day
DAY ENVIRONMENTAL, INC.

ENVIRONMENTAL CONSULTANTS
AN AFFILIATE OF DAY ENGINEERING, P.C.

November 7, 2017

Ms. Charlotte Theobald
NYSDEC
Division of Environmental Remediation
6274 East Avon-Lima Road
Avon, New York 14414

Re: ISCO Polishing
Andrews Street Site
300, 304-308 and 320 Andrews Street
and 25 Evans Street
Rochester, New York
NYSDEC Site #E828144

Dear Ms. Theobald:

This letter identifies the proposed scope of work for continued in-situ chemical oxidation (ISCO) groundwater polishing on a portion of the above-referenced property (Site) that is intended to supplement the on-going ISCO polishing that is using Carus Remediation's RemOx-SR and RemOx-SR^{+} cylinders in select existing injections wells and monitoring wells. A Project Locus Map is included as Figure 1.

1.0 Background

The attached Figure 2 includes Tetrachloroethene (PCE) concentrations detected in June 2017 groundwater samples that were collected from the overburden monitoring well field at the Site. As shown, the highest concentrations of PCE were detected at monitoring wells MW-01, MW-03A and MW-17. Wells MW-03A and MW-17 are located within the former PCE source area, and well MW-01 is located within the hydraulically downgradient PCE plume core. [Note: The complete set of cumulative groundwater monitoring results for existing wells and previously decommissioned wells is provided in the September 28, 2017 Periodic Review Report.]

Previous ISCO injection points, remediation pits and injection wells are shown on Figure 3. As shown, numerous injection wells exist around MW-1 (e.g., IW-1, IW-4A, IW-4B, IW-8 and IW-9); however, no injection wells exist around wells MW-03A and MW-17.

2.0 ISCO Groundwater Polishing

Based on cumulative groundwater monitoring results, ISCO groundwater polishing beyond that currently being conducted is proposed for the areas around MW-01, MW-03A and MW-17. The components of this additional work are outlined herein.

2.1 Installation and Development of New Injection wells.

To supplement the existing field of ISCO injection wells, it is proposed that eight approximately 20-foot deep 2-inch diameter PVC injection wells with 10 to 15 foot long 10-slot screened intervals be installed at the Site. Four of these injection wells will be installed around, and approximately 10 feet away from, existing monitoring well MW-03A. The remaining four injection wells will be installed around, and approximately 10 feet away from, existing monitoring well MW-17. The tentative locations of these eight injection wells are shown on Figure 3.

At each injection well location, a rotary drill-rig will be used to advance 4.25-inch inner diameter hollow stem augers to the desired depth. Depending upon existing boring log data for previous test boring and well locations, intermittent split spoon samples may or may not be collected from each injection well boring ahead of the augers. Once the desired depth is achieved, the 2-inch diameter PVC screen and solid PVC riser will be installed with a sand pack being placed around the screen and extending at least one foot above the top of the screen, a minimum two foot thick bentonite seal will be placed above the sand pack, and the remaining annulus will be filled with grout (94% Portland cement, 6% bentonite). Each solid PVC riser pipe will extend above the ground surface and be equipped with a PVC cap or J-plug.

The drilling subcontractor will arrive on-site with clean drilling equipment and will also construct a temporary decontamination pad. Drilling equipment (e.g., augers) will be decontaminated (steam-cleaned) between injection well locations and also prior to leaving the Site. Split spoon samplers, if used, will be decontaminated after each use and prior to leaving the Site.

Once the grout has set (generally one day after installation), the eight new injection wells will be developed by removing at least five well casing volumes of water. The development water will be containerized in New York State Department of Transportation approved 55-gallon drums that will be staged on-site.

2.2 Project-Derived Wastes

Displaced soil cuttings and other solid project-derived waste materials will be placed in a lined roll-off container, characterized (sampled and analyzed for parameters required by the disposal facility, transported off-site on a NYSDEC Part 364 permitted vehicle, and disposed at an appropriate regulated landfill facility in accordance with applicable local state and federal regulations.

[Note: Decontamination water, well development water, or other water generated during the work that is generally free of sediments will be used as make-up water for the ISCO groundwater polishing. As such, liquid project-derived waste is not anticipated to be generated.]

2.3 Additional ISCO Polishing Using Existing and New Injection Wells.

The additional ISCO groundwater polishing will entail injection of 4% to 5% potassium permanganate ($KMnO_4$) solution at existing injection wells (e.g., IW-1, IW-4A, IW-4B, IW-5, IW-8 and IW-9 in proximity to monitoring well MW-01) and new injection wells that are in proximity to monitoring wells MW-03A and MW-17. To prepare for the additional ISCO groundwater polishing, any mesh strings of Carus RemOx-SR cylinders or RemOx-SR$^+$ cylinders in the existing injection wells and monitoring wells involved with this work will be removed, labeled, and placed in one or more 55-gallon drums with secure lids which will also be labeled, stored on-site, and re-installed in the future.

Initially, groundwater will be extracted from injection wells and/or monitoring wells MW-01, MW-03A and MW-17, which will be transferred to two or more 55 gallon drums, which may be set in series to allow suspended sediments in the groundwater to settle out. The $KMnO_4$ will be purchased as an approximate >97% pure solid, and will be mixed with site groundwater (and potable water from the Rochester public water system if necessary), to form an approximate 4% to 5 % $KMnO_4$ solution.

Pumps with tubing connected to secure fittings on injection well heads will then be used to inject the 4% or 5% $KMnO_4$ solution under low pressure (e.g., 10 pounds per square inch or less). While $KMnO_4$ solution is added to injection wells, groundwater will continue to be removed from monitoring wells MW-01, MW-03A and/or MW-17, and the removed groundwater will be treated in the drums with $KMnO_4$ to create additional $KMnO_4$ solution that will be re-injected. In addition, the injection and extraction locations may be reversed, where approximate 4% to 5% $KMnO_4$ solution is added to monitoring wells MW-01, MW-03A and/or MW-17, and groundwater is extracted from one or more of the existing or new injection wells, which will later be used to formulate approximate 4% to 5% $KMnO_4$ solution that will be injected at a later time.

The goal of the additional ISCO groundwater polishing is to treat and recirculate groundwater in the former source area and plume core area in proximity to monitoring wells MW-01, MW-03A and MW-17 where highest residual PCE concentrations have been measured.

It is anticipated that up to 330 pounds of >97% pure solid $KMnO_4$ may initially be purchased, which is below the United States Department of Homeland Security (DHS) Chemical Facility Anti-Terrorism Standards (CFATS) Screening Threshold Quantity (STQ) of 400 pounds. Additional >97% pure solid $KMnO_4$ may be purchased as deemed necessary, but the 400 pound STQ will not be exceeded.

It is currently anticipated that twenty ISCO groundwater polishing extraction/injection (recirculation) events will be conducted over an approximate 9 month period; however, the number of events and the duration of this additional work will likely be adjusted based on actual field conditions observed.

2.4 General Provisions

Applicable provisions set forth in the Health and Safety Plan (HASP) and Quality Assurance Project Plan (QAPP) that are included in the August 2015 Site Management Plan (SMP) will be implemented during fieldwork associated with this additional ISCO groundwater polishing work. This includes calling in a utility stakeout prior to start of drilling activities, and implementing the air monitoring outlined in the Community Air Monitoring Plan (CAMP) during drilling activities. Groundwater monitoring will continue as scheduled in the SMP.

Where applicable, individuals involved with implementation of the fieldwork will be 29 CFR 1910.120 HAZWOPER trained, and current HAZWOPER certifications for these individuals will be made available upon request.

It is requested that the NYSDEC provide approval and/or comments to the proposed ISCO groundwater polishing.

If there are any questions, please contact this office.

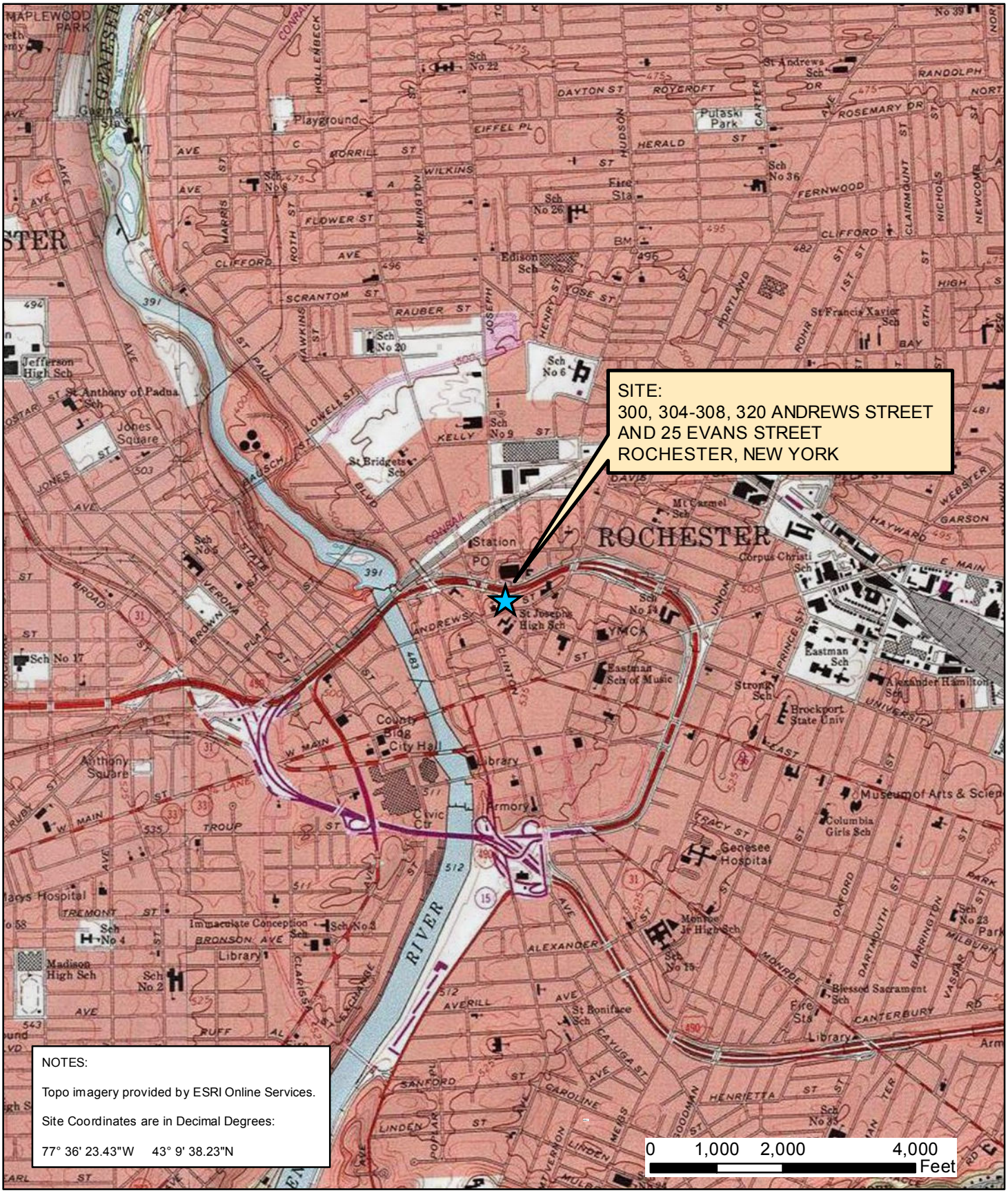
Very truly yours,
Day Environmental, Inc.

Jeffrey A. Danzinger
Associate Principal

JAD/s

Figures

ec: Joseph Biondolillo (City of Rochester)
Dennis Peck (City of Rochester)



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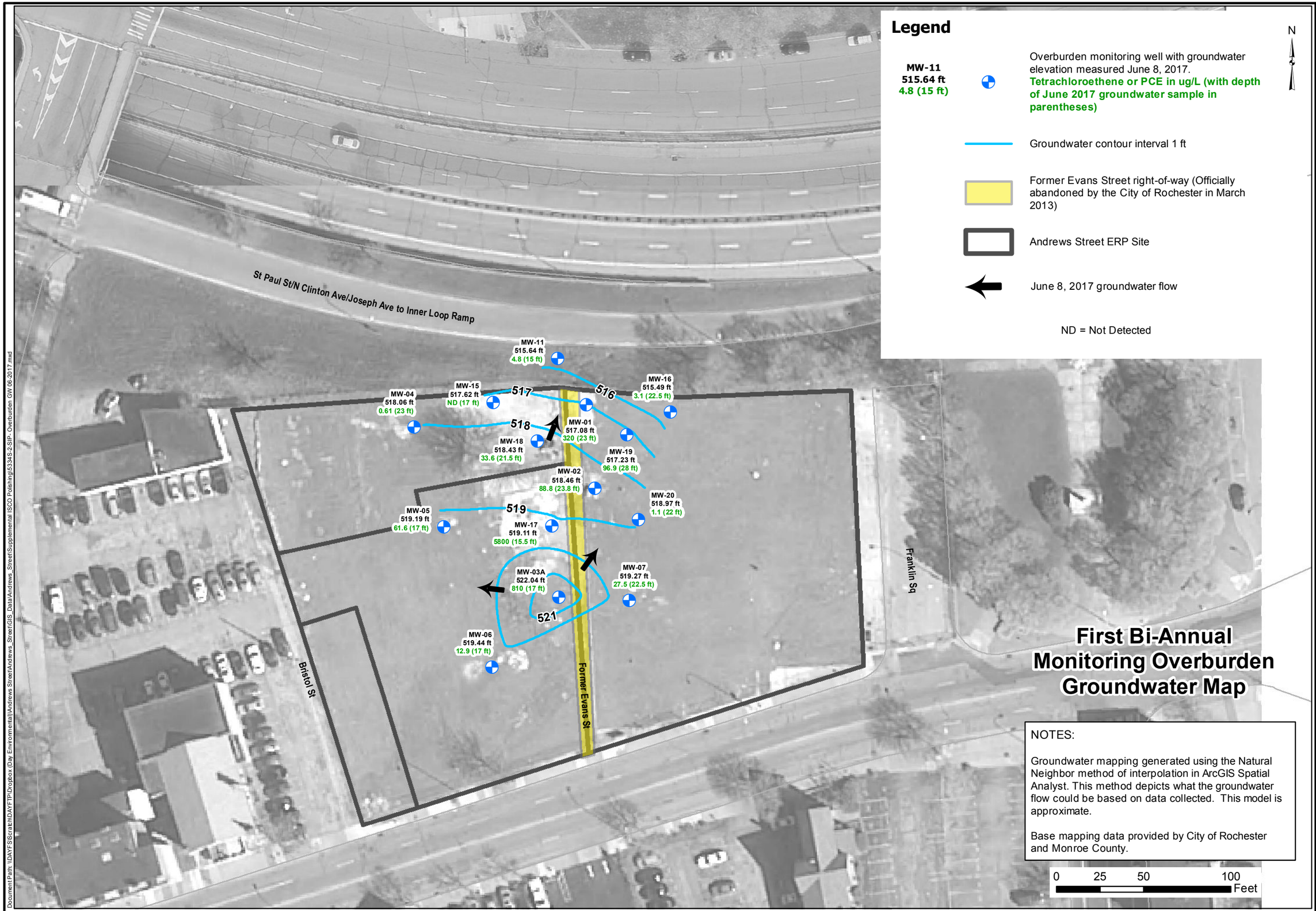
Date 09-26-2017 Drawn By CPS Scale AS NOTED	**DAY ENVIRONMENTAL, INC.** **Environmental Consultants** **Rochester, New York 14606** **New York, New York 10016-0701**	Project Title 300, 304-308, 320 ANDREWS STREET AND 25 EVANS STREET ROCHESTER, NEW YORK (NYSDEC SITE NO.: E828144) ENVIRONMENTAL RESTORATION PROJECT Drawing Title Project Locus Map	Project No. 5334S-17 FIGURE 1



Legend

MW-11
515.64 ft
4.8 (15 ft)

Overburden monitoring well with groundwater elevation measured June 8, 2017.
Tetrachloroethene or PCE in ug/L (with depth of June 2017 groundwater sample in parentheses)

Groundwater contour interval 1 ft

Former Evans Street right-of-way (Officially abandoned by the City of Rochester in March 2013)

Andrews Street ERP Site

June 8, 2017 groundwater flow

ND = Not Detected

N

First Bi-Annual Monitoring Overburden Groundwater Map

NOTES:

Groundwater mapping generated using the Natural Neighbor method of interpolation in ArcGIS Spatial Analyst. This method depicts what the groundwater flow could be based on data collected. This model is approximate.

Base mapping data provided by City of Rochester and Monroe County.

0 25 50 100 Feet

DESIGNED BY	DRAWN BY	SCALE	DATE
JAD	CPS	AS NOTED	07-2017

DATE DRAWN	DATE ISSUED
07-2017	07-10-2017

DAY ENVIRONMENTAL, INC.
Environmental Consultants
Rochester, New York 14606
New York, New York 10170

Project Title
300, 304-308, 320 ANDREWS STREET
AND 25 EVANS STREET
ROCHESTER, NEW YORK

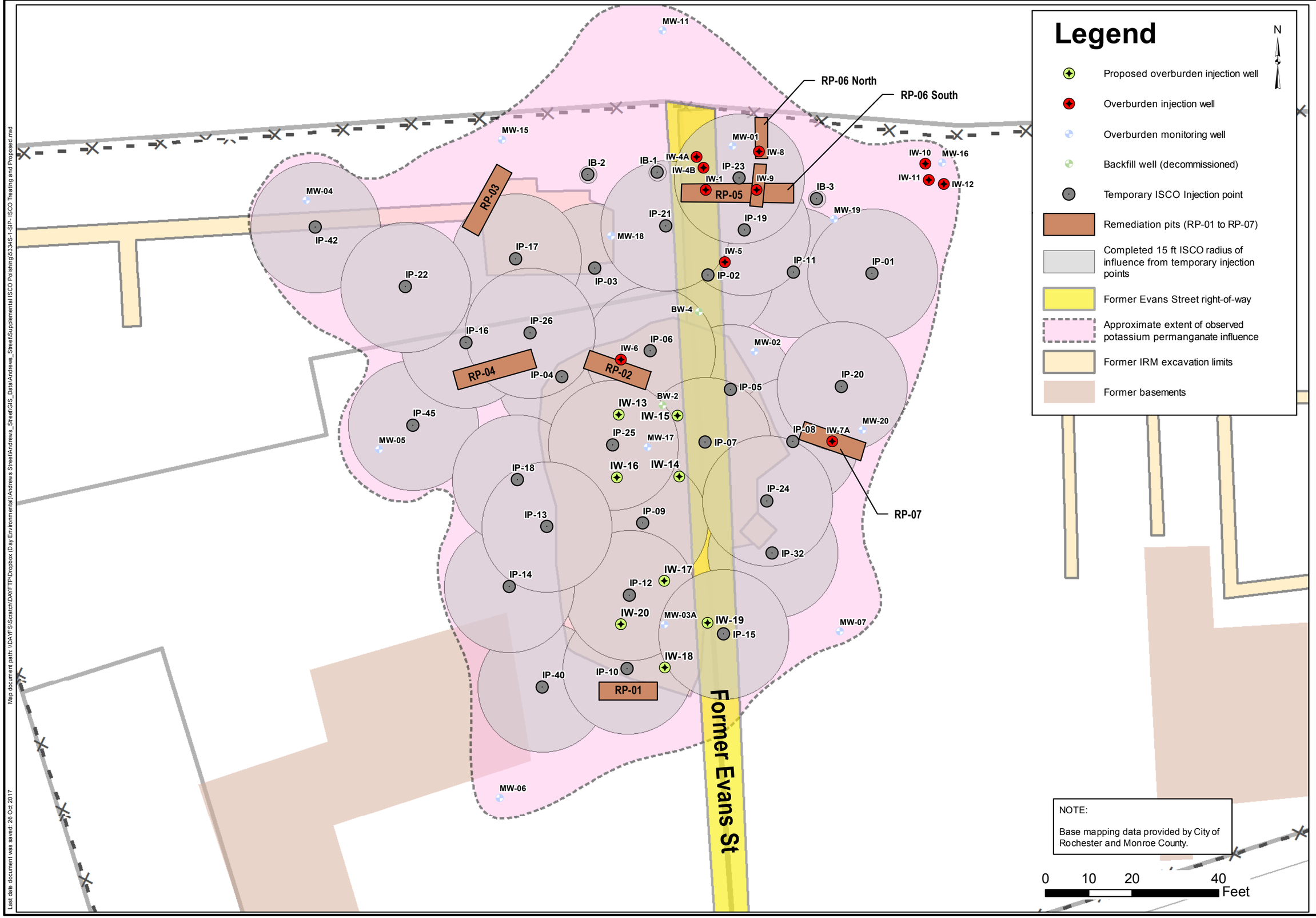
ENVIRONMENTAL RESTORATION PROJECT NYSDEC SITE NO.: E828144

Drawing Title
Site Plan with Overburden Groundwater Potentiometric Map for June 8, 2017 and PCE Concentrations Detected in June 2017 Overburden Groundwater Samples

Project No.
5334S-17

FIGURE 2

Document Path: \\DAYFS\Scratch\DAYFTP\Dropbox (Day Environmental)\Andrews Street\Andrews_Street\GIS_Data\Andrews_Street\Supplemental ISCO Polishing\5334S-2-SIP- Overburden GW 06-2017.mxd



Legend

- Proposed overburden injection well
- Overburden injection well
- Overburden monitoring well
- Backfill well (decommissioned)
- Temporary ISCO Injection point
- Remediation pits (RP-01 to RP-07)
- Completed 15 ft ISCO radius of influence from temporary injection points
- Former Evans Street right-of-way
- Approximate extent of observed potassium permanganate influence
- Former IRM excavation limits
- Former basements

N

NOTE:

Base mapping data provided by City of Rochester and Monroe County.

0 10 20 40 Feet

DESIGNED BY	DATE	DRAWN BY	DATE DRAWN	SCALE	DATE ISSUED
JAD	10-2017	CPS	10-2017	AS NOTED	10-26-2017

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Environmental Consultants
Rochester, New York 14606
New York, New York 10170

Project Title
300, 304-308, 320 ANDREWS STREET
AND 25 EVANS STREET
ROCHESTER, NEW YORK

ENVIRONMENTAL RESTORATION PROJECT NYSDEC SITE NO: E828144

Drawing Title
Site Plan with In-Situ Chemical Oxidation Treatment Measures
Including Proposed Overburden Injection Wells

Project No.
5334S-17

FIGURE 3

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