DECISION DOCUMENT

Ardsley, LLC
Brownfield Cleanup Program
Town of Greenburgh, Westchester County
Site No. C360146
June 2022

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

DECLARATION STATEMENT - DECISION DOCUMENT

Ardsley, LLC
Brownfield Cleanup Program
Town of Greenburgh, Westchester County
Site No. C360146
June 2022

Statement of Purpose and Basis

This document presents the remedy for the Ardsley, LLC 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 Ardsley, LLC 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 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. Cover System

A site cover will be required to allow for commercial use of the site in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used, it will be a minimum of one foot 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 for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to, pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs. In areas where building foundations or building slabs preclude contact with the soil, the requirement for a site cover with be deferred until such a time that they are removed.

3. In-situ Chemical Oxidation

In-situ chemical oxidation (ISCO) will be implemented to treat VOCs including PCE, TCE, and their respective breakdown products in soil. A chemical oxidant will be mechanically mixed into soils to a depth of 14 feet below ground surface in both unsaturated and saturated zones to destroy the VOCs in an approximately 6,400 square foot area located in the central portion of the site in the area of the "Former Solvent Shed." ISCO will also address the VOCs in groundwater through mixing with soils beneath the groundwater table.

4. Monitored Natural Attenuation (MNA)

Groundwater contamination (remaining after active remediation) will be addressed with MNA. Groundwater will be monitored for site-related contamination and also for MNA indicators, which will provide an understanding of the biological activity breaking down the contamination. Reports of the attenuation will be provided annually, and additional active remediation will be proposed if it appears that natural processes alone will not address the contamination to the Department’s satisfaction. The contingency remedial action will depend on the information collected, but it is currently anticipated that additional ISCO would be performed.

5. 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 4 commercial cleanup at a minimum.

5a. 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 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 Westchester County DOH; and
- require compliance with the Department approved Site Management Plan.

5b. 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 5a above.

Engineering Controls: The site cover discussed in remedial element 2 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 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;
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 4 will be placed in any areas where the upper one foot of exposed surface soil exceed the applicable soil cleanup objectives (SCOs);
- 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 24, 2022

Janet E Brown

Date

Janet Brown, Director
Remedial Bureau C

DECISION DOCUMENT

Ardsley, LLC
Town of Greenburgh, Westchester County
Site No. C360146
June 2022

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 repositories:

DECInfo Locator - Web Application/On-line repository
https://www.dec.ny.gov/data/DecDocs/C360146/

Greenburgh Public Library
300 Tarrytown Road
Elmsford, NY 10523
Phone: 914-721-8200

Ardsley Public Library
9 American Legion Drive
Ardsley, NY 10502
Phone: 914-693-6636

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 at 1 Lawrence Street in the Town of Greenburgh, Westchester County. The site is a 6.25-acre area in the Saw Mill River valley and is bordered on the south by Lawrence Street, and on the east by the Saw Mill River Road. A branch of the Saw Mill River runs along and/or through the eastern site boundary. Another branch of the river and vacant land abut the northern and western site boundaries, with the Saw Mill River Parkway beyond the river to the west. The site is located approximately 1 mile east of the Hudson River.

Site Features: The site is currently not improved with any structures and there are no current operations at the site. Several former building slabs, foundations, and asphalt paved areas are present at the site. A branch of the Saw Mill River flows in a southerly direction along the site's eastern boundary. Lands on both sides of the east branch of the Saw Mill River are included in the site for the purposes of the BCP; however, the Saw Mill River is excluded from the site.

Current Zoning and Land Use: The site is currently zoned general (light) industrial and is not active. A 20-ft wide sewer easement runs through the length of the site from north to south.

Past Use of the Site: The site was initially developed by Stauffer Chemical Company (Stauffer) in the 1920s. Stauffer manufactured citric acid from the 1920s to the 1940s, potash from the 1930s to 1973, and carbon disulfide and insoluble sulfur from the 1930s through the 1950s. A variety of biocides and pesticides were produced at the site through 1984, when chemical manufacturing at the facility was ceased entirely. Research and development (R&D) operations began in the 1950s and continued after cessation of the manufacturing activities. Storage of waste generated from the site along with industrial solvents storage was located in the central north portion of the site. Akzo Nobel acquired Stauffer in 1987 and initially continued Stauffer's R&D operations. Eventually, Akzo Nobel converted the R&D operations away from the Stauffer processes towards Akzo Nobel's products and processes. Changes to the systems during the conversion generally involved modifications of equipment to facilitate R&D and pilot scale production of various chemical products. The R&D operations continued at the site until January

2006, at which time all site operations ceased. Structures were demolished to grade during in 2008 and 2009.

Site Geology and Hydrogeology: Shallow subsurface soils consist of fill material which include sand, gravel, brick, and concrete. Fill varies in thickness across the site ranging in depth from five to ten feet below ground surface (bgs). Beneath fill, alluvial deposits comprised primarily of sand with lesser components of silt and clay are present throughout the site. The alluvial deposits extend to at least 25 bgs. In addition to sand, small amounts of gravel are present in alluvial deposits near the Saw Mill River. Additionally, a locally present peat layer containing greater amounts of organics is present in the central portion of the site at depths ranging from approximately 9.5 to 15 feet bgs. This peat layer consists of a mixture of silt, sand, and gravel, with varying amounts of brown to black peat and occasional wood fragments and roots. The thickness of the peat layer ranges from two to four feet.

Groundwater was encountered in the overburden water-bearing zone at depths ranging from approximately four to ten feet bgs. Groundwater flows to the southeast across the site towards the Saw Mill River.

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 commercial use (which allows for 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 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
- surface water
- soil
- sediment
- 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:

benzo(a)pyrene
PCBs
tetrachloroethene (PCE)
carbon disulfide
copper
chloroform
carbon tetrachloride
arsenic
trichloroethene (TCE)
benzene
vinyl chloride
cis-1,2-dichloroethene
chrysene
indeno(1,2,3-CD)pyrene
benzo(a)anthracene
benzo(b)fluoranthene
dibenz[a,h]anthracene

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.

There were no IRMs performed at this site during the RI.

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.

Soil and groundwater samples from the site as well as surface water and sediment samples from the Saw Mill River were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, metals), cyanide, hexavalent chromium, and the emerging contaminants per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. Soil vapor samples were analyzed for volatile organic compounds (VOCs). Based on investigations conducted to date, the primary contaminants of concern include VOCs, SVOCs, PCBs, and metals, in soil; VOCs and metals in groundwater; and VOCs in soil vapor.

Soil – SVOCs consisting of polycyclic aromatic hydrocarbons (PAHs) and metals are found in surface soils (0 to 2 inches bgs) and near surface soils (2 to 12 inches bgs) throughout the site exceeding soil cleanup objectives (SCOs) for both commercial and unrestricted use. The following PAHs were identified at concentrations that exceed their respective commercial soil cleanup objectives (CSCOs): benzo[a]anthracene (19 parts per million [ppm] vs. CSCO of 5.6 ppm), benzo[b]fluoranthene (5.7 - 91 ppm vs. CSCO of 5.6 ppm), benzo(a)pyrene (5 - 81 ppm vs. CSCO of 1 ppm), chrysene (83 ppm vs. CSCO of 56 ppm), dibenzo(a,h)anthracene (9 ppm vs. CSCO of 0.56 ppm) and indeno(1,2,3-cd)pyrene (35 ppm vs. CSCO of 5.6 ppm). The following metals were identified at concentrations that exceed their respective CSCOs: copper (294 - 405 ppm vs. CSCO of 270 ppm) and arsenic (16.4 ppm vs. CSCO of 16 ppm).

The VOC tetrachloroethene (PCE) was identified in site subsurface soil at depths of up to 15 feet bgs at concentrations exceeding SCOs for both the protection of groundwater and unrestricted use. Concentrations of PCE ranged from 4.3 ppm to 520 ppm compared to the Protection of Groundwater SCO (PGWSCO) of 1.3 ppm. PCE exceedances in subsurface soils were located in the central portion of the site in the area of the former solvent shed.

PCBs were detected in one surface soil sample in exceedance of CSCOs at a concentration of 8.2 ppm (CSCO for PCBs is 1 ppm). PCBs were detected in one subsurface soil sample with a concentration of 3 ppm at a depth of 1.5 to 2 feet. This concentration exceeds the CSCO for PCBs but does not exceed the PGWSCO.

The emerging contaminants perfluorooctanesulfonic acid (PFOS) was detected in site soils at a maximum concentration of 1.79 parts per billion (ppb). Other PFAS compounds were detected, but all below the soil guidance value of 1 ppb. 1,4-dioxane was not detected in any on-site soils. No pesticides were detected in on-site soils above their CSCOs.

Based on the on-site soil investigation, it does not appear that soil contamination is migrating off-site.

Groundwater – Groundwater samples were collected from ten monitoring wells. No pesticides or PCBs were detected in any groundwater samples. The following VOCs were identified at concentrations that exceed the Ambient Water Quality Standards for groundwater (AWQS): PCE (5.3 - 400 parts per billion [ppb] vs. 5 ppb AWQS), trichloroethene (TCE) (15 ppb vs 5 ppb AWQS), cis-1,2-dichloroethene (2.7 - 8.2 ppb vs 5 ppb AWQS), vinyl chloride (9.3 ppb vs 2 ppb AWQS), benzene (6.2 ppb vs 5 ppb AWQS), chloroform (8.1 ppb vs 7 ppb AWQS), and carbon disulfide (89 ppb vs 60 ppb AWQS). Concentrations of VOCs in groundwater were highest in the area of the former solvent shed in the same area as the elevated VOC concentrations in soil.

Two SVOCs and several metals exceeded groundwater standards in groundwater samples collected from the site. Elevated levels of SVOCs and metals in groundwater samples collected from the site are likely attributable to non-dissolved phase particulates due to high turbidity in groundwater samples or in the case of certain metals (iron, manganese, sodium) naturally occurring phenomenon or related to road salt application. Soil data do not indicate a source of SVOC or metal contamination to groundwater.

The emerging contaminants PFOA was detected in the on-site monitoring wells at concentrations exceeding the New York Department of Health's maximum contaminant level (MCL) of 10 parts per trillion (ppt) for public water systems with a maximum concentration of 30 ppt. PFOS and other PFAS compounds were detected in on-site groundwater, but below 10 ppt. 1,4-dioxane was detected in several groundwater monitoring wells but all below the 1 ppb MCL. These concentrations are indicative of urban background conditions.

Based on the on-site groundwater investigation, there is a potential for low levels of VOC contamination to migrate off-site to the south.

Soil Vapor - Elevated levels of chlorinated volatile organic compounds (CVOCs) including, PCE (5.3 - 15 micrograms per cubic meter (ug/m3)) and carbon tetrachloride (0.49 - 3.2 ug/m3), were identified in soil vapor samples collected from the site adjacent to the southern boundary of the site (Lawrence Street). The only structure near the site is to the south on the far side of Lawrence Street and is used for commercial purposes as a party venue. There is the potential for vapors to migrate off-site and accumulate beneath this structure.

Surface Water – Surface water samples were collected from the Saw Mill River adjacent to the site. Surface water samples were collected upstream of, adjacent to, and downstream of the site. No VOCs, SVOCs, pesticides, or PCBs were detected in the upstream, midstream, and downstream samples. Concentrations of aluminum (107 – 206 ppb vs 100 ppb) and iron (386 – 560 ppb vs 300 ppb) exceeded the Ambient Water Quality Standards (AWQS) for protection of aquatic life (chronic values). Concentrations of these constituents were slightly higher at the two downstream locations than at the upstream location. Given the natural ubiquity of aluminum and iron, these data do not suggest surface water presence is related to site sources. Lead was detected in all three samples, at concentrations well below the AWQS that were similar in the upstream and downstream sampling locations. PFOA was detected in all surface water samples above the New York's maximum contaminant level (MCL) of 10 ppt with concentrations ranging from 12 to 12.6 ppt. There is no discernible difference in concentrations from upstream to downstream that would indicate contamination emanating from the site. Therefore, there is no indication site contaminants are migrating into surface water.

Sediment – Sediment samples were collected from the Saw Mill River adjacent to the site. Sediment samples were collected upstream of, adjacent to, and downstream of the site. VOCs, SVOCs, and pesticides concentrations were not above Class A sediment guidance values (SGVs) in any sediment samples. Lead (42.5 - 49.6 ppm vs 36 ppm SGV), copper (36 ppm vs 32 ppm SGV), zinc (141 - 143 ppm vs 120 ppm SGV), and total PCBs (0.3-1.3 ppm vs 0.1 ppm SGV) were above Class A SGVs. PCB concentrations in adjacent off-site sediment decreased from upstream of the site (1.3 ppm), to midstream adjacent to the site (0.96 ppm), to downstream (0.33 ppm). Additionally, of the 148 subsurface soil samples collected on-site, only two locations approximately two feet below ground surface contained PCBs that exceeded the applicable SCO. Therefore, there is no indication the site is contributing to PCB contamination to the stream sediment. The PCBs in sediment appear to be coming from an upstream source unrelated to the 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.*

Trespassers may come into contact with site contaminants in the surface soil or if they dig below the surface. Contaminated groundwater at the site is not used for drinking or other purposes and the site is served by the Suez Water Rate District that obtains water from a different source not affected by this contamination. Contact with contaminated sediments in the adjacent Saw Mill River is not expected because the sharp site slope prohibits access. Additionally, no water intakes are present along this portion of the river. Volatile organic compounds in the soil vapor (air spaces within the soil) may move into 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 site is currently vacant; however, the potential exists for people to inhale site contaminants in indoor air due to soil vapor intrusion in any future onsite building development and occupancy. Environmental sampling indicates soil vapor intrusion may be a concern for offsite 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.

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 ground or surface water 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 Track 4: Restricted use with site-specific soil cleanup objectives remedy.

The selected remedy is referred to as the In-Situ Chemical Oxidation (ISCO), Cover System, and Monitored Natural Attenuation (MNA) 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. Cover System

A site cover will be required to allow for commercial use of the site in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used, it will be a minimum of one foot 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 for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to, pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs. In areas where building foundations or building slabs preclude contact with the soil, the requirement for a site cover with be deferred until such a time that they are removed.

3. In-situ Chemical Oxidation

In-situ chemical oxidation (ISCO) will be implemented to treat VOCs including PCE, TCE, and their respective breakdown products in soil. A chemical oxidant will be mechanically mixed into soils to a depth of 14 feet below ground surface in both unsaturated and saturated zones to destroy the VOCs in an approximately 6,400 square foot area located in the central portion of the site in the area of the "Former Solvent Shed." ISCO will also address the VOCs in groundwater through mixing with soils beneath the groundwater table.

4. Monitored Natural Attenuation (MNA)

Groundwater contamination (remaining after active remediation) will be addressed with MNA. Groundwater will be monitored for site-related contamination and also for MNA indicators, which will provide an understanding of the biological activity breaking down the contamination. Reports of the attenuation will be provided annually, and additional active remediation will be proposed if it appears that natural processes alone will not address the contamination to the Department’s satisfaction. The contingency remedial action will depend on the information collected, but it is currently anticipated that additional ISCO would be performed.

5. 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 4 commercial cleanup at a minimum.

5a. 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 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 Westchester County DOH; and
- require compliance with the Department approved Site Management Plan.

5b. 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 5a above.

Engineering Controls: The site cover discussed in remedial element 2 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 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;
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 4 will be placed in any areas where the upper one foot of exposed surface soil exceed the applicable soil cleanup objectives (SCOs);
- 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.

7/23/2020

Author: BFTaylor Path: V:\Ramsey\ELT\Ardsley\Site_Location.mxd

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FIGURE 1
SITE LOCATION
ARDSLEY LLC SITE (C360146)
TOWN OF GREENBURGH, WESTCHESTER COUNTY, NEW YORK

0 1,400 2,800
Feet

DRAFT

9/11/2021

Legend

- Site Boundary
- Saw Mill River (Approximate)
- Remaining Asphalt/Pavement
- Remaining Concrete Foundation Slab
- Trunk Sewer Line (66 in. Reinforced Concrete Pipe)
- Permanent Sewer Easement
- Topographic Elevation Contour (1-foot interval)
- FIRM Designated Floodway
- FIRM Designated 100-year Flood Zone
- Existing Fence (Approximate)
- Sanitary Sewer Manhole
- Existing Fence to be maintained
- New Fence
- 12-inch Imported Cover
- In-Situ Chemical Oxidation (0-14 ft. BGS)
- Asphalt to remain as Site cover
- Monitoring Well to be maintained
- Monitoring Well to be decommissioned
- Monitoring Well to be installed

Sources:
1) Base map developed based on figures prepared by First Environment (March 2019), Paul J. Petretti (July 2019 and July 2020), and MJ Engineering and Land Surveying (April 2021).
2) Aerial photo from NYSDOP 2016 Survey.

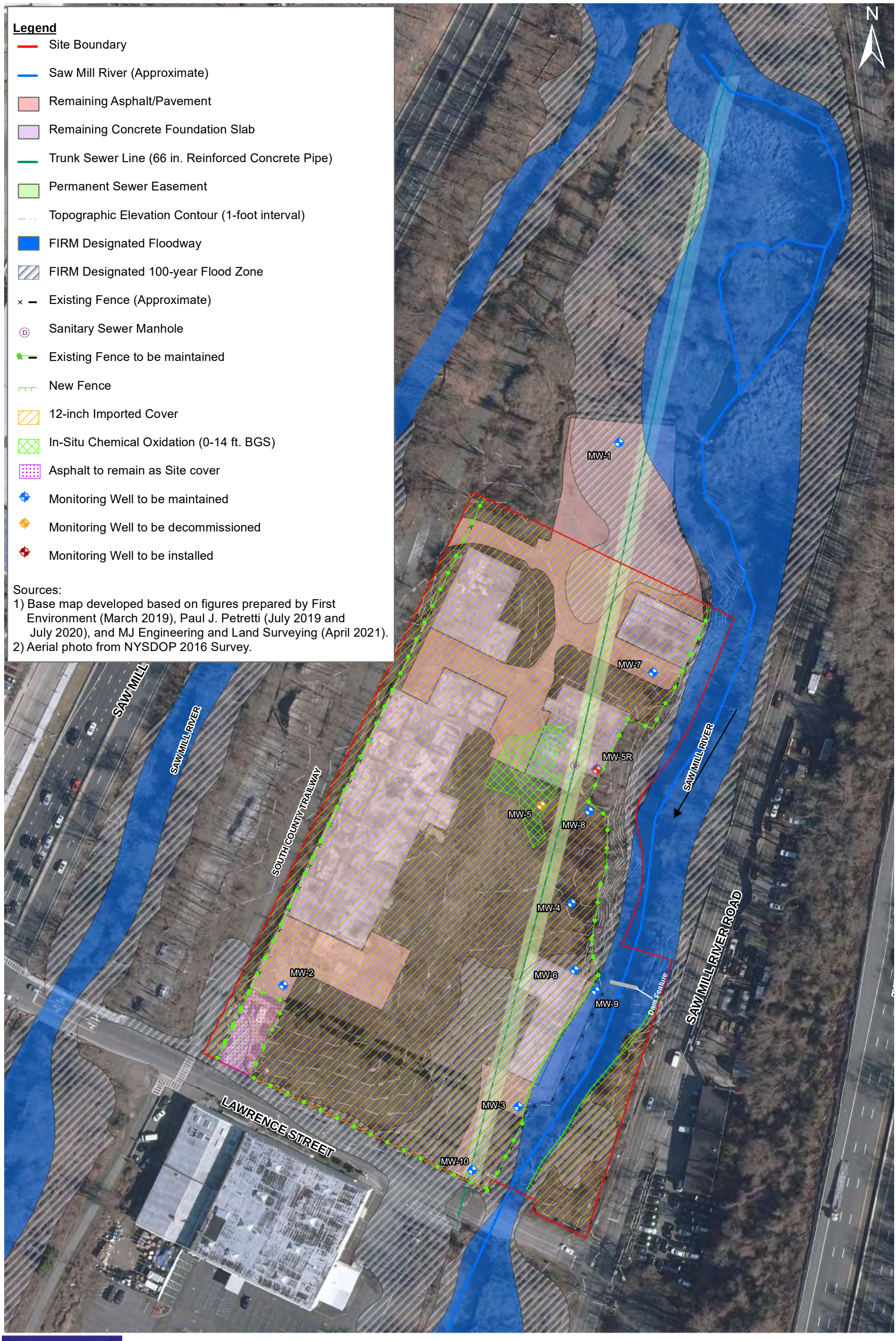

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FIGURE 2-1
REMEDIAL PLAN
ARDSLEY LLC SITE (C360146)
TOWN OF GREENBURGH, WESTCHESTER COUNTY, NEW YORK

0 50 100
Feet