DECISION DOCUMENT

Former CJ's Service Center Property
Brownfield Cleanup Program
Staten Island, Richmond County
Site No. C243041
June 2016

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

DECLARATION STATEMENT - DECISION DOCUMENT

Former CJ's Service Center Property
Brownfield Cleanup Program
Staten Island, Richmond County
Site No. C243041
June 2016

Statement of Purpose and Basis

This document presents the remedy for the Former CJ's Service Center Property site, a brownfield cleanup site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the Former CJ's Service Center Property site and the public's input to the proposed remedy presented by the Department.

Description of Selected Remedy

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Groundwater Containment System

The glacial till present at the site has a low permeability which limits the effectiveness of any in-

situ groundwater treatment. As a result, containment of remaining groundwater contamination will be required to prevent it from migrating off-site. This will be accomplished by the installation of a sheet pile containment wall that will isolate/contain the groundwater contamination remaining after the soil removal IRM. Perimeter sheet piling will be installed around the on-site source area (area of soil removal IRM) and will include properly sealed joints to make the sheet pile joints water tight. The sheet piles will be driven approximately 25 feet below current grade (lowest historic depth to water on-site was 10.41 feet below ground surface), unless refusal is encountered above that depth. The top of the sheet piling will be required to be left approximately one foot below proposed final grade.

3. Cover System

A site cover will be required to allow for restricted residential use of the site. The cover will consist either of the structures such as buildings, pavement, sidewalks comprising the site development or a soil cover in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d).

4. Vapor Mitigation:

Any on-site buildings will be required to have a sub-slab depressurization system, or a similar engineered system, to mitigate the migration of vapors into the building from soil and/or groundwater.

5. Institutional Control

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);

- allow the use and development of the controlled property for restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;

- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or NYCDOH; and

- require compliance with the Department approved Site Management Plan.

6. Site Management Plan

A Site Management Plan is required, which includes the following:

a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in Paragraph 5 above.

Engineering Controls: The sheet pile containment wall discussed in paragraph 2 above, the cover system discussed in Paragraph 3 above and the sub-slab depressurization system discussed in Paragraph 4 above.
This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;

- descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;

- a provision for future containment or treatment of residual groundwater contamination if remedial element 2 is not effective in preventing off-site migration of groundwater contamination;

- provisions for the management and inspection of the identified engineering controls;

- maintaining site access controls and Department notification; and

- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring of groundwater and soil vapor to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department;

Declaration

The remedy conforms with promulgated standards and criteria that are directly applicable, or that are relevant and appropriate and takes into consideration Department guidance, as appropriate. The remedy is protective of public health and the environment.

June 30, 2016

Date

Robert Cozzy, Director
Remedial Bureau B

DECISION DOCUMENT

Former CJ's Service Center Property
Staten Island, Richmond County
Site No. C243041
June 2016

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of contaminants at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of contaminants at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum.

The New York State Brownfield Cleanup Program (BCP) is a voluntary program. The goal of the BCP is to enhance private-sector cleanups of brownfields and to reduce development pressure on "greenfields." A brownfield site is real property, the redevelopment or reuse of which may be complicated by the presence or potential presence of a contaminant.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repositories:

New York Public Library - Huguenot Park Branch
Attn: Steven Horvath
830 Huguenot Avenue
Staten Island, NY 10312
Phone: 718 984 4636

Community Board #3
Attn: Charlene Wagner
1243 Woodrow Road, 2nd Floor
Staten Island, NY 10309
Phone: 718 356 7900

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The site is located in Staten Island, New York. The site is approximately 0.375 acres in size situated on the north side of Amboy Road, between Foster Avenue to the east and Odell Place to the west. The site is comprised of two contiguous lots.

Site Features: The site is currently vacant; all on-site features were demolished and removed from the site in the fall of 2015.

Current Zoning and Land Use: The site is currently vacant and is zoned for R3X residential and Special South Richmond Development District (SRD). The site had operated as a retail gasoline and service station since prior to 1937 and the owners are in the process of obtaining a commercial use variance to allow for commercial use of the property.

The surrounding area is a mix of residential and commercial properties. The site is bordered to the west by a Freshwater Wetland (AR-37- Scudder- Amboy). To the north there is a single residence and further north is a portion of New York City Department of Environmental Protection (NYCDEP) owned land that is part of the Freshwater Wetland mentioned above.

Past Use of the Site: The site was operated as a retail gasoline and service station since prior to 1937. The business was shut down on August 2014. The gasoline station had a pump island and two dispensers and the service station had two service bays.

Two sub-surface investigations were conducted at the site in November 2006 and February 2007 under the spill program which included the collection of soil and groundwater samples. The test results indicated that several volatile organic compounds (VOC's) and semi-volatile organic compounds (SVOC's) were detected above the Department's cleanup objectives.

Site Geology and Hydrogeology: The top 8 to 10 feet of site soil consists of historic fill and re-worked native material. The underlying soil is comprised primarily of glacial till and consists of silt, clay, poorly sorted fine sand, gravel, cobbles, and boulders in a clay and silt matrix; the glacial till has a low permeability. Bedrock was not encountered at the site which is expected to be 200 to 300 feet below ground surface.

Groundwater depth at the site is approximately 6.5 to 10.5 feet below the ground surface and flows to the south-southeast. Groundwater beneath the site is not expected to be tidally influenced due to the site geology and distance from the shoreline.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to restricted-residential use (which allows for commercial use and industrial use) as described in Part 375-1.8(g) were/was evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the Remedial Investigation (RI) to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is available in the RI Report.

SECTION 5: ENFORCEMENT STATUS

The Applicant(s) under the Brownfield Cleanup Agreement is a/are Volunteer(s). The Applicant(s) does/do not have an obligation to address off-site contamination. However, the Department has determined that this site does not pose a significant threat to public health or the environment; accordingly, no enforcement actions are necessary.

Off-site petroleum-related contamination will be addressed under the Department's Spill Response program.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A remedial investigation (RI) serves as the mechanism for collecting data to:

- characterize site conditions;
- determine the nature of the contamination; and
- assess risk to human health and the environment.

The RI is intended to identify the nature (or type) of contamination which may be present at a site and the extent of that contamination in the environment on the site, or leaving the site. The RI reports on data gathered to determine if the soil, groundwater, soil vapor, indoor air, surface water or sediments may have been contaminated. Monitoring wells are installed to assess groundwater and soil borings or test pits are installed to sample soil and/or waste(s) identified. If other natural resources are present, such as surface water bodies or wetlands, the water and sediment may be sampled as well. Based on the presence of contaminants in soil and groundwater, soil vapor will also be sampled for the presence of contamination. Data collected

in the RI influence the development of remedial alternatives. The RI report is available for review in the site document repository and the results are summarized in section 6.3.

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a contaminant that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized below. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

benzene
toluene
ethylbenzene
xylene (mixed)
methyl-tert-butyl ether (MTBE)
benzo(a)pyrene
benzo(b)fluoranthene

The contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Decision Document.

The following IRM(s) has/have been completed at this site based on conditions observed during the RI.

Removal of 4 USTs, pump islands, 2 dispensers, associated piping and grossly contaminated soil

In the fall of 2015 the following structures and piping associated with the former CJ's Service Station Site were removed for off-site disposal:

- The former service station pump island with two dispensers;
- Three 2000-gallon gasoline underground storage tanks (USTs), which were encased in concrete;
- One 4000-gallon gasoline UST, which was encased in concrete; and
- Associated product piping between the former tank field and the pump island.

No other former USTs were encountered during the IRM.

Grossly contaminated soil was also removed where it was technically and practically feasible. A total of 406.45 tons of petroleum contaminated soil and smaller pieces of concrete intermixed with the soil was disposed off-site. Any fill material brought to the site met the requirements for cover material as set forth in 6 NYCRR Part 375-6.7(d). The work that was performed as a part of the IRM is documented in the Construction Completion Report for the Interim Remedial Measure, dated March 2016.

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water. The RI report presents a detailed discussion of any existing and potential impacts from the site to fish and wildlife receptors.

Nature and Extent of Contamination: Soil, surface soil and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), and pesticides. Soil vapor was analyzed only for VOCs. Based upon investigations conducted to date, the primary contaminants of concern for the site include petroleum hydrocarbon related VOCs. All samples were collected from on-site. An interim remedial measure (IRM) was also conducted concurrent with the remedial investigation. It is expected that some contamination in groundwater and soil vapor may have migrated off-site based on the detection of elevated concentrations of contaminants of concern in the respective media near the site boundary. Based on the RI and IRM confirmatory sampling results there is no data to confirm that site related soil contamination is present off-site.

Soil: As a part of the 2015 soil removal IRM, post excavation soil samples were collected; results from those samples indicate that following VOCs exceeded the lower of the restricted residential use soil cleanup objectives (RRSCOs) or applicable protection of groundwater SCOs (PGWSCOs) at the site: benzene at 15 parts per million or ppm compared to the PGWSCO of

0.06 ppm; toluene at 21 ppm compared to the PGWSCO of 0.7 ppm; ethylbenzene at 72 ppm compared to the PGWSCO of 1 ppm; xylene (total) at 250 ppm compared to the PGWSCO of 1.6 ppm and MTBE at 6 ppm compared to the PGWSCO of 0.93 ppm. The SVOCs benzo[a]pyrene at 4.6 ppm compared to the RRSCO of 1 ppm; and benzo[b]fluoranthene at 6.2 ppm compared to the RRSCO of 1 ppm were detected above the RRSCOs in two soil borings to a maximum depth of seven feet below land surface (bls).

Surface Soil: Four surface soil samples were collected from throughout the site for analysis. As per laboratory analysis no site related contaminant of concern (COC) has been detected in any surface soil samples.

Groundwater: VOCs were detected in all 19 (nineteen) of the samples collected during the RI. The following is the list of site related VOC contaminants of concern (based on concentrations and frequencies of detections): benzene at 4,800 parts per billion or ppb compared to groundwater standard of 1 ppb; ethylbenzene at 1,400 ppb compared to groundwater standard of 5 ppb; toluene at 120 ppb compared to groundwater standard of 5 ppb; and xylenes (total) at 2,800 ppb compared to groundwater standard of 5 ppb.

Eighteen groundwater samples were analyzed for SVOCs. SVOCs were detected in 14 samples however, the following are the site related contaminants of concern: benzo[a]pyrene at 0.05 ppb compared to groundwater standard of ND ('ND' means a non-detectable concentration by the approved analytical method); and benzo[b]fluoranthene at 0.06 ppb compared to groundwater standard of 0.002 ppb.

Soil Vapor: Eight soil vapor samples were collected from the site. Twenty-seven compounds were detected in the eight soil vapor samples. All of the compounds detected were either petroleum related VOCs or acetone. The following presents the highest concentrations of each contaminant of concern detected in soil vapor: benzene at 41,500 microgram per cubic meter or µg/m3; toluene at 1910 µg/m3; ethylbenzene at 52,100 µg/m3, total xylene at 28550 µg/m3 and MTBE as 40.4 µg/m3.

Special Resources Impacted/Threatened: The site is located in an urban area; a wetland is located to the west of the site, but contamination has not migrated off-site toward the wetland therefore a Fish and Wildlife Impact Analysis is not warranted.

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

People who enter the site could contact contaminants in soil by walking on the soil or digging below the ground surface. Contaminated groundwater at the site is not used for drinking or other purposes and the site is served by a public water supply that is not affected by this contamination. Volatile organic compounds in the contaminated groundwater or contaminated soil may move into the soil vapor (air spaces within the soil), which in turn may move into

overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. The potential exists for the inhalation of site contaminants due to soil vapor intrusion in any future on-site redevelopment. Additional investigation of the potential for soil vapor intrusion to occur off-site is needed.

6.5: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

SECTION 7: ELEMENTS OF THE SELECTED REMEDY

The alternatives developed for the site and the evaluation of the remedial criteria are presented in the Alternative Analysis. The remedy is selected pursuant to the remedy selection criteria set forth in DER-10, Technical Guidance for Site Investigation and Remediation and 6 NYCRR Part 375.

The selected remedy is a Track 4: Restricted use with site-specific soil cleanup objectives remedy.

The selected remedy is referred to as the groundwater containment, cover system and vapor mitigation remedy.

The elements of the selected remedy, as shown in Figures 3A and 3B, are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Groundwater Containment System

The glacial till present at the site has a low permeability which limits the effectiveness of any in-situ groundwater treatment. As a result, containment of remaining groundwater contamination will be required to prevent it from migrating off-site. This will be accomplished by the installation of a sheet pile containment wall that will isolate/contain the groundwater contamination remaining after the soil removal IRM. Perimeter sheet piling will be installed around the on-site source area (area of soil removal IRM) and will include properly sealed joints to make the sheet pile joints water tight. The sheet piles will be driven approximately 25 feet below current grade (lowest historic depth to water on-site was 10.41 feet below ground surface), unless refusal is encountered above that depth. The top of the sheet piling will be required to be left approximately one foot below proposed final grade.

3. Cover System

A site cover will be required to allow for restricted residential use of the site. The cover will consist either of the structures such as buildings, pavement, sidewalks comprising the site development or a soil cover in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d).

4. Vapor Mitigation:
Any on-site buildings will be required to have a sub-slab depressurization system, or a similar engineered system, to mitigate the migration of vapors into the building from soil and/or groundwater.

5. Institutional Control
Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);

- allow the use and development of the controlled property for restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;

- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or NYCDOH; and

- require compliance with the Department approved Site Management Plan.

6. Site Management Plan
A Site Management Plan is required, which includes the following:
a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:
Institutional Controls: The Environmental Easement discussed in Paragraph 5 above.
Engineering Controls: The sheet pile containment wall discussed in paragraph 2 above, the cover system discussed in Paragraph 3 above and the sub-slab depressurization system discussed in Paragraph 4 above.
This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;

- descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;

• a provision for future containment or treatment of residual groundwater contamination if remedial element 2 is not effective in preventing off-site migration of groundwater contamination;

• provisions for the management and inspection of the identified engineering controls;

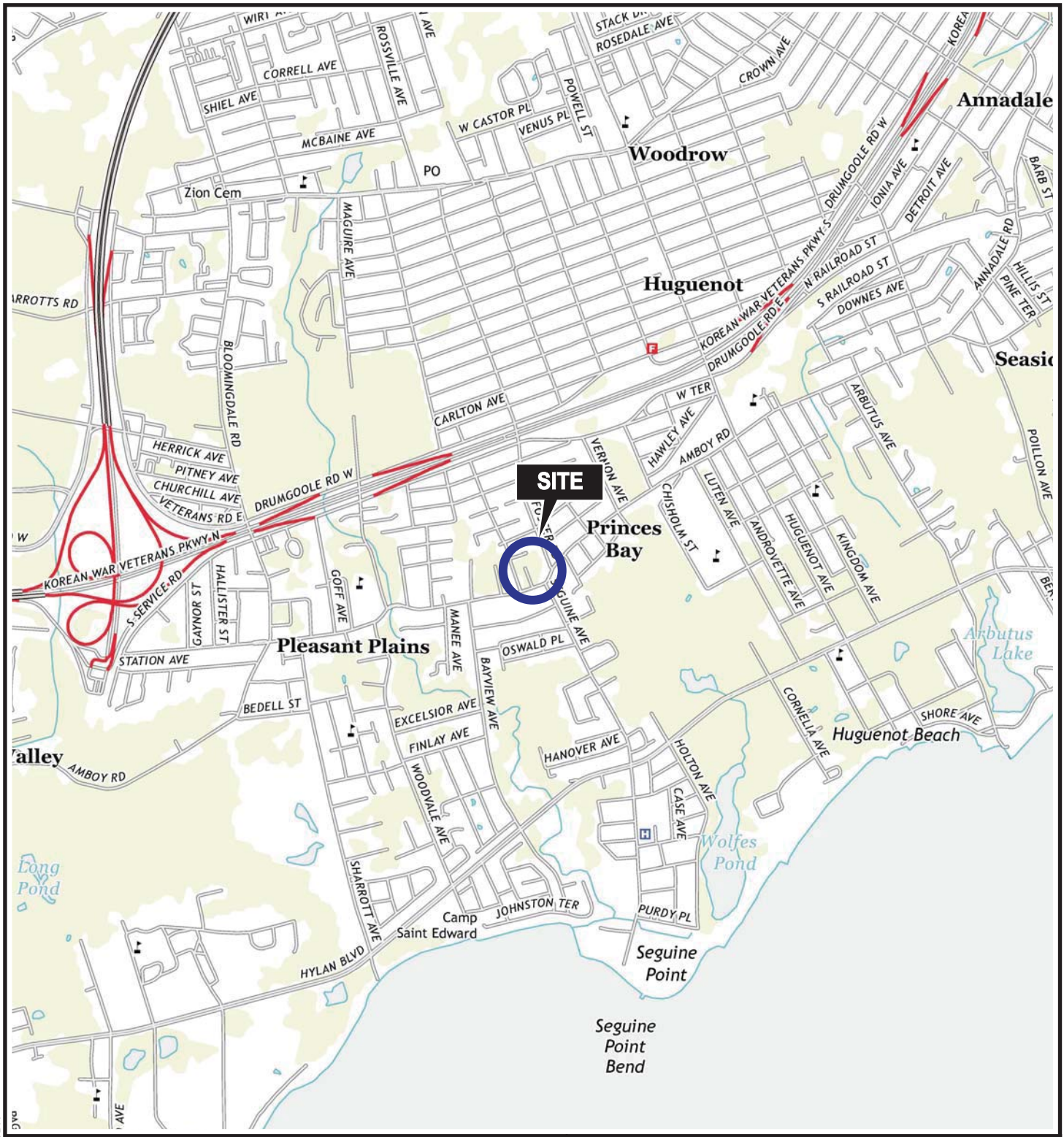
• maintaining site access controls and Department notification; and

• the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

• monitoring of groundwater and soil vapor to assess the performance and effectiveness of the remedy;

• a schedule of monitoring and frequency of submittals to the Department;



QUADRANGLE LOCATION

SOURCE:
USGS; 2013, Arthur Kill, NY-NJ
7.5 Minute Topographic Quadrangle

N

0 2000’

Title:

SITE LOCATION MAP

5801 AMBOY ROAD
STATEN ISLAND, NEW YORK

Prepared for:

SHORE TO SHORE FOSTER LLC

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: W.M.	Date: 09FEB16	FIGURE
Prepared by: J.A.D.	Scale: AS SHOWN	1
Project Mgr.: W.M.	Project No.: 2508.0001Y000	
File: 2508.0001Y125.02.CDR		

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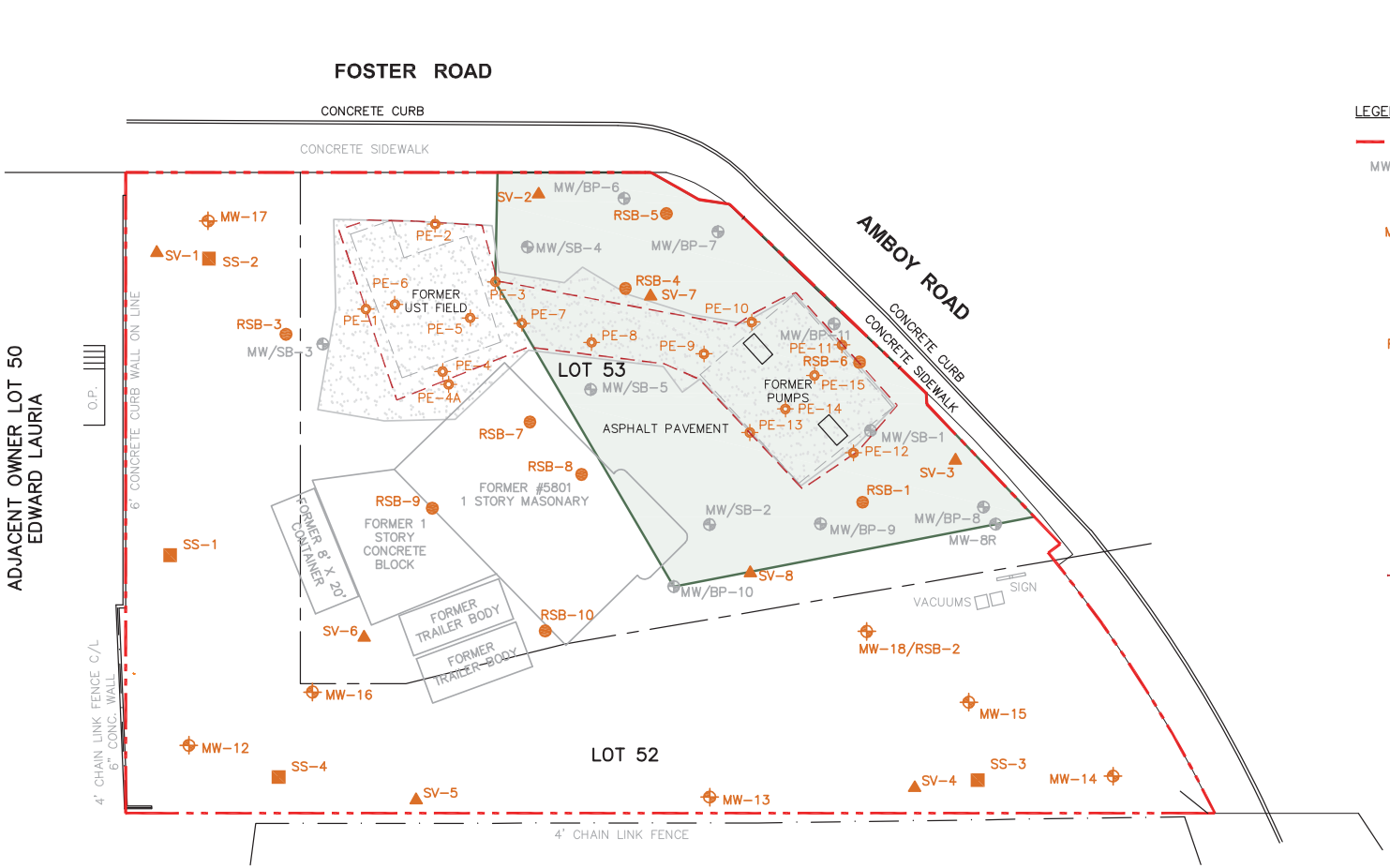

ADJACENT OWNER LOT 39
LAND OF THE CITY OF NEW YORK N.Y.C.D.E.P.
A.K.A. FRESHWATER WETLAND (AR-37 SCUDDER AMBOY)

LEGEND

- BOUNDARY OF BROWNFIELD CLEANUP SITE
- MW/SB-1 — LOCATION AND DESIGNATION OF EXISTING MONITORING WELL/SOIL BORING (INSTALLED BY TYREE BROTHERS)
- MW-12 — LOCATION AND DESIGNATION OF MONITORING WELL INSTALLED BY ROUX ASSOCIATES (2015)
- SV-1 — LOCATION AND DESIGNATION OF SOIL VAPOR SAMPLE POINT INSTALLED BY ROUX ASSOCIATES (2015)
- RSB-5 — LOCATION AND DESIGNATION OF SOIL BORING INSTALLED BY ROUX ASSOCIATES (2015)
- SS-1 — LOCATION AND DESIGNATION OF SHALLOW SOIL SAMPLE (0-2 INCHES) INSTALLED BY ROUX ASSOCIATES (2015)
- PE-1 — LOCATION AND DESIGNATION OF POST-EXCAVATION SAMPLE COLLECTED BY ROUX ASSOCIATES (2015)
- EXTENT OF 2-INCH ASPHALT PAVEMENT INSTALLED IN 2015
- EXTENT OF 2015 IRM EXCAVATION AREA
- PETROLEUM SOURCE AREA OF CONCERN (AOC)

NOTE

BASE MAP ADAPTED FROM MAP SURVEY OF PROPERTY IN THE BOROUGH OF STATEN ISLAND, CITY OF NEW YORK GENERATED BY RAJAKARUNA & ETTLINGER P.C. CONSULTING ENGINEERS AND CITY SURVEYORS NOVEMBER 17, 2015).

20' 0 20'

Title:

SITE PLAN

5801 AMBOY ROAD
STATEN ISLAND, NEW YORK

Prepared For:
SHORE TO SHORE FOSTER LLC

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: W.M.	Date: 01MAR16	FIGURE
Prepared by: J.A.D.	Scale: AS SHOWN	2
Project Mgr: W.M.	Project: 2508.0001Y000	
File: 2508.0001Y121.01.DWG		

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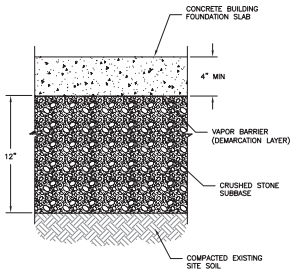
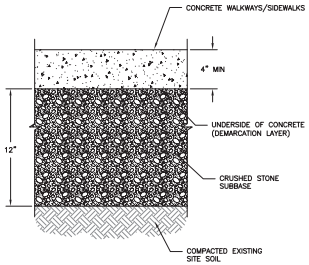
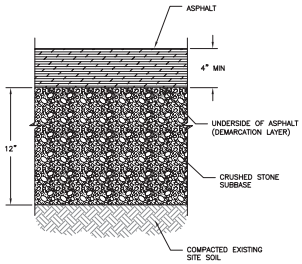


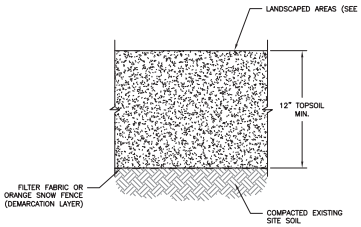
1 PROPOSED SITE COVER SYSTEM: CONCRETE BUILDING FOUNDATION
SCALE: NOT TO SCALE



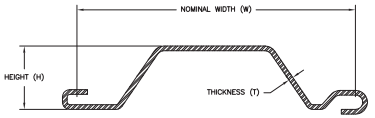
2 PROPOSED SITE COVER SYSTEM: CONCRETE WALKWAYS/SIDEWALKS
SCALE: NOT TO SCALE



3 PROPOSED SITE COVER SYSTEM: ASPHALT PARKING AREAS
SCALE: NOT TO SCALE



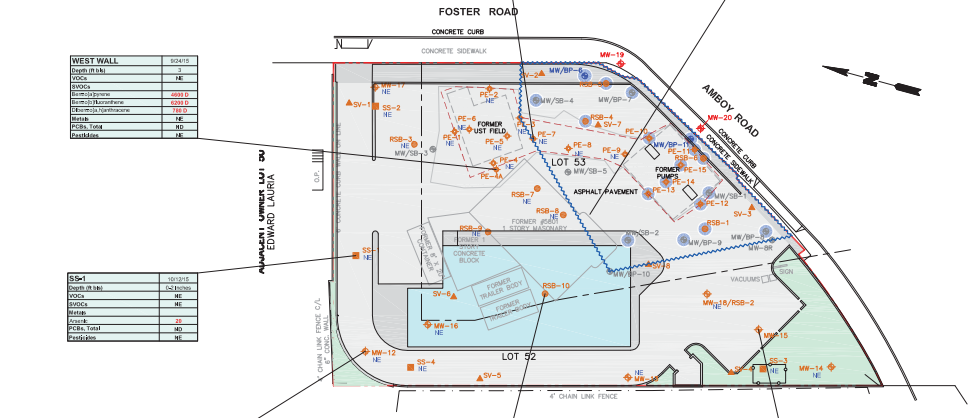
4 PROPOSED SITE COVER SYSTEM: LANDSCAPED AREAS
SCALE: NOT TO SCALE



PHYSICAL PROPERTIES

SECTION	THICKNESS T IN (mm)	HEIGHT H IN (mm)	NOMINAL WIDTH W IN (mm)	SECTION AREA IN² (mm²)	WEIGHT lbs/lin ft (kg/lin m)	WEIGHT lbs/lin ft² (kg/lin m²)	MOMENT OF INERTIA IN⁴/wall ft (cm⁴/wall m)	RADIUS OF GYRATION IN (mm)	SECTION MODULUS IN³/wall ft (cm³/wall m)
S64	.250	5.91	27.75	9.97	33.9	14.7	24.0	2.36	7.89

5 PROPOSED SEALED SHEET PILE CONTAINMENT WALL
SCALE: NOT TO SCALE



PIPING @TANK	10/13/15
Depth (ft bls)	4-5
VOCs	NE
SVOCs	ND
Metals	NE
PCBs, Total	ND
Pesticides	ND
See Note 2	

RSB-5	9/17/15	10/13/15	10/13/15
Depth (ft bls)	0 - 2	5-10	15-17
VOCs	ND	NE	NE
SVOCs	ND	NE	NA
Metals			
Arsenic	NE	18	NA
PCBs, Total	ND	ND	NA
Pesticides	NE	ND	NA

WEST WALL	9/24/15
Depth (ft bls)	3
VOCs	NE
SVOCs	
Benzo(a)pyrene	4600 D
Benzo(b)fluoranthene	6200 D
Dibenz(a,h)anthracene	780 D
Metals	NE
PCBs, Total	ND
Pesticides	NE

SS-1	10/13/15
Depth (ft bls)	0-2 inches
VOCs	NE
SVOCs	NE
Metals	
Arsenic	20
PCBs, Total	ND
Pesticides	NE

MW-12	9/18/15	10/2/15	10/2/15	10/2/15
Depth (ft bls)	0 - 2	5 - 7	8 - 10	10 - 12
VOCs	NE	NE	NE	NE
SVOCs	NE	NE	NE	NA
Metals				
Arsenic	NE	NE	21	NA
PCBs, Total	ND	ND	NE	NA
Pesticides	NE	NE	NE	NA

RSB-10	10/13/15	10/13/15	10/13/15	10/13/15	10/13/15
Depth (ft bls)	2.5 - 5	2.5 - 5 DUP	7 - 8	11 - 14	11 - 14 DUP
VOCs	NE	NE	NE	NE	NE
SVOCs					
Benzo(a)pyrene	1400 JV	ND	NE	NA	NA
Metals	NE	NE	NE	NA	NA
PCBs, Total	NE	NE	NE	NA	NA
Pesticides	NE	NE	NE	NA	NA

MW-15	10/1/15	10/1/15	10/1/15
Depth (ft bls)	0 - 2	5 - 7	7 - 8
VOCs	NE	NE	NE
SVOCs			
Benzo(a)pyrene	NE	1800 D	NA
Metals			
Cadmium	NE	4.8	NA
PCBs, Total	NE	NE	NA
Pesticides	NE	NE	NA

ADJACENT OWNER LOT 39
LAND OF THE CITY OF NEW YORK N.Y.C.D.E.P.
A.K.A. FRESHWATER WETLAND (AR-37 SCUDDER AMBOY)

LEGEND

- BOUNDARY OF BROWNFIELD CLEANUP SITE
- MW/SB-1 — LOCATION AND DESIGNATION OF EXISTING MONITORING WELL/SOIL BORING (INSTALLED BY TYREE BROTHERS) TO BE ABANDONED
- MW-12 — LOCATION AND DESIGNATION OF MONITORING WELL INSTALLED BY ROUX ASSOCIATES (2015) TO BE ABANDONED
- SV-1 — LOCATION AND DESIGNATION OF SOIL VAPOR SAMPLE POINT INSTALLED BY ROUX ASSOCIATES (2015)
- RSB-5 — LOCATION AND DESIGNATION OF SOIL BORING INSTALLED BY ROUX ASSOCIATES (2015)
- SS-1 — LOCATION AND DESIGNATION OF SHALLOW SOIL SAMPLE (0-2 INCHES) INSTALLED BY ROUX ASSOCIATES (2015)
- PE-1 — LOCATION AND DESIGNATION OF POST-EXCAVATION SAMPLE COLLECTED BY ROUX ASSOCIATES (2015)
- MW/BP-6 — LOCATION AND DESIGNATION OF EXISTING MONITORING WELL (INSTALLED BY TYREE BROTHERS) TO BE MAINTAINED AND USED FOR INTRODUCTION OF DYE
- MW-19 — LOCATION AND DESIGNATION OF PROPOSED OFF-SITE MONITORING WELL
- EXTENT OF 2-INCH ASPHALT PAVEMENT INSTALLED IN 2015
- EXTENT OF 2015 IRM EXCAVATION AREA
- POTENTIAL SOURCES OF PETROLEUM CONTAMINATION
- PROPOSED SEALED SHEET PILE CONTAINMENT WALL TO 25 FT BLS FOR PETROLEUM SOURCE AREA (SEE DETAIL 5 AND NOTE 5)
- PROPOSED SITE COVER SYSTEM: CONCRETE BUILDING FOUNDATION (SEE DETAIL 1)
- PROPOSED SITE COVER SYSTEM: CONCRETE WALKWAYS AND SIDEWALKS (SEE DETAIL 2)
- PROPOSED SITE COVER SYSTEM: ASPHALT PARKING AREAS (SEE DETAIL 3)
- PROPOSED SITE COVER SYSTEM: LANDSCAPED AREAS (SEE DETAIL 4 AND NOTE 3)
- NE — INDICATES NO EXCEEDANCES OF THE NYSDEC COMMERCIAL SCOs
- PROPOSED SSDS EQUIPMENT ENCLOSURE WITH CHAINLINK PRIVACY FENCE (SEE NOTE 4)

NOTES

1. BASE MAP ADAPTED FROM MAP SURVEY OF PROPERTY IN THE BOROUGH OF STATEN ISLAND, CITY OF NEW YORK GENERATED BY RAJAKARUNA & ETTLINGER P.C. CONSULTING ENGINEERS AND CITY SURVEYORS JANUARY 1, 2015).
2. THE INITIAL SAMPLE COLLECTED AT 3FT BLS INDICATED VOC EXCEEDANCES OF COMMERCIAL SCOs, HOWEVER, THE EXCAVATION IN THIS AREA WAS EXTENDED TO 4-5FT BLS AND SAMPLE "PIPING AT TANK" WAS COLLECTED, AND HAD NO EXCEEDANCE OF THE NYSDEC COMMERCIAL SCOs.
3. ALL LANDSCAPED AREAS WILL HAVE ONE FOOT OF SOIL MEETING THE LOWER OF THE PROTECTION OF GROUNDWATER OR COMMERCIAL SCOs.
4. SEE PLATE 8, FOR SSDS DESIGN.
5. SEALANT SYSTEM FOR SHEET PILE WALL SHALL BE THE ROXAN® SYSTEM CONSISTING OF ADEKA® P-201 SEALANT AND PROPRIETARY APPLICATION EQUIPMENT OR APPROVED EQUAL. FINAL SELECTION OF MATERIALS FOR PROPOSED SEALED SHEETS PILING CONTAINMENT WALL WILL BE MADE IN ADVANCE OF THE CONSTRUCTION BASED ON AVAILABILITY OF MATERIALS AND EQUIPMENT. ANY CHANGE TO PROPOSED MATERIALS WILL BE APPROVED BY THE REMEDIAL ENGINEER AND DOCUMENTED IN IN THE FER.
6. THE FINAL LOCATION OF THE PROPOSED OFF-SITE MONITORING WELLS (MW-19 AND MW-20) WILL BE DETERMINED BASED ON LOGISTICAL CONSTRAINTS AT THE TIME OF INSTALLATION.

Parameter (Concentrations in µg/kg)	Standards* (µg/kg)
VOCs	
SVOCs	
Benzo(a)pyrene	1000
Benzo(b)fluoranthene	5600
Dibenz(a,h)anthracene	560
Metals	
Arsenic	16
Copper	270

Concentrations in µg/kg
µg/kg =Micrograms per kilogram
*NYSDEC Part 375 Commercial SCOs
NYSDEC = New York State Department of Environmental Conservation
D - Diluted Sample
DUP - Duplicate Sample
FER - Final Engineering Report
VOCs = Volatile Organic Compounds
SVOCs = Semi-volatile Organic Compounds
PCBs = Polychlorinated Biphenyls
SCOs = Soil Cleanup Objectives
NE = No exceedance
ND = No detection
NA = Not analyzed for by laboratory
ft bls = Feet below land surface
JV = Estimated quantity added based on DUSR
SSDS = Sub-slab Depressurization System
= Results shown in red type exceed NYSDEC Part 375 Commercial SCOs

Post - Excavation Sample Key

Location ID	Sample ID
PE-1	Tank North Wall
PE-2	Tank East Wall
PE-3	Tank South Wall
PE-4	Tank West Wall
PE-4A	West Wall
PE-5	Tank Bottom South
PE-6	Tank Bottom North
PE-7	Piping @ Tank Flr / Piping at Tank
PE-8	Piping @ 15 Tank Flr
PE-9	Piping @ Pump Flr
PE-10	Pump East Wall
PE-11	Pump South Wall
PE-12	Pump West Wall
PE-13	Pump North Wall
PE-14	Pump Bottom North
PE-15	Pump Bottom South

20' 0 20'

Title: REMEDIAL ALTERNATIVE 2: TRACK 4

5801 AMBOY ROAD
STATEN ISLAND, NEW YORK

Prepared For:
SHORE TO SHORE FOSTER LLC

Remedial
REMEDIAL ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERS

Compiled by: W.M.	Date: 10MAY16	Figure
Prepared by: G.M.	Scale: AS SHOWN	
Project Mgr: W.M.	Project: 2508.0001Y000	3A
File: 2508.0001Y125.01.DWG		

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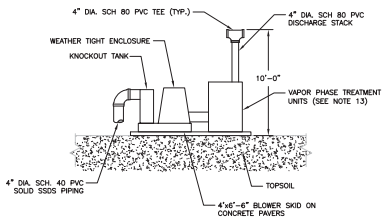
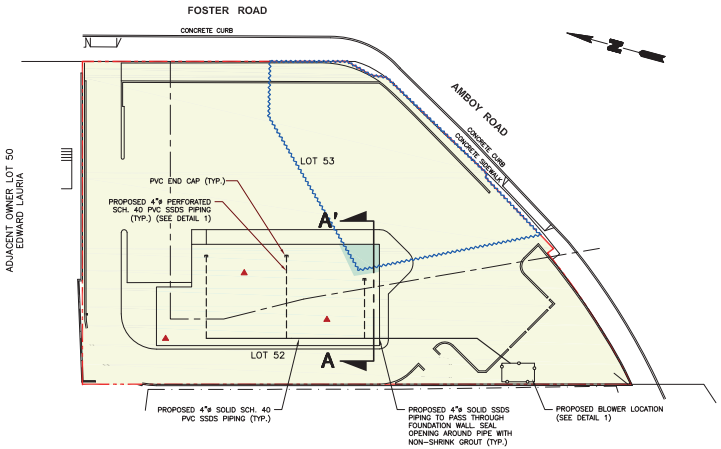


1 ACTIVE SITE-WIDE SUB-SLAB DEPRESSURIZATION SYSTEM

SCALE: NOT TO SCALE



ADJACENT OWNER LOT 39
LAND OF THE CITY OF NEW YORK N.Y.C.D.E.P.
A.K.A. FRESHWATER WETLAND (AR-37 SCUDDER AMBOY)

LEGEND

- BOUNDARY OF BROWNFIELD CLEANUP SITE
- PROPOSED SEALED SHEET PILE CONTAINMENT WALL TO 25 FT BLS FOR PETROLEUM SOURCE AREA (SEE DETAIL 5 ON PLATE 7)
- PROPOSED SSDS EQUIPMENT ENCLOSURE WITH CHAINLINK PRIVACY FENCE
- SITE COVER SYSTEM (SEE PLATE 7 FOR DETAILS)
- LOCATION OF PROPOSED SOIL VAPOR MONITORING POINT (SEE DETAIL 2 AND GENERAL NOTE 2)
- PROPOSED THICKENED CONCRETE SLAB (24") WITHIN SEALED SHEET PILE CONTAINMENT WALL (SEE GENERAL NOTE 3 AND SECTION A-A')

GENERAL NOTES

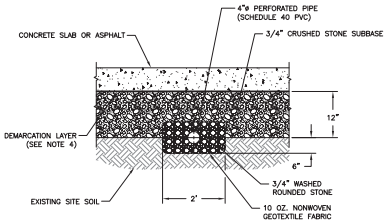
1. BASE MAP ADAPTED FROM MAP SURVEY OF PROPERTY IN THE BOROUGH OF STATEN ISLAND, CITY OF NEW YORK GENERATED BY RAJAKARUNA & ETTLINGER P.C. CONSULTING ENGINEERS AND CITY SURVEYORS JANUARY 1, 2015).
2. SOIL VAPOR MONITORING POINTS TO BE USED FOR MEASURING SUB-SLAB VACUUM.

   SSDS - SUB-SLAB DEPRESSURIZATION SYSTEM

   PVC- POLYVINYL CHLORIDE
3. THICKENED CONCRETE SLAB SHALL BE INCLUDED AT THE PORTION OF THE BUILDING SLAB THAT OVERHANGS THE SEALED SHEET PILE CONTAINMENT WALL. THIS WILL ISOLATE THAT AREA FROM THE REST OF THE BUILDING TO PREVENT DRAWING VAPORS FROM THE PETROLEUM SOURCE AREA. SEE SECTION A-A'.

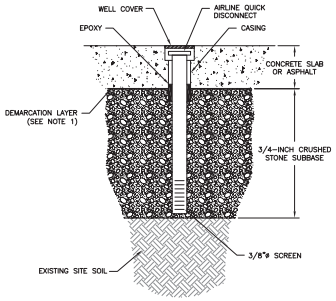
DESIGN NOTES

1. THE SURFACES LINED WITH GEOTEXTILE AND POLYETHYLENE VAPOR BARRIER TO BE FREE OF ALL ROCKS, STONES, SHARP OBJECTS OR CONSTRUCTION DEBRIS OF ANY KIND.
2. GEOTEXTILE NONWOVEN FABRIC AND POLYETHYLENE VAPOR BARRIER TO BE INSTALLED DIRECTLY ON FILL OR STONE. GEOTEXTILE MATERIAL TO OVERLAP A MINIMUM OF 12" AND THE OVERLAPPED SEAMS TO BE SEALED WITH TAPE. VAPOR BARRIER TO OVERLAP A MINIMUM OF 6" AND TO BE SEALED WITH PRESSURE SENSITIVE TAPE.
3. ALL PENETRATIONS THROUGH THE SLAB ON GRADE TO BE SEALED USING A SILICONE BASED WATERPROOF SEALANT OR EQUIVALENT.
4. THE DEMARCATION LAYER SHALL BE THE VAPOR BARRIER BENEATH THE BUILDING SLAB, THE UNDERSIDE OF THE CONCRETE FOR WALKWAYS AND SIDEWALKS, THE UNDERSIDE OF THE ASPHALT IN PARKING AREAS, OR ORANGE SNOW FENCE, FILTER FABRIC OR APPROVED EQUAL IN LANDSCAPED AREAS.
5. CONTRACTOR SHALL COORDINATE WITH PLUMBING, MECHANICAL, CIVIL AND ELECTRICAL CONTRACTORS FOR ALL UTILITY CROSSINGS.
6. THE PERFORATED PIPE MAY BE ROUTED AROUND OR UNDERNEATH ANY UTILITY LINES (SEWER, WATER, GAS), AS REQUIRED AND AS APPROVED BY THE ENGINEER.
7. PROVIDE ELECTRICAL/CONTROL CONDUIT TO BLOWER. COORDINATE WITH ELECTRICAL CONTRACTOR.
8. ELECTRICAL CONDUIT SHALL BE SIZED FOR 115 VOLT, SINGLE PHASE, 30 AMPS 60 HZ, FOR BLOWER MOTOR.
9. THE BLOWER DISCHARGE SHALL BE LOCATED A MINIMUM OF 10 FEET FROM HVAC AIR INLETS AND 10 FEET ABOVE GRADE.
10. THE BLOWER SHALL BE A 2HP, AMETEK ROTRON® MODEL EN505AX56ML OR APPROVED EQUAL.
11. THE BLOWER SHALL BE PROVIDED WITH A WEATHER TIGHT ENCLOSURE (FRP MOLDED SHELTER) DWYER MODEL D-100HDS OR APPROVED EQUAL.
12. THE BLOWER SKID SHALL INCLUDE WEATHER TIGHT ENCLOSURE, 7 GALLON AMETEK ROTRON MODEL MS200P KNOCKOUT TANK (WITH HIGH LEVEL ALARM), VACUUM RELIEF VALVE, GAUGES, AND INTERCONNECTING PIPING/FITTINGS (INCLUDING A MANUAL DILUTION VALVE).
13. VAPOR PHASE TREATMENT UNITS MAY BE REQUIRED. SPACE SHOULD BE AVAILABLE FOR THE VAPOR PHASE TREATMENT. IF REQUIRED, THE VAPOR PHASE TREATMENT UNITS SHALL BE TWO CARBTROL G-2 (24-INCH DIAMETER BY 3 FT TALL) OR APPROVED EQUAL.
14. 3/4" STONE SHALL COME FROM A NYSDEC PERMITTED MINE OR QUARRY AND SHALL CONTAIN LESS THAN 10% BY WEIGHT MATERIAL WHICH WOULD PASS THROUGH A SIZE NO. 80 SIEVE.
15. BLOWER SHALL BE PROVIDED WITH A REMOTE ALARM CAPABLE OF ALERTING THE OWNER OF A SYSTEM SHUTDOWN OR LOW VACUUM CONDITION VIA PHONE OR TEXT MESSAGE.



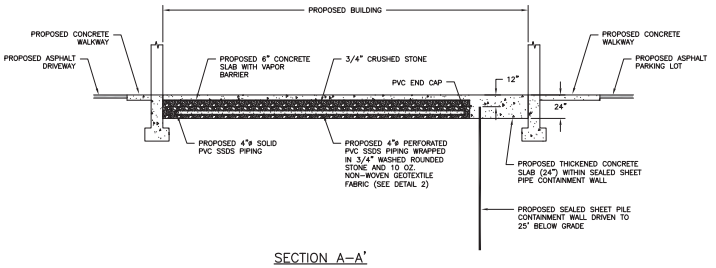
2 SUB-SLAB DEPRESSURIZTION SYSTEM PIPE DETAIL

SCALE: NOT TO SCALE



3 SOIL VAPOR MONITORING POINT DETAIL (SEE GENERAL NOTE 2)

SCALE: NOT TO SCALE



SECTION A-A'

SCALE: NOT TO SCALE

20' 0 20'

Title: **SUB-SLAB DEPRESSURIZATION SYSTEM DESIGN**

5801 AMBOY ROAD
STATEN ISLAND, NEW YORK

Prepared For:
SHORE TO SHORE FOSTER LLC

Remedial
REMEDIAL ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERS

Compiled by: W.M.	Date: 10MAY16
Prepared by: B.H.C.	Scale: AS SHOWN
Project Mgr: W.M.	Project: 2508.0001Y000
File: 2508.0001Y125.01.DWG	

Figure 3B

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