

DECISION DOCUMENT

Centre Avenue Development - South
Brownfield Cleanup Program
New Rochelle, Westchester County
Site No. C360182
June 2021



**Department of
Environmental
Conservation**

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

DECLARATION STATEMENT - DECISION DOCUMENT

Centre Avenue Development - South
Brownfield Cleanup Program
New Rochelle, Westchester County
Site No. C360182
June 2021

Statement of Purpose and Basis

This document presents the remedy for the Centre Avenue Development - South 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 Centre Avenue Development - South site and the public's input to the proposed remedy presented by the Department.

Description of Selected Remedy

During the course of the investigation, certain actions known as interim remedial measures (IRMs), were initiated at the above referenced site. An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the remedial investigation (RI) or alternatives analysis (AA). The IRM being undertaken at this site is discussed in Section 6.2.

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 remedial design program will include:

- 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;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

2. In-situ Chemical Oxidation

In-situ chemical oxidation (ISCO) will be implemented to treat VOCs including PCE, TCE, and 1,1,1-TCA, their respective breakdown products, toluene, and the emerging contaminant 1,4-dioxane in groundwater. A chemical oxidant will be injected into the subsurface bedrock groundwater beneath the site to destroy the contaminants. Areas of injection include upgradient of wells identified to have groundwater standard exceedances and areas whose groundwater concentrations indicate the possibility of free-phase NAPL. The chemical oxidant will initially be injected via bedrock injection wells screened at various depths between 27 and 65 feet above mean sea level (ft, amsl). ISCO must reduce contaminant concentrations to levels that are acceptable to the Department. Additional rounds of ISCO injections may be required to reduce groundwater contaminant concentrations to levels that are acceptable to the Department.

3. In-situ Treatment using Activated Carbon

Liquid activated carbon (LAC) will be added to the subsurface along the downgradient property lines to capture and prevent the off-site migration of PFAS compounds. LAC is also capable of removing PCE, TCE, and 1,1,1-TCA, their respective breakdown products, and toluene by adsorption onto the carbon particle surfaces. In the area of the captured contamination, conditions will be maintained that will allow for anaerobic degradation of the chlorinated contaminants of concern to occur. LAC treatment will take place following the ISCO treatment; provided that the sampling results indicate that the oxidant levels and contaminant trends in the groundwater meet the metrics needed for LAC treatment. LAC will be injected via bedrock injection wells screened at various depths between 27 and 65 ft, amsl. LAC must reduce contaminant concentrations to levels that are acceptable to the Department. Additional rounds of LAC injections may be required to reduce groundwater contaminant concentrations to levels that are acceptable to the Department.

4. Groundwater Contingency (In-Situ Chemical Reduction/Groundwater Extraction and Treatment)

If ISCO and/or LAC treatment is ineffective in reducing groundwater contaminant levels to levels that are acceptable to the Department, or LAC cannot be implemented due to incompatible groundwater conditions (i.e. elevated levels of oxidant in the LAC treatment zone), contingent remedial actions may be required which could include in-situ chemical reduction (ISCR) or groundwater extraction and treatment. ISCR could be implemented to treat VOCs including PCE, TCE, and 1,1,1-TCA, their respective breakdown products, and toluene. ISCR consisting of

injecting zero-valent iron (ZVI) into the subsurface bedrock groundwater beneath the site could be used to degrade the contaminants.

5. Conditional Track 1

The intent of the remedy is to achieve a Track 1 unrestricted use. A Site Management Plan (SMP) will be developed and an Environmental Easement will be recorded to address residual groundwater impacts and a soil vapor intrusion (SVI) evaluation of the site, and to implement actions as needed. The SMP requires groundwater monitoring until contaminant concentrations are below groundwater standards, or there is a bulk reduction to asymptotic levels acceptable to the Department. A Track 1 cleanup can only be achieved if any SVI mitigation systems on future buildings and groundwater treatment/monitoring are no longer needed within 5 years of the date of the Certificate of Completion. Upon a demonstration that these components of the remedy are no longer necessary, the SMP and Environmental Easement will be extinguished. If the bulk reduction in groundwater concentrations to asymptotic levels acceptable to the Department are reached but the concentrations remain above groundwater standards, and depending on the need for SVI mitigation, the site may still be eligible for a Track 1 cleanup, however, a groundwater use restriction and associated easement would still be required. If no EE or SMP is needed to achieve soil, groundwater, or soil vapor remedial action objectives, then the following local use restriction will be relied upon to prevent ingestion of groundwater: Chapter 873, Article VII of the Laws of Westchester County, which prohibits potable use of groundwater without prior approval.

In the event that Track 1 unrestricted use is not achieved, including achievement of groundwater and soil vapor remedial objectives, the following contingent remedial elements will remain, and the remedy will achieve a Track 2 residential cleanup.

5a. Engineering and Institutional Controls

Imposition of an institutional control in the form of an environmental easement and a Site Management Plan, as described below, will be required. The remedy will achieve a Track 2 residential cleanup at a minimum.

5b. 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 residential, restricted-residential use or commercial use or industrial 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 County DOH; and
- require compliance with the Department approved Site Management Plan.

5c. Site Management Plan

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

1. 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 5b above.

Engineering Controls: Groundwater monitoring and any engineering controls that may be required following the five-year conditional Track 1 evaluation period (e.g., sub-slab depressurization system).

This Site Management Plan (SMP) includes, but may not be limited to:

- descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion of any future buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- provisions for the management and inspection of the identified engineering controls, if any;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

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

- Monitoring groundwater to assess the performance and effectiveness of the groundwater treatment implemented, and to inform the need for additional groundwater treatment;
- a schedule of monitoring and frequency of submittals to the Department; and
- monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

- b. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of vapor mitigation system(s), if any. The plan includes, but is not limited to:

- procedures for operating and maintaining the system(s)/contingent groundwater remedy, if any; and
- compliance inspection of the system(s) to ensure proper O&M as well as providing the data for any necessary reporting;
- maintaining site access controls and Department notification; and
- providing the Department access to the site and O&M records.

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 9, 2021



for

Date

Janet Brown, Director
Remedial Bureau C

DECISION DOCUMENT

Centre Avenue Development - South
New Rochelle, Westchester County
Site No. C360182
June 2021

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, where a contaminant is present at levels exceeding the soil cleanup objectives or other health-based or environmental standards, criteria or guidance, based on the reasonably anticipated use of the property.

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 repository:

DECInfo Locator - Web Application
<https://gisservices.dec.ny.gov/gis/dil/index.html?rs=C360182>

New Rochelle Public Library
1 Library Plaza
New Rochelle, NY 10801
Phone: 914-632-7878

Please note that in-person repositories may be temporarily unavailable due to COVID-19 precautions.

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 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 the City of New Rochelle, Westchester County, New York at 33 Centre Avenue on a 0.46-acre lot. The site is located on the northern part of the city block bordered by Centre Avenue to the north, Huguenot Street to the east, Columbus Avenue to the south, and Relyea Place to the west. The site is bordered to the south by multi-story residential and commercial buildings. The site is approximately 1 mile west of Echo Bay. The Industrial Overall Services Corp. (Site No. 360109) State Superfund site is located just to the west of the site (downgradient), on the other side of Reylea Place.

Site Features: The site is currently being developed into a multi-story residential building and construction of the building began in July 2020, after all soil above bedrock was removed from the site as part of an Interim Remedial Measure (IRM) completed under the BCP.

Current Zoning and Land Use: The site is located within the Downtown Business (DB) (eastern portion) and Light Industry (LI) (western portion) zoning districts. Permitted principal uses of DB districts include stores, retail, offices, and residential units located on the second floor and above. Permitted principal uses of LI districts include manufacturing, offices, medical facilities and parking garages. The current zoning designation is consistent with the proposed development.

Past Use of the Site: The site has been used for various residential, commercial and industrial purposes since the 1930s. Starting in 1971, the western half of the site was used as an electroplating and metal-finishing business and the eastern half of the site was used as a parking lot. Industrial operations ceased in December 2018.

Site Geology and Hydrogeology: Site soils consisted of historic fill across the site from grade surface to depths ranging from 1 to 7.5 feet below grade surface (ft bgs). Historic fill was generally deeper on the eastern portion of the site. Historic fill predominately consisted of brown and black sand with varying amounts of gravel, brick, organic material, asphalt, metal and clay with an average fill depth of approximately 5 ft bgs across the Site. The fill material was underlain by fine to silty sand followed by a 6 to 12-inch layer of weathered (decomposed) rock overlying the bedrock. All soil was removed from the site as part of an IRM. Bedrock beneath the site consists of metamorphic rock containing high angle features capable of transporting groundwater to depths of at least 70 feet below the top of bedrock. Groundwater underlying the site is present in bedrock and flows to the south-southwest.

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 that restrict 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 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 Applicants under the Brownfield Cleanup Agreement are Volunteers. The Applicants do not have an obligation to address off-site contamination. However, the Department has determined that this site does pose a significant threat to public health or the environment and there are off-site impacts that require remedial activities; accordingly, enforcement actions are necessary.

The Department will seek to identify any parties (other than the Volunteers) known or suspected to be responsible for contamination at or emanating from the site, referred to as Potentially Responsible Parties (PRPs). The Department will bring an enforcement action against the PRPs. If an enforcement action cannot be brought or does not result in the initiation of a remedial program by any PRPs, the Department will evaluate the off-site contamination for action under the State Superfund. The PRPs are subject to legal actions by the State for recovery of all response costs the State incurs or has incurred.

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:

tetrachloroethene (PCE)	chrysene
trichloroethene (TCE)	dibenz[a,h]anthracene
1,1-dichloroethene	DDT
1,1,1-Trichloroethane (TCA)	indeno(1,2,3-CD)pyrene
1,1 dichloroethene	mercury
chromium	zinc
nickel	cis-1,2-dichloroethene
barium	trans-1,2-dichloroethene
lead	vinyl chloride
copper	1,2-dichloroethane
dieldrin	toluene
DDE	pyrene
DDD	fluoranthene
chlordane	PCBs
benzo(a)anthracene	Cyanides (soluble cyanide salts)
benzo(a)pyrene	perfluorooctanoic acid
benzo(b)fluoranthene	Perfluorooctane Sulfonate
benzo(k)fluoranthene	1,4-dioxane

xylene (mixed)

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

- groundwater
- soil
- soil vapor intrusion

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 has been completed at this site based on conditions observed during the RI.

Soil Removal

Excavation and off-site disposal of all on-site soils down to bedrock which exceed unrestricted soil cleanup objectives (USCOs) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, metals, and cyanide as defined by 6 NYCRR Part 375-6.8. Approximately 11,000 cubic yards of contaminated soil was removed from the site. In addition, 5-15 feet of weathered bedrock was removed across the site. No material was imported to backfill or regrade the site.

Groundwater samples were collected following the IRM to determine the effectiveness of the IRM in removing the source of contamination to groundwater.

The IRM work is documented in a Construction Completion Report (CCR) dated March 2021. The Department anticipates approving the CCR in June 2021.

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.

Remediation at the site is partially complete. Prior to remediation, the primary contaminants of concern include VOCs, SVOCs, PCBs, pesticides, metals, and cyanide in soil, VOCs, metals and the emerging contaminants PFAS and 1,4-dioxane in the groundwater, and VOCs in soil vapor. Remedial actions thus far have successfully achieved soil cleanup objectives for unrestricted use.

Prior to Completion of partial Remediation:

Soil and groundwater samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, metals, cyanide, and the emerging contaminants per-and poly fluoroalkyl substances (PFAS) and 1,4-dioxane. Soil vapor samples were analyzed for VOCs. Based on investigations conducted to date, the primary contaminants of concern include VOCs, SVOCs, PCBs, pesticides, metals, and cyanide in soil, VOCs, metals and the emerging contaminants PFAS and 1,4-dioxane in the groundwater, and VOCs in soil vapor.

Soil - A total of 36 soil samples were collected during the remedial investigation from 19 borings extending to bedrock across the site. Several constituents were identified at concentrations that exceed their Unrestricted Soil Cleanup Objectives (USCOs). The following is a list of those compounds and the maximum exceedance: trichloroethene (TCE) 0.92 parts per million (ppm) vs USCO of 0.47 ppm, benzo(a)anthracene 64 ppm vs USCO of 1 ppm, benzo(a)pyrene 56 ppm vs USCO of 1 ppm, benzo(k)fluoranthene 25 ppm vs USCO of 0.8 ppm, benzo(b)fluoranthene 69 ppm vs USCO of 1 ppm, chrysene 61 ppm vs USCO of 1 ppm, dibenzo(a,h)anthracene 8.6 ppm vs USCO of 0.33 ppm, fluoranthene 120 ppm vs USCO of 100 ppm, indeno(1,2,3-cd)pyrene 36 ppm vs USCO of 0.5 ppm, pyrene 120 ppm vs USCO of 100 ppm, barium 416 ppm vs USCO of 350 ppm, copper 396 ppm vs USCO of 50 ppm, lead 357 ppm vs USCO of 63 ppm, mercury 2.54 ppm vs USCO of 0.18 ppm, nickel 1600 ppm vs USCO of 30 ppm, zinc 254 ppm vs USCO of 109 ppm, 4,4'-DDE 0.134 ppm vs USCO of 0.0033 ppm, 4,4'-DDD 0.156 ppm vs USCO of 0.0033 ppm, 4,4'-DDT 0.521 ppm vs USCO of 0.0033 ppm, chlordane 0.186 ppm vs USCO of 0.094 ppm, dieldrin 0.0234 ppm vs USCO of 0.005 ppm, PCBs 0.11 ppm vs USCO of 0.1 ppm, and cyanide 74 ppm vs USCO of 27 ppm.

Emerging contaminants were detected in soil samples collected from the site. The emerging contaminant 1,4-dioxane was detected in one sample at a concentration of 16 parts per billion (ppb). Perfluorooctanesulfonic acid (PFOS) was detected in 22 out of 30 samples collected throughout the site with a maximum concentration of 21.8 ppb. Perfluorooctanoic acid (PFOA) was detected in 6 out of 30 samples collected throughout the site with a maximum concentration of 1.52 ppb. Concentrations of PFAS in soil were generally higher on the western half of the site compared to the eastern half of the site.

All on-site soils were excavated down to the bedrock surface and transported off-site for disposal as part of a soil removal IRM. Therefore, following the IRM, there are no soils remaining that exceed the USCOs. There is no indication that soil contamination extends off-site.

Groundwater - A total of nine groundwater wells were installed in bedrock throughout the site prior to the IRM. A non-aqueous phase liquid (NAPL) was encountered in one well on the east half of the site. This NAPL was again encountered during the IRM at the weathered bedrock interface and sampled. Fingerprinting results indicated that the NAPL was characteristic of a highly degraded petroleum. No further evidence of the NAPL was observed on the eastern half of the site after the removal of the affected bedrock and liquids encountered.

Prior to the IRM, groundwater samples were collected from monitoring wells and analyzed for VOCs, SVOCs, PCBs, pesticides, metals and cyanide as well as the emerging contaminants PFAS and 1,4-dioxane. No PCBs or cyanide were detected in any groundwater samples. The SVOCs

benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, chrysene, and phenol; the metals chromium, iron, manganese, magnesium, and nickel; and the pesticide dieldrin were detected in at least one groundwater sample in exceedance of groundwater standards.

The locations where elevated SVOCs were noted in groundwater do not coincide with locations where elevated SVOCs were noted in soil, which suggests that the PAHs may be present in the dissolved phase.

The concentrations of sodium, iron, manganese, magnesium appear to be background levels with no distinction between upgradient and downgradient monitoring wells. These compounds are typically naturally occurring or related to road salt application. Nickel and chromium, which may have been used during the electroplating process, were detected at maximum concentrations of 12,970 ppb versus a groundwater standard of 100 ppb, and 7,937 ppb versus a groundwater standard of 50 ppb, respectively. The pesticide dieldrin was only detected in one well at 0.005 ppb, marginally exceeding the groundwater standard of 0.004 ppb.

The chlorinated VOCs PCE, TCE and 1,1,1-TCA, and their respective degradation byproducts, were detected in groundwater samples collected from the western half of the site in exceedance of groundwater standards and at levels suggesting the presence of separate phase material. The VOC toluene was also detected in exceedance of groundwater standards in the western half of the site and xylene (22 ppb) on the eastern half of the site in one sample. The highest concentrations of VOCs encountered at the site were for TCE (3,400 ppb), 1,1,1-TCA (1,000,000 ppb), 1,1-dichloroethene (28,000 ppb), and toluene (7,200 ppb) compared to a groundwater standard of 5 ppb for each of these constituents. Chlorinated VOCs were not detected in groundwater samples collected from the eastern half of the site. 1,4-dioxane, a contaminant (stabilizer) typically associated with 1,1,1-TCA, was detected at concentrations up to 320 ppb in groundwater samples, where elevated levels of chlorinated VOCs were also encountered on the western half of the site.

For PFAS, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) were reported at concentrations of up to 796 and 3,140 parts per trillion (ppt), respectively, exceeding the 10 ppt screening levels for groundwater for each. PFAS concentrations in groundwater were approximately an order of magnitude higher on the western half of the site compared to the eastern half of the site.

VOC, PFAS, and 1,4-dioxane groundwater contamination is migrating off-site in the direction of groundwater flow to the southwest. The off-site groundwater plumes from this site are comingled with groundwater plumes emanating from the Industrial Overall Services Corp. (Site No. 360109) State Superfund site. The Industrial Overall Services Corp. site is located just to the west of the site on the other side of Relyea Place. No private or municipal drinking water wells are within 0.5 miles of the site, and Chapter 873, article VII of the Laws of Westchester County, prohibits potable use of groundwater without prior approval.

A supplemental remedial investigation (SRI-1) was conducted following the IRM to determine the nature and extent of contamination in bedrock groundwater. The SRI-1 consisted of the geophysical logging at ten locations and the installation of sixteen monitoring wells screened at depths ranging from 75 to 27 feet above mean sea level (ft, amsl) following the IRM. The data

collected during the SRI revealed that source level contamination consisting primarily of chlorinated VOCs (max concentration 140,000 ppb 1,1,1-TCA compared to the groundwater standard of 5 ppb) persists in bedrock groundwater following the IRM. Total CVOC concentrations are greatest in the southwest corner of the site and have migrated both horizontally and vertically through high angle features towards the southwest site boundary. PFAS (SRI-1 max concentration 904 ppt PFOS) and 1,4-dioxane (SRI-1 max concentration 294 ppb) concentrations in bedrock groundwater are lower than pre-IRM concentrations, but still well above groundwater standards.

A second supplemental remedial investigation (SRI-2) was conducted following SRI-1 to further determine the extent of contamination in bedrock groundwater off-site in high angle fracture features. SRI-2 consisted of the installation of six monitoring wells screened at depths ranging from 55 to 45 ft, amsl and 0 to 20 ft, amsl. The data collected during SRI-2 revealed that elevated levels of contamination consisting primarily of chlorinated VOCs are migrating horizontally and vertically off-site in groundwater through high angle fracture features. PFAS, 1,4-dioxane and CVOCs are present in bedrock groundwater at depths down to 0 ft, amsl.

Soil Vapor - A total of nine soil vapor samples were collected from locations throughout the site prior to the implementation of the IRM. Elevated levels of chlorinated volatile organic compounds were detected in soil vapor samples collected from the western half of the site, nearer to where elevated levels of PCE, TCE and 1,1,1-TCA were encountered in groundwater contamination. The maximum concentrations of TCE, 1,1-dichloroethene, and 1,1,1-TCA detected were 184 micrograms per cubic meter (ug/m³), 1,110 ug/m³, 15,100 ug/m³ respectively. Soil vapor impacts may extend off-site and may be comingled with soil vapor impacts from the Industrial Overall Services Corp. site.

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*.

Contaminated groundwater at the site is not used for drinking or other purposes and the site is served by a public water supply that obtains water from a different source not affected by this contamination. Volatile organic compounds in the groundwater 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. Currently, there are no occupied buildings on-site therefore soil vapor intrusion does not represent a current concern. The potential for soil vapor intrusion is being evaluated for new buildings currently under construction and will include actions taken to address exposures as needed. Sub-slab depressurization systems (SSDSs) have been installed on two-off-site buildings and air monitoring is on-going for other off-site buildings as a result of soil vapor intrusion investigations associated with the neighboring Industrial Overall Services Corporation Site (#360109) whose site building also has a SSDS installed to address potential exposures associated with soil vapor intrusion. Additional evaluations are needed to confirm if soil vapor intrusion concerns are limited to these off-site buildings.

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.
- Remove the source of groundwater contamination.

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.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

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 Conditional Track 1 remedy.

The selected remedy is referred to as the Groundwater Treatment remedy.

The elements of the selected remedy, as shown in Figure 2, 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 remedial design program will include:

- 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;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

2. In-situ Chemical Oxidation

In-situ chemical oxidation (ISCO) will be implemented to treat VOCs including PCE, TCE, and 1,1,1-TCA, their respective breakdown products, toluene, and the emerging contaminant 1,4-dioxane in groundwater. A chemical oxidant will be injected into the subsurface bedrock groundwater beneath the site to destroy the contaminants. Areas of injection include upgradient of wells identified to have groundwater standard exceedances and areas whose groundwater concentrations indicate the possibility of free-phase NAPL. The chemical oxidant will initially be injected via bedrock injection wells screened at various depths between 27 and 65 feet above mean sea level (ft, amsl). ISCO must reduce contaminant concentrations to levels that are acceptable to the Department. Additional rounds of ISCO injections may be required to reduce groundwater contaminant concentrations to levels that are acceptable to the Department.

3. In-situ Treatment using Activated Carbon

Liquid activated carbon (LAC) will be added to the subsurface along the downgradient property lines to capture and prevent the off-site migration of PFAS compounds. LAC is also capable of removing PCE, TCE, and 1,1,1-TCA, their respective breakdown products, and toluene by

adsorption onto the carbon particle surfaces. In the area of the captured contamination, conditions will be maintained that will allow for anaerobic degradation of the chlorinated contaminants of concern to occur. LAC treatment will take place following the ISCO treatment; provided that the sampling results indicate that the oxidant levels and contaminant trends in the groundwater meet the metrics needed for LAC treatment. LAC will be injected via bedrock injection wells screened at various depths between 27 and 65 ft, amsl. LAC must reduce contaminant concentrations to levels that are acceptable to the Department. Additional rounds of LAC injections may be required to reduce groundwater contaminant concentrations to levels that are acceptable to the Department.

4. Groundwater Contingency (In-Situ Chemical Reduction/Groundwater Extraction and Treatment)

If ISCO and/or LAC treatment is ineffective in reducing groundwater contaminant levels to levels that are acceptable to the Department, or LAC cannot be implemented due to incompatible groundwater conditions (i.e. elevated levels of oxidant in the LAC treatment zone), contingent remedial actions may be required which could include in-situ chemical reduction (ISCR) or groundwater extraction and treatment. ISCR could be implemented to treat VOCs including PCE, TCE, and 1,1,1-TCA, their respective breakdown products, and toluene. ISCR consisting of injecting zero-valent iron (ZVI) into the subsurface bedrock groundwater beneath the site could be used to degrade the contaminants.

5. Conditional Track 1

The intent of the remedy is to achieve a Track 1 unrestricted use. A Site Management Plan (SMP) will be developed and an Environmental Easement will be recorded to address residual groundwater impacts and a soil vapor intrusion (SVI) evaluation of the site, and to implement actions as needed. The SMP requires groundwater monitoring until contaminant concentrations are below groundwater standards, or there is a bulk reduction to asymptotic levels acceptable to the Department. A Track 1 cleanup can only be achieved if any SVI mitigation systems on future buildings and groundwater treatment/monitoring are no longer needed within 5 years of the date of the Certificate of Completion. Upon a demonstration that these components of the remedy are no longer necessary, the SMP and Environmental Easement will be extinguished. If the bulk reduction in groundwater concentrations to asymptotic levels acceptable to the Department are reached but the concentrations remain above groundwater standards, and depending on the need for SVI mitigation, the site may still be eligible for a Track 1 cleanup, however, a groundwater use restriction and associated easement would still be required. If no EE or SMP is needed to achieve soil, groundwater, or soil vapor remedial action objectives, then the following local use restriction will be relied upon to prevent ingestion of groundwater: Chapter 873, Article VII of the Laws of Westchester County, which prohibits potable use of groundwater without prior approval.

In the event that Track 1 unrestricted use is not achieved, including achievement of groundwater and soil vapor remedial objectives, the following contingent remedial elements will remain, and the remedy will achieve a Track 2 residential cleanup.

5a. Engineering and Institutional Controls

Imposition of an institutional control in the form of an environmental easement and a Site Management Plan, as described below, will be required. The remedy will achieve a Track 2 residential cleanup at a minimum.

5b. 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 residential, restricted-residential use or commercial use or industrial 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 County DOH; and
- require compliance with the Department approved Site Management Plan.

5c. Site Management Plan

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

1. 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 5b above.

Engineering Controls: Groundwater monitoring and any engineering controls that may be required following the five-year conditional Track 1 evaluation period (e.g., sub-slab depressurization system).

This Site Management Plan (SMP) includes, but may not be limited to:

- descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion of any future buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- provisions for the management and inspection of the identified engineering controls, if any;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

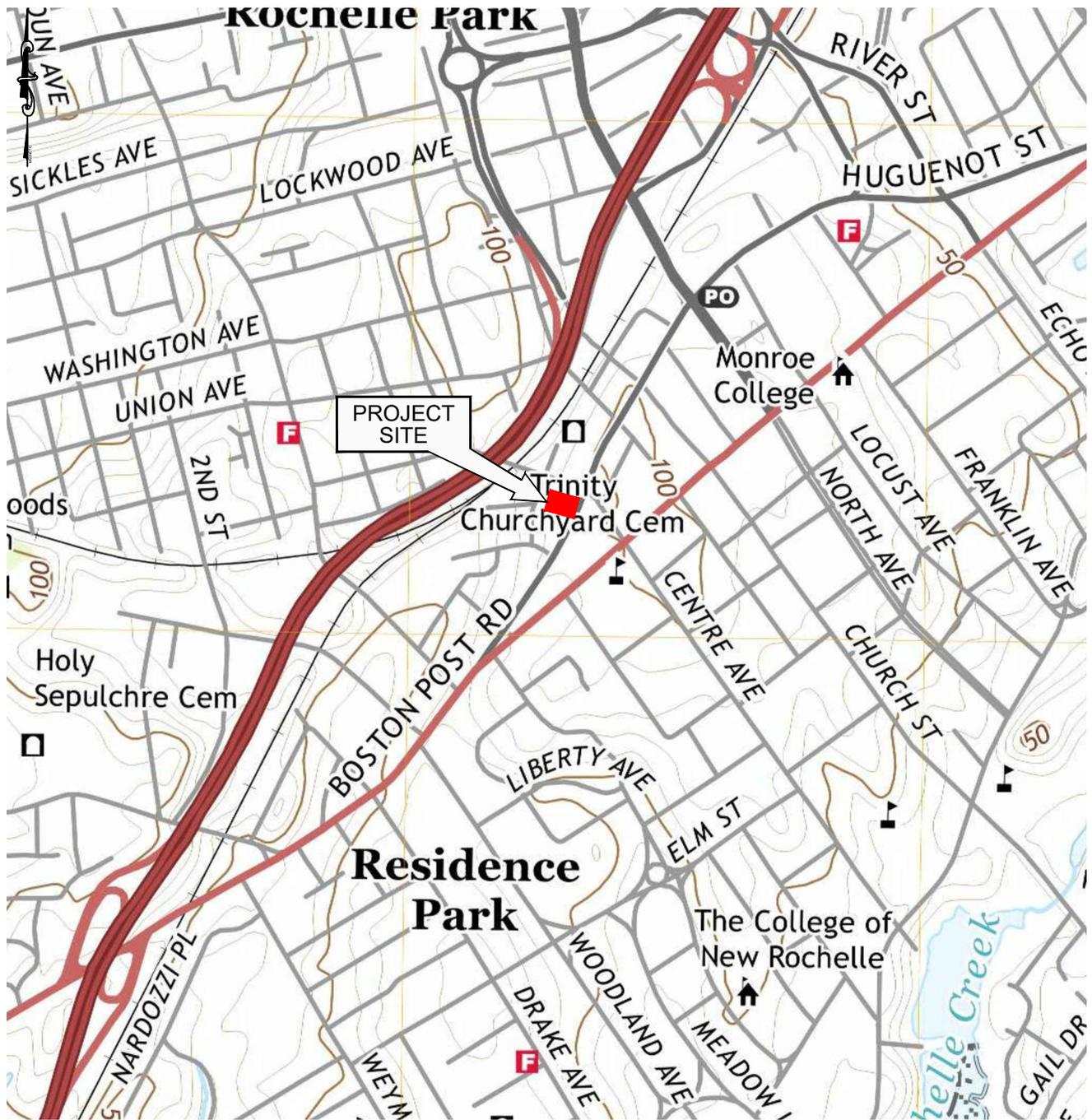
a. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- Monitoring groundwater to assess the performance and effectiveness of the groundwater treatment implemented, and to inform the need for additional groundwater treatment;
- a schedule of monitoring and frequency of submittals to the Department; and
- monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

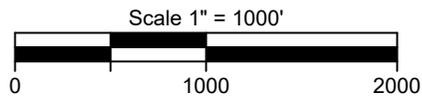
b. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of vapor mitigation system(s), if any. The plan includes, but is not limited to:

- procedures for operating and maintaining the system(s)/contingent groundwater remedy, if any; and
- compliance inspection of the system(s) to ensure proper O&M as well as providing the data for any necessary reporting;
- maintaining site access controls and Department notification; and
- providing the Department access to the site and O&M records.

N:\ACAD\10567\CADD\RAWP\2020-05-14\10567 FIG 1.1 - SITE LOCATION PLAN.DWG 05/14/20 04:45:44PM, jenny, LAYOUT: FIG-1.1



REFERENCE:
BASE MAP ACQUIRED FROM UNITED STATES GEOLOGICAL SURVEY, DATED 2019.



1	2	3
4	5	6
7	8	

ADJOINING QUADRANGLES

HUGUENOT PARTNERS, LLC
33 CENTRE AVENUE
SECTION NO. 2, BLOCK NO. 437
LOTS 1,3, AND 42
NEW ROCHELLE, NEW YORK

SITE LOCATION PLAN

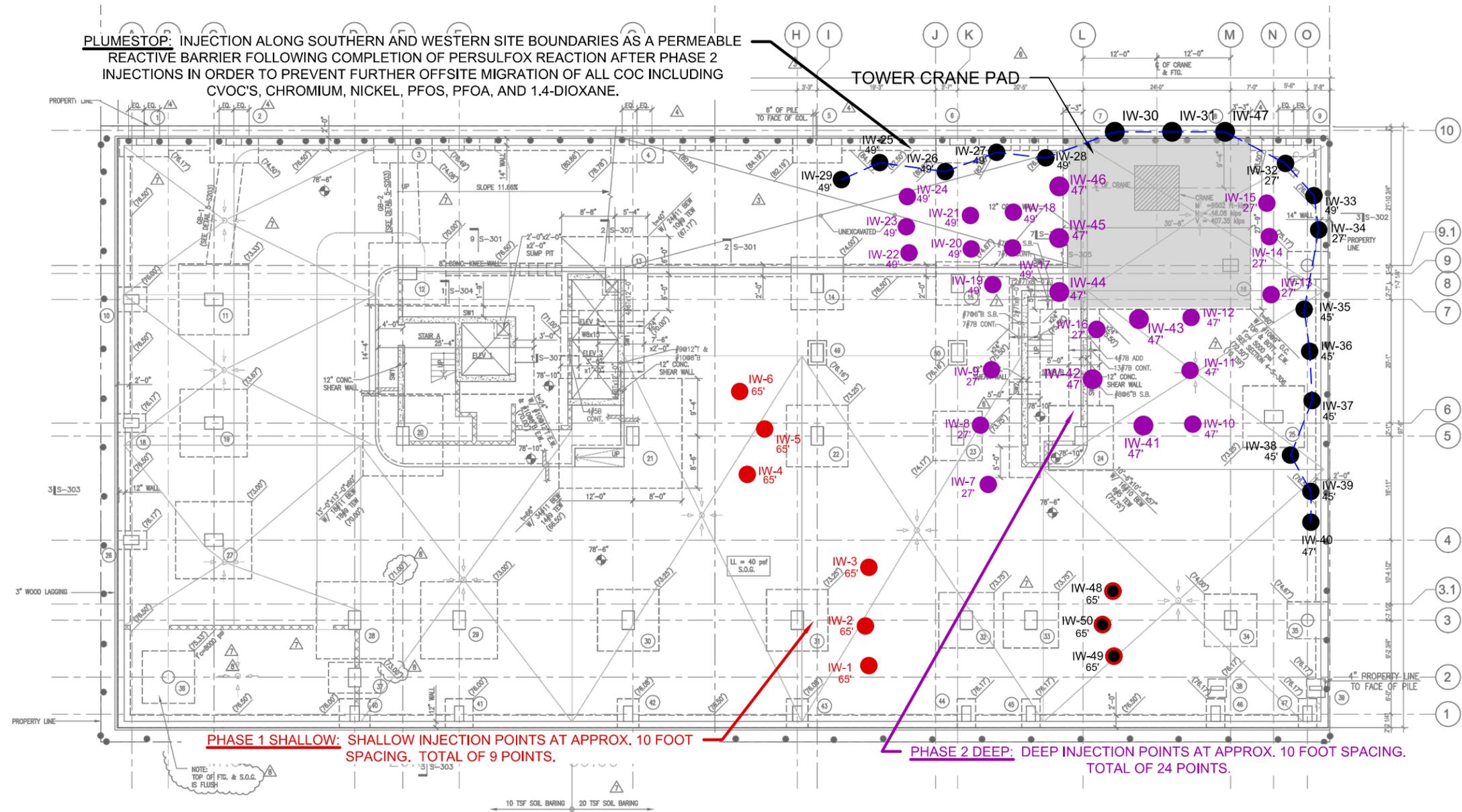
SESI
CONSULTING
ENGINEERS D.P.C.

SOILS / FOUNDATIONS
SITE DESIGN
ENVIRONMENTAL

12A MAPLE AVE. PINE BROOK, N.J. 07058 PH: 973-808-9050

FIG-1.1
DRAWN BY: yy
CHECKED BY: SSG
SCALE: AS NOTED
DATE: 05/15/2020
JOB NO.: 10567

N:\ACAD\10567\CADD\10567 - G-2 - WELL LOCATION PLAN.DWG 04/22/21 03:17:55PM, ocs, LAYOUT: G-2



PLUMESTOP: INJECTION ALONG SOUTHERN AND WESTERN SITE BOUNDARIES AS A PERMEABLE REACTIVE BARRIER FOLLOWING COMPLETION OF PERSULFOX REACTION AFTER PHASE 2 INJECTIONS IN ORDER TO PREVENT FURTHER OFFSITE MIGRATION OF ALL COC INCLUDING CVOC'S, CHROMIUM, NICKEL, PFOS, PFOA, AND 1,4-DIOXANE.

PHASE 1 SHALLOW: SHALLOW INJECTION POINTS AT APPROX. 10 FOOT SPACING. TOTAL OF 9 POINTS.

PHASE 2 DEEP: DEEP INJECTION POINTS AT APPROX. 10 FOOT SPACING. TOTAL OF 24 POINTS.

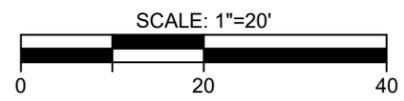
LEGEND:

- IW-1 65' - INJECTION WELL LOCATION AND TERMINAL INSTALLATION ELEVATION IN FEET AMSL
- IW-52 65' - PROPOSED ADDITIONAL INJECTION WELL (PHASE 1 SHALLOW)

NOTE:
THIS PLAN IS FOR LOCATING INJECTION WELLS ONLY. OTHER SITE WORK SHOWN HERE IS NOT INTENDED FOR CONSTRUCTION.

NYS Education Law
Unauthorized alterations or additions to this plan are a violation of section 7209 (2) of the New York State Education Law. Copies of this map not having the seal of the engineer shall not be valid.
© SESI CONSULTING ENGINEERS D.P.C. 2021
This drawing and all information contained here on is proprietary information of SESI CONSULTING ENGINEERS D.P.C. and may not be copied or reproduced, either in whole or in part, by any method, without written permission of SESI CONSULTING ENGINEERS D.P.C.

REFERENCE
SITE INFORMATION TAKEN FROM "FOUNDATION AND GARAGE FLOOR PLAN (B1)" PREPARED BY TADJER-COHEN-EDELSON ASSOC. INC.. DATED 08/05/19, LATEST REV. 05/01/2020.



dwg by: yy
chk by: JM
scale: AS NOTED
date: 04/22/2021

SESI
CONSULTING ENGINEERS D.P.C.
SOILS / FOUNDATIONS
SITE DESIGN
ENVIRONMENTAL
12A MAPLE AVE. PINE BROOK, N.J. 07058 PH: 973-808-9050

HUGENOT PARTNERS, LLC
33 CENTRE AVENUE
SECTION NO.2, BLOCK NO. 437 LOTS 1, 3, AND 42
NEW ROCHELLE, NEW YORK

INJECTION SEQUENCE PLAN

job no: 10567
drawing no:

G-2