DRAFT

CONCEPTUAL DESIGN MEMORANDUM

SOLVENT FINISHERS SITE
JERICHO, NEW YORK 11590

NYSDEC Site No. 130172
Work Assignment No. D007620-32

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233

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MARCH 2019

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1.0 EXISTING CONDITIONS

The Site has been assigned NYSDEC Site No. 130172 and is a Class 2 site listed on the NYSDEC Registry of Inactive Hazardous Waste Disposal Sites. Class 2 is assigned to sites at which the disposal of hazardous waste has been confirmed and the presence of such hazardous waste or its components or breakdown products represents a significant threat to public health or the environment. The primary Site contaminants of concern (COCs) are tetrachloroethene (PCE) and trichloroethene (TCE).

1.1 Site Location and Setting

The Site is located in a highly-developed suburban portion of Nassau County, New York, consisting primarily of commercial and industrial buildings and single-family residences. The Site occupies approximately 3.8 acres at 601 Cantiague Rock Road and is improved with an approximately 58,000 square foot one-story building. Other notable Site features include paved and gravel parking areas and landscaped areas.

The limits of remediation extend over 7,000 feet south of the Site. For the purposes of the Conceptual Design, the area targeted for remediation has been organized into four individual Work Zones (WZs) which are described in Section 5.2.

1.2 Current and Historic Site Uses

The Site is currently zoned Light Industrial (light manufacturing), is owned by the Nassau County Industrial Development Authority (NCIDA), and is occupied by Rubies Costume, Inc. The Site is currently used as a costume manufacturer and retail store. The Site occupant leases parking space to an automobile dealership adjacent to the west of the Site. The surrounding parcels include commercial, industrial and public uses. The nearest residential property is approximately 400 feet northeast of the Site. There are additional residential properties east, west and approximately 2,500 feet south of the Site. The Hicksville Water District municipal drinking water supply well field is located approximately 11,500 feet southeast of the Site.

The Site historically operated as an artificial leather and plastics manufacturer, an industrial dry cleaner, and a manufacturer of imprinted and embroidered sportswear. As documented in the ROD, PCE was historically used at the Site and the Nassau County Department of Health (NCDOH) documented wastewater discharges containing elevated concentrations of PCE to the ground and Site drainage structures beginning in 1977.

1.3 Geology and Hydrogeology

Based on information gathered during the Pre-Design Investigation, completed in 2017, and previous investigations, the geology within the limits of the area targeted for remediation generally consists of stratified sand, gravel and discrete silt and clay layers from the ground surface to more than 500 feet below ground

surface (bgs). An underlying clay layer was not encountered on-Site during the Pre-Design Investigation; however, based on observations at off-Site locations during the Pre-Design Investigation, an underlying clay layer is generally expected to be present beneath the area between 500 and 550 feet bgs. During the Pre-Design Investigation, the underlying clay layer was encountered at SF-MW-103ML at approximately 490 feet bgs, approximately 1,500 feet south of the Site, slopes upward in a southerly direction to approximately 410 feet bgs at SF-MW-105ML, immediately south of the Northern State Parkway, and then slopes gradually downward in a southerly direction for approximately 2,600 feet to approximately 435 feet bgs at SF-MW-107ML. Additionally, immediately south of the Northern State Parkway, the underlying clay layer slopes upward from SF-MW-104ML near the western edge of the area targeted for remediation for approximately 375 feet in an easterly direction to SF-MW-105ML and then slopes downward towards SF-MW-106ML, resulting in a clay ridge within the area of the groundwater plume. It should be noted that the above description of the surface of the underlying clay layer is based on limited data points and unknown variations are likely present.

The depth to water at the Site is approximately 85 feet bgs and ranges between approximately 28 and 85 feet bgs off-Site (depending on ground surface elevation). Groundwater flow direction within the area targeted for remediation is predominantly to the south/southwest.

1.4 Extent of Contamination

The results of the Pre-Design Investigation identified PCE at concentrations of up to 55,000 micrograms per liter (µg/L) at 495 feet bgs on-Site, 640 µg/L at 490 feet bgs off-Site north of the Northern State Parkway, and up to 21,000 µg/L approximately 4,750 feet south of the Northern State Parkway at a depth of approximately 380 feet bgs. It is possible that PCE in the form of non-aqueous phase liquid (NAPL) has migrated deep on-Site, potentially to the surface of the underlying clay, and downgradient of the Site. The mass and precise locations of NAPL are unknown. Concentrations of TCE and other chlorinated VOCs exceeding Class GA Values generally coincide with elevated concentrations of PCE. The area targeted for remediation is described in Section 5.1.

2.0 INTRODUCTION

This report presents the Conceptual Design of the *in-situ* chemical oxidation (ISCO) and enhanced *in-situ* bioremediation (EISB) elements of the Selected Remedy, described in the Record of Decision (ROD) issued by the New York State Department of Environmental Conservation (Department or NYSDEC) in July 2016, for the Solvent Finishers Site located at 601 Cantiague Rock Road, Jericho, NY (the "Site"). The Conceptual Design has been generally completed in accordance with the NYSDEC Division of Environmental Remediation (DER) Work Assignment (WA) No. D007620-32 Notice to Proceed dated October 7, 2016, the NYSDEC-approved Scope of Work dated May 17, 2017 and guidance provided by the Department.

This Conceptual Design has been prepared to target the horizontal and vertical limits of concentrations of chlorinated volatile organic compounds (CVOCs) in groundwater above NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 Class GA Standards and Guidance Values ("Class GA Values"). The limits of remediation addressed by this Conceptual Design are shown on **Drawing 2**. The Conceptual Design has been prepared for the implementation of ISCO and EISB via injection in accordance with the Department-issued Record of Decision dated July 2016.

This Conceptual Design Memorandum has been organized into eight sections as follows:

- **Section 1** – Introduction.
- **Section 2** – Site description and summary of environmental setting.
- **Section 3** – Applicable regulatory criteria.
- **Section 4** – Descriptions of the selected remedial technologies.
- **Section 5** – Descriptions of the primary design criteria for the remedy.
- **Section 6** – Descriptions of the physical layout of remediation components and equipment.
- **Section 7** – Descriptions of the amendments and process flow.
- **Section 8** – Significant assumptions and potential obstacles to remedy implementation.
- **Section 9** – Remedial action estimated costs.
- **Section 10** – References.

3.0 REMEDIATION STANDARDS AND GOALS

The ROD for the Site included the following Remedial Action Objectives (RAOs) for groundwater:

RAOs for Protection of Public Health

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

RAOs for Protection of the Environment

- Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable; and
- Remove the source of groundwater or surface water contamination.

The New York State groundwater classification for the Site is GA, which indicates waters that could be used as a source of potable water supply. As such, the Conceptual Design has been prepared to reduce concentrations of VOCs to NYSDEC Class GA Values. Since PCE and TCE are the primary COCs, and concentrations of TCE exceeding Class GA Values generally coincide with elevated concentrations of PCE, the Conceptual Design has been prepared to target concentrations of PCE exceeding the Class GA Value of 5 µg/L identified during the Pre-Design Investigation and previous investigations.

4.0 SELECTED TECHNOLOGIES

The Conceptual Design has been prepared to implement ISCO and EISB to remediate chlorinated VOCs impacts in groundwater. The groundwater contaminant plume targeted for treatment via injection is defined by the estimated and inferred extent of PCE concentrations greater than 5 ppb. A network of injection wells will be used to inject amendments into discrete screened intervals of the impacted aquifer, isolated at the time of injection by inflatable packers. ISCO will be implemented via sequenced injections consisting primarily of sodium persulfate ($Na_2S_2O_8$) and sodium hydroxide (NaOH) activator and chase water to optimize amendment distribution and clear injection well screens to maintain injection efficiency. EISB will be implemented via sequenced injections consisting primarily of sodium lactate ($NaC_3H_5O_3$), pH buffered chase water to optimize amendment distribution and clear injection well screens to maintain injection efficiency, and bioaugmentation cultures and anaerobic chase water to encourage microbial growth. Details regarding selected amendments and dosage rates are included in Section 7.1. The same general amendment preparation and delivery processes, as described in Section 7.2, will be utilized for both ISCO and EISB. The Conceptual Design does not include extraction or recirculation of groundwater within the limits of remediation.

5.0 BASIS OF DESIGN FOR EXTENT OF TREATMENT AND WORK ZONES

5.1 Lateral and Vertical Extent of Treatment Areas

The lateral and vertical extents of areas targeted for remediation are based on the plume figures in the March 2018 Pre-Design Investigation report (**Attachment A**). The targeted treatment area encompasses the on-Site and off-Site areas within the 5 µg/L PCE isopleths. **Drawing 2** shows the plan-view extent of treatment areas defined by the 5 µg/L PCE isopleths in each vertical treatment zone.

The vertical groundwater treatment intervals extend from approximately 75 feet North American Vertical Datum of 1988 (NAVD 88) to -400 feet NAVD 88. The five vertical treatment zones are defined as follows:

- Treatment Zone D1 (75 to 0 feet NAVD 88),
- Treatment Zone D2 (0 to -100 feet NAVD 88),
- Treatment Zone D3 (-100 to -200 feet NAVD 88),
- Treatment Zone D4 (-200 to -300 feet NAVD 88), and
- Treatment Zone D5 (-300 to -400 feet NAVD 88).

The following table summarizes the key parameters that represent the basis of design for ISCO and EISB groundwater remediation.

BASIS OF DESIGN GROUNDWATER REMEDIATION	
Design Parameter	**Value/Range of Values**
Aerial Extent of Treatment Area	~34 acres (~1,500,000 ft^2)
Vertical Extent of Treatment Zones*	~75 feet NAVD 88 to ~-400 feet NAVD 88
Maximum PCE Concentrations – Groundwater	Maximum On-Site: 55,000 µg/L Maximum Off-Site: 21,000 µg/L
Groundwater Concentration Targeted	PCE >5 µg/L

*The target treatment depths vary for each location based on surface topography and PCE distribution. Treatment depths provided in feet bgs are based on average ground surface elevations within a work zone.

5.2 Work Zone Descriptions

The groundwater treatment area has been organized into four (4) Work Zones (WZs) where work will be completed as shown in **Drawing 3**. The WZ designations along with the corresponding vertical treatment zones and treatment descriptions are summarized in the table below:

Work Zone	Vertical Treatment Zone	Treatment Zone Description
WZ-1	D1 through D5 (75 to -400 feet NAVD 88)	On-Site ISCO, PCE > 5 µg/L
WZ-2	D1 through D5 (75 to -400 feet NAVD 88)	Off-Site ISCO, PCE >50 mg/L; Off-Site EISB, PCE ≤50 mg/L and > 5 µg/L
WZ-3	D1 through D5 (75 to -300 feet NAVD 88)	Off-Site EISB, PCE > 5 µg/L
WZ-4	D4 (-200 to -300 feet NAVD 88)	Off-Site EISB, PCE > 5 µg/L

Drawing 4 provides a cross-section through the approximate centerline of the plume, with profile views of the extents of the WZ boundaries along with example injection wells targeting the specific vertical treatment zones.

As shown on **Drawings 3 and 4**, details of the WZ boundaries are summarized below:

- The WZ-1 boundary is the On-Site extent of treatment > 5 µg/L.
- WZ-2 boundaries extend from WZ-1 (or the Site boundaries) to the northern boundary of the Northern State Parkway.
- WZ-3 extends from the southern boundary of the Northern State Parkway to the eastern boundary of the Wantagh State Parkway.
- WZ-4 extends from the western boundary of the Wantagh State Parkway to the estimated downgradient edge of the PCE plume > 5 µg/L.

Please note the following details about the WZs and wells shown on **Drawings 3 and 4**:

- WZ-2 and WZ-3 border the Northern State Parkway, but neither work zone intrudes onto the Northern State Parkway and no work is planned within the Northern State Parkway.
- WZ-3 and WZ-4 border the Wantagh State Parkway, but neither work zone intrudes onto the Wantagh State Parkway and no work is planned within the Wantagh State Parkway.
- Due to the scale of **Drawing 3**, the well symbols are not to scale and are purposefully larger to aid visualization. No wells are proposed within areas considered to be inaccessible such as within the footprints of buildings, the footprint of residential properties, the Northern State Parkway, and the Wantagh State Parkway.

6.0 WELL INFRASTRUCTURE LAYOUT

The estimated number of injection wells and performance monitoring wells for the proposed groundwater remediation are summarized in Sections 6.1 and 6.2, respectively. **Drawing 3** shows the plan view layout of the injection well clusters and the nested performance monitoring well clusters. **Drawing 4** shows an example cross-section of the injection well clusters in profile view along the approximate centerline of the plume. No performance monitoring wells are shown on **Drawing 4.** Please note that the existing monitoring wells located on-Site and off-Site will also be utilized as performance monitoring wells.

Drawing 5 provides typical well construction details and specifications for injection wells and performance monitoring wells. However, an evaluation of the optimal diameters for the screens and boreholes for injection wells has not been completed. Therefore, details shown on the drawing are conceptual.

6.1 Injection Wells

A cluster of injection wells, each consisting of individual wells screened within separate Treatment Zone intervals (i.e., D1, D2, D3, D4 or D5), will be constructed at each injection location. This approach will minimize certain challenges associated with injection well construction, minimize the pathway for vertical contaminant migration between the Treatment Zone intervals, provide for the ability to inject simultaneously into multiple depths during a single event, and aid in managing variations in aquifer properties and geochemistry among the Treatment Zones.

The layout of the injection wells utilizes a spacing between well clusters within each injection row of approximately 50 feet on center and the spacing between injection rows is approximately 100 feet. Throughout the treatment areas and work zones, there are numerous inaccessible areas such as buildings, parkways, and residential properties. Due to access constraints, the injection well layout was adjusted to avoid inaccessible areas, which results in a reduction in the feasible quantities of injection wells and a corresponding loss of remediation efficiency. This is most evident in the residential neighborhoods within WZ-3 and WZ-4, where access is expected to be limited primarily to the public roadways.

The injection wells within each of the Work Zones are summarized in the table below:

Work Zone	Proposed Injection Well Quantities
WZ-1	48 ISCO Injection Wells (Zone D1 = 10, Zone D2 = 10, Zone D3 = 9, Zone D4 = 9 and Zone D5 = 10)
WZ-2	1,112 EISB Injection Wells and 17 ISCO Injection Wells (Zone D1 = 230, Zone D2 = 236, Zone D3 = 172, Zone D4 = 259 and Zone D5 = 232)
WZ-3	487 Injection Wells (Zone D1 = 70, Zone D2 = 94, Zone D3 = 133 and Zone D4 = 190)
WZ-4	73 Injection Wells (Zone D4 = 73)
Total	1,737 Injection Wells

6.2 Performance Monitoring Wells

The number and locations of performance monitoring wells are preliminary and under development. Each performance monitoring well will be a nested well consisting of several 2-inch diameter PVC monitoring wells spanning a treatment zone (as shown on **Drawing 5**). The number and locations of performance monitoring wells within each of the Work Zones shown on the Conceptual Design drawings are summarized in the table below.

Work Zone	Nested Monitoring Well Quantities
WZ-1	5 Nested Monitoring Wells (Zone D1 = 1, Zone D2 = 1, Zone D3 = 1, Zone D4 = 1 and Zone D5 = 1)
WZ-2	20 Nested Monitoring Wells (Zone D1 = 4, Zone D2 = 4, Zone D3 = 4, Zone D4 = 4 and Zone D5 = 4)
WZ-3	10 Nested Monitoring Wells (Zone D1 = 2, Zone D2 = 2, Zone D3 = 3 and Zone D4 = 3)
WZ-4	2 Nested Monitoring Wells (Zone D4 = 2)
Total	37 Nested Monitoring Wells (11 Nested Monitoring Well Clusters).

7.0 AMENDMENTS AND PROCESS FLOW

7.1 Description of Amendments and Loadings

This section provides a general overview of the amendments selected for the groundwater remediation. For amendments which are available as multiple commercial products, the exact commercial products will be selected by the Contractor in accordance with the specifications for the amendments.

7.1.1 *In-Situ Chemical Oxidation (ISCO)*

The ISCO technology involves injecting chemical oxidant(s) into the subsurface to chemically convert chlorinated VOCs into non-toxic by-products, primarily carbon dioxide and water. Sodium persulfate activated with sodium hydroxide is the selected ISCO reagent based on the results of the treatability study and pilot test conducted as part of the Pre-Design Investigation. ISCO will be implemented in WZ-1 targeting Treatment Zones D1 through D5 and in WZ-2 targeting Treatment Zone D1 only (PCE > 50 mg/L). The estimated amendment injection quantities for the ISCO groundwater remediation are:

- Chemical Oxidant: ~1,94 x 10^6 pounds of Sodium Persulfate
- Activator: ~2.53 x 10^5 gallons of 25% NaOH
- Total Volume of Injection Solution: ~1.2 x 10^7 gallons (~20% pore volume)

7.1.2 *Enhanced In-Situ Bioremediation (EISB)*

EISB typically includes the introduction of carbon substrates into the subsurface that are utilized by subsurface bacteria for food and energy to bioremediate the chlorinated VOCs in a process known as reductive dechlorination. There are many organic substrates, which can be naturally degraded and fermented in the subsurface that result in the generation of hydrogen (*i.e.,* release of electron donor) and also provide carbon for cell growth. Sodium lactate, which is an easily distributed and rapidly degraded soluble substrate, was selected as the primary amendment for biostimulation for the EISB remediation. Additional EISB amendments will be utilized to enhance treatment, including pH buffer, micronutrients (diammonium phosphate and Vitamin B12), anaerobic water amendments (sodium ascorbate), and bioaugmentation culture.

EISB will be implemented in WZ-2 through WZ-4, including in a limited area of WZ-2 where near-Site ISCO will also be conducted. The general injection scheme of EISB will consist of injecting electron donor (i.e., sodium lactate) solution followed by chase water containing pH buffer, micronutrients, anaerobic chase water and bioaugmentation culture into the injection wells. The estimated amendment injection quantities for the EISB groundwater remediation are:

- Electron Donors:

  - 7.36×10^6 gallons of 60% sodium lactate or equivalent
- Buffer: ~1.62×10^8 pounds of sodium bicarbonate or equivalent
- Micronutrients: To be determined in subsequent design phase
- Bioaugmentation Culture: 1.4×10^5 gallons
- Sodium Ascorbate (for anaerobic water): 1×10^4 pounds
- Total Injection Solution: 4.13×10^8 gallons (~15% of pore volume)

7.2 Process Flow Overview

As shown in **Drawing 6** and described in Sections 7.2.1 through 7.2.3 below, the process flow for injection consists of three major unit operations: (1) off-site preparation of amendment solutions, (2) truck-based delivery of amendment solutions and chase water to the Site, and (3) injection at each injection well via a mobile truck-based system with down-hole packer assemblies.

7.2.1 *Off-Site Amendment Mixing*

Dilution and mixing of amendment solutions will be performed at an off-site mixing plant operated by the Contractor. The mixing plant will contain storage areas for raw amendments, adequate water supply (minimum of 250,000 gallons per day), mixing/blending equipment (e.g., tanks, mixers, pumps, etc.), and appropriate safety measures. The mixing plant will have a spill prevention plan and necessary infrastructure to prevent spills and contain spills if they occur. The mixing plant will have a truck loading station where multiple trucks can queue up to be filled with specified amendment solutions.

7.2.2 *Truck-Based Delivery*

The amendment solutions, prepared and ready to inject, will be transported to the injection wells from the off-site mixing plant by tanker trucks. Multiple delivery runs from the off-site mixing plant to specified injection wells are anticipated per truck per day. The tanker trucks will meet minimum specifications.

7.2.3 *Truck-Based Injection Distribution System*

The injection of amendment solutions into the subsurface will take place via a mobile, truck-based injection distribution system. Since each injection well will have multiple screens, down-hole packer strings (single and straddle) will be deployed to isolate and inject into one screen at a time. Due to the depths of the treatment intervals, a hoisting mechanism or vehicle will be required for packer assembly deployment and retrieval. Each tanker truck will have a mobile programmable logic controller (PLC) assembly with a data logger and variable frequency drive (VFD) to control pump flow and monitor injection pressures. The pressure above

and below each packer will also be monitored with transducers attached to the packer string and connected to the PLC.

A cloud-based tracking system will be employed for injection monitoring and reporting. Each truck load for injection will arrive at the Site with a digital code that identifies the amendment solution, quantity and concentration. The digital code for each truck load will be matched with the digital code of the injection well and injection interval to cross-reference and document each injection load. It is anticipated that the Contractor will provide Technicians, who serve dual roles as truck drivers and injection technicians. The Technicians will use the digital codes to track materials injected into each injection well interval by scanning/entering the digital codes. The PLC will be connected to the cloud and synced to simplify tracking of operations.

8.0 MAJOR DESIGN ASSUMPTIONS

The major assumptions applied for the Conceptual Design are listed below.

A. Contract Time
   1. The Conceptual Design is generally based on requiring the Contractor to complete the specified work (i.e., injection and monitoring well construction and amendment injections) within 3 to 5 years of issuance of Notice to Proceed.

B. Remediation Technology
   1. The EISB and ISCO amendment can be adequately distributed using the injection-only method.
      a. Confirmed through an on-site pilot test for distances of 20 feet.
      b. For longer distances, natural gradients will distribute the amendment, which would need to be confirmed through modeling in subsequent design phases.
   2. The assumed extent of the 5 ppb plume is adequate to address the requirements of the ROD.
   3. The assumed extent of the 50 ppm plume is adequate to define the extent of near-Site (off-Site) ISCO treatment.
   4. No polishing injections or additional related work is included.

C. Amendment Mixing Plant
   1. A Contractor will be able to provide a mixing plant and the requisite volumes of water and amendment for the planned injections.
   2. No significant amounts of waste will be generated by the Mixing Plant.

D. Injection System
   1. Injection flow rates of 100 gpm can be sustained to allow for multiple truckloads of injections per truck per day.
   2. It is anticipated that injection pressures will be minimal when the system is started up. If loss of well efficiency occurs, flow rates will be controlled by injection pressures. Injections may be cycled using feedback from pressure sensors.

E. Operations
   1. No polishing injections or additional work based on results of performance monitoring is included.

9.0 COST ESTIMATE

Conceptual level design and cost estimating have been completed. ASTM International and the American Association of Cost Engineering (AACE) recognize five cost estimation classes. Consistent with the United States Environmental Protection Agency (USEPA) (Exhibit 2-3), a Conceptual Design cost estimate is Class 4 [American National Standards Institute (ANSI) Standard Reference Z94.2-1989], which has a project definition level of 1% to 15% and accuracy range of -15/-30% to +20%/+50%. The accuracy of the estimate presented herein is expected to be in the range of plus or minus 50%. A cost estimate breakdown is provided in Appendix B. The following table summarizes the estimated costs of the major elements of the groundwater remediation work for the Site.

Item Description	Estimated Capital and Implementation Cost ($)	Estimated Engineering/PM/CM and Design Cost ($)	Estimated Total Cost ($)
Infrastructure	158,800,000	16,700,000	175,500,000
Operations	252,100,000	25,200,000	277,300,000
Performance Monitoring	2,900,000	300,000	3,200,000
TOTAL ESTIMATED COST			**$456,000,000**

The estimated costs based on the Conceptual Design are significantly greater than estimated costs in the ROD. This significant difference is attributable to multiple factors, including the greater length and depth of the groundwater plume identified during the Pre-Design Investigation than was considered in the ROD. PCE was detected during the Pre-Design Investigation at concentrations of up to 55,000 µg/L at 495 feet bgs on-Site, 640 µg/L at 490 feet bgs off-Site North of the Northern State Parkway, and up to 21,000 µg/L approximately 4,750 feet south of the Site at a depth of approximately 380 feet bgs. The ROD conceptually targets the treatment of approximately 42,000 cubic yards (CY) on-Site by ISCO and approximately 155,000 CY off-Site by EISB to achieve RAOs. Based on results of the Pre-Design Investigation, estimated bulk volumes of PCE impacts greater than Class GA Values are approximately 500,000 CY on-Site and 25,000,000 CY off-Site.

Additionally, the reduced zone of influence (ZOI) of injections observed during pilot tests compared to those considered in the ROD is another primary factor of the significant difference in estimated remediation cost. The remedy described in the ROD assumed a ZOI of 30 feet for injections and targeted between 10 and 20% of the pore volume of the treatment interval. Injection pilot tests targeted 50% of the pore volume, achieved an approximate ZOI of 10 feet, and did not result in significant reductions of PCE in the targeted intervals.

As a result of the above-described factors, significantly greater number of injection wells, significantly deeper injection wells, and injection of significantly greater amounts of ISCO and EISB amendments will be required

to achieve RAOs than were accounted for in the ROD. Additionally, in order to install appropriately-sized injection wells to depths targeted for treatment greater than 200 feet bgs, drilling methods that generate significantly greater volumes of waste (i.e., mud rotary rather than sonic drilling) will be necessary.

Estimating the probable cost of several critical elements of the Conceptual Design, including drilling and installation of 6-inch diameter injection wells to 550+ feet below ground surface, construction and operation of an amendment mixing plant, and the truck-based delivery of the above-described volumes of amendments requires a level of effort beyond that typical of a concept-level design. In order to prepare the cost estimate, TRC relied on estimates based on costs of similar elements of the Pre-Design Investigation and discussions with qualified contractors. While TRC is confident of the technical necessity of including these elements in order to achieve RAOs, costs included in the Conceptual Design for these elements should be qualified as uncertain. Additionally, note, the scale of work described in the Conceptual Design may exceed the capacity of readily-available resources and/or infrastructure. Costs to develop infrastructure within the area targeted for remediation are not included in the cost estimate.

10.0 REFERENCES

- ASTM International, E 2516-06, Standard Classification for Cost Estimate Classification System, 2006.
- American Association of Cost Engineering (AACE) International No. 17R-97, Recommended Practice for Cost Estimate Classification System.
- AACE International No. 18R-97, Recommended Practice for Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries.
- CDM Smith, Final Remedial Investigation Report, Solvent Finishers, December 2014.
- CDM Smith, Final Feasibility Study, Solvent Finishers, July 2016.
- New York State Department of Environmental Conservation (NYSDEC), Record of Decision, Solvent Finishers State Superfund Project, July 2016.
- TRC Engineers, Inc., Draft Pre-Design Investigation Report, Solvent Finishers Site, March 2018.
- United States Environmental Protection Agency (USEPA), A Guide to Developing and Documenting Cost Estimates During the Feasibility Study; EPA 540-R-00-002, 2000.

DRAWINGS

CONCEPTUAL DESIGN DRAFT

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION

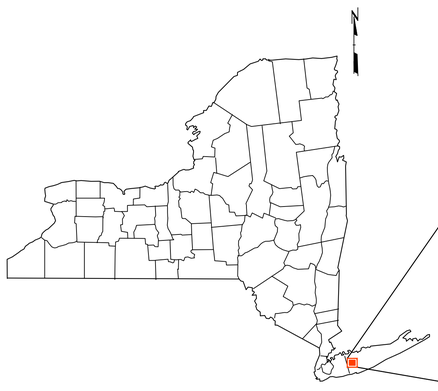
SOLVENT FINISHERS SITE
SITE NO. 130172
601 CANTIAGUE ROCK ROAD, JERICHO, NEW YORK

REMEDIAL CONSTRUCTION CONTRACT DRAWINGS
CONTRACT_____

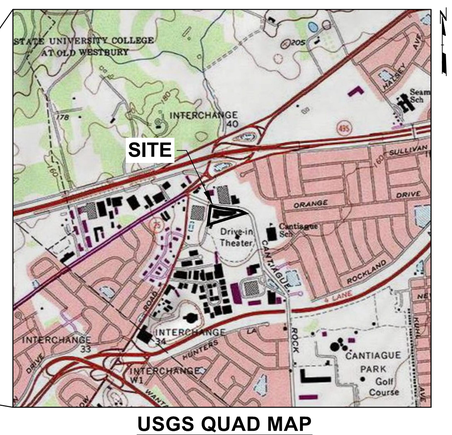
MARCH 2019

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

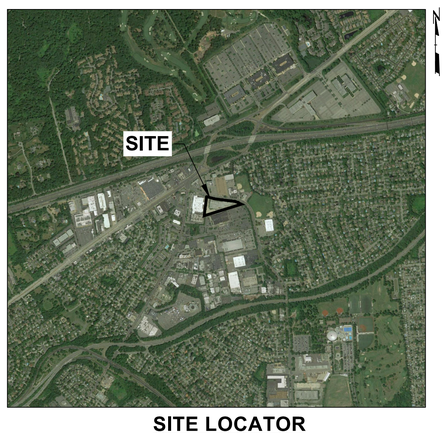
TRC ENGINEERS, INC.



NEW YORK



USGS QUAD MAP
SCALE:1"=1500'



SITE LOCATOR
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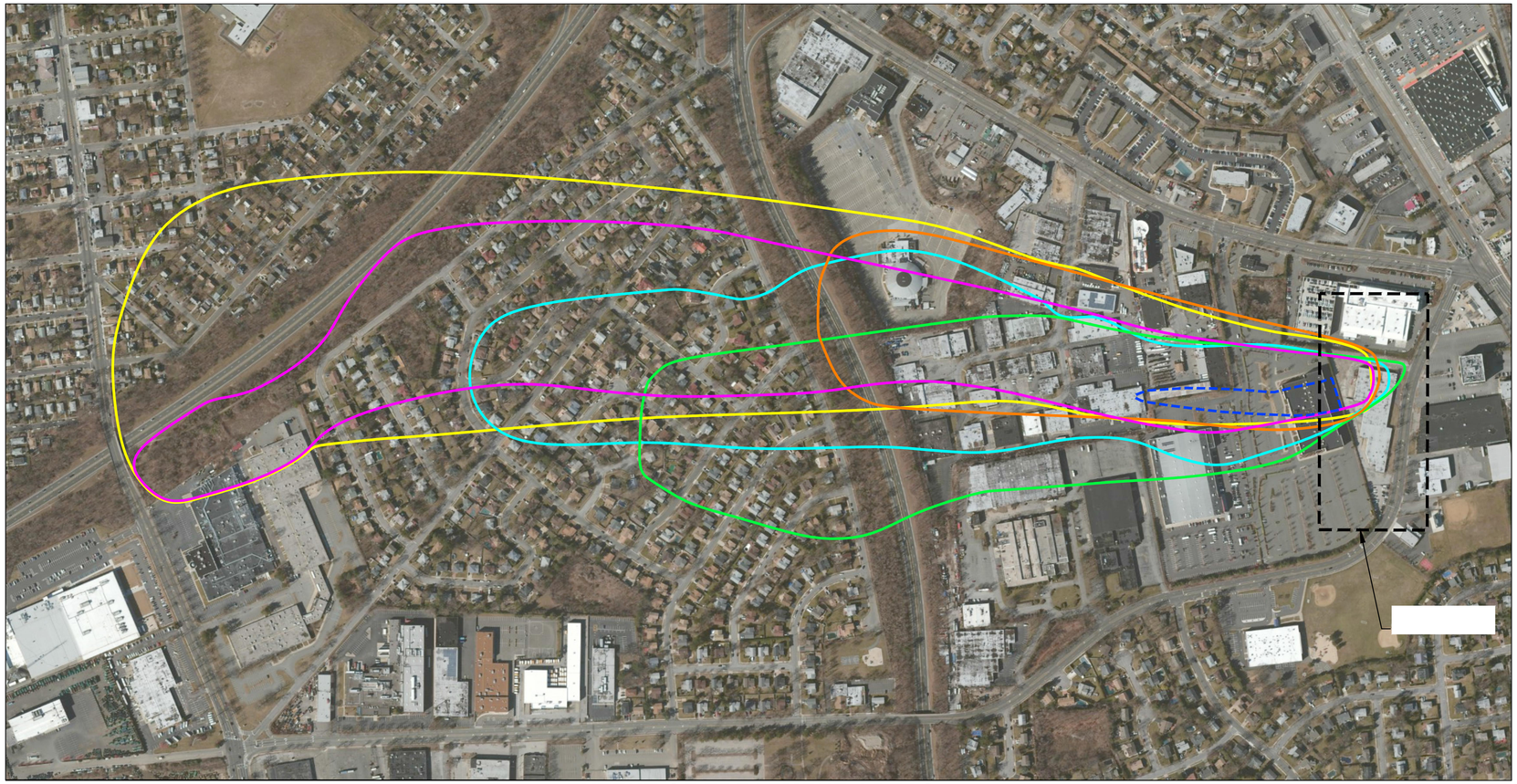
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DRAWING NUMBER	**DRAWING TITLE**
1	TITLE SHEET
2	EXTENT OF TREATMENT AREAS
3	WORK ZONES AND WELL LOCATIONS
4	CROSS-SECTION OF INJECTION WELLS
5	TYPICAL WELL CONSTRUCTION DETAILS
6	PROCESS FLOW DIAGRAM

TRC

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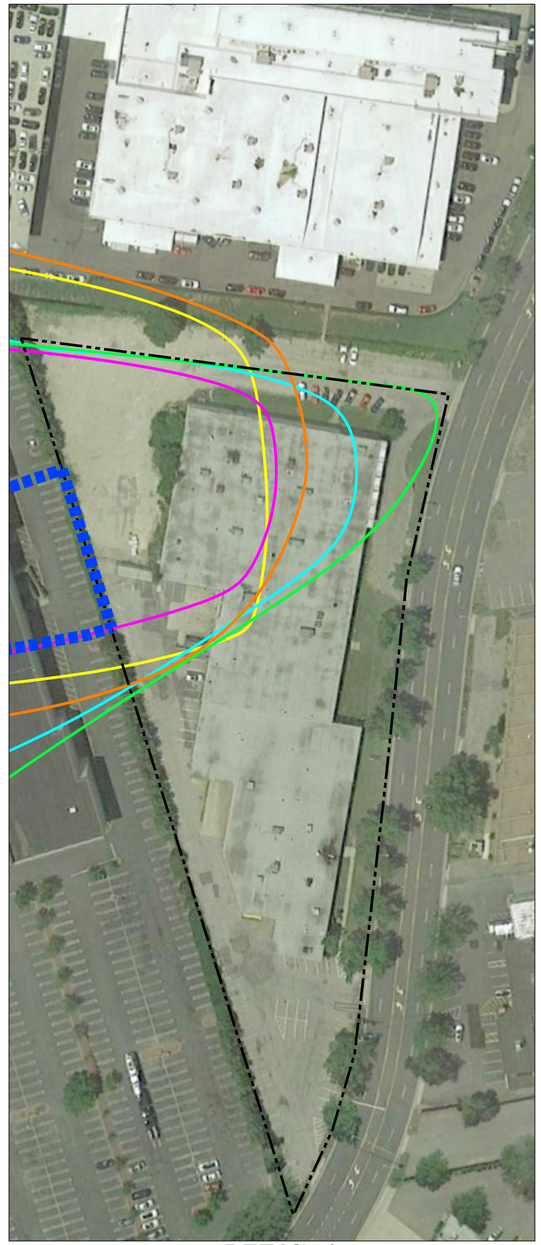
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Version: 2017-10-21



EXTENT OF TREATMENT AREAS

0 400 800
SCALE IN FEET



DETAIL 1

0 100 200
SCALE IN FEET

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXTENT OF TREATMENT ZONE D1 75 TO 0 FT. (NAVD 88)
- EXTENT OF TREATMENT ZONE D2 0 TO -100 FT. (NAVD 88)
- EXTENT OF TREATMENT ZONE D3 -100 TO -200 FT. (NAVD 88)
- EXTENT OF TREATMENT ZONE D4 -200 TO -300 FT. (NAVD 88)
- EXTENT OF TREATMENT ZONE D5 -300 TO -400 FT. (NAVD 88)
- EXTENT OF NEAR-SITE ISCO TREATMENT ZONE D1 AND ZONE D2

NOTES

1. FT: FEET
2. NAVD 88: NORTH AMERICAN VERTICAL DATUM OF 1988

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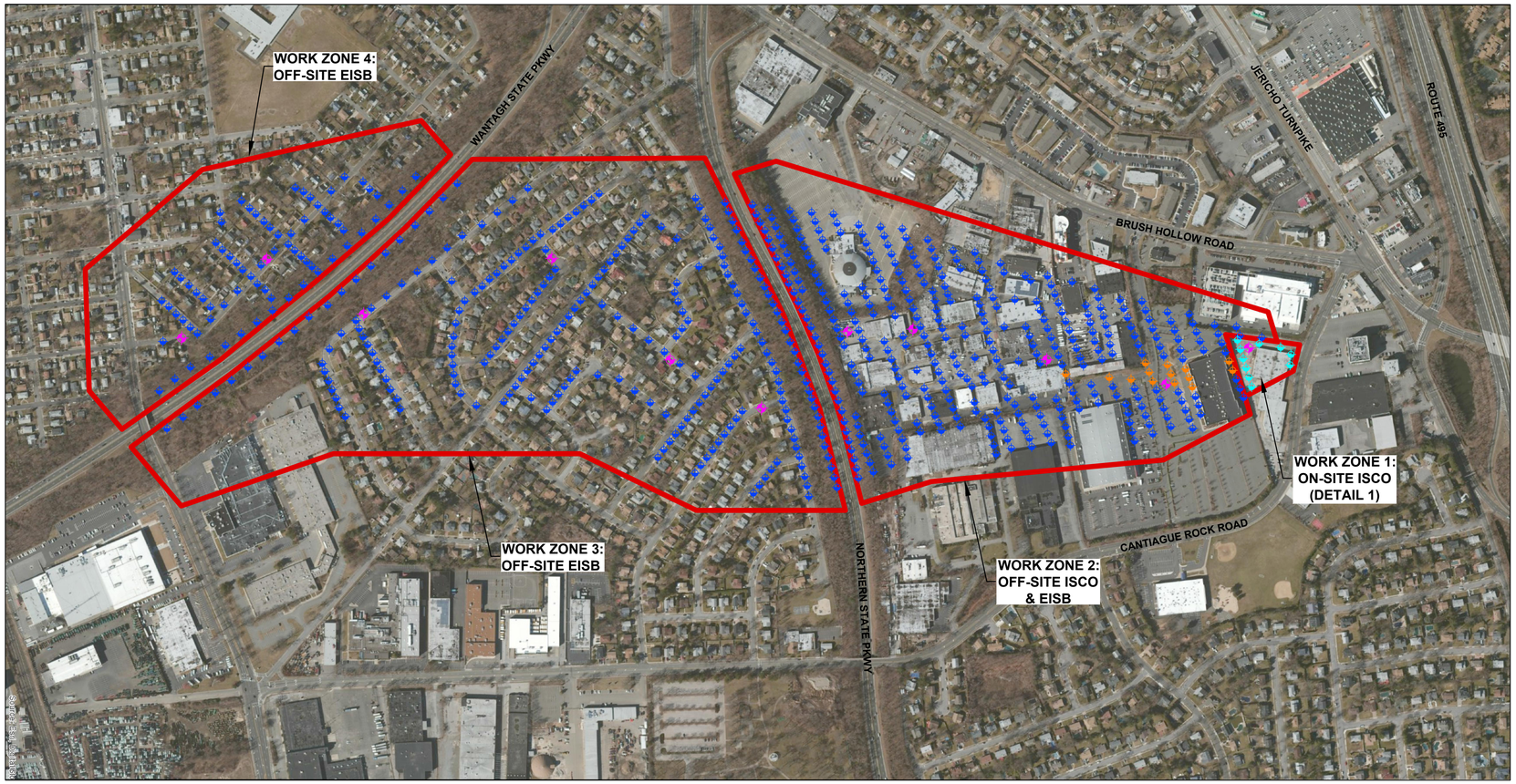
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DATE: MARCH 2019	
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PROJECT NAME:

DRAWING TITLE:

DRAWING 2

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WORK AREA LAYOUT

0 400 800

SCALE IN FEET



DETAIL 1: WORK ZONE 1

0 100 200

SCALE IN FEET

	WELL DRILLING SUMMARY																
	INJECTION WELLS										MONITORING WELLS						
WORK ZONE AND TREATMENT ZONE	EISB INJECTION WELL COUNTS	ISCO INJECTION WELL COUNTS	10" Ø BOREHOLE (FT)	6" Ø PVC RISER BLANK (FT)	6" Ø STAINLESS STEEL TRANSITION BLANK (FT)	6" Ø NO. 20-SLOT T304-SS SCREEN (FT)	6" Ø STAINLESS STEEL DIVIDER BLANK (FT)	6" Ø STAINLESS STEEL SUMP BLANK (FT)	FILTER PACK (FT)	CEMENT AND BENTONITE GROUT (FT)	NESTED WELL COUNTS	12" Ø BOREHOLE (FT)	10" Ø BOREHOLE (FT)	2" Ø PVC RISER (FT)	2" Ø NO. 10-SLOT PVC SCREEN (FT)	FILTER PACK (FT)	CEMENT AND BENTONITE GROUT (FT)
WORK ZONE 1 - ZONE D1	0	10	1,630	820	30	550	200	30	680	950	1	0	155	348	30	50	105
WORK ZONE 1 - ZONE D2	0	10	2,640	1,570	30	700	300	40	880	1,760	1	258	0	820	40	68	190
WORK ZONE 1 - ZONE D3	0	9	3,276	2,313	27	630	270	36	792	2,484	1	358	0	1,220	40	68	290
WORK ZONE 1 - ZONE D4	0	9	4,176	3,213	27	630	270	36	792	3,384	1	458	0	1,620	40	68	390
WORK ZONE 1 - ZONE D5	0	10	5,640	4,570	30	700	300	40	880	4,760	1	558	0	2,020	40	68	490
WORK ZONE 2 - ZONE D1	215	15	32,890	14,260	690	12,650	4,600	690	15,640	17,250	4	0	540	1,150	120	200	340
WORK ZONE 2 - ZONE D2	234	2	57,584	32,332	708	16,520	7,080	944	20,768	36,816	4	950	0	2,960	160	272	678
WORK ZONE 2 - ZONE D3	172	0	59,168	40,764	516	12,040	5,160	688	15,136	44,032	4	1,350	0	4,560	160	272	1,078
WORK ZONE 2 - ZONE D4	259	0	114,996	87,283	777	18,130	7,770	1,036	22,792	92,204	4	1,750	0	6,160	160	272	1,478
WORK ZONE 2 - ZONE D5	232	0	126,208	101,384	696	16,240	6,960	928	20,416	105,792	4	2,150	0	7,760	160	272	1,878
WORK ZONE 3 - ZONE D1	70	0	10,360	4,690	210	3,850	1,400	210	4,760	5,600	2	0	280	605	60	100	180
WORK ZONE 3 - ZONE D2	94	0	23,406	13,348	282	6,580	2,820	376	8,272	15,134	2	485	0	1,520	80	136	349
WORK ZONE 3 - ZONE D3	133	0	46,417	32,186	399	9,310	3,990	532	11,704	34,713	3	1,028	0	3,480	120	204	824
WORK ZONE 3 - ZONE D4	190	0	85,310	64,980	570	13,300	5,700	760	16,720	68,590	3	1,328	0	4,680	120	204	1,124
WORK ZONE 3 - ZONE D5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WORK ZONE 4 - ZONE D1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WORK ZONE 4 - ZONE D2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WORK ZONE 4 - ZONE D3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WORK ZONE 4 - ZONE D4	73	0	32,047	24,236	219	5,110	2,190	292	6,424	25,623	2	865	0	3,040	80	136	729
WORK ZONE 4 - ZONE D5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	1672	65	605,748	427,949	5,211	116,940	49,010	6,638	146,656	459,092	37	11,535	975	41,943	1,410	2,390	10,120

LEGEND (SYMBOLS NOT TO SCALE)

- APPROXIMATE PROPERTY BOUNDARY
- TREATMENT AREA EXTENTS
- NESTED MONITORING WELL CLUSTER LOCATION
- INJECTION WELL CLUSTER LOCATION - EISB ONLY
- INJECTION WELL CLUSTER LOCATION - ISCO ONLY
- INJECTION WELL CLUSTER LOCATION - ISCO AND EISB

NOTES

1. EISB: ENHANCED IN-SITU BIOREMEDIATION
2. ISCO: IN-SITU CHEMICAL OXIDATION
3. FT: FEET
4. NAVD 88: NORTH AMERICAN VERTICAL DATUM OF 1988
5. INJECTION WELL CLUSTERS ON THE PLAN-VIEW MAP REPRESENT CO-LOCATED WELLS THAT COVER MULTIPLE VERTICAL TREATMENT ZONES AT THAT LOCATION.
6. MONITORING WELL CLUSTERS CONSIST OF MULTIPLE NESTED WELLS. REFER TO DRAWING 5.
7. INDIVIDUAL INJECTION WELL COUNTS IN THE TABLE REPRESENT INDIVIDUAL WELLS WHILE SYMBOLS ON THE PLAN-VIEW MAP REPRESENT WELL CLUSTERS.
8. NESTED MONITORING WELL COUNTS IN THE TABLE REPRESENT NESTED WELL QUANTITIES WHILE SYMBOLS ON THE PLAN-VIEW MAP ARE MONITORING WELL CLUSTERS.
9. TREATMENT ZONE D1 IS THE VERTICAL INTERVAL FROM 75 TO 0 FT. (NAVD 88)
10. TREATMENT ZONE D2 IS THE VERTICAL INTERVAL FROM 0 TO -100 FT. (NAVD 88)
11. TREATMENT ZONE D3 IS THE VERTICAL INTERVAL FROM -100 TO -200 FT. (NAVD 88)
12. TREATMENT ZONE D4 IS THE VERTICAL INTERVAL FROM -200 TO -300 FT. (NAVD 88)
13. TREATMENT ZONE D5 IS THE VERTICAL INTERVAL FROM -300 TO -400 FT. (NAVD 88)
14. THERE SHALL BE NO WORK IN THE NORTHERN STATE PARKWAY OR THE WANTAGH STATE PARKWAY.
15. THE WELL CLUSTER SYMBOLS ARE NOT TO SCALE. THE SYMBOLS MAY APPEAR TO BE INSIDE BUILDING FOOTPRINTS OR OTHER INACCESSIBLE AREAS; HOWEVER, NO WELLS SHALL BE INSTALLED WITHIN THE FOOTPRINT OF ANY BUILDINGS OR RESIDENTIAL PROPERTIES.

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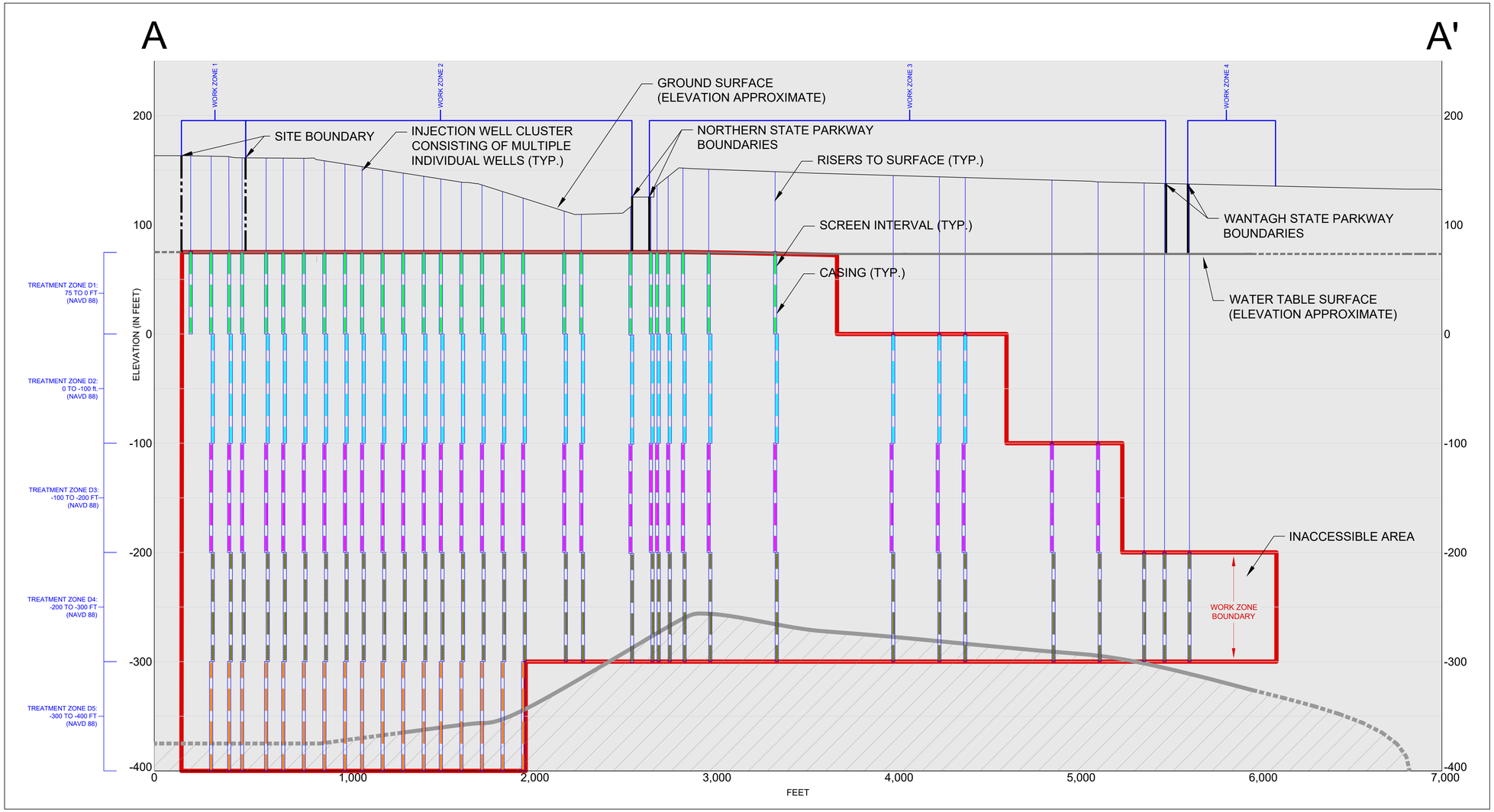
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DRAWN BY: MG
CHECKED BY: BL
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SCALE: AS SHOWN
PROJECT NUMBER: 266631.0000.0000

PROJECT NAME:
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SOLVENT FINISHERS SITE NO. 130172
601 CANTIAGUE ROCK ROAD
JERICHO, NEW YORK

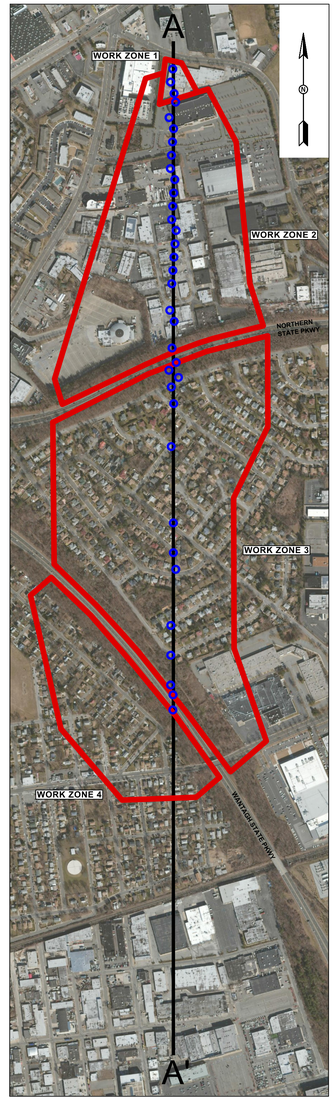
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WORK ZONES AND WELL LOCATIONS

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NOT TO SCALE



TRANSECT A-A' MAP

0 600 1200
SCALE IN FEET

TRANSECT A-A' MAP LEGEND

- INJECTION WELL CLUSTER LOCATION
- WORK ZONE BOUNDARY

LEGEND

- TREATMENT ZONE D1 — 75 TO 0 FT. (NAVD 88)
- TREATMENT ZONE D2 — 0 TO -100 FT. (NAVD 88)
- TREATMENT ZONE D3 — -100 TO -200 FT. (NAVD 88)
- TREATMENT ZONE D4 — -200 TO -300 FT. (NAVD 88)
- TREATMENT ZONE D5 — -300 TO -400 FT. (NAVD 88)
- CLAY (INFERRED)

NOTES

1. DASHED LINES INDICATE NO DATA.
2. NAVD 88: NORTH AMERICAN VERTICAL DATUM OF 1988
3. FT: FEET
4. EACH INJECTION WELL CLUSTER SHOWN IN THE CROSS-SECTION CONSISTS OF MULTIPLE SEPARATE INDIVIDUAL WELLS. THE STAGGERED REPRESENTATION SHOWS EACH INDIVIDUAL WELL PER VERTICAL TREATMENT ZONE. INDIVIDUAL RISERS TO THE GROUND SURFACE ARE REQUIRED BUT NOT SHOWN FOR EACH WELL.
5. WELLS SHOWN IN CROSS-SECTION ARE EXAMPLES OF WELLS ALONG THE TRANSECT ONLY. NO WELLS ARE PROPOSED IN THE NORTHERN STATE PARKWAY OR WANTAGH STATE PARKWAY.
6. MONITORING WELLS ARE NOT SHOWN.

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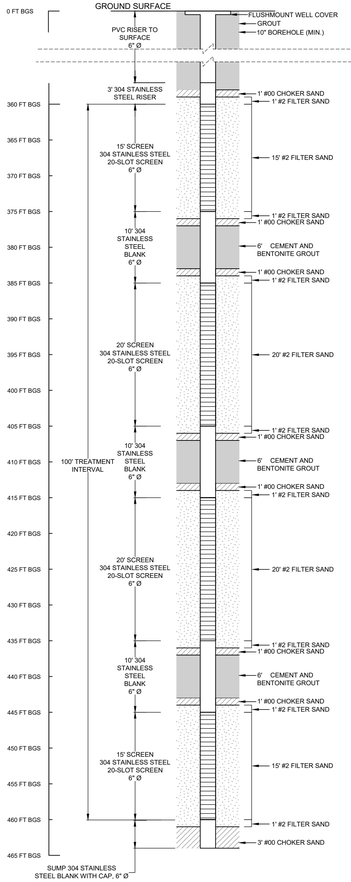
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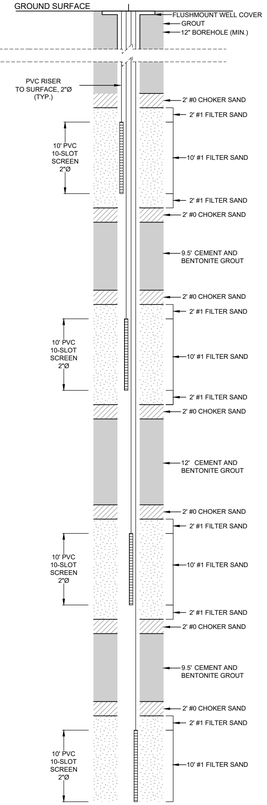
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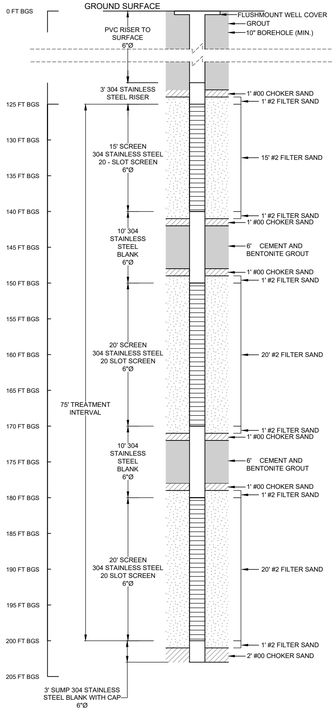
DETAIL 1.A
TYPICAL 6" Ø INJECTION WELL WITH 100' TREATMENT INTERVAL
N.T.S.



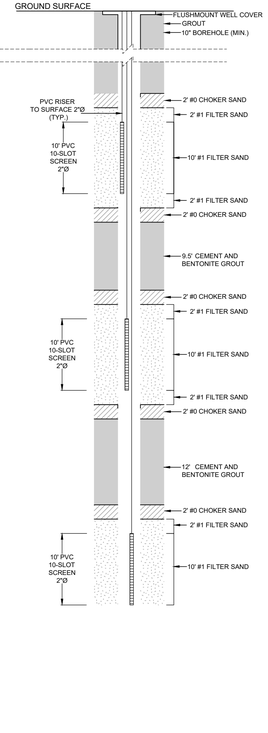
DETAIL 2.A
TYPICAL 2" Ø NESTED MONITORING WELL WITH 100' MONITORING INTERVAL
N.T.S.



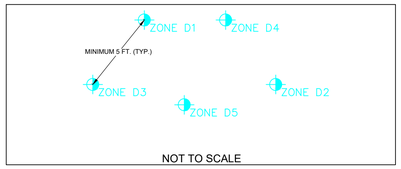
DETAIL 1.B
TYPICAL 6" Ø INJECTION WELL WITH 75' TREATMENT INTERVAL
N.T.S.



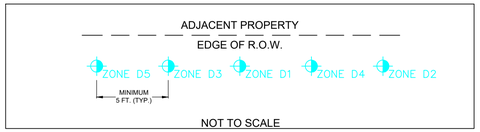
DETAIL 2.B
TYPICAL 2" Ø NESTED MONITORING WELL WITH 75' MONITORING INTERVAL
N.T.S.



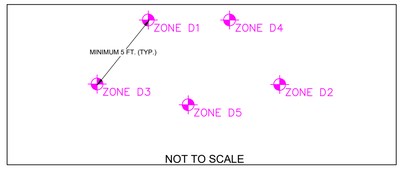
TYPICAL LAYOUT OF INJECTION WELL CLUSTER IN OPEN AREAS (E.G., PARKING LOTS)*



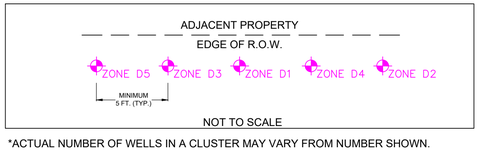
TYPICAL LAYOUT OF INJECTION WELL CLUSTER IN ROAD WAYS*



TYPICAL LAYOUT OF NESTED MONITORING WELL CLUSTER IN OPEN AREAS (E.G., PARKING LOTS)*



TYPICAL LAYOUT OF NESTED MONITORING WELL CLUSTER IN ROAD WAYS*



*ACTUAL NUMBER OF WELLS IN A CLUSTER MAY VARY FROM NUMBER SHOWN.

LEGEND

- NESTED MONITORING WELL
- INJECTION WELL

NOTES

1. EACH MONITORING WELL IN A CLUSTER IS A NESTED WELL.
2. GROUNDWATER TABLE IS AT APPROXIMATELY 75 FT NAVD 88.
3. MONITORING AND INJECTION WELLS SHALL BE SPACED NO CLOSER THAN 5 FEET APART.
4. MONITORING AND INJECTION WELLS SHALL BE INSTALLED STARTING WITH THE DEEPEST WELL IN A CLUSTER AND PROCEED IN DEPTH ORDER TO THE SHALLOWEST WELL IN THE CLUSTER.
5. LAYOUT OF WELL CLUSTERS IS SHOWN FOR CONCEPTUAL UNDERSTANDING ONLY. EACH MONITORING AND INJECTION WELL SHALL BE INSTALLED AT THE LOCATION OF THE SPECIFIED COORDINATES.
6. R.O.W.: RIGHT OF WAY
7. BLANK: RISER PIPE (NOT SCREENED)
8. IW: INJECTION WELL
9. MW: MONITORING WELL
10. IN: INCHES
11. FT BGS: FEET BELOW GROUND SURFACE
12. FT: FEET
13. NAVD 88: DATUM=NORTH AMERICAN VERTICAL DATUM OF 1988
14. ZONE D1: 75 TO 0 FT (NAVD 88)
15. ZONE D2: 0 TO -100 FT (NAVD 88)
16. ZONE D3: -100 TO -200 FT (NAVD 88)
17. ZONE D4: -200 TO -300 FT (NAVD 88)
18. ZONE D5: -300 TO -400 FT (NAVD 88)
19. SCH 10 SS: SCHEDULE 10 STAINLESS STEEL
20. SCH 40 SS: SCHEDULE 40 STAINLESS STEEL
21. SCH 40 PVC: SCHEDULE 40 POLYVINYL CHLORIDE
22. SCH 80 PVC: SCHEDULE 80 POLYVINYL CHLORIDE
23. SS: 304 STAINLESS STEEL
24. NO. 20-SLOT T304-SS 250: NUMBER 20-SLOT SCREEN MADE OF TYPE 304 STAINLESS STEEL RATED FOR A DEPTH OF 250 FEET. SCREEN MUST HAVE A COLLAPSE STRENGTH OF OVER 50 PSI.
25. NO. 20-SLOT T304-SS 600: NUMBER 20-SLOT SCREEN MADE OF TYPE 304 STAINLESS STEEL RATED FOR A DEPTH OF 600 FEET. SCREEN MUST HAVE A COLLAPSE STRENGTH OF OVER 250 PSI.
26. NO. 10-SLOT SCH40 PVC: NUMBER 10-SLOT SCREEN MADE OF SCHEDULE 40 PVC
27. NO. 10-SLOT SCH80 PVC: NUMBER 10-SLOT SCREEN MADE OF SCHEDULE 80 PVC
28. NA = NOT APPLICABLE

TYPICAL INJECTION WELL CONSTRUCTION DETAILS AND QUANTITIES

VERTICAL ZONE	QUANTITY OF WELLS OF THIS TYPE	DRILLING METHOD	APPROXIMATE GROUND SURFACE ELEVATION (FT NAVD 88)	APPROXIMATE GROUNDWATER TABLE ELEVATION (FT NAVD 88)	TARGETED TREATMENT INTERVAL (FT BGS)	TARGETED TREATMENT INTERVAL (FT NAVD 88)	OPEN INTERVAL TYPE	SCREEN CONFIGURATION	MINIMUM BOREHOLE DIAMETER (IN)	CASING & SCREEN DIAMETER (IN)	CASING MATERIALS	WELL SCREEN CONSTRUCTION	WELL SCREEN #1 (FT BGS)	WELL SCREEN #2 (FT BGS)	WELL SCREEN #3 (FT BGS)	WELL SCREEN #4 (FT BGS)	SUMP LENGTH (FT)	TOTAL DEPTH (FT BGS)	SURFACE FINISHING	WELL CONSTRUCTION DETAIL REFERENCE	NOTE
ZONE D1	10	SONIC	160	75	(85 TO 160)	(75 TO 0)	SCREENED	IN-LINE	10	6	SCH 40 PVC / SCH 10 304 SS	NO. 20-SLOT T304-SS 250	(85 TO 100)	(110 TO 130)	(140 TO 160)	NA	3	163	12" MANHOLE	DRAWING 5: DETAIL 1.B	
ZONE D1	230	SONIC	140	75	(65 TO 140)	(75 TO 0)	SCREENED	IN-LINE	10	6	SCH 40 PVC / SCH 10 304 SS	NO. 20-SLOT T304-SS 250	(65 TO 80)	(90 TO 110)	(120 TO 140)	NA	3	143	12" MANHOLE	DRAWING 5: DETAIL 1.B	
ZONE D1	70	SONIC	145	75	(70 TO 145)	(75 TO 0)	SCREENED	IN-LINE	10	6	SCH 40 PVC / SCH 10 304 SS	NO. 20-SLOT T304-SS 250	(70 TO 85)	(95 TO 115)	(125 TO 145)	NA	3	148	12" MANHOLE	DRAWING 5: DETAIL 1.B	
ZONE D2	10	SONIC	160	75	(160 TO 260)	(0 TO -100)	SCREENED	IN-LINE	10	6	SCH 40 PVC / SCH 10 304 SS	NO. 20-SLOT T304-SS 600	(160 TO 175)	(185 TO 205)	(215 TO 235)	(245 TO 260)	4	264	12" MANHOLE	DRAWING 5: DETAIL 1.A	
ZONE D2	236	SONIC	140	75	(140 TO 240)	(0 TO -100)	SCREENED	IN-LINE	10	6	SCH 40 PVC / SCH 10 304 SS	NO. 20-SLOT T304-SS 600	(140 TO 155)	(165 TO 185)	(195 TO 215)	(225 TO 240)	4	244	12" MANHOLE	DRAWING 5: DETAIL 1.A	
ZONE D2	94	SONIC	145	75	(145 TO 245)	(0 TO -100)	SCREENED	IN-LINE	10	6	SCH 40 PVC / SCH 10 304 SS	NO. 20-SLOT T304-SS 600	(145 TO 160)	(170 TO 190)	(200 TO 220)	(230 TO 245)	4	249	12" MANHOLE	DRAWING 5: DETAIL 1.A	
ZONE D3	9	SONIC	160	75	(260 TO 360)	(-100 TO -200)	SCREENED	IN-LINE	10	6	SCH 80 PVC / SCH 10 304 SS	NO. 20-SLOT T304-SS 600	(260 TO 275)	(285 TO 305)	(315 TO 335)	(345 TO 360)	4	364	12" MANHOLE	DRAWING 5: DETAIL 1.A	
ZONE D3	172	SONIC	140	75	(240 TO 340)	(-100 TO -200)	SCREENED	IN-LINE	10	6	SCH 80 PVC / SCH 10 304 SS	NO. 20-SLOT T304-SS 600	(240 TO 255)	(265 TO 285)	(295 TO 315)	(325 TO 340)	4	344	12" MANHOLE	DRAWING 5: DETAIL 1.A	
ZONE D3	133	SONIC	145	75	(245 TO 345)	(-100 TO -200)	SCREENED	IN-LINE	10	6	SCH 80 PVC / SCH 10 304 SS	NO. 20-SLOT T304-SS 600	(245 TO 260)	(270 TO 290)	(300 TO 320)	(330 TO 345)	4	349	12" MANHOLE	DRAWING 5: DETAIL 1.A	
ZONE D4	9	SONIC	160	75	(360 TO 460)	(-200 TO -300)	SCREENED	IN-LINE	10	6	SCH 80 PVC / SCH 40 304 SS	NO. 20-SLOT T304-SS 600	(360 TO 375)	(385 TO 405)	(415 TO 435)	(445 TO 460)	4	464	12" MANHOLE	DRAWING 5: DETAIL 1.A	
ZONE D4	259	SONIC	140	75	(340 TO 440)	(-200 TO -300)	SCREENED	IN-LINE	10	6	SCH 80 PVC / SCH 40 304 SS	NO. 20-SLOT T304-SS 600	(340 TO 355)	(365 TO 385)	(395 TO 415)	(425 TO 440)	4	444	12" MANHOLE	DRAWING 5: DETAIL 1.A	
ZONE D4	190	SONIC	145	75	(345 TO 445)	(-200 TO -300)	SCREENED	IN-LINE	10	6	SCH 80 PVC / SCH 40 304 SS	NO. 20-SLOT T304-SS 600	(345 TO 360)	(370 TO 390)	(400 TO 420)	(430 TO 445)	4	449	12" MANHOLE	DRAWING 5: DETAIL 1.A	
ZONE D4	73	SONIC	135	75	(335 TO 435)	(-200 TO -300)	SCREENED	IN-LINE	10	6	SCH 80 PVC / SCH 40 304 SS	NO. 20-SLOT T304-SS 600	(335 TO 350)	(360 TO 380)	(390 TO 410)	(420 TO 435)	4	439	12" MANHOLE	DRAWING 5: DETAIL 1.A	
ZONE D5	10	SONIC	160	75	(460 TO 560)	(-300 TO -400)	SCREENED	IN-LINE	10	6	SCH 80 PVC / SCH 40 304 SS	NO. 20-SLOT T304-SS 600	(460 TO 475)	(485 TO 505)	(515 TO 535)	(545 TO 560)	4	564	12" MANHOLE	DRAWING 5: DETAIL 1.A	
ZONE D5	232	SONIC	140	75	(440 TO 540)	(-300 TO -400)	SCREENED	IN-LINE	10	6	SCH 80 PVC / SCH 40 304 SS	NO. 20-SLOT T304-SS 600	(440 TO 455)	(465 TO 485)	(495 TO 515)	(525 TO 540)	4	544	12" MANHOLE	DRAWING 5: DETAIL 1.A	

TYPICAL MONITORING WELL CONSTRUCTION DETAILS AND QUANTITIES

VERTICAL ZONE	QUANTITY OF WELLS OF THIS TYPE	DRILLING METHOD	APPROXIMATE GROUND SURFACE ELEVATION (FT NAVD 88)	APPROXIMATE GROUNDWATER TABLE ELEVATION (FT NAVD 88)	TARGETED TREATMENT INTERVAL (FT BGS)	TARGETED TREATMENT INTERVAL (FT NAVD 88)	OPEN INTERVAL TYPE	SCREEN CONFIGURATION	MINIMUM BOREHOLE DIAMETER (IN)	CASING & SCREEN DIAMETER (IN)	CASING MATERIAL	WELL SCREEN CONSTRUCTION	WELL SCREEN #1 (FT BGS)	WELL SCREEN #2 (FT BGS)	WELL SCREEN #3 (FT BGS)	WELL SCREEN #4 (FT BGS)	SUMP LENGTH (FT)	TOTAL DEPTH (FT BGS)	SURFACE FINISHING	WELL CONSTRUCTION DETAIL REFERENCE	NOTE
ZONE D1	1	SONIC	160	75	(85 TO 160)	(75 TO 0)	SCREENED	NESTED	10	2	SCH 40 PVC	NO. 10-SLOT SCH40 PVC	(87.5 TO 97.5)	(115 TO 125)	(145 TO 155)	NA	NA	155	12" MANHOLE	DRAWING 5: DETAIL 2.B	
ZONE D1	4	SONIC	140	75	(65 TO 140)	(75 TO 0)	SCREENED	NESTED	10	2	SCH 40 PVC	NO. 10-SLOT SCH40 PVC	(67.5 TO 77.5)	(95 TO 105)	(125 TO 135)	NA	NA	135	12" MANHOLE	DRAWING 5: DETAIL 2.B	
ZONE D1	2	SONIC	145	75	(70 TO 145)	(75 TO 0)	SCREENED	NESTED	10	2	SCH 40 PVC	NO. 10-SLOT SCH40 PVC	(72.5 TO 82.5)	(100 TO 110)	(130 TO 140)	NA	NA	140	12" MANHOLE	DRAWING 5: DETAIL 2.B	
ZONE D2	1	SONIC	160	75	(160 TO 260)	(0 TO -100)	SCREENED	NESTED	12	2	SCH 40 PVC	NO. 10-SLOT SCH40 PVC	(162.5 TO 172.5)	(190 TO 200)	(220 TO 230)	(247.5 TO 257.5)	NA	257.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	
ZONE D2	4	SONIC	140	75	(140 TO 240)	(0 TO -100)	SCREENED	NESTED	12	2	SCH 40 PVC	NO. 10-SLOT SCH40 PVC	(142.5 TO 152.5)	(170 TO 180)	(200 TO 210)	(227.5 TO 237.5)	NA	237.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	
ZONE D2	2	SONIC	145	75	(145 TO 245)	(0 TO -100)	SCREENED	NESTED	12	2	SCH 40 PVC	NO. 10-SLOT SCH40 PVC	(147.5 TO 157.5)	(175 TO 185)	(205 TO 215)	(232.5 TO 242.5)	NA	242.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	
ZONE D3	1	SONIC	160	75	(260 TO 360)	(-100 TO -200)	SCREENED	NESTED	12	2	SCH 40 PVC	NO. 10-SLOT SCH40 PVC	(262.5 TO 272.5)	(290 TO 300)	(320 TO 330)	(347.5 TO 357.5)	NA	357.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	
ZONE D3	4	SONIC	140	75	(240 TO 340)	(-100 TO -200)	SCREENED	NESTED	12	2	SCH 40 PVC	NO. 10-SLOT SCH40 PVC	(242.5 TO 252.5)	(270 TO 280)	(300 TO 310)	(327.5 TO 337.5)	NA	337.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	
ZONE D3	3	SONIC	145	75	(245 TO 345)	(-100 TO -200)	SCREENED	NESTED	12	2	SCH 40 PVC	NO. 10-SLOT SCH40 PVC	(247.5 TO 257.5)	(275 TO 285)	(305 TO 315)	(332.5 TO 342.5)	NA	342.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	
ZONE D4	1	SONIC	160	75	(360 TO 460)	(-200 TO -300)	SCREENED	NESTED	12	2	SCH 80 PVC	NO. 10-SLOT SCH80 PVC	(362.5 TO 372.5)	(390 TO 400)	(420 TO 430)	(447.5 TO 457.5)	NA	457.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	
ZONE D4	4	SONIC	140	75	(340 TO 440)	(-200 TO -300)	SCREENED	NESTED	12	2	SCH 80 PVC	NO. 10-SLOT SCH80 PVC	(342.5 TO 352.5)	(370 TO 380)	(400 TO 410)	(427.5 TO 437.5)	NA	437.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	
ZONE D4	3	SONIC	145	75	(345 TO 445)	(-200 TO -300)	SCREENED	NESTED	12	2	SCH 80 PVC	NO. 10-SLOT SCH80 PVC	(347.5 TO 357.5)	(375 TO 385)	(405 TO 415)	(432.5 TO 442.5)	NA	442.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	
ZONE D4	2	SONIC	135	75	(335 TO 435)	(-200 TO -300)	SCREENED	NESTED	12	2	SCH 80 PVC	NO. 10-SLOT SCH80 PVC	(337.5 TO 347.5)	(365 TO 375)	(395 TO 405)	(422.5 TO 432.5)	NA	432.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	
ZONE D5	1	SONIC	160	75	(460 TO 560)	(-300 TO -400)	SCREENED	NESTED	12	2	SCH 80 PVC	NO. 10-SLOT SCH80 PVC	(462.5 TO 472.5)	(490 TO 500)	(520 TO 530)	(547.5 TO 557.5)	NA	557.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	
ZONE D5	4	SONIC	140	75	(440 TO 540)	(-300 TO -400)	SCREENED	NESTED	12	2	SCH 80 PVC	NO. 10-SLOT SCH80 PVC	(442.5 TO 452.5)	(470 TO 480)	(500 TO 510)	(527.5 TO 537.5)	NA	537.5	12" MANHOLE	DRAWING 5: DETAIL 2.A	

PRELIMINARY: NOT FOR CONSTRUCTION

WARNING - IT IS A VIOLATION OF NEW YORK EDUCATION LAW SECTION 7209.2, FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR, TO ALTER THIS DOCUMENT IN ANY WAY. IF ALTERED, THE ALTERING PERSON SHALL COMPLY WITH THE REQUIREMENTS OF NEW YORK LAW, SECTION 7209.2.

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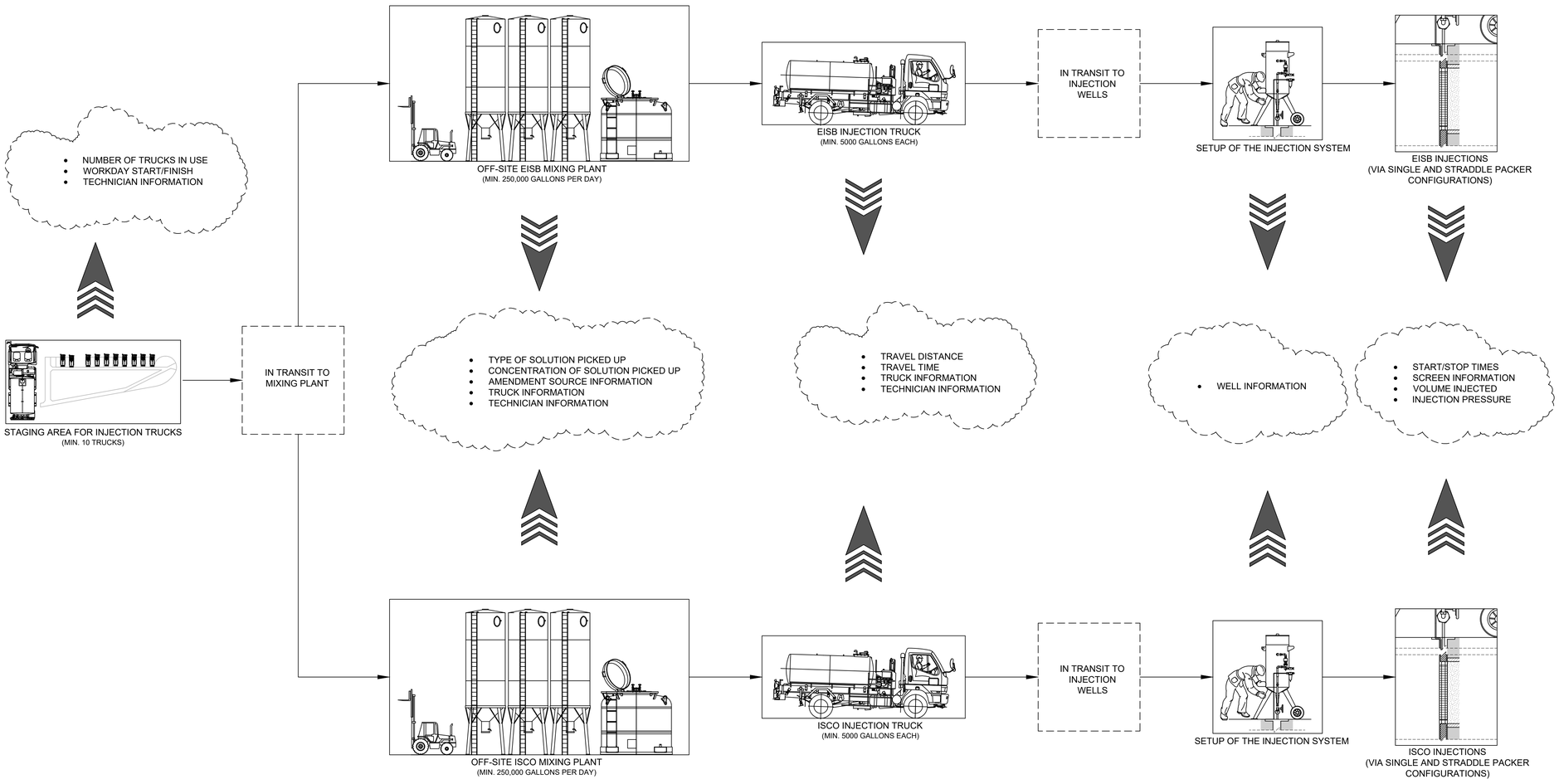
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SCALE: AS SHOWN
PROJECT NUMBER: 266631.0000.0000

PROJECT NAME:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SOLVENT FINISHERS SITE NO. 130172
601 CANTIAGUE ROCK ROAD
JERICHO, NEW YORK

DRAWING TITLE:
TYPICAL WELL CONSTRUCTION DETAILS

DRAWING
5

Path\Name: \\nyc-fp1\Projects\NYSDEC\Assignments\WA #32 - Solvent Finishers - RD\Remedial Design\Conceptual Design\Figures\Figure 5 - Well Construction Details.dwg - Date\Time: Fri, 29 Mar 2019 - 3:30pm - User Name: ANBrown - Layout Tab: DWG 5



LEGEND

CLOUD-BASED DATA COLLECTION

NOTES

1. TRUCKS MAY CARRY MORE THAN ONE TYPE OF SOLUTION (E.G., EISB OR ISCO SOLUTIONS). TANK WASH REQUIRED PRIOR TO CHANGE IN USE BETWEEN EISB AND ISCO SOLUTIONS. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. SOLUTIONS FROM THE EISB PLANT SHALL INCLUDE:
   - LACTATE SOLUTION
   - CULTURE SOLUTION
   - BUFFER SOLUTION
   - ANAEROBIC SOLUTION
   - FRESH WATER
3. SOLUTIONS FROM THE ISCO PLANT SHALL INCLUDE
   - SODIUM PERSULFATE SOLUTION
   - ACTIVATOR SOLUTION
   - FRESH WATER
4. INJECTION TRUCKS SHALL MEET THE FOLLOWING MIMIMUM REQUIREMENTS:
   - MIN. TANK CAPACITY OF 5,000 GALLONS
   - TANK, HOSES AND PUMPING EQUIPMENT CHEMICALLY-COMPATIBLE WITH THE CHEMICAL SOLUTIONS BEING TRANSPORTED.
   - INJECTION EQUIPMENT (E.G., PUMPS), INSTRUMENTATION (E.G., FLOW METER, PRESSURE GAUGE), INJECTION CONTROL DEVICES (E.G., PRESSURE RELIEF VALVES, SAFETY ALARMS, FLOW CONTROL VALVES), AND POWER SUPPLY TO INJECT AND MONITOR THE INJECTION FLUID AT AN INJECTION RATE UP TO 100 GPM.
   - COMPRESSED NITROGEN SUPPLY TO INFLATE PACKERS (SINGLE AND STRADDLE PACKER CONFIGURATIONS).
5. GRAPHICS OF PROCESS ELEMENTS ARE CONCEPTUAL EXAMPLES TO AID IN VISUALIZING THE PROCESS FLOW. NOT ALL WORK OR REQUIREMENTS ARE SHOWN.

PRELIMINARY: NOT FOR CONSTRUCTION

WARNING - IT IS A VIOLATION OF NEW YORK EDUCATION LAW SECTION 7209.2, FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR, TO ALTER THIS DOCUMENT IN ANY WAY. IF ALTERED, THE ALTERING PERSON SHALL COMPLY WITH THE REQUIREMENTS OF NEW YORK LAW, SECTION 7209.2.

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SOLVENT FINISHERS SITE NO. 130172
601 CANTIAGUE ROCK ROAD
JERICHO, NEW YORK

DRAWING TITLE:
PROCESS FLOW DIAGRAM

DRAWING
6

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ATTACHMENT A

WELL	ELEVATION OF SAMPLE (FT NAVD 88)	PCE CONCENTRATION (UG/L)[1]	QUALIFIER
MW-1	79.73	NS	
MW-2	78.25	NS	
MW-3	72.63	1.0	U
MW-4	72.48	0.23	J
MW-5	73.11	1.0	U
MW-6	72.41	44	
SF-MW-101ML (A)	42.26	42,000	
SF-MW-102ML (A)	41.46	4,400	
SF-MW-1B	57.75	2.0	
SF-MW-1D	37.75	3.0	
SF-MW-1F	17.75	0.76	J
SF-MW-2B	62.41	130,000	
SF-MW-2D	42.41	44,000	
SF-MW-3B	61.03	6.4	
SF-MW-3D	41.03	1.0	U
SF-MW-4F	3.14	20	
SF-MW-5F	4.34	1,800	
SF-MW-6D	12.19	55	
SF-MW-7A	45.39	1.0	U
SF-EISB-PT-01	60.92	530	
SF-EISB-PT-02ML (A)	76.06	84	
SF-EISB-PT-02ML (B)	61.06	720	
SF-EISB-PT-03	61.13	460	
SF-EISB-PT-04	60.67	970	D
SF-ISCO-PT-01	42.50	2,200	
SF-ISCO-PT-02ML (A)	57.09	4,400	
SF-ISCO-PT-02ML (B)	42.09	62,000	

HISTORIC DIRECT PUSH VERTICAL PROFILE POINT	ELEVATION OF SAMPLE (FT NAVD 88)	PCE CONCENTRATION (UG/L)[2]	QUALIFIER
SB-01	45.35	12	
SB-02	74.57	230,000	
SB-03	54.54	260,000	D
SB-04	74.83	1.1	
SB-05	74.78	23	D
SB-06	21.17	48	
SB-07	53.19	81,000	
SB-08	32.76	13	
SB-09	19.86	6.8	
SB-10	10.79	920	
SB-11	46.63	17	
SB-12	1.41	4	J
SB-13	4.22	29	
SB-14	2.3	5	U
SB-15	9.06	54	
SB-16	22.89	110	D
SB-17	6.06	0.5	U
SB-18	56.38	0.34	J
SB-19	1.57	0.5	U

Notes
[1]DATA ARE FOR GROUNDWATER SAMPLES COLLECTED IN 2017.
[2]DATA ARE FOR GROUNDWATER SAMPLES COLLECTED IN 2011.
NAVD 88 - NORTH AMERICAN VERTICAL DATUM 1988
UG/L - MICROGRAMS PER LITER
U - NOT DETECTED
NS - NOT SAMPLED
J - ESTIMATED VALUE
D - DILUTION REQUIRED

ENLARGEMENT OF SOUTHWEST PORTION OF THE SITE

0 25 50
FEET
SCALE:1 " = 50 '

0 400 800
FEET
SCALE:1 " = 800 '
SHEET SIZE: 11" x 17"

LEGEND

- EXISTING MONITORING WELL
- HISTORIC DIRECT PUSH VERTICAL PROFILE POINT (2011)
- NEW INJECTION WELL
- NEW MONITORING WELL
- SYLVANIA SITE MONITORING WELL
- GENERAL INSTRUMENTS SITE MONITORING WELL
- SOLVENT FINISHERS SITE
- SYLVANIA SITE
- GENERAL INSTRUMENTS SITE
- 5 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)
- 100 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)
- 1,000 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)

NOTES:
1. THERE IS NO EXISTING DATA FOR THE SUBJECT DEPTH INTERVAL AT LOCATIONS SHOWN IN GRAY.
2. AT LOCATIONS WHERE THERE IS MORE THAN ONE DATA POINT, CONTOURS WERE GENERATED USING THE HIGHEST RESULT.

NYSDEC SOLVENT FINISHERS SITE

SITE NO. 130172
JERICHO, NASSAU COUNTY

SUMMARY OF RESULTS OF ANALYSIS OF GROUNDWATER FOR PCE – 100 TO 0 FEET NAVD 88

FIGURE 4A

MARCH 2018

TRC
1430 BROADWAY
NEW YORK, NY

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WELL	ELEVATION OF SAMPLE (FT NAVD 88)	PCE CONCENTRATION (UG/L)[1]	QUALIFIER
MW-201-220[2]	-63.09	1	U
MW-202-220[2]	-72.40	0.96	J
MW-203-360[2]	-16.75	69	D
SF-MW-2K	-57.59	6,000	
SF-MW-3K	-58.97	1.0	U
SF-MW-4J	-63.86	100	
SF-MW-4K	-76.86	100	
SF-MW-5G	-15.66	24,000	
SF-MW-5K	-75.66	1,600	
SF-MW-6F	-17.81	110	
SF-MW-6K	-67.81	54	
SF-MW-7H	-74.61	10	
SF-MW-8L	-64.85	490	
SF-MW-9L	-67.13	4.5	
SF-MW-10J	-66.75	1.0	U
SF-MW-11J	-67.37	19	
SF-MW-12J	-66.40	5,000	
SF-MW-101ML (B)	-32.74	6,400	
SF-MW-102ML (B)	-33.55	31,000	

HISTORIC DIRECT PUSH VERTICAL PROFILE POINT	ELEVATION OF SAMPLE (FT NAVD 88)	PCE CONCENTRATION (UG/L)[3]	QUALIFIER
SB-01	-24.65	0.32	J
SB-02	-35.43	300	
SB-03	-35.46	230,000	D
SB-04	-25.17	0.29	J
SB-05	-5.22	6.8	
SB-06	-48.83	12	
SB-07	-6.81	750	
SB-08	-37.24	1.8	
SB-09	-30.14	13	
SB-10	-9.21	3,200	D
SB-11	-33.37	0.32	J
SB-12	-58.59	1,300	
SB-13	-15.78	420	D
SB-14	-57.7	5	U
SB-15	-30.94	540	
SB-16	-27.11	5.9	
SB-17	-3.94	0.5	U
SB-18	-3.62	5	U
SB-19	-18.43	0.5	U

Notes
[1]DATA ARE FOR GROUNDWATER SAMPLES COLLECTED IN 2017, EXCEPT WHERE NOTED.
[2]DATA ARE FOR GROUNDWATER SAMPLES COLLECTED IN 2015.
[3]DATA ARE FOR GROUNDWATER SAMPLES COLLECTED IN 2011.
NAVD 88 - NORTH AMERICAN VERTICAL DATUM 1988
UG/L - MICROGRAMS PER LITER
U - NOT DETECTED
J - ESTIMATED VALUE
D - DILUTION REQUIRED

ENLARGEMENT OF SOUTHWEST PORTION OF THE SITE

0 25 50
FEET
SCALE:1 " = 50 '

0 400 800
FEET
SCALE:1 " = 800 '
SHEET SIZE: 11" x 17"

LEGEND

- EXISTING MONITORING WELL
- HISTORIC DIRECT PUSH VERTICAL PROFILE POINT (2011)
- NEW INJECTION WELL
- NEW MONITORING WELL
- SYLVANIA SITE MONITORING WELL
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- SYLVANIA SITE
- GENERAL INSTRUMENTS SITE
- 5 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)
- 100 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)
- 1,000 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)

NOTES:
1. THERE IS NO EXISTING DATA FOR THE SUBJECT DEPTH INTERVAL AT LOCATIONS SHOWN IN GRAY.
2. AT LOCATIONS WHERE THERE IS MORE THAN ONE DATA POINT, CONTOURS WERE GENERATED USING THE HIGHEST RESULT.

NYSDEC SOLVENT FINISHERS SITE

SITE NO. 130172
JERICHO, NASSAU COUNTY

SUMMARY OF RESULTS OF ANALYSIS OF GROUNDWATER FOR PCE – 0 TO -100 FEET NAVD 88

FIGURE 4B

MARCH 2018

TRC
1430 BROADWAY
NEW YORK, NY

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WELL	ELEVATION OF SAMPLE (FT NAVD 88)	PCE CONCENTRATION (UG/L)[1]	QUALIFIER
MW-224	-177.72	15,000	
MW-225	-187.24	16	
SF-MW-7K	-104.61	1.7	
SF-MW-8M	-104.85	7,400	
SF-MW-8N	-155.85	0.33	J
SF-MW-9M	-107.13	91	
SF-MW-9N	-158.13	17	
SF-MW-10M	-106.75	1.0	U
SF-MW-10N	-181.75	0.21	J
SF-MW-11M	-107.37	350	
SF-MW-11N	-182.37	4,500	
SF-MW-12M	-106.40	19	
SF-MW-12N	-181.40	540	J
SF-MW-101ML (C)	-104.74	190,000	
SF-MW-102ML (C)	-102.55	21,000	
SF-MW-104ML (A)	-185.69	62	
SF-MW-105ML (A)	-193.48	3,000	
SF-MW-106ML (A)	-193.48	0.89	J
SF-MW-107ML (A)	-120.04	4.6	
W-37-325[2]	-181.03	160	D

Notes

[1]DATA ARE FOR GROUNDWATER SAMPLES COLLECTED IN 2017, EXCEPT WHERE NOTED.

[2]DATA IS FOR GROUNDWATER SAMPLE COLLECTED IN 2015.

NAVD 88 - NORTH AMERICAN VERTICAL DATUM 1988

UG/L - MICROGRAMS PER LITER

U - NOT DETECTED

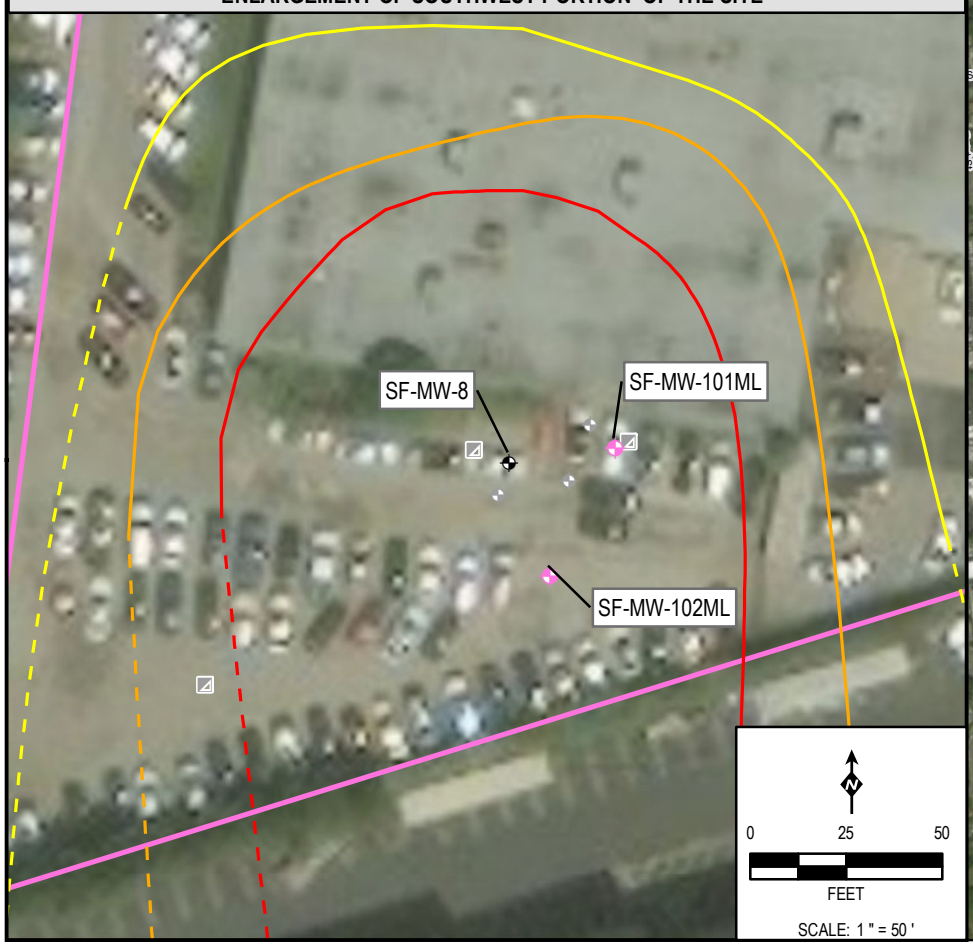
J - ESTIMATED VALUE

D - DILUTION REQUIRED

SF-MW-8
SF-MW-101ML
SF-MW-102ML
SF-MW-9
SF-MW-12
SF-MW-10
SF-MW-11
SF-MW-105ML
SF-MW-106ML
SF-MW-104ML
MW-224
SF-MW-7
SF-MW-107ML
MW-225
W-37-325

0 400 800
FEET
SCALE:1 " = 800 '
SHEET SIZE: 11" x 17"

ENLARGEMENT OF SOUTHWEST PORTION OF THE SITE



LEGEND

- EXISTING MONITORING WELL
- HISTORIC DIRECT PUSH VERTICAL PROFILE POINT (2011)
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- NEW MONITORING WELL
- SYLVANIA SITE MONITORING WELL
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NYSDEC SOLVENT FINISHERS SITE

SITE NO. 130172
JERICHO, NASSAU COUNTY

SUMMARY OF RESULTS OF ANALYSIS OF GROUNDWATER FOR PCE – -100 TO -200 FEET NAVD 88

FIGURE 4C

MARCH 2018

TRC 1430 BROADWAY NEW YORK, NY

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WELL	ELEVATION OF SAMPLE (FT NAVD 88)	PCE CONCENTRATION (UG/L)[1]	QUALIFIER
MW-202-380[2]	-242.16	1.4	J
MW-203-360[2]	-216.86	4.2	
MW-203-440[2]	-297.01	1	U
MW-220-325[3]	-202.80	3,200	D
SF-MW-103ML (A)	-243.32	0.33	J
SF-MW-103ML (B)	-287.32	460	
SF-MW-104ML (B)	-244.69	100	
SF-MW-104ML (C)	-284.69	440	
SF-MW-105ML (B)	-250.98	110	
SF-MW-106ML (B)	-273.48	0.46	J
SF-MW-107ML (B)	-215.04	2,800	
SF-MW-107ML (C)	-240.04	21,000	
SF-MW-107ML (D)	-290.04	610	
W-37-385[2]	-246.03	79	D

Notes

[1]DATA IS FOR GROUNDWATER SAMPLES COLLECTED IN 2017, EXCEPT WHERE NOTED.

[2]DATA ARE FOR GROUNDWATER SAMPLES COLLECTED IN 2015.

[3]DATA IS FOR GROUNDWATER SAMPLE COLLECTED IN 2016.

NAVD 88 - NORTH AMERICAN VERTICAL DATUM 1988

UG/L - MICROGRAMS PER LITER

U - NOT DETECTED

J - ESTIMATED VALUE

D - DILUTION REQUIRED

SF-MW-103ML
SF-MW-106ML
SF-MW-105ML
SF-MW-104ML
SF-MW-107ML
MW-203-440
MW-203-360
MW-202-380
W-37-385
MW-220-325

0 400 800
FEET
SCALE:1 " = 800 '
SHEET SIZE: 11" x 17"

LEGEND

- EXISTING MONITORING WELL
- HISTORIC DIRECT PUSH VERTICAL PROFILE POINT (2011)
- NEW INJECTION WELL
- NEW MONITORING WELL
- SYLVANIA SITE MONITORING WELL
- GENERAL INSTRUMENTS SITE MONITORING WELL
- SOLVENT FINISHERS SITE
- SYLVANIA SITE
- GENERAL INSTRUMENTS SITE
- 5 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)
- 100 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)
- 1,000 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)

NOTES:
1. THERE IS NO EXISTING DATA FOR THE SUBJECT DEPTH INTERVAL AT LOCATIONS SHOWN IN GRAY.

2. AT LOCATIONS WHERE THERE IS MORE THAN ONE DATA POINT, CONTOURS WERE GENERATED USING THE HIGHEST RESULT.

NYSDEC SOLVENT FINISHERS SITE

SITE NO. 130172
JERICHO, NASSAU COUNTY

SUMMARY OF RESULTS OF ANALYSIS OF GROUNDWATER FOR PCE – -200 TO -300 FEET NAVD 88

FIGURE 4D

MARCH 2018

TRC
1430 BROADWAY
NEW YORK, NY

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WELL	ELEVATION OF SAMPLE (FT NAVD 88)	PCE CONCENTRATION (UG/L)[1]	QUALIFIER
MW-202-495[2]	-357.35	1	U
SF-MW-101ML (D)	-332.74	55,000	
SF-MW-102ML (D)	-333.55	5,000	
SF-MW-103ML (C)	-351.32	640	
SF-MW-106ML (C)	-333.48	4.1	

Notes

[1]DATA ARE FOR GROUNDWATER SAMPLES COLLECTED IN 2017, EXCEPT WHERE NOTED.

[2]DATA IS FOR GROUNDWATER SAMPLE COLLECTED IN 2012.

NAVD 88 - NORTH AMERICAN VERTICAL DATUM 1988

UG/L - MICROGRAMS PER LITER

U - NOT DETECTED

SF-MW-101ML

SF-MW-102ML

SF-MW-103ML

SF-MW-106ML

MW-202-495

ENLARGEMENT OF SOUTHWEST PORTION OF THE SITE

0 25 50

FEET

SCALE: 1 " = 50 '

0 400 800

FEET

SCALE:1 " = 800 '

SHEET SIZE: 11" x 17"

LEGEND

- EXISTING MONITORING WELL
- HISTORIC DIRECT PUSH VERTICAL PROFILE POINT (2011)
- NEW INJECTION WELL
- NEW MONITORING WELL
- SYLVANIA SITE MONITORING WELL
- GENERAL INSTRUMENTS SITE MONITORING WELL
- SOLVENT FINISHERS SITE
- SYLVANIA SITE
- GENERAL INSTRUMENTS SITE
- 5 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)
- 100 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)
- 1,000 UG/L CONTOUR (INFERRED) (DASHED WHERE NOT DELINEATED)

NOTES:
1. THERE IS NO EXISTING DATA FOR THE SUBJECT DEPTH INTERVAL AT LOCATIONS SHOWN IN GRAY.

2. AT LOCATIONS WHERE THERE IS MORE THAN ONE DATA POINT, CONTOURS WERE GENERATED USING THE HIGHEST RESULT.

NYSDEC SOLVENT FINISHERS SITE

SITE NO. 130172
JERICHO, NASSAU COUNTY

SUMMARY OF RESULTS OF ANALYSIS OF GROUNDWATER FOR PCE – -300 TO -400 FEET NAVD 88

FIGURE 4E

MARCH 2018

TRC
1430 BROADWAY
NEW YORK, NY

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ATTACHMENT B

Attachment B
New York State Department of Environmental Conservation
Solvent Finishers Site
Jericho, NY

Preliminary Conceptual Design Cost Estimate

Item Description	Estimated Capital & Implementation Cost	Estimated Engineering/PM/CM /Design Cost	Estimated Total Cost
Access & Permitting	$ -	$ 800,000	$ 800,000
Well Installation	$ 131,608,000	$ 13,161,000	$ 144,769,000
Distribution Infrastructure	$ 27,185,000	$ 2,719,000	$ 29,904,000
Infrastructure	**$ 158,800,000**	**$ 16,680,000**	**$ 175,500,000**
Amendments	$ 172,950,000	$ 17,295,000	$ 190,245,000
Injections	$ 63,392,000	$ 6,339,000	$ 69,731,000
Maintenance & Decommissioning	$ 15,715,000	$ 1,572,000	$ 17,287,000
Operations	**$ 252,100,000**	**$ 25,210,000**	**$ 277,300,000**
Groundwater Sampling	$ 2,889,000	$ 289,000	$ 3,178,000
Performance Monitoring	**$ 2,900,000**	**$ 290,000**	**$ 3,200,000**
ESTIMATED TOTAL	**$ 413,800,000**	**$ 42,200,000**	**$ 456,000,000**

Refer to Conceptual Design Memorandum for important qualifiers.