casing will be placed down the open hole and a sand filter pack of #2 Morie sand will be placed around the screen to approximately two above the screened depth. The annulus above the filter pack will be sealed with a two-foot hydrated bentonite seal. A cement-bentonite grout will then be placed in the annulus above the bentonite seal to the surface. Surface completion of each monitoring well will consist of a locking J-plug and a protective flush mount manhole cover. All newly constructed monitoring wells will be developed using a submersible pump to equilibrate monitoring well water levels with the surrounding formation. A submersible pump will be lowered into the well and groundwater withdrawn until the well is dry or the water runs clear with a turbidity less than 50 NTU.

4. Groundwater Monitoring

To assess the performance of the *in situ* groundwater remediation, a groundwater monitoring program will be established. This will include two components: baseline sampling and performance monitoring. The sampling, sample handling, decontamination, and field instrument calibration procedures will be performed in accordance with established procedures for the Site as outlined in the Field Sampling Plan (FSP) / Quality Assurance Project Plan (QAPP), which is provided as Appendix O in the RIR/RAWP. The monitoring well network will include all monitoring wells remaining on-Site following completion of the excavations (if any), RMW-5, RMW-7 and the five proposed new monitoring wells shown on Plate 2 (RMW-9R, RMW-11R, RMW-12R, RMW-13 and RMW-14). The details of the baseline and performance monitoring are provided in this section.

4.1 Baseline Monitoring

Baseline groundwater sampling will be performed to evaluate levels of VOCs and naturally occurring biogeochemical conditions in the groundwater zone prior to the first injection event. During the baseline testing, the monitoring wells in the network will be sampled and analyzed for Target Compound List (TCL) VOCs using USEPA SW846 Method 8260. Prior to sample and data collection, the monitoring wells will be purged via low-flow means using a bladder pump. Samples and parameter readings (dissolved oxygen, oxidation-reduction potential, pH and temperature) will be collected using a flow-through cell to prevent sample contact with atmospheric air.

All laboratory samples will be submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory for analysis. All groundwater samples will be placed in the laboratory-supplied containers, stored on ice in coolers, and transported to the laboratory under chain of custody procedures in accordance with the QAPP. The data will be reported in Category B Deliverables and TCL VOC data will be validated with a Data Usability Summary Report (DUSR) prepared. Purge water from the sampling will be containerized so that it can be characterized and properly disposed off-Site.

4.2 Performance Monitoring

Following the contaminated soil excavation, ISCO event and completion of the excavation application (if needed), it is anticipated that groundwater concentrations of CVOCs and petroleum-related VOCs present on-Site will decrease significantly.

In order to evaluate on-Site conditions and the effectiveness of the treatment, performance monitoring samples will be collected from monitoring wells in the network approximately one month following injections. The wells will be sampled for the same parameters outlined in the baseline sampling and field parameter readings will be collected as well.

Performance monitoring will be conducted for eight additional quarterly rounds, at which time the Volunteer will request to discontinue sampling if concentration reductions are observed. Any modification to the sampling schedule and any decision to discontinue groundwater monitoring will be subject to NYSDEC approval.

4.3 Data Evaluation and Reporting

Progress updates during the field work will be provided to the NYSDEC in Daily Reports in accordance with the RIR/RAWP. Data from each of the ongoing performance monitoring events will be submitted in a brief summary report after the DUSR is received. After the injection events and all the performance monitoring

rounds have been completed, the performance monitoring results will be evaluated to determine the effectiveness of the injections at reducing the residual VOC concentrations in the groundwater at the Site. The evaluation will be summarized and will be submitted as an appendix to the first Periodic Review Report (PRR) to be submitted during the Site Monitoring phase following issuance of the COC.

5. Schedule

The anticipated schedule for the in situ groundwater remediation to be completed during the Remedial Action is as follows:

- Well Installation and Well Development – September/October 2019
- Baseline Groundwater Sampling Event – September/October 2019
- First AOC-3 and AOC-4 Injection Event – September/October 2019
- AOC-2 *In Situ* Excavation Application (if necessary) – September/October 2019
- First Injection Performance Monitoring Sampling Event – November 2019

The anticipated schedule for the in situ groundwater remediation to be completed during Site Monitoring Phase is as follows:

- Second AOC-3 and AOC-4 Injection Event (if needed) – January 2020
- Second Injection Performance Monitoring Sampling Event (if needed) – February 2020
- First Quarterly Performance Monitoring Sampling Event – February 2020
- Second Quarterly Performance Monitoring Sampling Event – May 2020
- Third Quarterly Performance Monitoring Sampling Event – August 2020
- Fourth Quarterly Performance Monitoring Sampling Event – November 2020
- Fifth Quarterly Performance Monitoring Sampling Event – February 2021
- Sixth Quarterly Performance Monitoring Sampling Event – May 2021
- Seventh Quarterly Performance Monitoring Sampling Event – August 2021
- Eighth Quarterly Performance Monitoring Sampling Event – November 2021
- Submission of Injection Results Report to the NYSDEC – to be determined (report will be submitted as an appendix to the first PRR)

The above schedule may be altered based on approval of the RIR/RAWP by the NYSDEC, the excavation schedule and the performance monitoring results.

Respectfully submitted,

ROUX ENVIRONMENTAL ENGINEERING AND GEOLOGY, D.P.C.

Frank Cherena, P.G.
Principal Geologist

Noelle Clarke, P.E.
Principal Engineer

TABLE

Summary of VOCs in Groundwater Samples

Notes Utilized in Table
Groundwater Tables
NYSDEC - New York State Department of Environmental Conservation
AWQSGVs - Ambient Water-Quality Standards and Guidance Values
µg/L - Micrograms per liter
J - Estimated Value
U - Compound was analyzed for but not detected
V - Value altered or qualifier added during data validation
UJ - Analyte was not detected. The associated reported quantitation limit is an estimate
-- No NYSDEC AWQSGV available
NA - Compound was not analyzed for by laboratory
Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

Table 1. Summary of VOCs in Groundwater Samples
Parkchester Crossing 1590 White Plains Road, Bronx, New York

LOCATION			AOC-1_TW-A	AOC-1_TW-E	AOC-1_TW-C	RMW-7	RMW-7
SAMPLING DATE			7/12/2019	7/12/2019	7/12/2019	11/20/2018	7/16/2019
	NYSDEC AWQSGVs	Units					
Volatile Organics							
1,2,4-Trichlorobenzene	5	µg/L	2.5 U	2.5 U	2.5 U	**18**	2.5 U
1,3,5-Trimethylbenzene	5	µg/L	2.5 U	2.5 U	2.5 U	2.9	2.5 U
Acetone	50	µg/L	5 U	3.7	6.9	5 U	1.5 J
Benzene	1	µg/L	0.5 U	0.5 U	0.57	**110**	0.67
Chloroform	7	µg/L	2.5 U	2.5 U	2.5 U	0.74 J	2.5 U
Ethylbenzene	5	µg/L	2.5 U	2.5 U	2.5 U	**97 JV**	2.5 U
Isopropylbenzene	5	µg/L	2.5 U	2.5 U	2.5 U	**19**	2.5 U
m,p-Xylene	5	µg/L	2.5 U	2.5 U	2.5 U	**50 JV**	2.5 U
Naphthalene	10	µg/L	2.5 U	1.2 J	2.5 U	**39**	2.5 U
n-Propylbenzene	5	µg/L	2.5 U	2.5 U	2.5 U	2.2	2.5 U
o-Xylene	5	µg/L	2.5 U	2.5 U	0.76 J	**93**	2.5 U
p-Diethylbenzene	--	µg/L	2 U	0.74 J	2 U	--	2 U
sec-Butylbenzene	5	µg/L	2.5 U	0.73 J	2.5 U	0.55 J	2.5 U
Styrene	5	µg/L	2.5 U	2.5 U	2.5 U	3.5	2.5 U
Tetrachloroethene	5	µg/L	0.24 J	0.23 J	0.5 U	1 U	0.5 U
Toluene	5	µg/L	2.5 U	2.5 U	2.5 U	**18**	2.5 U
Xylenes, Total	--	µg/L	2.5 U	2.5 U	0.76 J	**140 JV**	2.5 U

FIGURE

Site Location Map

QUADRANGLE LOCATION

SOURCE:
USGS; Flushing, NY (2013) and
Central Park, NY-NJ (2013)
7.5 Minute Topographic Quadrangles

N

0 2000'

Title:

SITE LOCATION

1590 WHITE PLAINS ROAD
BRONX, NEW YORK

Prepared for:

ZP REALTY, LLC

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: D.H.	Date: 25JUL19	FIGURE
Prepared by: B.H.C.	Scale: AS SHOWN	1
Project Mgr.: D.H.	Project No.: 2530.0001Y000	
File: 2530.0001Y129.01.CDR		

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APPENDICES

A. REGENESIS Injection and Application Calculations
B. REGENESIS Material Information Sheets

APPENDIX A

REGENESIS Injection and Application Calculations

REGENESIS

Project Information

Parkchester Crossing
Bronx, New York
AOC 3
Prepared For:
Dana Hignell - Roux Environmental Engineering and Geology

Target Treatment Zone (TTZ) Info	Unit	Value
Treatment Area	ft^2	4,200
Top Treat Depth	ft	3.5
Bot Treat Depth	ft	12.0
Vertical Treatment Interval	ft	8.5
Treatment Zone Volume	ft^3	35,700
Treatment Zone Volume	cy	1,322
Soil Type	---	sand
Porosity	cm^3/cm^3	0.33
Effective Porosity	cm^3/cm^3	0.20
Treatment Zone Pore Volume	gals	88,128
Treatment Zone Effective Pore Volume	gals	53,411
Fraction Organic Carbon (foc)	g/g	0.002
Soil Density	g/cm^3	1.7
Soil Density	lb/ft^3	108
Soil Weight	lbs	3.9E+06
Hydraulic Conductivity	ft/day	0.4
Hydraulic Conductivity	cm/sec	1.28E-04
Hydraulic Gradient	ft/ft	0.037
GW Velocity	ft/day	0.07
GW Velocity	ft/yr	24

Sources of Oxidant Demand	Unit	Value
Sorbed Phase Contaminant Mass	lbs	0
Dissolved Phase Contaminant Mass	lbs	0.1
Total Contaminant Mass	lbs	0
Stoichiometric PersulfOx Demand	lbs	2
Stoichiometric PersulfOx Required	lbs	3
Additional Soil Oxidant Demand	g/kg	2.5
SOD PersulfOx Required	lbs	10,708
Total PersulfOx Required	**lbs**	**10,711**

Application Dosing

PersulfOx Required	**lbs**	**10,745**

PersulfOx® Application Design Summary

AOC 3	
Application Method	**Direct Push**
Spacing Within Rows (ft)	10
Spacing Between Rows (ft)	10
Injection Points (per app.)	**42**
Number of Applications	**1**
Areal Extent (square ft)	4,200
Top Application Depth (ft bgs)	4
Bottom Application Depth (ft bgs)	12
PersulfOx to be Applied (lbs)	**10,745**
PersulfOx Solution %	19%
Volume Water (gals)	**5,489**
Total Volume (gals)	**6,026**

Field App. Instructions

Field Mixing Ratios
Water per Pt per app (gals)
131
PersulfOx per Pt per app (lbs)
256
Total Volume per Pt per app (gals)
143

Per Application Totals

PersulfOx per app. (lbs)	*10,745*	*Volume per vertical ft (gals)*
Volume Water per app. (gals)	*5,489*	*17*
Total Volume per app. (gals)	*6,026*	

Technical Notes/Discussion

Assumptions/Qualifications

In generating this preliminary estimate, Regenesis relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

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Prepared By: ***Alana Miller***
Date: ***8/9/2019***

REGENESIS

Project Information

Parkchester Crossing
Bronx, New York
AOC 4
Prepared For:
Dana Hignell - Roux Environmental Engineering and Geology

Target Treatment Zone (TTZ) Info	Unit	Value
Treatment Area	ft^2	6,800
Top Treat Depth	ft	2.0
Bot Treat Depth	ft	8.0
Vertical Treatment Interval	ft	6.0
Treatment Zone Volume	ft^3	40,800
Treatment Zone Volume	cy	1,511
Soil Type	---	sand
Porosity	cm^3/cm^3	0.33
Effective Porosity	cm^3/cm^3	0.20
Treatment Zone Pore Volume	gals	100,718
Treatment Zone Effective Pore Volume	gals	61,041
Fraction Organic Carbon (foc)	g/g	0.002
Soil Density	g/cm^3	1.7
Soil Density	lb/ft^3	108
Soil Weight	lbs	4.4E+06
Hydraulic Conductivity	ft/day	0.4
Hydraulic Conductivity	cm/sec	1.28E-04
Hydraulic Gradient	ft/ft	0.012
GW Velocity	ft/day	0.02
GW Velocity	ft/yr	8

Sources of Oxidant Demand	Unit	Value
Sorbed Phase Contaminant Mass	lbs	1
Dissolved Phase Contaminant Mass	lbs	0.3
Total Contaminant Mass	lbs	1
Stoichiometric PersulfOx Demand	lbs	4
Stoichiometric PersulfOx Required	lbs	7
Additional Soil Oxidant Demand	g/kg	2.5
SOD PersulfOx Required	lbs	12,238
Total PersulfOx Required	**lbs**	**12,245**

Application Dosing

PersulfOx Required	**lbs**	**12,287**

PersulfOx® Application Design Summary

AOC 4	
Application Method	**Direct Push**
Spacing Within Rows (ft)	10
Spacing Between Rows (ft)	10
Injection Points (per app.)	**68**
Number of Applications	**1**
Areal Extent (square ft)	6,800
Top Application Depth (ft bgs)	2
Bottom Application Depth (ft bgs)	8
PersulfOx to be Applied (lbs)	**12,287**
PersulfOx Solution %	19%
Volume Water (gals)	**6,277**
Total Volume (gals)	**6,892**

Field App. Instructions

Field Mixing Ratios
Water per Pt per app (gals)
92
PersulfOx per Pt per app (lbs)
181
Total Volume per Pt per app (gals)
101

Per Application Totals		
PersulfOx per app. (lbs)	*12,287*	*Volume per vertical ft (gals)*
Volume Water per app. (gals)	*6,277*	*17*
Total Volume per app. (gals)	*6,892*	

Technical Notes/Discussion

Assumptions/Qualifications

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Prepared By: ***Alana Miller***
Date: ***8/9/2019***

REGENESIS

Project Information

Parkchester Crossing
Bronx, New York
AOC 2 - Excavation

Prepared For:

Dana Hignell - Roux Environmental Engineering and Geology

Target Treatment Zone (TTZ) Info	Unit	Value
Treatment Area	ft^2	5,700
Top Treat Depth	ft	22.0
Bot Treat Depth	ft	24.0
Vertical Treatment Interval	ft	2.0
Treatment Zone Volume	ft^3	11,400
Treatment Zone Volume	cy	422
Soil Type	---	clay
Porosity	cm^3/cm^3	0.45
Effective Porosity	cm^3/cm^3	0.10
Treatment Zone Pore Volume	gals	38,375
Treatment Zone Effective Pore Volume	gals	8,528
Fraction Organic Carbon (foc)	g/g	0.010
Soil Density	g/cm^3	1.5
Soil Density	lb/ft^3	94
Soil Weight	lbs	1.1E+06
Hydraulic Conductivity	ft/day	0.4
Hydraulic Conductivity	cm/sec	1.28E-04
Hydraulic Gradient	ft/ft	0.005
GW Velocity	ft/day	0.02
GW Velocity	ft/yr	7
Sources of Oxidant Demand	**Unit**	**Value**
Sorbed Phase Contaminant Mass	lbs	22
Dissolved Phase Contaminant Mass	lbs	4.9
Total Contaminant Mass	lbs	27
Stoichiometric PersulfOx Demand	lbs	862
Stoichiometric PersulfOx Required	lbs	1,724
Additional Soil Oxidant Demand	g/kg	2.5
SOD PersulfOx Required	lbs	2,965
Total PersulfOx Required	**lbs**	**4,689**

Application Dosing

PersulfOx Required	**lbs**	**4,739**

PersulfOx® Application Design Summary

AOC 2 - Excavation		Field App. Instructions
Application Method	**Excavation**	
Number of Applications	**1**	
Areal Extent (square ft)	5,700	
Top Application Depth (ft bgs)	22	
Bottom Application Depth (ft bgs)	24	
PersulfOx to be Applied (lbs)	**4,739**	

Per Application Totals
PersulfOx per app. (lbs) *4,739*

Technical Notes/Discussion

Assumptions/Qualifications

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Prepared By: ***Alana Miller***
Date: ***8/9/2019***

REGENESIS

Project Info		
Parkchester Crossing		
Bronx, New York		
AOC 2 - Excavation		
Prepared For:		
Dana Hignell - Roux Environmental Engineering and Geology		
Target Treatment Zone (TTZ) Info	**Unit**	**Value**
Treatment Area	ft^2	5,700
Top Treat Depth	ft	22.0
Bot Treat Depth	ft	24.0
Vertical Treatment Interval	ft	2.0
Treatment Zone Volume	ft^3	11,400
Treatment Zone Volume	cy	422
Soil Type	---	clay
Porosity	cm^3/cm^3	0.45
Effective Porosity	cm^3/cm^3	0.10
Treatment Zone Pore Volume	gals	38,375
Treatment Zone Effective Pore Volume	gals	8,528
Fraction Organic Carbon (foc)	g/g	0.010
Soil Density	g/cm^3	1.5
Soil Density	lb/ft^3	94
Soil Weight	lbs	1.1E+06
Recommended Weight of ORC Advanced/Wt. of Soil	%	0.1%
ORC Advanced Pellets Required	**lbs**	**1,102**
Estimated Degradation Capacity as TPH	*lbs*	*55*
ORC Advanced® Pellets Application Design Summary		
Application Method	--	**Excavation Application**
Excavation Width	ft	57.0
Excavation Length	ft	100.0
Areal Extent (square ft)	sq. ft.	5,700
Top Application Depth (ft bgs)	ft	22
Bottom Application Depth (ft bgs)	ft	24
Estimated Saturated Treatment Thickness	ft	2
ORC Advanced to be Applied (lbs)	**lbs**	**1,102**
ORC Advanced per 1 ft lift	lb/ft	551

Assumptions/Qualifications

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Prepared By:
Alana Miller ***8/9/2019***

APPENDIX B

REGENESIS Material Information Sheets

PersulfOx® Technical Description

PersulfOx is an *In Situ* Chemical Oxidation (ISCO) reagent that destroys organic contaminants found in groundwater and soil through powerful, yet controlled, chemical reactions. A sodium persulfate-based technology (figure 1), PersulfOx employs a patented catalyst to enhance the oxidative destruction of both hydrocarbons and chlorinated contaminants in the subsurface.

Typically, sodium persulfate is activated with the addition of heat, chelated metals, hydrogen peroxide, or base in order to generate sulfate radicals. These activation processes are inherently complex, costly and can pose additional health and safety risks. In comparison, PersulfOx is a relatively safe and easy-to-use ISCO agent with a built-in catalyst which activates the persulfate component, generating contaminant-destroying free radicals without the need for the addition of a separate activator. The equation below shows the net complete oxidation of toluene, a constituent of gasoline, by PersulfOx:

Example of PersulfOx

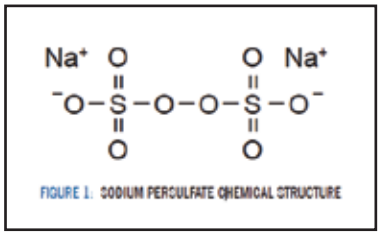


FIGURE 1: SODIUM PERSULFATE CHEMICAL STRUCTURE

For a list of treatable contaminants with the use of PersulfOx, view the Range of Treatable Contaminants Guide

Chemical Composition

- Sodium Persulfate - CAS #7775-27-1
- Sodium Silicate - CAS #1344-09-8

Properties

- pH - 7 to 11.5 at 25°C
- Appearance – White, free-flowing powder, clear to cloudy when mixed with water
- Odor – Not detectable
- Vapor Pressure – None
- Chemical Hazard Classification - Class 5.1 Oxidizer

Storage and Handling Guidelines

Storage
Store locked up
Keep away from heat
Store in a cool, dry place out of direct sunlight

Handling
Minimize dust generation and accumulation
Routine housekeeping should be instituted to ensure that dust does not accumulate on surfaces

PersulfOx® Technical Description

Storage (continued)
Store in original tightly closed container
Store in a well-ventilated place
Do not store near combustible materials
Store away from incompatible materials
Recommended to store at less than 40°C
Provide appropriate exhaust ventilation in places where dust is formed

Handling (continued)
Avoid mixing with combustibles
Avoid contamination
Keep away from clothing and other combustible materials
Wear appropriate personal protective equipment
Avoid breathing dust
Avoid contact with eyes, skin, and clothing
Avoid prolonged exposure
Do not taste or swallow
When using, do not eat, drink or smoke
Wear appropriate personal protective equipment
Wash hands thoroughly after handling
Observe good industrial hygiene practices

Applications

- PersulfOx is mixed with water at a rate of 5% to 20% prior to application.
- For most applications, REGENESIS suggests a 10-15% solution. The resulting mixture has viscosity similar to water.
- Injects into formation through direct push injection points, injection wells or other injection delivery systems.

Application instructions for this product are contained here PersulfOx Application Instructions.

Health and Safety

Material is relatively safe to handle; however, avoid contact with eyes, skin and clothing. OSHA Level D personal protection equipment including: vinyl or rubber gloves, eye protection, and dust mask are recommended when handling this product. Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: PersulfOx SDS.

OXYGEN RELEASE COMPOUND

ORC Advanced® Technical Description

ORC Advanced® is an engineered, oxygen release compound designed specifically for enhanced, *in situ* aerobic bioremediation of petroleum hydrocarbons in groundwater and saturated soils. Upon contact with groundwater, this calcium oxyhydroxide-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 hydroxide oxide
- Calcium hydroxide
- Monopotassium phosphate
- Dipotassium phosphate

Properties

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

OXYGEN RELEASE COMPOUND

ORC Advanced® Technical Description

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

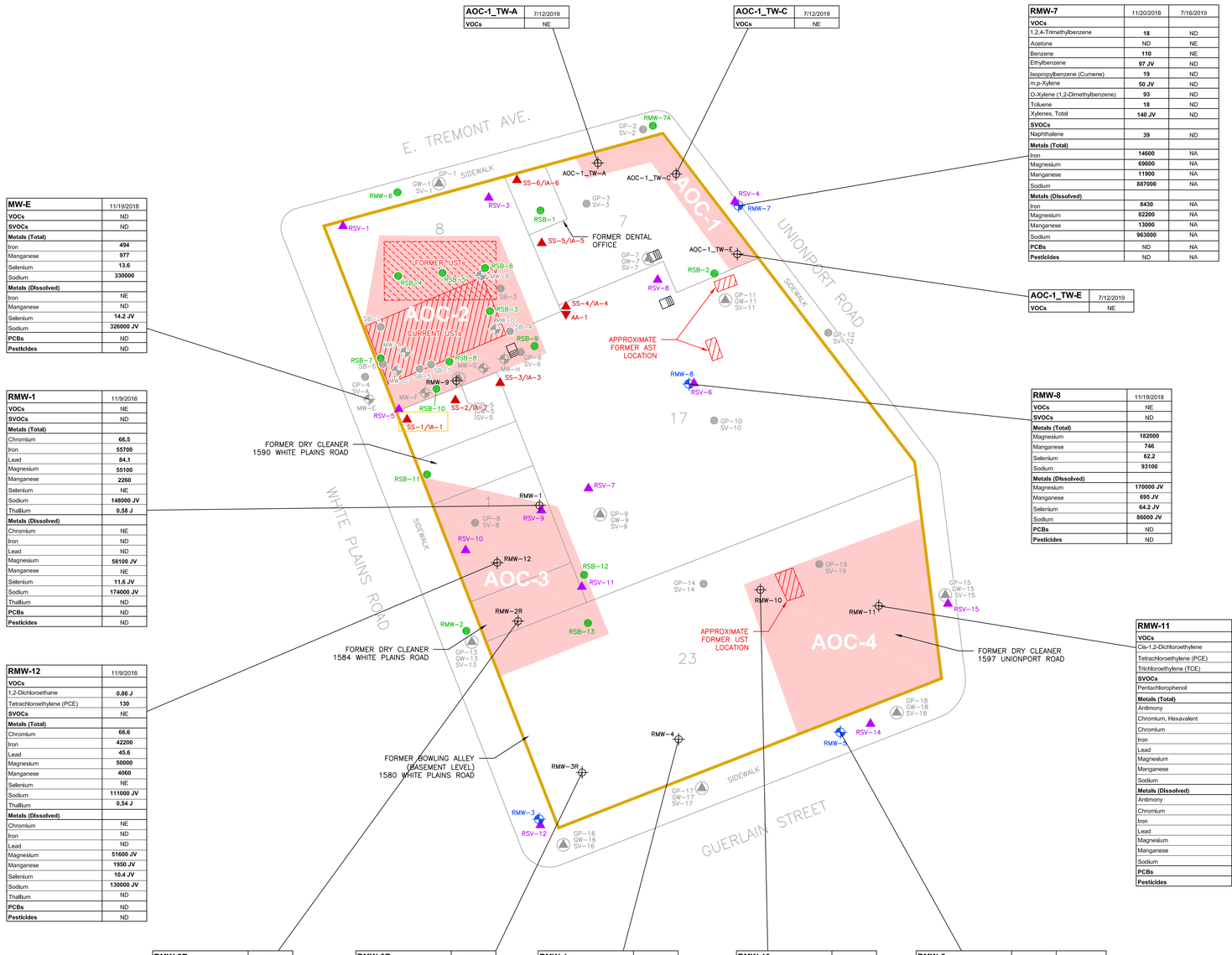
Wash thoroughly after handling. Wear protective gloves, eye protection, and face protection. Please review the ORC Advanced Safety Data Sheet for additional storage, usage, and handling requirements.

REGENESIS®

www.regenesis.com
1011 Calle Sombra, San Clemente CA 92673
949.366.8000

PLATES

1. Groundwater Sample Exceedances
2. Proposed Remedy: Combined Track 1 Unrestricted Use Cleanup/Track 4 Restricted Residential Use Cleanup



AOC-1_TW-A	7/12/2019
VOCs	NE

AOC-1_TW-C	7/12/2019
VOCs	NE

RMW-7	11/20/2018	7/16/2019
VOCs		
1,2,4-Trimethylbenzene	**18**	ND
Acetone	ND	NE
Benzene	**110**	NE
Ethylbenzene	**97 JV**	ND
Isopropylbenzene (Cumene)	**19**	ND
m,p-Xylene	**50 JV**	ND
O-Xylene (1,2-Dimethylbenzene)	**93**	ND
Toluene	**18**	ND
Xylenes, Total	**140 JV**	ND
SVOCs		
Naphthalene	**39**	ND
Metals (Total)		
Iron	**14600**	NA
Magnesium	**69600**	NA
Manganese	**11900**	NA
Sodium	**887000**	NA
Metals (Dissolved)		
Iron	**8430**	NA
Magnesium	**82200**	NA
Manganese	**13000**	NA
Sodium	**963000**	NA
PCBs	ND	NA
Pesticides	ND	NA

AOC-1_TW-E	7/12/2019
VOCs	NE

MW-E	11/19/2018
VOCs	ND
SVOCs	ND
Metals (Total)	
Iron	**494**
Manganese	**977**
Selenium	**13.6**
Sodium	**330000**
Metals (Dissolved)	
Iron	NE
Manganese	ND
Selenium	**14.2 JV**
Sodium	**326000 JV**
PCBs	ND
Pesticides	ND

RMW-1	11/9/2018
VOCs	NE
SVOCs	ND
Metals (Total)	
Chromium	**66.5**
Iron	**55700**
Lead	**84.1**
Magnesium	**55100**
Manganese	**2260**
Selenium	NE
Sodium	**148000 JV**
Thallium	**0.58 J**
Metals (Dissolved)	
Chromium	NE
Iron	ND
Lead	ND
Magnesium	**58100 JV**
Manganese	NE
Selenium	**11.6 JV**
Sodium	**174000 JV**
Thallium	ND
PCBs	ND
Pesticides	ND

RMW-8	11/19/2018
VOCs	NE
SVOCs	ND
Metals (Total)	
Magnesium	**182000**
Manganese	**746**
Selenium	**62.2**
Sodium	**93100**
Metals (Dissolved)	
Magnesium	**170000 JV**
Manganese	**695 JV**
Selenium	**64.2 JV**
Sodium	**86000 JV**
PCBs	ND
Pesticides	ND

RMW-11	11/13/2018	11/15/2018[1]
VOCs		
Cis-1,2-Dichloroethylene	**6.9**	NA
Tetrachloroethylene (PCE)	**330**	NA
Trichloroethylene (TCE)	**12**	NA
SVOCs		
Pentachlorophenol	**11 J**	NA
Metals (Total)		
Antimony	**3.8**	NA
Chromium, Hexavalent	NA	**119**
Chromium	**453**	NA
Iron	**10400**	NA
Lead	**48.3**	NA
Magnesium	**137000**	NA
Manganese	**368**	NA
Sodium	**543000**	NA
Metals (Dissolved)		
Antimony	NE	NA
Chromium	**397 JV**	NA
Iron	ND	NA
Lead	NE	NA
Magnesium	**128000 JV**	NA
Manganese	NE	NA
Sodium	**520000 JV**	NA
PCBs	ND	NA
Pesticides	ND	NA

RMW-12	11/9/2018
VOCs	
1,2-Dichloroethane	**0.86 J**
Tetrachloroethylene (PCE)	**130**
SVOCs	NE
Metals (Total)	
Chromium	**66.6**
Iron	**42200**
Lead	**45.6**
Magnesium	**50000**
Manganese	**4060**
Selenium	NE
Sodium	**111000 JV**
Thallium	**0.54 J**
Metals (Dissolved)	
Chromium	NE
Iron	ND
Lead	ND
Magnesium	**51600 JV**
Manganese	**1950 JV**
Selenium	**10.4 JV**
Sodium	**130000 JV**
Thallium	ND
PCBs	ND
Pesticides	ND

RMW-2R	11/9/2018
VOCs	
Cis-1,2-Dichloroethylene	**22**
Tetrachloroethylene (PCE)	**130**
Trichloroethylene (TCE)	**17**
Vinyl chloride	**7.5**
SVOCs	ND
Metals (Total)	
Iron	**27200**
Lead	**30.4**
Magnesium	**84300**
Manganese	**1290**
Sodium	**180000**
Metals (Dissolved)	
Iron	ND
Lead	ND
Magnesium	**84100 JV**
Manganese	**1010 JV**
Sodium	**196000 JV**
PCBs	ND
Pesticides	ND

RMW-3R	11/14/2018
VOCs	
Trichlorofluoromethane	**6**
SVOCs	
Pentachlorophenol	**5.6 J**
Phenol	**3.J+V**
Metals (Total)	
Iron	**435**
Sodium	**226000**
Metals (Dissolved)	
Iron	ND
Sodium	**217000 JV**
PCBs	ND
Pesticides	ND

RMW-4	11/13/2018
VOCs	NE
SVOCs	
Benzo(A)Anthracene	**0.61 J**
Benzo(A)Pyrene	**0.58 J**
Pentachlorophenol	**11 J**
Metals (Total)	
Chromium, Hexavalent	**54.9**
Chromium	**81.2**
Iron	**781**
Sodium	**118000**
Metals (Dissolved)	
Chromium, Hexavalent	ND
Chromium	**79.4 JV**
Iron	ND
Sodium	**122000 JV**
PCBs	ND
Pesticides	ND

RMW-10	11/13/2018
VOCs	
Tetrachloroethene (PCE)	**12**
SVOCs	ND
Metals (Total)	
Chromium	**112**
Iron	**936**
Magnesium	**95200**
Manganese	NE
Sodium	**305000**
Metals (Dissolved)	
Chromium	**51.4 JV**
Iron	ND
Magnesium	**98600 JV**
Manganese	**316 JV**
Sodium	**314000 JV**
PCBs	ND
Pesticides	ND

RMW-5	11/20/2018	11/20/2018 DUP
VOCs		
Tetrachloroethylene (PCE)	**100**	**95**
SVOCs	ND	ND
Metals (Total)		
Iron	**352**	NE
Magnesium	**48600**	**47100**
Manganese	**2830**	**2600 JV**
Selenium	NE	**10.4**
Sodium	**492000**	**496000**
Metals (Dissolved)		
Iron	ND	ND
Magnesium	**55100 JV**	**55300 JV**
Manganese	**3210 JV**	**3170 JV**
Selenium	**11.1 JV**	**10.9 JV**
Sodium	**509000 JV**	**509000 JV**
PCBs	ND	ND
Pesticides	ND	ND

LEGEND

- SITE BOUNDARY
- PERMANENT MONITORING WELL AND SOIL BORING LOCATION
- TEMPORARY MONITORING WELL AND SOIL BORING LOCATION
- SOIL VAPOR SAMPLING LOCATION
- SUB-SLAB VAPOR SAMPLING LOCATION
- AMBIENT AIR SAMPLING LOCATION
- SOIL BORING LOCATION
- APPROXIMATE EXISTING SOIL BORING/SOIL VAPOR SAMPLING LOCATION
- APPROXIMATE EXISTING MONITORING WELL LOCATION
- APPROXIMATE SOIL BORING/GROUNDWATER/SOIL VAPOR SAMPLING LOCATION
- TAX LOT BOUNDARY
- 17 TAX LOT NUMBER
- CATCH BASIN
- AST ABOVEGROUND STORAGE TANK
- UST UNDERGROUND STORAGE TANK
- AREA OF CONCERN BASED ON REMEDIAL INVESTIGATION RESULTS

TYPICAL DATA BOX INFORMATION

SAMPLE ID# → MW-E	11/19/2018 ← SAMPLE DATE
VOCs	ND
SVOCs	ND
Metals (Total)	
Iron	**494**
Manganese	**977**
Selenium	**13.6**
Sodium	**330000**
Metals (Dissolved)	
Iron	NE
Manganese	ND
Selenium	**14.2 JV**
Sodium	**326000 JV**
PCBs	ND
Pesticides	ND

ANALYTES — CONCENTRATION (µg/L)

Parameter	Standards* (µg/L)
VOCs	
1,2,4-Trimethylbenzene	5
1,2-Dichloroethane	0,6
Benzene	1
cis-1,2-Dichloroethene	5
Ethylbenzene	5
Isopropylbenzene	5
m+p-Xylene	5
n-Propylbenzene	5
o-Xylene	5
Tetrachloroethene	5
Toluene	5
Trichloroethene	5
Trichlorofluoromethane	5
Vinyl chloride	2
Xylenes (total)	5
SVOCs	
2,6-Dinitrotoluene	5
Benzo[a]anthracene	0,002
Benzo[a]pyrene	0
Naphthalene	10
Pentachlorophenol	1
Phenol	1
Metals	
Antimony	3
Chromium, Hexavalent	50
Chromium	50
Iron	300
Lead	25
Magnesium	35000
Manganese	300
Selenium	10
Sodium	20000
Thallium	0,5
PCBs	ND
Pesticides	ND
TAL PFAAs, Total	--

Concentrations in µg/L

µg/L - Micrograms per liter
* - NYSDEC AWQSGVs
NYSDEC - New York State Department of Environmental Conservation
AWQSGVs - Ambient Water-Quality Standards and Guidance Values
J - Estimated Value
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
PFAAs - Perfluoroalkyl Acids
NA - Compound not analyzed for
NE - No Exceedance
ND - No Detection
-- - No Standard or Guidance Value Available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

N

30' 0 30'

Title:

GROUNDWATER SAMPLE EXCEEDANCES

GROUNDWATER REMEDIATION WORK PLAN
PARKCHESTER CROSSING
1590 WHITE PLAINS ROAD, BRONX, NEW YORK

Prepared for:

ZP REALTY, LLC

ROUX

Compiled by: D.H.	Date: 09AUG19	PLATE
Prepared by: B.H.C.	Scale: AS SHOWN	1
Project Mgr: D.H.	Project: 2530.0001Y000	
File: 2530.0001Y129.02.DWG		

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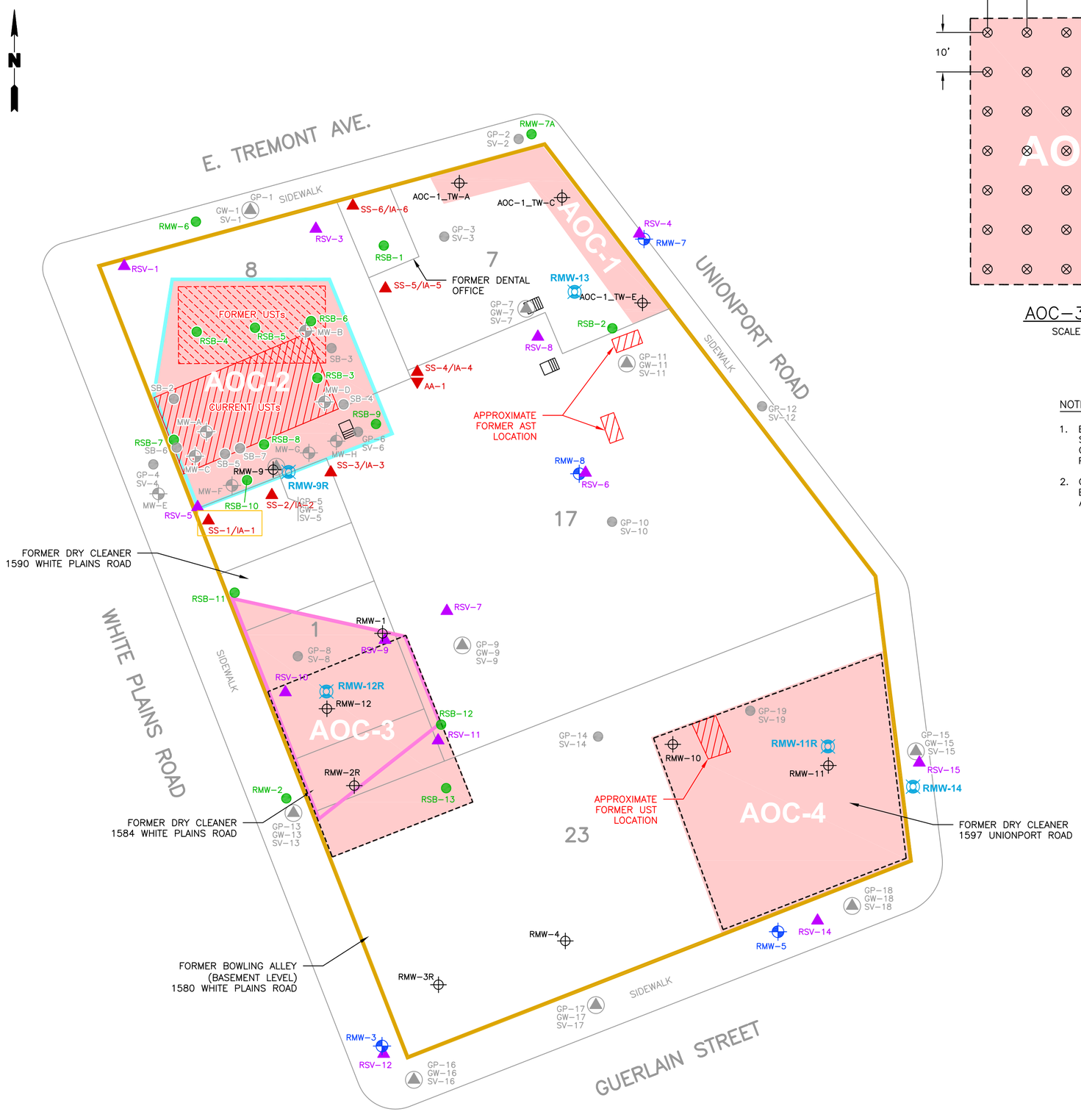
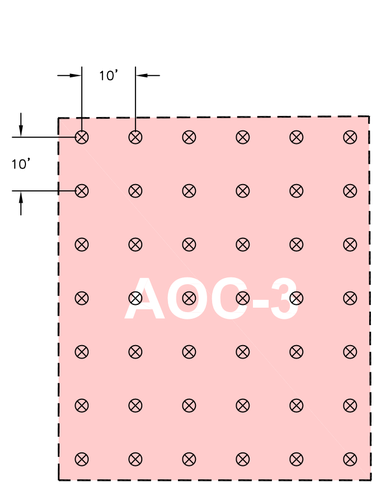
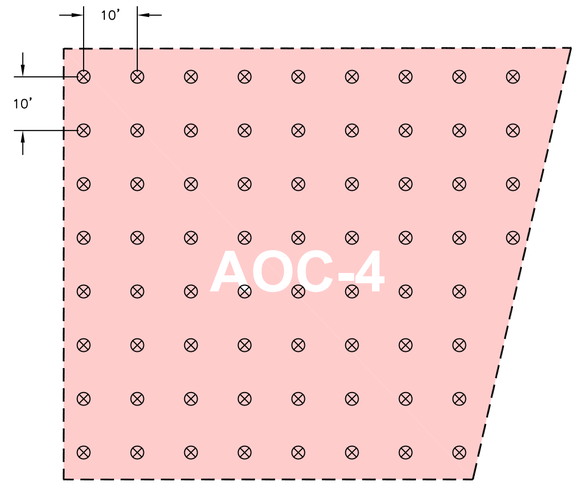




AOC-3 INSET
SCALE: 1"=20'



AOC-4 INSET
SCALE: 1"=20'

NOTES

1. BASED ON THE RESULTS OF THE GROUNDWATER SAMPLING COMPLETED IN JULY 2019, GROUNDWATER REMEDIATION IS NO LONGER PROPOSED FOR AOC-1.
2. GROUNDWATER REMEDIATION WITHIN AOC-2 WILL BE BASED ON THE RESULTS OF THE EXCAVATION AND DEWATERING ACTIVITIES.

LEGEND

- SITE BOUNDARY
- PERMANENT MONITORING WELL AND SOIL BORING LOCATION
- TEMPORARY MONITORING WELL AND SOIL BORING LOCATION
- PROPOSED POST-REMEDIAL MONITORING WELL LOCATION
- IN SITU CHEMICAL OXIDATION INJECTION POINT
- SOIL VAPOR SAMPLING LOCATION
- SUB-SLAB VAPOR SAMPLING LOCATION
- AMBIENT AIR SAMPLING LOCATION
- SOIL BORING LOCATION
- APPROXIMATE EXISTING SOIL BORING/SOIL VAPOR SAMPLING LOCATION
- APPROXIMATE EXISTING MONITORING WELL LOCATION
- APPROXIMATE SOIL BORING/GROUNDWATER/SOIL VAPOR SAMPLING LOCATION
- TAX LOT BOUNDARY
- 17 TAX LOT NUMBER
- CATCH BASIN
- AOC AREA OF CONCERN
- AST ABOVEGROUND STORAGE TANK
- UST UNDERGROUND STORAGE TANK
- AREA OF CONCERN BASED ON REMEDIAL INVESTIGATION RESULTS
- PROPOSED LIMITS OF EXCAVATION TO APPROXIMATELY 2 FEET BELOW GRADE SURFACE
- PROPOSED LIMITS OF EXCAVATION TO APPROXIMATELY 23 FEET BELOW GRADE SURFACE
- PROPOSED LIMITS OF IN SITU GROUNDWATER REMEDIATION

Title:

PROPOSED REMEDY

COMBINED TRACK 1 UNRESTRICTED USE CLEANUP/ TRACK 4 RESTRICTED RESIDENTIAL CLEANUP

GROUNDWATER REMEDIATION WORK PLAN
PARKCHESTER CROSSING
1590 WHITE PLAINS ROAD, BRONX, NEW YORK

Prepared for:

ZP REALTY, LLC

ROUX

Compiled by: D.H.	Date: 26JUL19	PLATE
Prepared by: B.H.C.	Scale: AS SHOWN	2
Project Mgr: D.H.	Project: 2530.0001Y000	
File: 2530.0001Y129.02.DWG		

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