Arcadis U.S., Inc.
6041 Wallace Road Extension
Suite 300
Wexford, Pennsylvania 15090
Phone: 724 742 9180
Fax: 724 742 9189
www.arcadis.com

Mr. Pietro Mannino, Chief
Western New York Remediation Section
United States Environmental Protection Agency, Region 2
290 Broadway
New York, New York 10007-1865

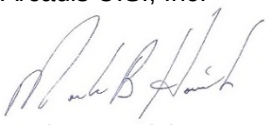
Date: October 19, 2021
Our Ref: 30009085
Subject: Remedial Action Work Plan
AVX Property, Operable Unit 2
Olean Well Field Superfund Site
Olean, New York

Dear Mr. Mannino,

On behalf of KYOCERA AVX Components Corporation (AVX), Arcadis U.S., Inc. (Arcadis) respectfully submits this Remedial Action Work Plan (RAWP) to the United States Environmental Protection Agency (USEPA) for the AVX property located at 1695 Seneca Avenue in Olean, Cattaraugus County, New York (AVX Property). This RAWP has been prepared in accordance with Section 4.1 of the Remedial Design/Remedial Action Statement of Work, Operable Unit Two, AVX Property at the Olean Well Field Superfund Site, and includes a proposed remedial action construction schedule, an updated Health and Safety Plan, and plans for satisfying permitting requirements to support implementation of the Final (100%) Remedial Design.

Please contact me if you have any questions or comments during your review of the RAWP.

Sincerely,
Arcadis U.S., Inc.



Mark B. Hanish
Project Manager

Email: mark.hanish@arcadis.com
Direct Line: 724.934.9518

CC. Ms. Jacqueline Frazier, U.S. Army Corps of Engineers
Mr. Gregory Hattan, U.S. Army Corps of Engineers
Mr. Steven Moeller, New York State Department of Environmental Conservation
Ms. Sharon Kivowitz, United States Environmental Protection Agency
Mr. Michael Scorca, United States Environmental Protection Agency
Ms. Maeve Wurtz, United States Environmental Protection Agency
Ms. Brandy Bossle, KYOCERA AVX Components Corporation
Mr. William B. Popham, Arcadis U.S., Inc.
Mr. Joseph Molina, Arcadis U.S., Inc.

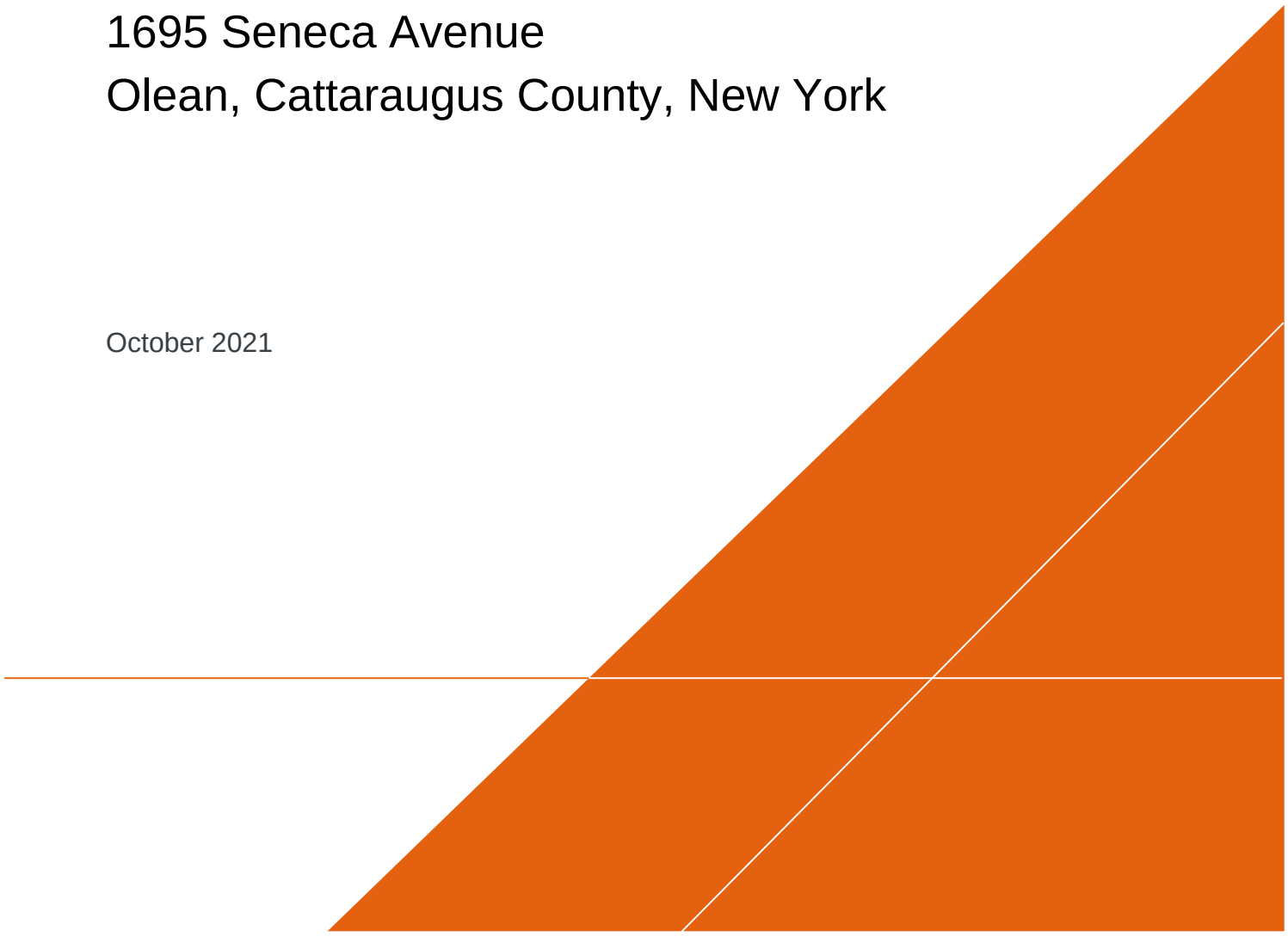
ARCADIS Design & Consultancy for natural and built assets

KYOCERA AVX Components Corporation

REMEDIAL ACTION WORK PLAN

AVX Property, Operable Unit 2
Olean Well Field Superfund Site
1695 Seneca Avenue
Olean, Cattaraugus County, New York

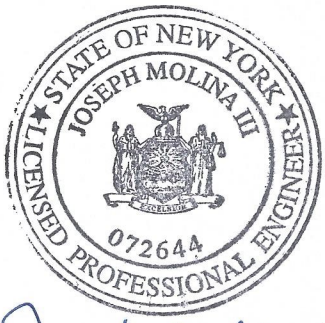
October 2021



REMEDIAL ACTION WORK PLAN

AVX Property
Operable Unit 2
Olean Well Field Superfund Site
1695 Seneca Avenue
Olean, Cattaraugus County, New York

Mark B. Hanish
Project Manager
NY P.G. License No. 000076-1



Joseph Molina III, P.E.
Senior Vice President
NY P.E. License No. 072644

William B. Popham
Senior Vice President

Prepared for:
KYOCERA AVX Components Corporation

Prepared by:
Arcadis U.S., Inc.
6041 Wallace Road Extension
Suite 300
Wexford
Pennsylvania 15090
Tel 724 742 9180
Fax 724 742 9189

Our Ref.:
30009085

Date:
October 2021

CONTENTS

TABLE

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

2017 ACD	Amended Remedial Design/Remedial Action Consent Decree between the United States (on behalf of the USEPA) and AVX in Civ. Action No. 1:98-CV-00054
Arcadis	Arcadis U.S., Inc.
AVX	KYOCERA AVX Components Corporation
AVX Property	AVX property located at 1695 Seneca Avenue in Olean, Cattaraugus County, New York
CFR	Code of Federal Regulations
COC	chemical of concern
Final RD	Final (100%) Remedial Design
HASP	Health and Safety Plan
IDW	investigation-derived waste
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
OU-2	Operable Unit 2
PDI	pre-design investigation
PDI Report	Pre-Design Investigation Report
RA	remedial action
RAO	remedial action objective
RAWP	Remedial Action Work Plan
ROD	Record of Decision
ROD Amendment	September 30, 2015 OU-2 ROD Amendment
SPDES	State Pollutant Discharge Elimination System
TSDF	treatment, storage, and disposal facility
USEPA	United States Environmental Protection Agency

1 INTRODUCTION

This Remedial Action Work Plan (RAWP) prepares for the final aspects of the implementation of the Final (100%) Remedial Design (Final RD; Arcadis U.S., Inc. [Arcadis] 2021) for the groundwater portion of the Operable Unit 2 (OU-2) remedy for the KYOCERA AVX Components Corporation (AVX) property located at 1695 Seneca Avenue in Olean, Cattaraugus County, New York (AVX Property) (**Figures 1-1 and 1-2**). The AVX Property is located within the area defined by the United States Environmental Protection Agency (USEPA) as the Olean Well Field Superfund Site. This RAWP has been prepared in accordance with Section 4.1 of the Remedial Design/Remedial Action (RD/RA) Statement of Work (SOW), Operable Unit Two, AVX Property at the Olean Well Field Superfund Site, and includes a proposed remedial action (RA) construction schedule, an updated Health and Safety Plan (HASP), and plans for satisfying permitting requirements. All other pertinent details and plans associated with implementation of the OU-2 RA are included in the Final RD.

1.1 Background

The key steps leading to the preparation of the RAWP are summarized below. Additional details regarding the regulatory history leading to the OU-2 RA can be found in the Final RD (Arcadis 2021).

- USEPA's 1996 Record of Decision (ROD) for OU-2.
- March 17, 1998 Consent Decree between the United States (on behalf of the USEPA) and AVX in Civ. Action No. 1:98-CV-00054, which required AVX to perform the remedy selected in the OU-2 ROD.
- USEPA's June 15, 2015 Proposed Plan and eventual September 30, 2015 OU-2 ROD Amendment (ROD Amendment), which selected the OU-2 remedy for the historical source area, downgradient till unit, and City Aquifer.
- January 25, 2017 Amended Remedial Design/Remedial Action Consent Decree between the United States (on behalf of the USEPA) and AVX in Civ. Action No. 1:98-CV-00054 (2017 ACD), which requires AVX to perform the work identified in the September 30, 2015 ROD Amendment. The 2017 ACD includes the Remedial Design/Remedial Action (RD/RA) Statement of Work (SOW), Operable Unit Two, AVX Property at the Olean Well Field Superfund Site.
- Arcadis' January 18, 2018 Remedial Design Work Plan.
- Arcadis' September 12, 2018 Pre-Design Investigation Report (PDI Report).
- Arcadis' June 17, 2019 PDI Report Response to Comments.
- Arcadis' August 2019 30% Remedial Design.
- USEPA's April 6, 2020 Comments to the 30% Remedial Design.
- Arcadis' May 6, 2020 Responses to USEPA's Comments to the 30% Remedial Design.
- USEPA's June 2, 2020 Approval of the 30% Remedial Design.

- Arcadis' June 2020 95% Remedial Design.
- USEPA's June 14, 2021 Comments to the 95% Remedial Design Report.
- Arcadis' July 2021 Final RD.
- USEPA's August 27, 2021 approval of the Final RD, which was sent via email on August 31, 2021 (**Appendix A**).
- USEPA's September 20, 2021 Notice of Authorization to Proceed with Remedial Action (**Appendix A**).

1.2 Purpose

The objective of the RAWP is to prepare for final aspects of the implementation of the Final RD for the groundwater portion of the OU-2 remedy. The final groundwater remedy was selected in the ROD Amendment (USEPA 2015) to meet the remedial action objectives (RAOs) for the ROD-defined chemicals of concern (COCs) (**Table 1-1**), specifically for groundwater. These RAOs, outlined in the ROD (USEPA 1996), are as follows:

- Restore the City Aquifer beneath the AVX Property to its beneficial use as a source of drinking water by reducing contaminant levels to the more stringent of federal maximum contaminant levels or New York State standards.
- Minimize, contain, and/or eliminate sources of volatile organic compound contaminants already in the till unit groundwater at the AVX Property.
- Minimize and/or eliminate the potential for future human exposure to site contaminants via contact with contaminated groundwater.

2 PERMITTING REQUIREMENTS

As described in Section 4 of the Final RD (Arcadis 2021), several regulatory and permitting requirements were considered during the RD phase. The following provides an update on the status of permitting requirements as the RA phase of the project is initiated:

- *Construction within a Wetland Area* – New York State (6 New York Codes, Rules, and Regulations [NYCRR] Parts 622-665) and USEPA (40 Code of Federal Regulations [CFR] Part 230) regulations were previously consulted. As detailed in Appendix A of the Final RD, the New York State Department of Environmental Conservation (NYSDEC) does not require permits for the work on the AVX Property because no areas are recognized as New York State-regulated wetlands. That finding was confirmed by consulting the New York State's Environmental Resource Mapper that provides an online inventory of areas that the state identifies as wetlands (see Attachment 1 of the Arcadis June 17, 2019 correspondence to USEPA [Arcadis 2019a] within **Appendix B**). In addition, the USEPA indicated in a December 19, 2017 email from Michael Walters of the USEPA to Mark Hanish of Arcadis that the OU-2 area is within a scrub/shrub, forested wetland zone, and that information for any imported fill materials proposed for use during the pre-design investigation (PDI) and remedial construction activities would require USEPA review. Appendix A of the Final RD also detailed communications documenting that the USEPA indicated that "although no federal permit is required for remedial action activities within the OU2 area wetland zone, imported fill material must meet the requirements of Table 1 of 40 CFR 401.15 and Section 307 (a)(1) of the Clean Water Act." During previous phases of work, the required information was provided to the USEPA, and USEPA approved placement of fill along the proposed access routes and working platform leading to and within the area of the future containment barrier.

  For the proposed RA activities, an access road and hydraulic containment trench construction platform is required within this area, as shown in the Final RD. Therefore, the areas that will be affected by that construction and the types of fill material to be used are also defined in the technical specifications and drawings in the Final RD. The volumes of that fill material can be estimated, and this information can be provided if requested by the USEPA.

- *Disposal of Potentially Contaminated Water and Soil* – As was performed during the PDI activities, the NYSDEC Solid Waste (6 NYCRR Part 360) and Hazardous Waste (6 NYCRR Parts 370-375) regulations, as well as USEPA Resource Conservation and Recovery Act Hazardous Waste (40 CFR Parts 261-263) regulations will be followed for any wastes generated. As has historically been performed for all prior phases of investigation, investigation-derived wastes (IDWs) will be contained and stored onsite before shipment to a permitted offsite treatment, storage, and disposal facility (TSDF). In accordance with Section 121(d)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act (a.k.a. the Offsite Rule under 40 CFR Part 300.440), for newly generated wastes, Arcadis or AVX will provide the USEPA with any required analytical data representative of the IDW for its review, including the waste characterization determination. As part of that submission, Arcadis or AVX will provide the USEPA a completed ***USEPA Region 2 Offsite Rule Request Form*** for each proposed waste stream and each receiving offsite TSDF. Based on information on the completed forms, the USEPA will evaluate whether each proposed receiving offsite TSDF is acceptable. AVX anticipates that non-hazardous soil and non-hazardous water wastes may be generated during the hydraulic containment barrier installation and assumes that if offsite disposal

is required, the USEPA will review and approve the selected TSDFs in parallel with the schedule of other RA tasks to not delay implementation of the RA in accordance with any approved RA schedules.

- *Construction of Treatment Building* – The Town of Olean Building Department has been consulted, and all necessary building permits will be obtained now that the Final RD was approved. Arcadis will continue to keep in contact with the Town of Olean to obtain updated direction from the building code enforcement officer throughout implementation of the RA activities.
- *Pumping/Extraction of Groundwater* – NYCRR Part 605 requirements will be complied with for extracting groundwater.
- *Air Emissions* – As noted in the PDI Report (Arcadis 2018b), after consulting the New York State Air Pollution Regulations (6 NYCRR Parts 200-263) and Division of Air Resources-1 Guidance, Arcadis determined that it is unlikely that air treatment will be required due to the anticipated low influent groundwater flow rates, the expected diminishing COC concentrations over time, and the substantial distance to the nearest property boundary. Nonetheless, air dispersion modeling will be performed as part of this RAWP to confirm this assumption. If modeling indicates that some air treatment is necessary, that secondary treatment (likely to be vapor phase carbon) will be added to the treatment train at the time the treatment system is constructed. An addendum to the RAWP will be provided in the event that vapor phase treatment is necessary.
- *Discharge of Production Well Water* – As noted in the Final RD, the water generated by production well PW-1 is discharged to an outfall near AVX's southern property boundary under a State Pollutant Discharge Elimination System (SPDES) permit (No. NY-0073547) that was renewed in 2018 and does not require renewal again until 2023. Based on a September 18, 2018 email from Mr. Robert Smythe of the NYSDEC Division of Water to Mark Hanish of Arcadis, Mr. Smythe indicated that because there is no longer non-contact cooling water discharged at the facility, the facility would fall under the exemption for SPDES permitting for remediation activities (**Appendix B**). Under this exemption, the discharge must still meet the substantive requirements of the SPDES permit but would be overseen by the Division of Environmental Remediation.
- *Discharge of Treated Water and Sanitary Sewer Connection* – The City of Olean Wastewater Treatment Plant was consulted during the design process, and all necessary discharge permits will be obtained before connection to the sanitary sewer. As a possible fallback option, Mr. Smythe of the NYSDEC Division of Water indicated that it could be possible to blend the treated hydraulic trench water into the PW-1 discharge water that flows to the SPDES permitted outfall (**Appendix B**).

3 PROJECT SCHEDULE

With the USEPA's September 20, 2021, Notice of Authorization to Proceed with Remedial Action, AVX intends to implement the approved Final RD as further described herein and in accordance with the estimated RA Construction Schedule provided in **Appendix C**. The initiation of construction activities will be triggered by the USEPA's approval of the RAWP, and therefore, the RA Construction Schedule includes durations and not specific dates. Furthermore, if the USEPA approves the RAWP at a time of the year that will not allow for field construction to be completed within a single construction season (late spring through late fall), the RAWP Construction Schedule provided in **Appendix C** will require modification.

In summary, and in accordance with the requirements of the 2017 ACD and as described in the Final RD, AVX will install a shallow hydraulic containment trench barrier system near the downgradient (southern) edge of the property (**Figure 3-1**), including associated recovery/conveyance and treatment systems. The till unit hydraulic barrier will be constructed as a sand/gravel-filled trench with a sump/pump system that will actively pump, convey, and treat groundwater to capture dissolved COCs entering from upgradient (from the direction of the former AVX Property operations building) to minimize and eventually eliminate the potential for offsite migration of dissolved COCs. Furthermore, operation of existing pumping well PW-1, which provided water to AVX's former operations for the purposes of non-contact cooling water, will continue to operate as part of the final groundwater remedy. Water pumped from pumping well PW-1 will continue to be monitored and discharged under the conditions set forth in the SPDES permit.

The hydraulic containment trench, recovery/conveyance features, and groundwater treatment system will all be constructed in general accordance with the Final RD (Arcadis 2021).

4 HEALTH AND SAFETY PLAN

The site-specific HASP has been updated to cover the activities anticipated to be conducted during implementation of the Final RD (Arcadis 2021), as well as ongoing activities conducted at the site. The updated HASP is provided as **Appendix D**.

5 REFERENCES

Arcadis. 2018a. Remedial Design Work Plan. AVX Corporation, Olean, New York. January 18.

Arcadis. 2018b. Pre-Design Investigation Report. AVX Corporation, Olean, New York. September 12.

Arcadis. 2019a. Response to USEPA Comments on the Pre-Design Investigation Report. AVX Corporation, Olean, New York. June 17.

Arcadis. 2019b. 30% Remedial Design. AVX Corporation, Olean, New York. August 30.

Arcadis. 2020a. Response to USEPA Comments on the 30% Remedial Design. AVX Corporation, Olean, New York. May 6.

Arcadis. 2020b. 95% Remedial Design. AVX Corporation, Olean, New York. June.

Arcadis. 2021. Final (100%) Remedial Design. AVX Corporation, Olean, New York. July 2021.

USEPA. 1996. Record of Decision for Operable Unit 2, Olean, New York.

USEPA. 2015. Operable Unit 2 Record of Decision Amendment. Olean, New York. September 30.

USEPA. 2017. Amended Remedial Design/Remedial Action Consent Decree between the United States (on behalf of the USEPA) and AVX in Civ. Action No. 1:98-CV-00054. January 25.

USEPA. 2020a. Comments on the 30% Remedial Design. AVX Corporation, Olean, New York. April 6.

USEPA. 2020b. Approval of the 30% Remedial Design. AVX Corporation, Olean, New York. June 2.

USEPA. 2021a. Comments on the 95% Remedial Design. AVX Corporation, Olean, New York. June 14.

USEPA. 2021b. Approval of Final 100% Remedial Design Report. August 27, (received by Arcadis on August 31, 2021).

USEPA. 2021c. Notice of Authorization to Proceed with Remedial Action. September 20

TABLE

Table 1-1
Remediation Goals for Chemicals of Concern (Reproduced from Table 6 of USEPA 2015)
Remedial Action Work Plan
AVX Corporation
Olean, New York

Remediation Goals for Groundwater				
Chemicals of Concern (COCs)	**New York State Groundwater Quality Standards[a] (µg/L)**	**NYSDOH Drinking Water Quality Standards[b] (µg/L)**	**National Primary Drinking Water Standards[c] (µg/L)**	**Cleanup Level[d]**
cis-1,2-dichloroethene	5	5	70	5
trans-1,2-dichloroethene	5	5	100	5
1,2-dichloroethane	0.6	0.6	5	0.6
1,1,1-trichloroethane	5	5	5	5
Trichloroethene	5	5	5	5
Toluene	5	5	1,000	5
Tetrachloroethene	5	5	5	5
Vinyl chloride	2	2	2	2
Xylene	5	5	10,000	5

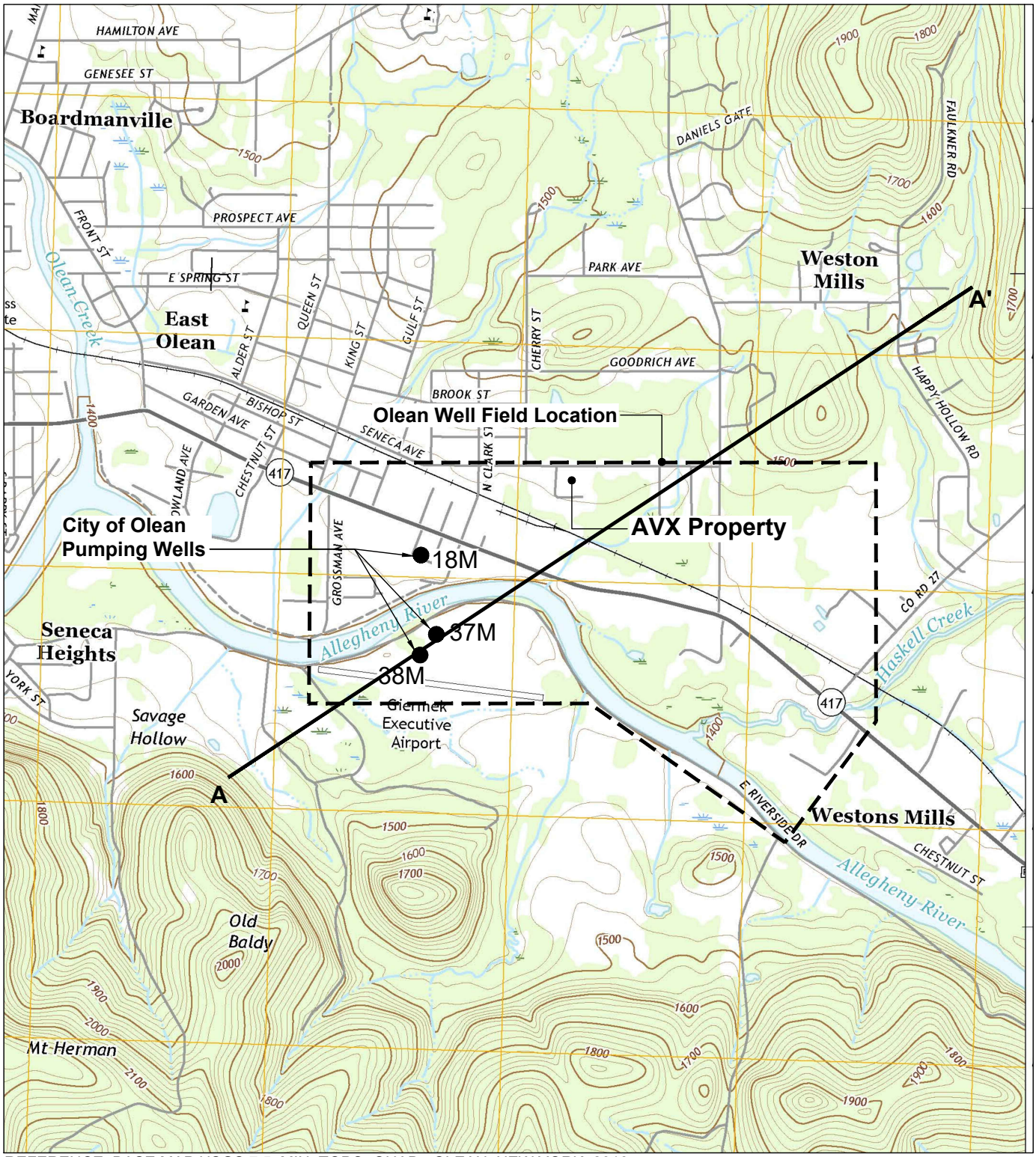
Remediation Goals for Soil	
Chemicals of Concern (COCs)	**Soil Remediation Goals[e] (mg/kg)**
cis-1,2-dichloroethene	0.25
trans-1,2-dichloroethene	0.19
1,2-dichloroethane	0.02
1,1,1-trichloroethane	0.68
Trichloroethene	0.47
Toluene	0.7
Tetrachloroethene	1.3
Vinyl chloride	0.02
Xylene	1.6

Notes:

[a] New York Surface Water and Ground Water Quality Standards (6 NYCRR Part 703), February 16, 2008.
[b] New York State Department of Health Drinking Water Standards (10 NYCRR Part 5), September 2007.
[c] USEPA National Primary Drinking Water Standards (web page), USEPA 816-F-09-004, May 2009.
[d] The remediation goals are selected based on New York State Groundwater Quality Standards, or NYSDOH Drinking Water Standards when groundwater quality standards are not available.
[e] New York State Department of Environmental Conservation soil cleanup objectives (6 NYCRR Sections 375-6.4(b)(3) and 375-6.5)

mg/kg = milligram per kilogram
NYCRR = New York Codes, Rules, and Regulations
NYSDOH = New York State Department of Health
µg/L = microgram per liter
USEPA = United States Environmental Protection Agency

FIGURES



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., OLEAN, NEW YORK, 2016.

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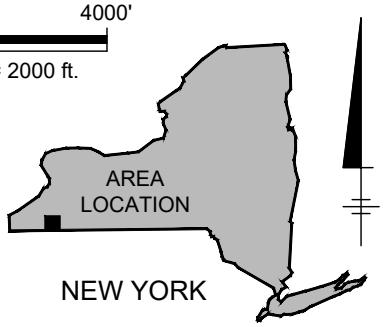
Approximate Scale: 1 in. = 2000 ft.

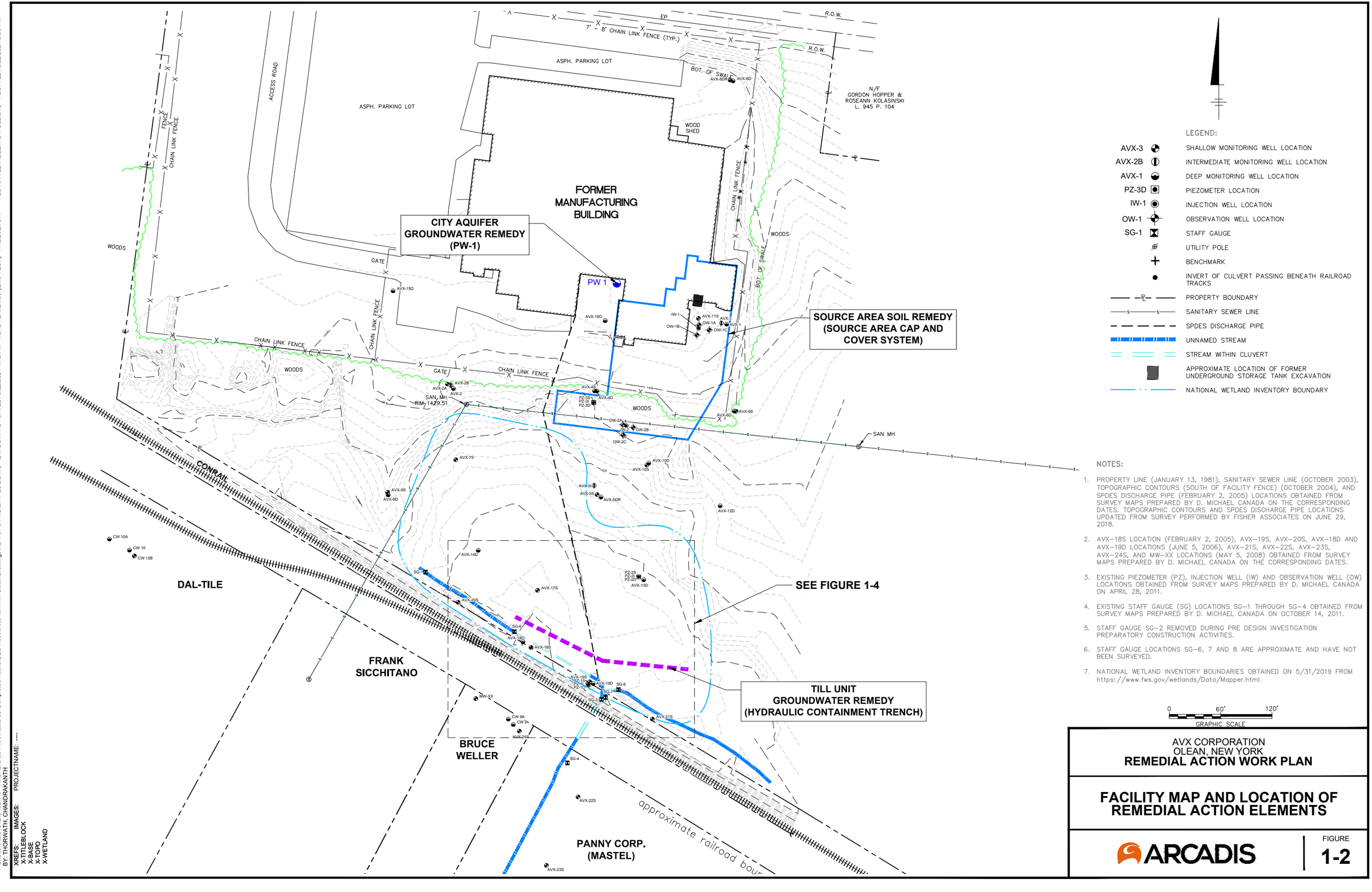


AVX CORPORATION
OLEAN, NEW YORK
REMEDIAL ACTION WORK PLAN

SITE LOCATION MAP

ARCADIS

FIGURE
1-1



NOTES:

1. PROPERTY LINE (JANUARY 13, 1981), SANITARY SEWER LINE (OCTOBER 2003), TOPOGRAPHIC CONTOURS (SOUTH OF FACILITY FENCE) (OCTOBER 2004), AND SPDES DISCHARGE PIPE (FEBRUARY 2, 2005) LOCATIONS OBTAINED FROM SURVEY MAPS PREPARED BY D. MICHAEL CANADA ON THE CORRESPONDING DATES. TOPOGRAPHIC CONTOURS AND SPDES DISCHARGE PIPE LOCATIONS UPDATED FROM SURVEY PERFORMED BY FISHER ASSOCIATES ON JUNE 29, 2018.
2. AVX–18S LOCATION (FEBRUARY 2, 2005), AVX–19S, AVX–20S, AVX–18D AND AVX–19D LOCATIONS (JUNE 5, 2006), AVX–21S, AVX–22S, AVX–23S, AVX–24S, AND MW–XX LOCATIONS (MAY 5, 2008) OBTAINED FROM SURVEY MAPS PREPARED BY D. MICHAEL CANADA ON THE CORRESPONDING DATES.
3. EXISTING PIEZOMETER (PZ), INJECTION WELL (IW) AND OBSERVATION WELL (OW) LOCATIONS OBTAINED FROM SURVEY MAPS PREPARED BY D. MICHAEL CANADA ON APRIL 28, 2011.
4. EXISTING STAFF GAUGE (SG) LOCATIONS SG–1 THROUGH SG–4 OBTAINED FROM SURVEY MAPS PREPARED BY D. MICHAEL CANADA ON OCTOBER 14, 2011.
5. STAFF GAUGE SG–2 REMOVED DURING PRE DESIGN INVESTIGATION PREPARATORY CONSTRUCTION ACTIVITIES.
6. STAFF GAUGE LOCATIONS SG–6, 7 AND 8 ARE APPROXIMATE AND HAVE NOT BEEN SURVEYED.
7. NATIONAL WETLAND INVENTORY BOUNDARIES OBTAINED ON 5/31/2019 FROM https: //www.fws.gov/wetlands/Data/Mapper.html.

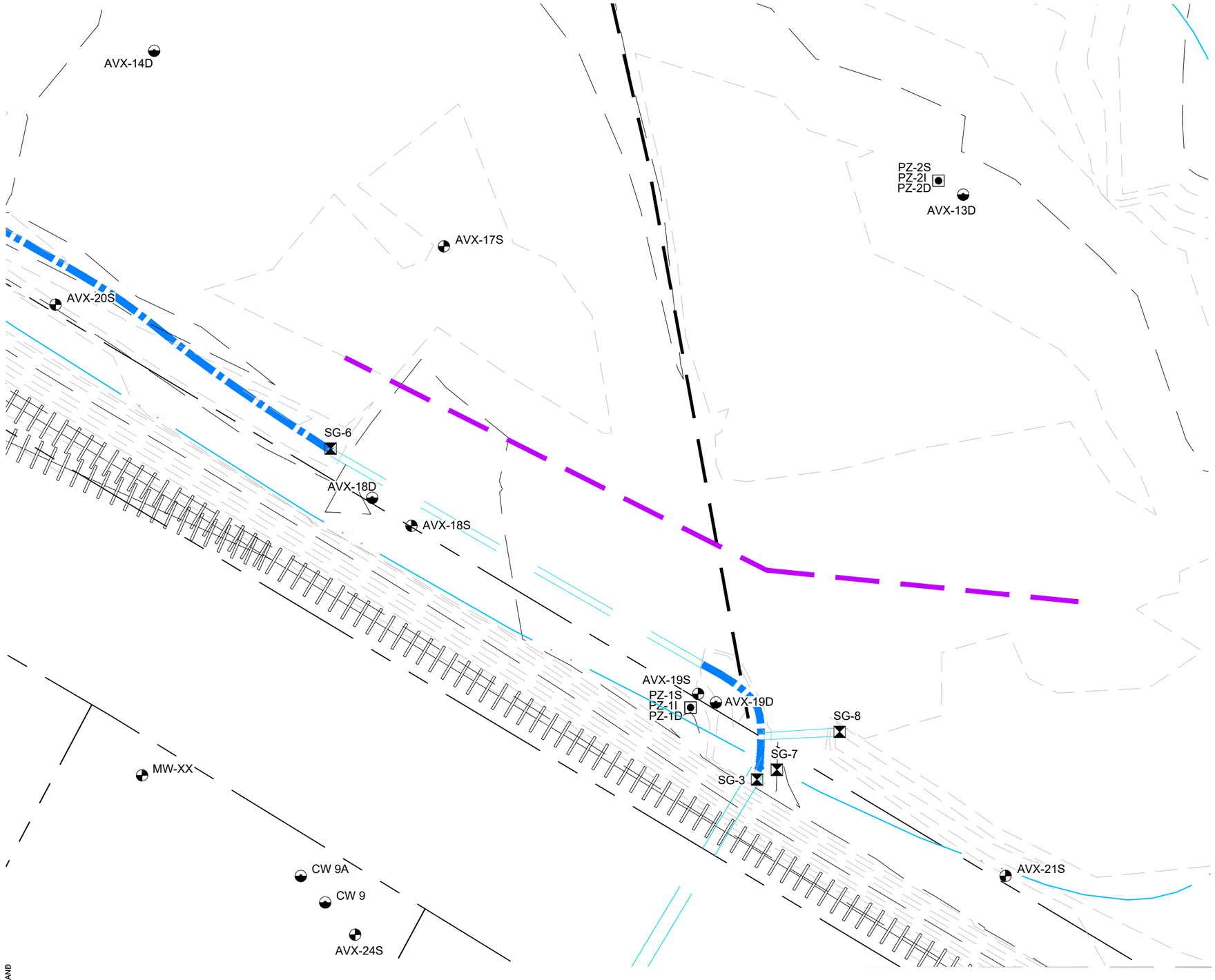
0 60' 120'
GRAPHIC SCALE

AVX CORPORATION
OLEAN, NEW YORK
REMEDIAL ACTION WORK PLAN

FACILITY MAP AND LOCATION OF REMEDIAL ACTION ELEMENTS

ARCADIS

FIGURE
1-2



LEGEND:

- AVX-3 — SHALLOW MONITORING WELL LOCATION
- AVX-2B — INTERMEDIATE MONITORING WELL LOCATION
- AVX-1 — DEEP MONITORING WELL LOCATION
- PZ-3D — PIEZOMETER LOCATION
- IW-1 — INJECTION WELL LOCATION
- OW-1 — OBSERVATION WELL LOCATION
- SG-1 — STAFF GAUGE
- UTILITY POLE
- BENCHMARK
- INVERT OF CULVERT PASSING BENEATH RAILROAD TRACKS
- PROPERTY BOUNDARY
- SANITARY SEWER LINE
- SPDES DISCHARGE PIPE
- UNNAMED STREAM
- STREAM WITHIN CLUVERT
- NATIONAL WETLAND INVENTORY BOUNDARY
- PROPOSED HYDRAULIC CONTAINMENT TRENCH

NOTES:

1. PROPERTY LINE (JANUARY 13, 1981), SANITARY SEWER LINE (OCTOBER 2003), TOPOGRAPHIC CONTOURS (SOUTH OF FACILITY FENCE) (OCTOBER 2004), AND SPDES DISCHARGE PIPE (FEBRUARY 2, 2005) LOCATIONS OBTAINED FROM SURVEY MAPS PREPARED BY D. MICHAEL CANADA ON THE CORRESPONDING DATES. TOPOGRAPHIC CONTOURS AND SPDES DISCHARGE PIPE LOCATIONS UPDATED FROM SURVEY PERFORMED BY FISHER ASSOCIATES ON JUNE 29, 2018.
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0 15' 30'
GRAPHIC SCALE

AVX CORPORATION
OLEAN, NEW YORK
REMEDIAL ACTION WORK PLAN

APPROXIMATE LOCATION OF HYDRAULIC TRENCH INSTALLATION

ARCADIS

FIGURE
3-1

CITY: Syracuse DIV/GROUP: EnvCAD DB: R.BASSETT, E. KRAHMER, A.Schilling PM/TM: D. Kingsley LYR:ON=*;OFF=REF, (FRZ)
C:\Users\ctl10112\OneDrive - ARCADIS\00-Files\Tasks\00-Completed Tasks\GEC Resources for AVX Olean\Drawings\RD-F01-4-APPROXIMATE LOC.DWG LAYOUT: 3-1 SAVED: 9/22/2021 1:12 PM ACADVER: 24.0S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/22/2021
3:36 PM BY: THORWATH, CHANDRAKANTH
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X-TITLEBLOCK
X-BASE
X-TOPO
X-WETLAND

APPENDIX A

Key Correspondences in Advance of the Remedial Action

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

Mr. Mark Hanish, Project Coordinator
Arcadis U.S. Inc.
6041 Wallace Road Extension
Suite 300
Wexford, PA 15090

Re: Olean Well Field Superfund Site, Cattaraugus County, New York
Final 100% Remedial Design Report for Operable Unit Two Amended Remedy for the AVX Corporation Property, Olean Well Field Superfund Site
Consent Decree, Civil Action 1:98-CV-00054

Dear Mr. Hanish:

This letter is to approve the Final 100% Remedial Design Report, dated July 2021, for the Operable Unit Two Interim Remedy addressing soil and groundwater at the AVX Corporation Property of the Olean Well Field Superfund Site. The Remedial Design Report includes, among other appendices, a Community Air Monitoring Plan, Construction Quality Assurance/Quality Control Plan, and Site Management Plan. We look forward to working with you on the implementation of the interim remedy for the AVX Property.

Please contact Peter Mannino at 212-637-4287 with any questions.

Sincerely,

Doug Garbarini, Chief
New York Remediation Branch
Superfund and Emergency Management Division

Herman, Megan

From: Mannino, Pietro <Mannino.Pietro@epa.gov>
Sent: Monday, September 20, 2021 3:09 PM
To: Hanish, Mark
Cc: Wurtz, Maeve
Subject: Olean Well Field Site

Mark;
As per our conversation last week, on August 27, 2021, EPA approved the Final 100% Remedial Design Report for the OU2 Amended Remedy for the AVX Property at the Olean Well Field Superfund site. This email serves as EPA's Authorization to Proceed with the Remedial Action as per Section 7.3 RA Schedule in the Statement of Work. Please let us know if you have any questions.

APPENDIX B

Permitting-Related Correspondences and Documents

Mr. Michael Walters
Remedial Project Manager
New York Remediation Branch
United States Environmental Protection Agency, Region 2
290 Broadway
New York, New York 10007-1866

Arcadis U.S., Inc.
6041 Wallace Road Extension
Suite 300
Wexford
Pennsylvania 15090
Tel 724 742 9180
Fax 724 742 9189
www.arcadis.com

Subject:
Responses to United States Environmental Protection Agency's May 9, 2019 Comments to September 2018 Pre-Design Investigation Report
AVX Corporation
Olean Well Field Superfund Site
Olean, New York

Date:
June 17, 2019

Contact:
Mark B. Hanish

Phone:
724.934.9518

Email:
mark.hanish@arcadis.com

Our ref:
B0007385.0001

Dear Mr. Walters:

On behalf of AVX Corporation (AVX), Arcadis U.S., Inc. (Arcadis) respectfully submits this letter in response to the United States Environmental Protection Agency's (USEPA's) May 9, 2019 comments to the *Pre-Design Investigation Report* (PDI Report), submitted in September 2018 by Arcadis for the AVX site located at 1695 Seneca Avenue in Olean, New York (site). Arcadis received the USEPA's PDI Report comments by certified mail on May 13, 2019.

Each of the USEPA's comments is provided below, in italics, followed by our response.

SPECIFIC COMMENTS

Specific Comment 1:

Section 1.2.3.2; - Groundwater Flow. The water table in the upper zone depends on location of sand stringers within the unit. These vary greatly and are not limited to the upper 3-5 ft bgs.

Response to Specific Comment 1:

The location and depth of sand stringers and the depth to the water table are two different subjects. The statement in Section 1.2.3.2, to which USEPA refers, is strictly about the depth to the saturated zone, as determined by the water levels measured in the shallowest monitoring wells, regardless of the presence, number, and distribution of stand stringers intersected by the well screen in the wells.

Specific Comment 2:

Section 1.3.1 Soil-Historical Source Area; Page 4 - The source area located near DP 18 [sic], below the pipe at the top of the drainage swale, should be included in this discussion.

Response to Specific Comment 2:

Section 1.3.1 currently refers to the entirety of the "southern drainage swale area" in the historical source area discussion. Geoprobe point GP-18 is within the southern drainage swale area near its upgradient end. Where necessary, the 30% Remedial Design will more clearly point out that direct push point GP-18 is located within the upgradient end of that drainage swale.

Specific Comment 3:

Section 3.4.1, - Vertical elevations are said to be accurate to +/- 1.0 foot. Is that accuracy for the map overall or at individual locations? Usually land surface accuracy at a measured point is to 0.1 foot. Water level accuracy is to 0.01 foot.

Response to Specific Comment 3:

For topographical information, each ground shot was surveyed to an accuracy of +/-0.1 foot but presented on the figures as 1-foot contour intervals. Any point shots on wells, well casings, or well pads were surveyed to an accuracy +/-0.01 foot. Care will be taken to make this clearer in the 30% Remedial Design.

Specific Comment 4:

Fig. 4-1 – The scale on fig. 4-1 is incorrect.

Response to Specific Comment 4:

The scale on **Figure 4-1** has been corrected and is attached. The corrected version of that figure will serve as the basis for any related and necessary figures that are included within the 30% Remedial Design and associated plans.

Specific Comment 5:

Section 4.3.1 and Table 4-2 - The text notes that higher VOCs were found in the western test (TW) wells. The groundwater sample from TW-03 had the highest VOCs, which included 430 ug/L of TCE, 16,000 ug/L of cis-DCE, and 700 ug/L of 1,1-DCA. The groundwater sample from TW-04 (which is to the west, near AVXMW-18S [sic]) also contained significant amounts of VOCs, including 1,600 ug/L of TCE, 5,200 ug/L of cis-DCE, and 270 ug/L of 1,1-DCA. The concentrations of 1,1,1-TCA were not listed for either well in Table 4-2. Provide the concentrations of 1,1,1-TCA.

Response to Specific Comment 5:

The first three sentences of the USEPA's comment appear primarily a restatement of what was presented in Section 4.3.1 but included volatile organic carbon concentration data that had been tabulated in Table 4-2 of the PDI Report. It is unclear if USEPA was attempting to make a point by restating this information. Regarding the USEPA's comment about 1,1,1-trichloroethane (1,1,1-TCA), concentrations of that constituent (all below analytical reporting limits) are listed in the expanded **Table 4-2** (attached), which also includes all constituents analyzed. This revised table will be included, as needed, in the 30% Remedial Design.

Specific Comment 6:

Section 4.3.4 - The WHAEM model uses Dupuit calculations for one-dimensional flow. The model is a highly simplified representation of the complex geologic setting at AVX. Several simplifying assumptions for the model may not be realistic for AVX. a) The model assumes uniform hydraulic properties. The till unit system at AVX is heterogeneous, with interbedded and irregular layers of silt, clay, and sand. b) The model assigns one average hydraulic conductivity (K) for the system, but the differences in K between less permeable layers of silt and clay and the more permeable layers of sand are probably very substantial. The assumed uniformity could under-represent the higher flow conditions in the sand layers that are present in the unit. c) Indicate the areas of Federal or State-designated wetlands on a map. In the model, the wetland was assigned a negative recharge, with a rate of loss of 13 inches per year, which is a significantly high amount of the available water. Also note that the growing season at the site is probably only about six months per year.

Response to Specific Comment 6:

Note that the predicted pumping rate from the proposed hydraulic trench is based on the actual pumping flow rate data from four independent step tests from the four temporary wells installed along the anticipated alignment of the proposed barrier. While the WHAEM model does assume uniform hydraulic parameters over the simulated vertical interval, the hydraulic conductivity used in the model is consistent with the aquifer testing results. The aquifer test results were used to estimate hydraulic conductivities that represent not just the sands but also the combined sand, silt, and clay intervals. Therefore, the bulk hydraulic conductivity can be used in the model to represent the transmissivity of the intersected portion of the till unit. Applying higher hydraulic conductivity estimates, representative of the sand intervals, to the entire saturated thickness of the upper zone unit would result in excessively high estimates of groundwater withdrawal rates because the sand stringers only account for a portion of the formation.

The federal-designated wetlands within the AVX property are depicted on output obtained from the United States Fish and Wildlife Service National Wetlands Inventory Wetlands Mapper (https://www.fws.gov/wetlands/data/mapper.html) as of May 14, 2019 (see **Attachment 1**). The Freshwater Forested/Shrub Wetland area has also been overlaid on a site figure (see **Attachment 1**). There are no state-designated wetlands on the AVX property.

The evapotranspiration rate of 13 inches per year used in the model is actually much less than the estimated lake evaporation rate in this area. According to van der Leeden (1990), approximately 26 to 28 inches per year would be expected to evaporate annually. Evapotranspiration rates can easily exceed lake evaporation rates. The value used in the model is conservatively low (about half of the estimated lake evaporation rate) and should account for dormant periods that may last approximately 6 months. It should also be noted that during the simulation of the recovery trench, the evapotranspiration rate was reduced further by approximately 20% to account for anticipated reduction in water levels, thereby allowing a greater simulated withdrawal by the recovery trench.

Specific Comment 7:

Section 4.3.4 Groundwater Modelling; Page 18; last paragraph states: "While the actual depth of the trench is not sensitive in the analytical model formulation, it is recommended that the base of the interceptor trench constructed substantially (more than 5 feet) above the base of the till." It was not clear how thickness is accounted for in this model. How deep was the trench and the piping simulated to be installed? In order to maximize the surface area of the trench and to not penetrate the lower aquifer, the

bottom of the constructed trench should not exceed 4 to 5 feet above the top of the City Aquifer. Remedial design should also include any other measures to prevent downward migration of contaminants from the trench. A layer of collection piping should be considered for construction near the base of the trench. A second shallower layer of piping might also be useful.

Response to Specific Comment 7:

The model accounts for the trench as a line sink that does not require specification of the depth of the trench, only the withdrawal rate and overall length. The model cannot simulate the depth and width of the actual trench. Given the low-flow rates simulated by the model and the low pumping rates observed during the step tests, it is expected that the proposed trench depth and width is capable of handling the expected flow rates.

It is not clear at this time whether a pipe will be included in the design of the trench given the granular trench fill will be far more permeable than formation materials. The permeable granular fill within the hydraulic trench will transmit much more flow than the surrounding till, whether or not a pipe is installed in the base of the trench. Consequently, we believe that adding a pipe will not provide any significant, if any, additional capture influence. Furthermore, adding a second pipe, higher in the trench, will provide even less benefit and is not being considered in the design.

The design criteria and chosen construction methods will ultimately dictate whether horizontal piping can or should be installed. From our experience with many other hydraulic trenches, installation of horizontal piping can often be difficult to incorporate in the trench construction and can eventually compromise the performance of a trench. Therefore, for certain construction methods, the risk of poorer hydraulic performance due to construction complications stemming from installation of a horizontal pipe is far greater than the relatively small potential flow enhancement. Furthermore, in addition to the construction complications potentially increasing the risk of poor trench performance, the costs for installation can be significantly higher depending on the construction method (e.g., via a biopolymer slurry installation techniques).

If the design and construction methods are conducive to installation of a horizontal pipe, that pipe would likely be installed near the base of the trench but would unlikely be connected with the withdrawal wells that would be installed at key locations within the hydraulic trench. Drawdown will ultimately be controlled at the wells with the maximum drawdown possible controlled by the level of the pump intake installed in those wells.

Note that the goal of the hydraulic trench will be to minimize pumping while maintaining the appropriate influence over the dissolved constituents of interest in groundwater migrating downgradient toward the trench. The trench extraction rate and associated drawdown will be maintained so as to prevent those constituents of interest from migrating through and downgradient of the trench.

Note that the anticipated maximum trench depth is primarily a function of engineering design considerations that include a margin of safety to not penetrate or install the trench through the entire till unit clay into the underlying sand and gravel aquifer. The measures to prevent downward migration of contaminants are those that are naturally present, namely the undisturbed low permeability till located beneath the trench, whose permeability diminishes with depth within the till unit.

Specific Comment 8:

Remedial design should consider adding a model limitations section to the groundwater model discussion. Some topics could include i) model does not incorporate vertical gradients or vertical resistance to flow; ii) model does not include known geologic heterogeneity including sandier soils to the west, etc.

Response to Specific Comment 8:

The Basis of Design Report within the 30% Remedial Design will include a limitations section for the modelling analysis. The following paragraphs summarize the model limitations:

> The analytical groundwater model developed for the evaluation of proposed recovery trench assumes homogeneous hydraulic parameters, including hydraulic conductivity and the regional hydraulic gradient. Additionally, the model assumes two-dimensional groundwater flow conditions within the till unit. While the selected model parameters provided model output that was a close match to observed groundwater conditions and that the values selected are consistent with testing results near the proposed recovery trench, it is possible that the spatial variability of these parameters across the site area could result in greater or lesser amounts of groundwater entering both the wetland discharge area and the hydraulic trench. This variability could influence the pumping rates of the hydraulic trench necessary for containment of the plume.
>
> Additionally, the model simulates the recovery of groundwater in the recovery trench using a line sink term, where only the discharge rate is specified. The model does not have the ability to simulate the upward flow into a partially penetrating recovery trench. It is assumed that given the low estimated groundwater discharge and planned depth of the trench, that potentially low vertical hydraulic conductivities will not overly restrict groundwater flow from entering the trench. Currently, groundwater from the entire vertical interval of the upper zone appears to discharge to the wetland and existing surface-water drainage without restriction.

Specific Comment 9:

Section 4.3.4 Groundwater Modelling; Page 18 - Remedial design should consider incorporating depictions of the model's boundary conditions and the wetland boundary into the groundwater model in Figures 4-2 and 4-3.

Response to Specific Comment 9:

The various boundary features relevant to the groundwater model, particularly the approximate wet/wetland area, is already depicted on Figures 4-2 and 4-3 of the PDI Report. Furthermore, the National Wetlands Inventory-mapped wetland is also depicted on figures provided in **Attachment 1**. Where necessary, the 30% Remedial Design will also include these features.

Specific Comment 10:

Section 4.3.4 Groundwater Modelling - In the model, the simulated water levels are compared to an average of three events during 2018. The hydraulic conductivity (K) ranged from 0.09 to 0.45 ft/d, with a geometric mean K of 0.25 ft/d. The hydraulic gradient was estimated at 0.022 ft/ft. The model results suggest that the design rate of a 200-foot long trench system could be 0.5 GPM. It was not stated whether 2018 was a wetter or drier year than average. This could affect the amount of water that could be captured by the trench system for treatment.

Response to Specific Comment 10:

The model assumed that 2018 conditions represented a typical average precipitation year. Potentially, the system flow rates will be variable based on the amount of precipitation in a given year and the amount of evapotranspiration occurring in the wetland area. Note that because this trench is planned for an area that is perennially wet and the water levels and hydraulic gradients in the area of the trench have changed little over the decades of groundwater gauging of the till unit wells. Wetter years will largely result only in higher surface- water runoff to the unnamed creek to the south, whereas drier years will result in lower surface-water runoff to that creek.

Nonetheless, variations from dry to wet year conditions could result in estimated flow rates that vary approximately +/-30%, which still places the estimated wet year system flow rate at under 1 gallon per minute (gpm). The actual system design will have a capacity to handle and treat a much greater withdrawal rate, if needed.

Specific Comment 11:

If the proposed design of the trench were to be appropriate for the real-world conditions at AVX, then about 0.5 gpm would generate about 720 gal/day of influent. This would be about 5,740 gal/week. If flow were about 1 gpm, then influent would be about 11,480 gal/week. The remedial design should consider pumping the water to a holding tank for later transport weekly, or as needed, to an off-property treatment facility. It is also possible that the trench will yield 5 or even more gpm, especially during wet years. This should be factored into the system design.

Response to Specific Comment 11:

We clearly understand that the flow rates into the hydraulic trench are likely to be low based on the extremely low flows sustainable from the 4 test wells installed and pumped during the pre-design investigation. This is one of the primary factors for why AVX requested USEPA to reconsider our design and installation of a permeable reactive barrier in lieu of a hydraulic containment trench. If we, nonetheless, assume that the final remedy will include a hydraulic containment trench, there is no scenario that we can envision where batch-tanking of pumped water and periodic transport of that batched water for offsite treatment is a cost-effective water-handling alternative. Therefore, we will not further consider batch collection, transportation, and disposal of water during the remedial design process. Instead, the design will include flexibility to pump and treat a much wider range of flows than are expected. The till zone is fully saturated to the ground surface all year long, in the area of the trench; therefore, the flow variability is not likely to be great regardless of whether the year is a wet or dry one.

Specific Comment 12:

Section 5 Conclusions and Recommendations - In order to ensure that potential contamination is more fully addressed, the trench should be extended to the West. The Eastern extent should be kept as proposed. The additional segment should continue 100 to 200 feet West-Northwest from TW-4.

Response to Specific Comment 12:

Please note that the groundwater flow paths within the till unit in the area of the proposed hydraulic trench already converge to area of the proposed trench, even in the absence of pumping, because of the topography of that area. The placement of the proposed hydraulic trench in the PDI Report takes advantage of and enhances this. The USEPA's suggestion to extend the trench an additional 100 to 200

feet appears arbitrary and is not based on the hydraulics of the area that are well known/documented. Although we will fully consider, during the design process, the USEPA's suggestion of lengthening the trench, there currently does not appear to be a technical basis for extending the length of the proposed hydraulic containment trench. Nonetheless, we will consider slight readjustment of the position of the entire trench westward given that the higher concentrations of dissolved constituents of interest were in the western half of the proposed trench location in water sampled from test wells TW-03 and TW-04.

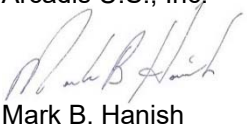
CLOSING

After the USEPA has had an opportunity to review this letter, if there are any remaining open items, we propose a conference call to discuss these concerns at the USEPA's earliest convenience.

Please contact me at 724.934.9518 if you have any questions or comments about information presented herein.

Sincerely,

Arcadis U.S., Inc.



Mark B. Hanish
Project Manager

Copies:
Sharon Kivowitz, EPA-ORC
Michael Scorca, EPA-PSB
Maurice Moore, NYSDEC
John Waites, AVX Corporation
William B. Popham, Arcadis

REFERENCES

Van der Leeden, Fritz, 1990. The Water Encyclopedia, Lewis Publishers, Inc., Chelsea, Michigan 48118. ISBN 0-87371-120-3

TABLE

Table 4-2
Summary of Groundwater Analytical Results for Step Test Wells
Pre-Design Investigation Report
AVX Corporation
Olean, New York

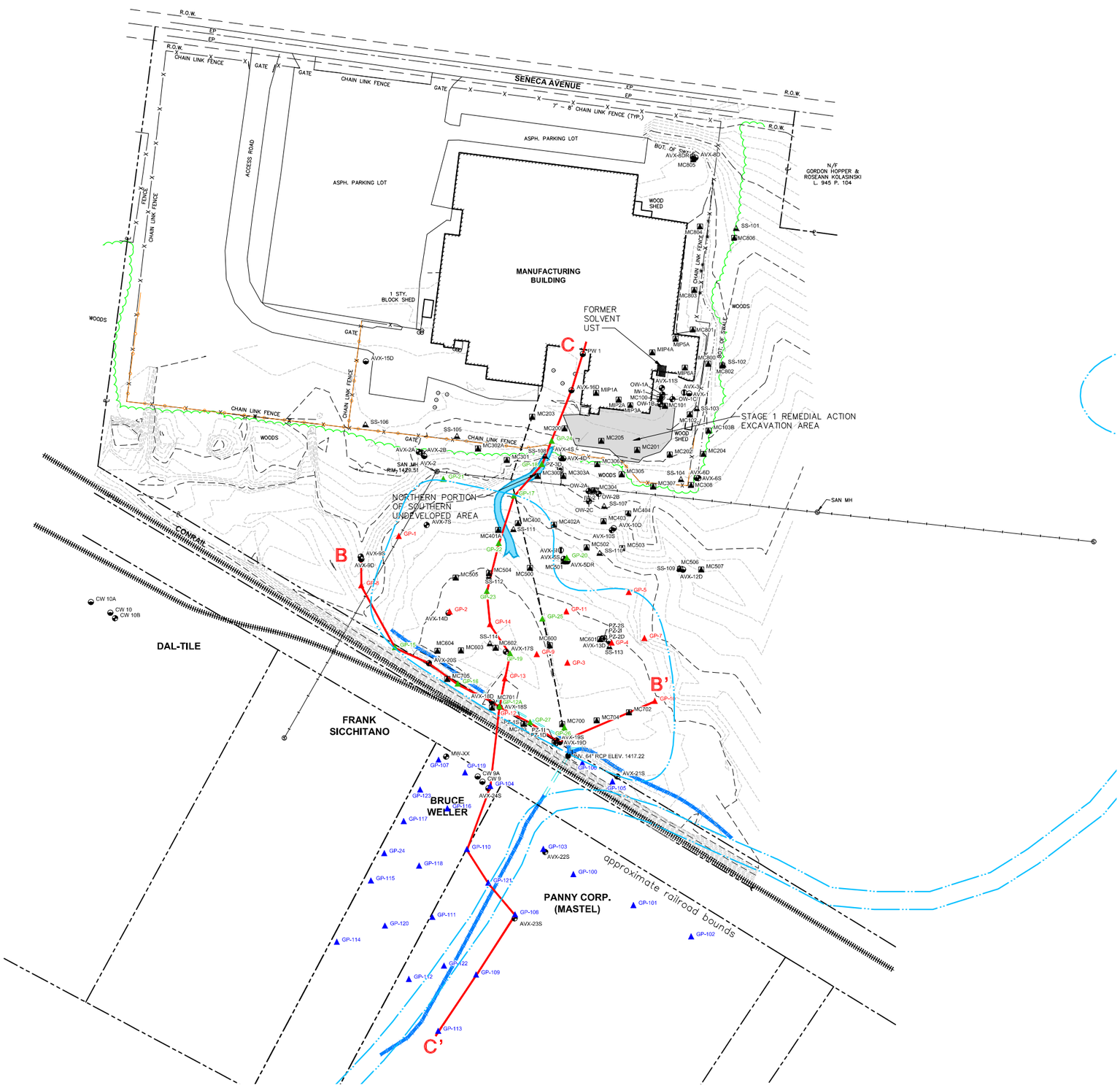
Location ID: Date Collected: Sample Name:	Units	TW-01 06/21/18 TW-01	TW-02 06/19/18 TW-02	TW-03 06/22/18 TW-03	TW-04 06/20/18 TW-04
VOCs					
1,2-Dibromomethane	µg/L	1 U [1 U]	1 U	10 U	5 U
2-Butanone	µg/L	5 U [5 U]	5 U	50 U	25 U
2-Hexanone	µg/L	5 U [5 U]	5 U	50 U	25 U
4-Methyl-2-Pentanone	µg/L	5 U [5 U]	5 U	50 U	25 U
Acetone	µg/L	2.4 J [5 U]	2.6 J	50 U	25 U
Benzene	µg/L	1 U [1 U]	1 U	10 U	1.1 J
Bromoform	µg/L	1 U [1 U]	1 U	10 U	5 U
Bromomethane	µg/L	1 U [1 U]	1 U	10 U	5 U
Carbon Disulfide	µg/L	1 U [1 U]	0.36 J	10 U	5 U
Ethylbenzene	µg/L	1 U [1 U]	1 U	10 U	5 U
m,p-Xylenes	µg/L	2 U [2 U]	2 U	20 U	10 U
o-Xylene	µg/L	1 U [1 U]	1 U	10 U	5 U
Styrene	µg/L	1 U [1 U]	1 U	10 U	5 U
Toluene	µg/L	1 U [1 U]	1 U	10 U	5 U
1,1,1-Trichloroethane	µg/L	1 U [1 U]	1 U	10 U	5 U
1,1,2,2-Tetrachloroethane	µg/L	1 U [1 U]	1 U	10 U	5 U
1,1,2-Trichloroethane	µg/L	1 U [1 U]	1 U	10 U	5 U
1,1-Dichloroethane	µg/L	0.35 J [0.4 J]	50	700	270
1,1-Dichloroethene	µg/L	1 U [1 U]	9.6	410	170
1,2,3-Trichlorobenzene	µg/L	1 U [1 U]	1 U	10 U	5 U
1,2,4-Trichlorobenzene	µg/L	1 U [1 U]	1 U	10 U	5 U
1,2-Dibromo-3-chloropropane	µg/L	2 U [2 U]	2 U	20 U	10 U
1,2-Dichlorobenzene	µg/L	1 U [1 U]	1 U	10 U	5 U
1,2-Dichloroethane	µg/L	1 U [1 U]	0.61 J	15	14
1,2-Dichloropropane	µg/L	1 U [1 U]	1 U	10 U	5 U
1,3-Dichlorobenzene	µg/L	1 U [1 U]	1 U	10 U	5 U
1,4-Dichlorobenzene	µg/L	1 U [1 U]	1 U	10 U	5 U
Bromochloromethane	µg/L	1 U [1 U]	1 U	10 U	5 U
Bromodichloromethane	µg/L	1 U [1 U]	1 U	10 U	5 U
Carbon tetrachloride	µg/L	1 U [1 U]	1 U	10 U	5 U
Chlorobenzene	µg/L	1 U [1 U]	1 U	10 U	5 U
Chloroethane	µg/L	1 U [1 U]	1 U	10 U	4.2 J
Chloroform	µg/L	1 U [1 U]	1 U	10 U	5 U
Chloromethane	µg/L	1 U [1 U]	1 U	10 U	5 U
cis-1,2-Dichloroethene	µg/L	1.2 [1]	34	16,000 D	5,200 D
Cis-1,3-dichloropropene	µg/L	1 U [1 U]	1 U	10 U	5 U
Dibromochloromethane	µg/L	1 U [1 U]	1 U	10 U	5 U
Hexachlorobutadiene	µg/L	2 U [2 U]	2 U	20 U	10 U
Methylene Chloride	µg/L	1 U [1 U]	1 U	10 U	5 U
Tetrachloroethene	µg/L	1 U [1 U]	1 U	10 U	1.4 J
trans-1,2-Dichloroethene	µg/L	1 U [1 U]	0.43 J	560	39
Trans-1,3-dichloropropene	µg/L	1 U [1 U]	1 U	10 U	5 U
Trichloroethene	µg/L	0.3 J [0.28 J]	0.42 J	430	1,600 D
Trichlorofluoromethane	µg/L	1 U [1 U]	1 U	10 U	5 U
Vinyl Chloride	µg/L	0.82 J [0.96 J]	8.1	330	290

Table 4-2
Summary of Groundwater Analytical Results for Step Test Wells
Pre-Design Investigation Report
AVX Corporation
Olean, New York

Location ID: Date Collected: Sample Name:	Units	TW-01 06/21/18 TW-01	TW-02 06/19/18 TW-02	TW-03 06/22/18 TW-03	TW-04 06/20/18 TW-04
SVOCs SIM					
1,4-Dioxane	µg/L	12 [12]	630	700 J	210
Metals					
Aluminum, Total	µg/L	2,350 J [2,440 J]	1,720	18,300 J	7,460
Antimony, Total	µg/L	60 U [60 U]	60 U	60 U	60 U
Arsenic, Total	µg/L	5.5 J [4.4 J]	10 U	9.8 J	10 U
Barium, Total	µg/L	172 [175]	151	364	161
Beryllium, Total	µg/L	3 U [3 U]	3 U	0.9 J	0.3 J
Cadmium, Total	µg/L	5 U [5 U]	5 U	5 U	5 U
Calcium, Total	µg/L	58,400 [59,400]	61,700	99,300	103,000
Chromium, Total	µg/L	1.7 J [1.5 J]	10 U	21.4	6.8 J
Cobalt, Total	µg/L	1.9 J [50 U]	2.3 J	9.3 J	2.6 J
Copper, Total	µg/L	20 U [20 U]	20 U	18.6 J	20 U
Iron	µg/L	4,550 [4,680]	2,290	21,800	5,510
Lead, Total	µg/L	50 U [50 U]	5 U	10 J	5 U
Magnesium, Total	µg/L	13,300 [13,500]	12,800	20,900	15,600
Manganese, Total	µg/L	2,330 [2,370]	1,980	2,460	2,510
Mercury, Total	µg/L	0.2 U [0.2 U]	0.2 U	0.2 U	0.2 U
Nickel, Total	µg/L	40 U [40 U]	40 U	40 U	40 U
Potassium, Total	µg/L	3,570 J [3,640 J]	3,970	10,700 J	5,210
Selenium, Total	µg/L	10 U [10 U]	10 U	10 U	10 U
Silver, Total	µg/L	10 U [10 U]	10 U	10 U	10 U
Sodium, Total	µg/L	10,100 [10,300]	11,800	11,300	10,100
Thallium, Total	µg/L	10 U [10 U]	10 U	10 U	10 U
Vanadium, Total	µg/L	4.5 J [4.6 J]	3.4 J	28.9 J	12.9 J
Zinc, Total	µg/L	20 U [20 UB]	179	51.1 UB	16.1 J

Notes:
[ ] = duplicate sample
B = The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
D = Concentration is based on a diluted sample analysis.
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
SIM = selective ion monitoring
SVOC = semivolatile organic compound
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UB = Compound considered non-detect at the listed value due to associated blank contamination.
µg/L = micrograms per liter
VOC = volatile organic compound

FIGURES



LEGEND:

- SHALLOW MONITORING WELL LOCATION
- INTERMEDIATE MONITORING WELL LOCATION
- DEEP MONITORING WELL LOCATION
- PIEZOMETER LOCATION
- INJECTION WELL LOCATION
- OBSERVATION WELL LOCATION
- MEMBRANE INTERFACE PROBE LOCATION
- SURFACE SOIL SAMPLE LOCATION
- UTILITY POLE
- BENCHMARK
- INVERT OF CULVERT PASSING BENEATH RAILROAD TRACKS
- PROPERTY BOUNDARY
- SANITARY SEWER LINE
- SPDES DISCHARGE PIPE
- APPROXIMATE LOCATION OF FORMER UNDERGROUND STORAGE TANK EXCAVATION
- DIRECT-PUSH GROUNDWATER SAMPLING LOCATIONS (AUGUST 2007)
- DIRECT-PUSH GROUNDWATER SAMPLING LOCATIONS (DECEMBER 2004)
- DIRECT-PUSH GROUNDWATER SAMPLING LOCATIONS (OCTOBER 2003)
- STAGE 1 REMEDIAL ACTION EXCAVATION AREA
- CROSS-SECTION LOCATION
- SWALE
- UNNAMED CREEK
- NATIONAL WETLANDS INVENTORY BOUNDARY

NOTES:

1. PROPERTY LINE (JANUARY 13, 1981), SANITARY SEWER LINE (OCTOBER 2003), TOPOGRAPHIC CONTOURS (SOUTH OF FACILITY FENCE) (OCTOBER 2004), AND SPDES DISCHARGE PIPE (FEBRUARY 2, 2005) LOCATIONS OBTAINED FROM SURVEY MAPS PREPARED BY D. MICHAEL CANADA ON THE CORRESPONDING DATES.
2. AVX-18S LOCATION (FEBRUARY 2, 2005), AVX-19S, AVX-20S, AVX-18D, AND AVX-19D LOCATIONS (JUNE 5, 2006) DIRECT-PUSH GROUNDWATER SAMPLING LOCATIONS (SEPTEMBER 2007), AVX-21S, AVX-22S, AVX-23S, AVX-24S, AND MW-XX LOCATIONS (MAY 5, 2008) OBTAINED FROM SURVEY MAPS PREPARED BY D. MICHAEL CANADA ON THE CORRESPONDING DATES.
3. BOUNDARIES OF PROPERTIES TO THE SOUTH OF THE NORFOLK SOUTHERN RAIL LINE ARE FROM OLEAN TAX MAPS AND ARE APPROXIMATE.
4. BASE MAP IS POSITIONED IN THE STATE PLANE COORDINATE SYSTEM, NAD 83, WEST ZONE.
5. NATIONAL WETLAND INVENTORY BOUNDARIES OBTAINED ON 5/29/2019.

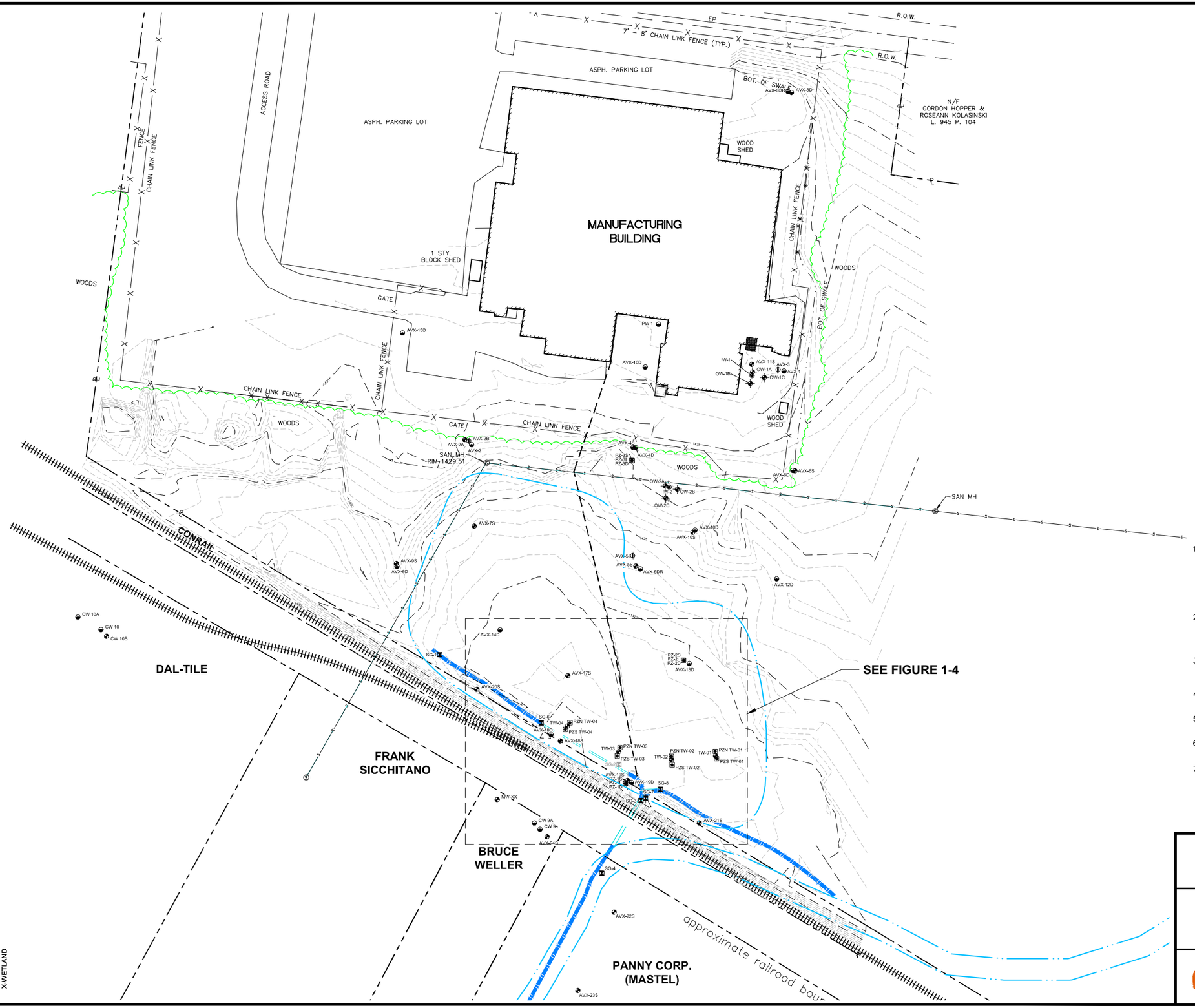
0 80' 160'
GRAPHIC SCALE

AVX CORPORATION
OLEAN, NEW YORK
PRE-DESIGN INVESTIGATION REPORT

SITE LAYOUT

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1-2



LEGEND:

AVX-3	SHALLOW MONITORING WELL LOCATION
AVX-2B	INTERMEDIATE MONITORING WELL LOCATION
AVX-1	DEEP MONITORING WELL LOCATION
PZ-3D	PIEZOMETER LOCATION
IW-1	INJECTION WELL LOCATION
OW-1	OBSERVATION WELL LOCATION
TW-01	TEMPORARY MONITORING WELL
SG-1	STAFF GAUGE
SG-2	STAFF GUAGE (REMOVED)
	UTILITY POLE
	BENCHMARK
	INVERT OF CULVERT PASSING BENEATH RAILROAD TRACKS
	PROPERTY BOUNDARY
	SANITARY SEWER LINE
	SPDES DISCHARGE PIPE
	UNNAMED STREAM
	STREAM WITHIN CLUVERT
	APPROXIMATE LOCATION OF FORMER UNDERGROUND STORAGE TANK EXCAVATION
	NATIONAL WETLAND INVENTORY BOUNDARY

NOTES:

1. PROPERTY LINE (JANUARY 13, 1981), SANITARY SEWER LINE (OCTOBER 2003), TOPOGRAPHIC CONTOURS (SOUTH OF FACILITY FENCE) (OCTOBER 2004), AND SPDES DISCHARGE PIPE (FEBRUARY 2, 2005) LOCATIONS OBTAINED FROM SURVEY MAPS PREPARED BY D. MICHAEL CANADA ON THE CORRESPONDING DATES. TOPOGRAPHIC CONTOURS AND SPDES DISCHARGE PIPE LOCATIONS UPDATED FROM SURVEY PERFORMED BY FISHER ASSOCIATES ON JUNE 29, 2019.
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5. STAFF GAUGE SG–2 REMOVED DURING PRE DESIGN INVESTIGATION PREPARATORY CONSTRUCTION ACTIVITIES.
6. STAFF GAUGE LOCATIONS SG–6, 7 AND 8 ARE APPROXIMATE AND HAVE NOT BEEN SURVEYED.
7. NATIONAL WETLAND INVENTORY BOUNDARIES OBTAINED ON 5/31/2019.

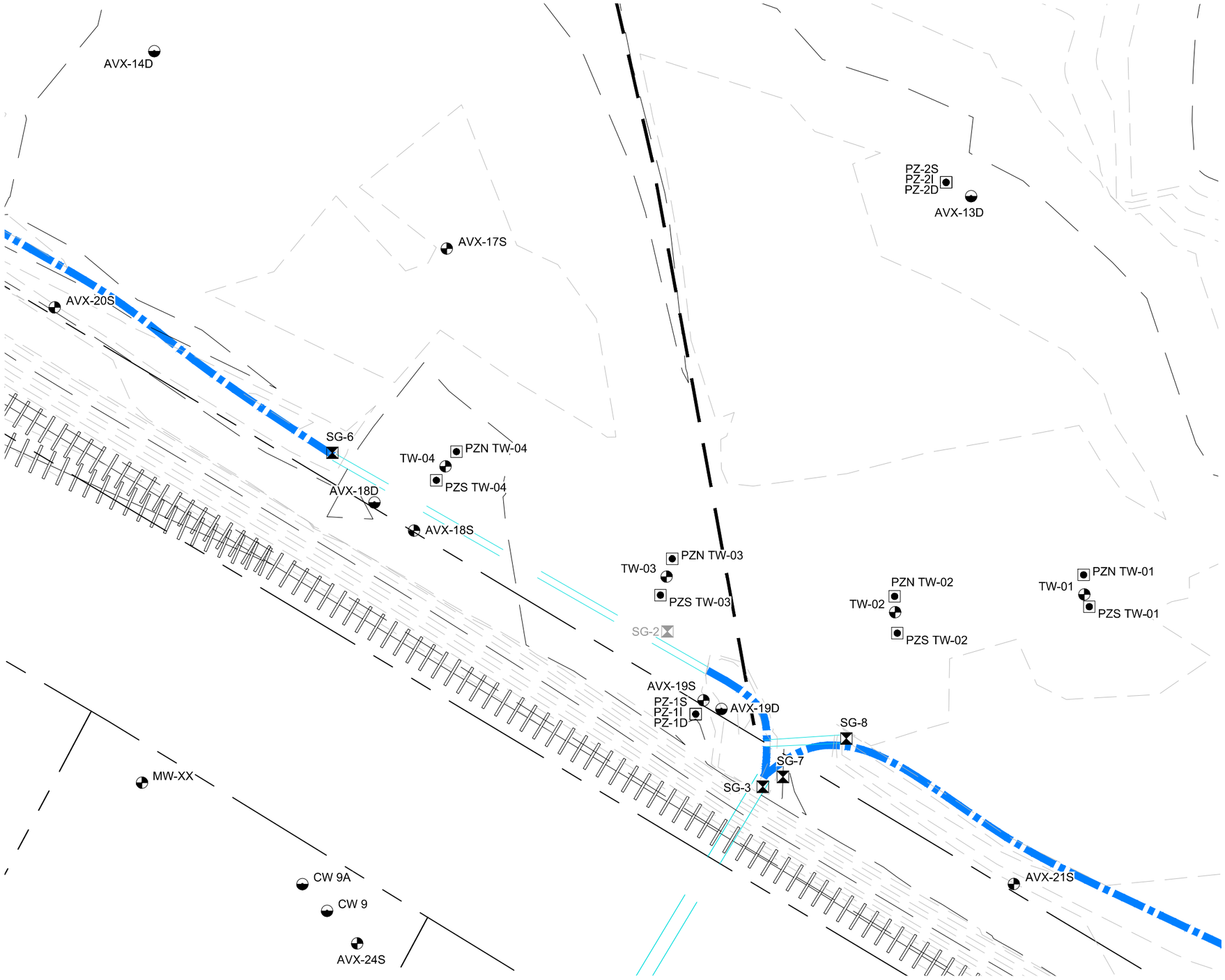
0 60' 120'
GRAPHIC SCALE

AVX CORPORATION
OLEAN, NEW YORK
PRE-DESIGN INVESTIGATION REPORT

SITE MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1-3



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	SPDES DISCHARGE PIPE
	UNNAMED STREAM
	STREAM WITHIN CLUVERT
	APPROXIMATE LOCATION OF FORMER UNDERGROUND STORAGE TANK EXCAVATION

NOTES:

1. PROPERTY LINE (JANUARY 13, 1981), SANITARY SEWER LINE (OCTOBER 2003), TOPOGRAPHIC CONTOURS (SOUTH OF FACILITY FENCE) (OCTOBER 2004), AND SPDES DISCHARGE PIPE (FEBRUARY 2, 2005) LOCATIONS OBTAINED FROM SURVEY MAPS PREPARED BY D. MICHAEL CANADA ON THE CORRESPONDING DATES. TOPOGRAPHIC CONTOURS AND SPDES DISCHARGE PIPE LOCATIONS UPDATED FROM SURVEY PERFORMED BY FISHER ASSOCIATES ON JUNE 29, 2019.
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6. STAFF GAUGE LOCATIONS SG-6, 7 AND 8 ARE APPROXIMATE AND HAVE NOT BEEN SURVEYED.
7. PRE-DESIGN INVESTIGATION TEST WELLS AND PIEZOMETERS NEAR THE SOUTHERN PROPERTY BOUNDARY SURVEYED BY FISHER ASSOCIATES ON JUNE 29, 2018.

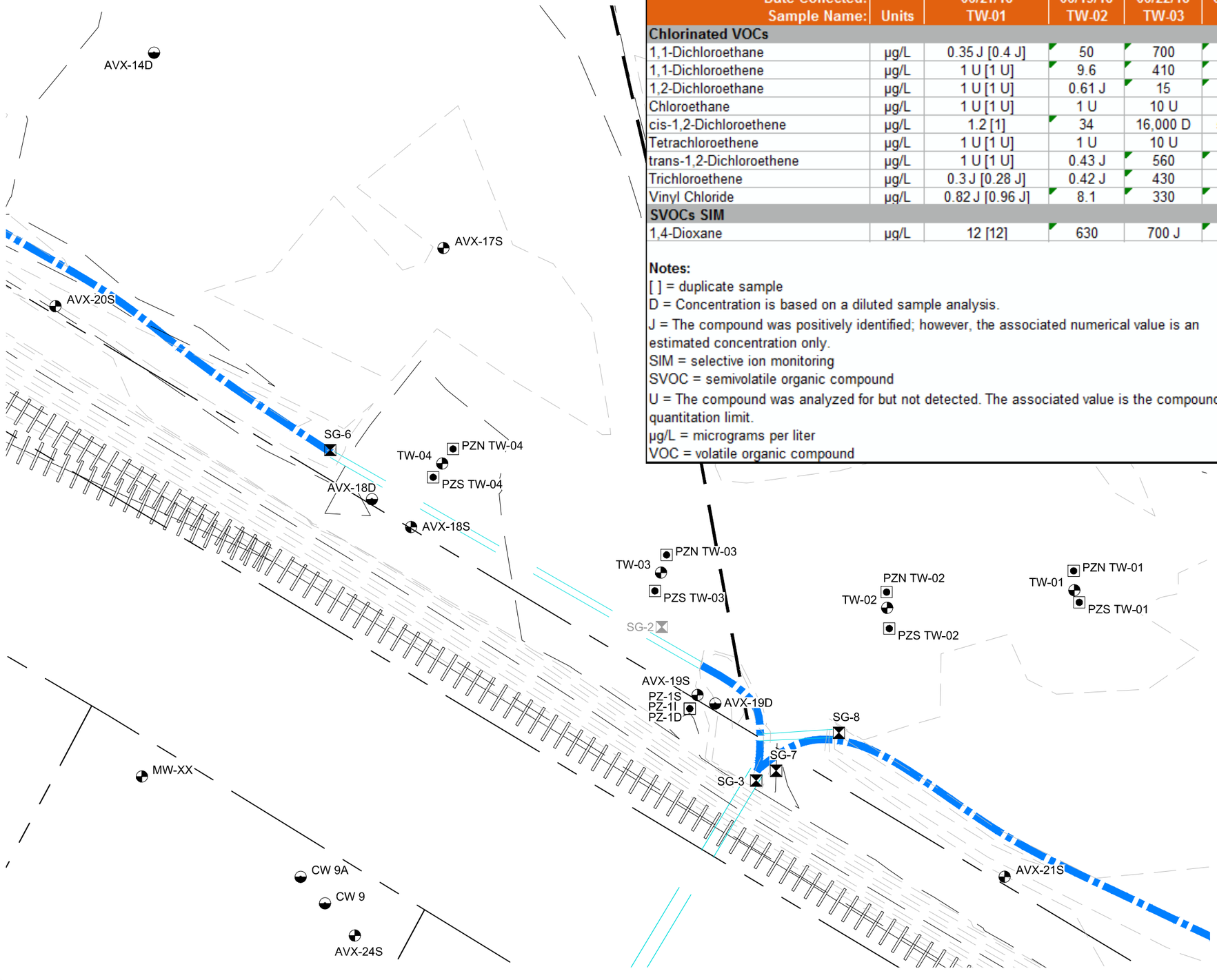
0 15' 30'
GRAPHIC SCALE

AVX CORPORATION
OLEAN, NEW YORK
PRE-DESIGN INVESTIGATION REPORT

AREA OF PDI HYDRAULIC ASSESSMENT

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1-4



Location ID:		TW-01	TW-02	TW-03	TW-04
Date Collected:		06/21/18	06/19/18	06/22/18	06/20/18
Sample Name:	Units	TW-01	TW-02	TW-03	TW-04
Chlorinated VOCs					
1,1-Dichloroethane	µg/L	0.35 J [0.4 J]	50	700	270
1,1-Dichloroethene	µg/L	1 U [1 U]	9.6	410	170
1,2-Dichloroethane	µg/L	1 U [1 U]	0.61 J	15	14
Chloroethane	µg/L	1 U [1 U]	1 U	10 U	4.2 J
cis-1,2-Dichloroethene	µg/L	1.2 [1]	34	16,000 D	5,200 D
Tetrachloroethene	µg/L	1 U [1 U]	1 U	10 U	1.4 J
trans-1,2-Dichloroethene	µg/L	1 U [1 U]	0.43 J	560	39
Trichloroethene	µg/L	0.3 J [0.28 J]	0.42 J	430	1,600 D
Vinyl Chloride	µg/L	0.82 J [0.96 J]	8.1	330	290
SVOCs SIM					
1,4-Dioxane	µg/L	12 [12]	630	700 J	210

Notes:

[ ] = duplicate sample

D = Concentration is based on a diluted sample analysis.

J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.

SIM = selective ion monitoring

SVOC = semivolatile organic compound

U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

µg/L = micrograms per liter

VOC = volatile organic compound

LEGEND:

- AVX-3 — SHALLOW MONITORING WELL LOCATION
- AVX-2B — INTERMEDIATE MONITORING WELL LOCATION
- AVX-1 — DEEP MONITORING WELL LOCATION
- PZ-3D — PIEZOMETER LOCATION
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0 15' 30'
GRAPHIC SCALE

AVX CORPORATION
OLEAN, NEW YORK
PRE-DESIGN INVESTIGATION REPORT

RESULTS OF HYDRAULIC TEST DISCHARGE SAMPLING DETECTABLE CVOCs AND 1,4-DIOXANE

ARCADIS Design & Consultancy for natural and built assets

FIGURE 4-1

CITY: Syracuse DIV/GROUP: EnvCAD DB: R.BASSETT, E. KRAHMER, A.Schilling PM/TM: D. Kingsley LYR:ON=*;OFF=REF, (FRZ)
C:\Users\aschilling\BIM 360\Arcadis\ANA - AVX CORP\Project Files\Olean - Remedial Design Work Plan\2018\B0007393.0000\01-DWG\PDI Fig2-SITE PLAN.DWG LAYOUT: 1-3 SAVED: 5/21/2019 11:43 AM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 5/21/2019 11:44 AM BY: SCHILLING, ADAM
XREFS: IMAGES: PROJECTNAME: ----
PDI TITLE BLOCK
X-BASE
X-TOPO

ATTACHMENT 1

U.S. Fish and Wildlife Service
National Wetlands Inventory

AVX Area Wetland

May 14, 2019

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Environmental Resource Mapper

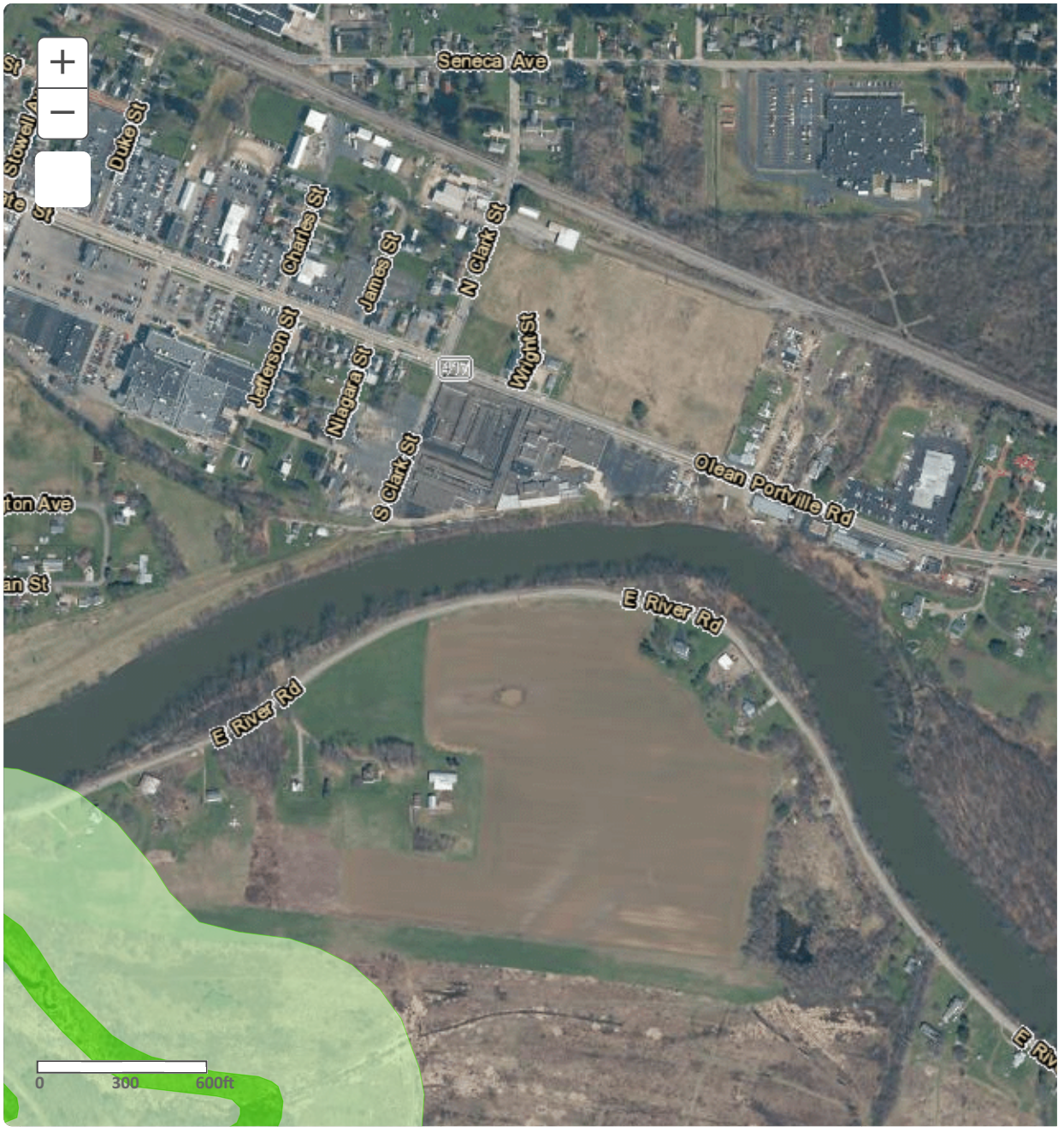
Base Map: NYS Aerial w Streets ▾ Using this map

- Search
- Tools
- **Layers and Legend**

☐ **All Layers**

- ☐ ★ Unique Geological Features
- ☐ — Waterbody Classifications for Rivers/Streams ⓘ
- ☐ ■ Waterbody Classifications for Lakes
- ☑ ■ State Regulated Freshwater Wetlands
  - ☐ ■ State Regulated Wetland Checkzone ⓘ
- ☑ ■ Significant Natural Communities
  - ☐ ■ Natural Communities Near This Location ⓘ
- ☐ ■ Rare Plants or Animals

- Other Wetland Layers
- Reference Layers
- Tell Me More...
- Need A Permit?
- Contacts



From: Smythe, William (DEC) <william.smythe@dec.ny.gov>
Sent: Tuesday, September 18, 2018 9:23 AM
To: Hanish, Mark
Cc: Moore, Maurice (DEC)
Subject: RE: Change of Process Conditions - SPDES Permit No. NY-007-3547, AVX Corporation, Olean, New York

Mark

I spoke with Maurice Moore and we both agreed that since there would be no non-contact cooling water discharged anymore that the site would fall under the exemption for SPDES permitting for remediation activities. Under this exemption, the discharge would still need to meet the substantive requirements of the permit and would be overseen by the Division of Environmental Remediation (DER). According to Maurice, DER would also require treatment of the trench water before blending with the remediation well water. You should contact him for details of what would be required.

From: Hanish, Mark [mailto:Mark.Hanish@arcadis.com]
Sent: Tuesday, September 18, 2018 5:43 AM
To: Smythe, William (DEC) <william.smythe@dec.ny.gov>; Konsella, Jeffrey A (DEC) <jeffrey.konsella@dec.ny.gov>
Cc: Moore, Maurice (DEC) <maurice.moore@dec.ny.gov>
Subject: RE: Change of Process Conditions - SPDES Permit No. NY-007-3547, AVX Corporation, Olean, New York

Hi Bill and Jeff,

Have you and your department had a chance to review our submittal and discuss internally? Have you caught up with Maurice?

Regards

Mark

From: Hanish, Mark
Sent: Friday, September 7, 2018 4:37 PM
To: 'Smythe, William (DEC)' <william.smythe@dec.ny.gov>
Cc: Moore, Maurice <mfmoore@gw.dec.state.ny.us>
Subject: RE: Change of Process Conditions - SPDES Permit No. NY-007-3547, AVX Corporation, Olean, New York

Hi Bill,

Have you and your department had a chance to review our submittal and discuss internally? Have you caught up with Maurice?

Regards

Mark

From: Hanish, Mark
Sent: Wednesday, August 29, 2018 11:06 AM
To: Smythe, William (DEC) <william.smythe@dec.ny.gov>
Cc: Moore, Maurice <mfmoore@gw.dec.state.ny.us>
Subject: RE: Change of Process Conditions - SPDES Permit No. NY-007-3547, AVX Corporation, Olean, New York

Hi Bill,

Yes….that is why I copied Maurice Moore. Maurice has been the NYSDEC rep for this EPA led site for quite some timenow, so you can reach out to him if you would like his perspective on things.

Thanks

Mark

From: Smythe, William (DEC) <william.smythe@dec.ny.gov>
Sent: Wednesday, August 29, 2018 10:57 AM
To: Hanish, Mark <Mark.Hanish@arcadis.com>
Subject: RE: Change of Process Conditions - SPDES Permit No. NY-007-3547, AVX Corporation, Olean, New York

Mark

Does DEC's division of Environmental Remediation have any involvement with the remediation activities on site that include the well?

From: Hanish, Mark [mailto:Mark.Hanish@arcadis.com]
Sent: Tuesday, August 28, 2018 10:02 PM
To: Smythe, William (DEC) <william.smythe@dec.ny.gov>
Cc: Konsella, Jeffrey A (DEC) <jeffrey.konsella@dec.ny.gov>; Moore, Maurice (DEC) <maurice.moore@dec.ny.gov>; John Waites <john.waites@avx.com>; Caldwell, John <John.Caldwell@avx.com>; Popham, William <William.Popham@arcadis.com>; Herman, Megan <Megan.Herman@arcadis.com>
Subject: Change of Process Conditions - SPDES Permit No. NY-007-3547, AVX Corporation, Olean, New York

Hi Bill,

As a follow up to our recent conversation, attached please find a letter describing the change of process conditions related to the above referenced SPDES permit at the AVX Corporation, Olean, NY site. Please let us know if there are any other actions we need to take.

Also, please let me know what you have heard from your inquiry to other NYSDEC technical resources regarding the possibility of blending small quantities of water from a future hydraulic containment trench with larger quantities of clean water being currently discharged under the site SPDES permit.

Thank you for your consideration of this matter.

Regards

Mark

Arcadis U.S. Inc.

Mark B. Hanish
Project Manager
Principal Geologist
6041 Wallace Road Extension, Suite 300
Wexford, PA 15090
Main Phone: 724.742.9180
Fax: 724.742.9189

Office Direct: 724.934.9518
Mobile: 412.225.4375
Mark.Hanish@arcadis.com
www.arcadis.com

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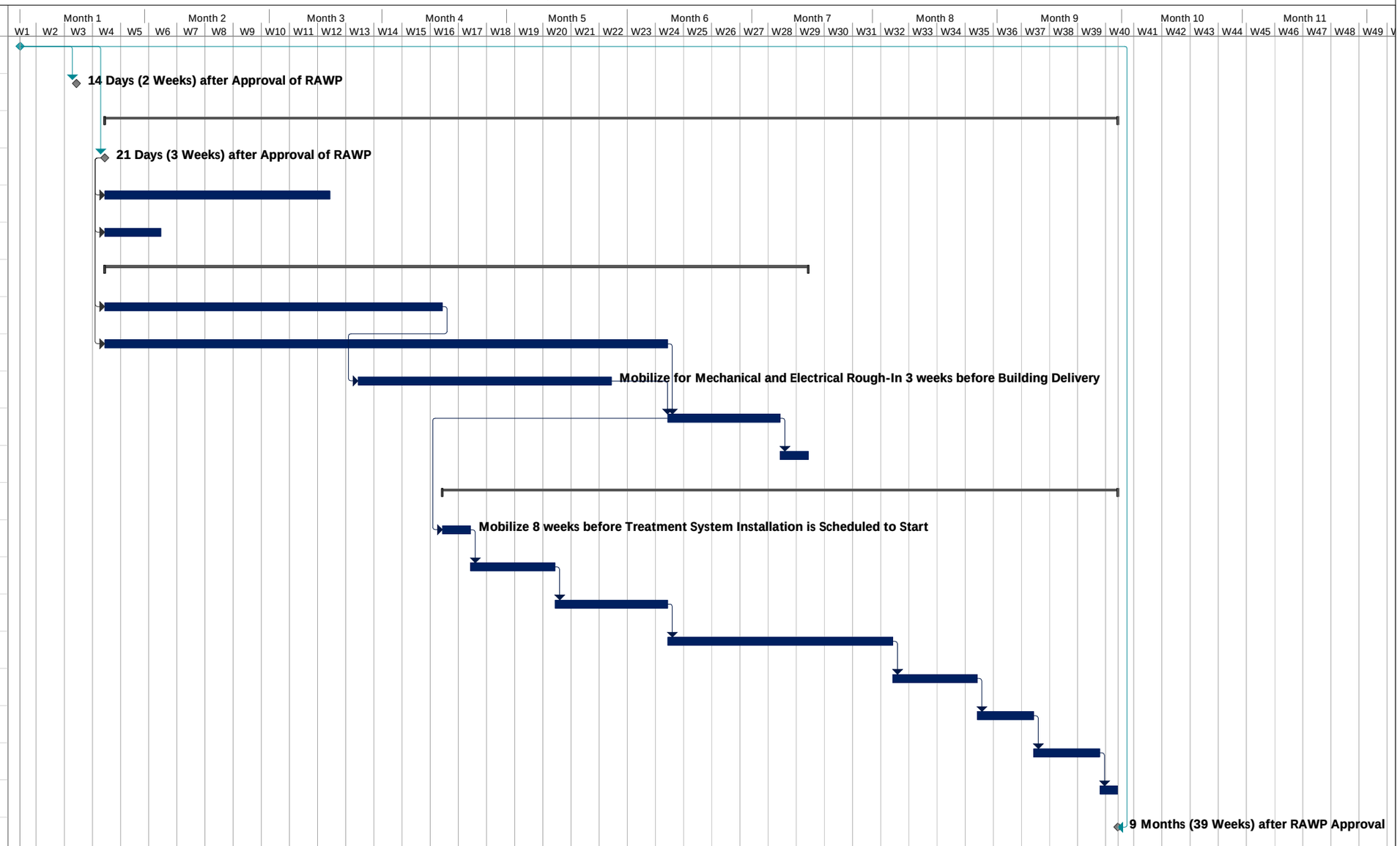
APPENDIX C

Estimated Remedial Action Construction Schedule

Remedial Action Work Plan
Project Schedule
AVX Corporation

ID	Task Name	Duration
1	**Approval of RAWP**	0 wks
2	**Pre-Construction Conference**	0 wks
3	**Remedial Action Construction**	**36 wks**
4	**Start Construction**	0 wks
5	**Permitting**	**8 wks**
6	**Contractor Work Plan Submittals**	**2 wks**
7	**Treatment System**	**25 wks**
8	*Building Manufacturing*	*12 wks*
9	*Skid System Manufacturing*	*20 wks*
10	*Building Installation*	*9 wks*
11	*System Installation*	*4 wks*
12	*System Testing*	*1 wk*
13	**Earthwork**	**24 wks**
14	*Mobilization*	*1 wk*
15	*Site Preparation*	*3 wks*
16	*Construction Grading*	*4 wks*
17	*Hydraulic Containment Trench*	*8 wks*
18	*Treatment System Conveyance*	*3 wks*
19	*Soil Management*	*2 wks*
20	*Site Restoration*	*2.5 wks*
21	*Demobilization*	*0.5 wks*
22	**Construction Complete**	0 wks



Project: RA Construction Sched
Date: Fri 10/15/21

Task Milestone Summary Project Summary

Note: Task durations and sequencing are estimated, and may be adjusted to align with the construction season.

APPENDIX D

Health and Safety Plan

Site Specific Health and Safety Plan

Revision 18 b

Project Name:	AVX Olean
Project Number:	30009085
Client Name:	KYOCERA AVX Components Corporation
Date:	9/20/2021
HASP Expires	9/20/2022
Revision:	

Approvals:

HASP Developer: Aaron Richardson

Project Manager: Mark Hanish

HASP Reviewer: Nicholas Monico

HASP Reviewer Name Typed

HASP Reviewer Signature (handwritten or digital signature)

Arcadis Culture of Caring

Arcadis is committed to a Culture of Caring that ensures each Arcadis employee, part time as needed employee (PTAN), temporary agency employee under Arcadis day to day control, Inexperienced Workers and contractor (cumulatively referred to here as "field staff") goes home at the end of the day free from injury or illness. I certify that the following has been performed with all Arcadis field staff on this project either in person or virtually through Teams:

☐ Reviewed the HASP including a discussion of hazard identification and controls.

- ☐ If conducting activities deemed by Arcadis to be "High Risk", frontline management has reviewed applicable H&S standards (Job Safety Analysis [JSA] when authorized by H&S) for these activities with field staff.
- ☐ If permit to work is required, frontline management has reviewed the permit(s) with field staff.

☐ Reviewed proactive H&S engagement expectations/injury prevention actions.
☐ Reviewed Stop Work Authority.
☐ Reviewed the incident reporting process and expectations including when WorkCare should be contacted by staff (WorkCare incident intervention for all minor, non-emergency injuries) and that the WorkCare phone number is programmed into field team cell phone.
☐ For Inexperienced Workers, a mentor has been assigned for the new task being performed.

For short service employees (SSEs), PTANS* and temporary agency employees* :

☐ Provided coaching and mentoring on Arcadis H&S expectations during project work. Reviewed in detail specific hazards and controls and provided a resource who can be contacted if individual has questions regarding planned or unplanned work tasks.

Mentor/Resource # _____ _____
Name Phone Number

Signed:

_____ Select

* Upon hiring/contracting for the first time.

Emergency Information

Site Address: 1695 Seneca Avenue
Olean, New York

Emergency Phone Numbers:

Emergency (fire, police, ambulance)		911
Emergency (facility specific, if applicable):		
Olean Police Department		716-376-5678
Emergency Other (specify):		
Primary Client Contact:	Brandy Bossle	864-228-4535
WorkCare (non-life-threatening injury/illness):		1-888-449-7787
Project H&S:	Aaron Richardson	585-202-4393
Task Manager:	Aaron Richardson	585-202-4393
Project Manager:	Mark Hanish	412-225-4375
H&S Specialist:	Greg Mason	859-806-0746
Area H&S Director:	Andrew McDonald	410-200-3752

Hospital Name and Address: Olean General Hospital
515 Main Street
Olean, NY 14760

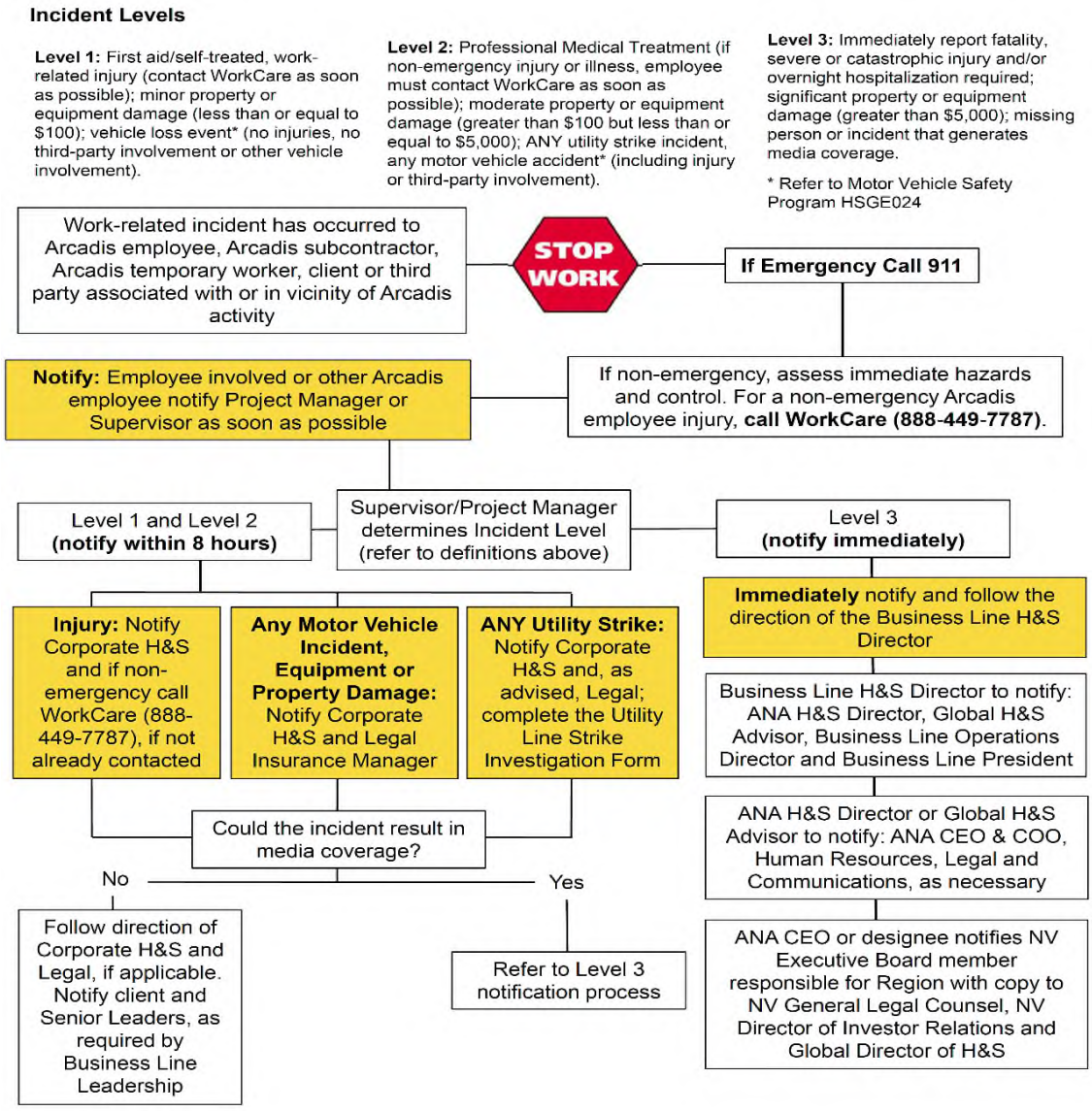
Hospital Phone Number: 716-373-2600

Supplemental Client Contact Information:

Other Important Phone Numbers:

Poison Control Center	1-800-222-1222
Nat. Response Ctr. (spills in reportable quantities)	1-800-424-8802
U.S. Coast Guard (spills to water)	1-800-424-8802

Incident Reporting Protocol Within Arcadis

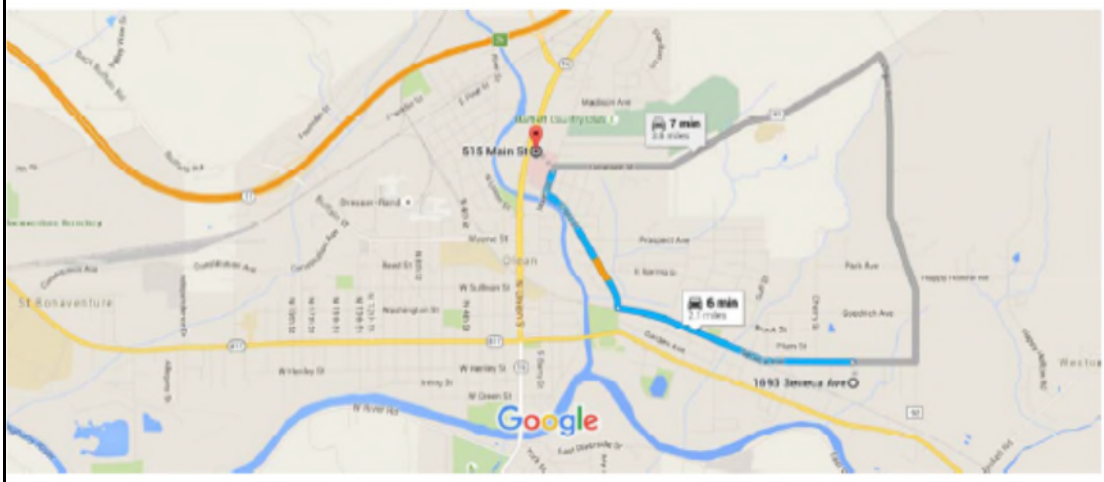


Client Incident Reporting Protocol

Any incidents must be reported by the Arcadis Project Manager to AVX as soon as possible.

Route to the Hospital

Google Maps 1695 Seneca Avenue, Olean, NY to 515 Main Street, Olean, NY Drive 2.1 miles, 6 min



Map data ©2016 Google 2000 ft

1695 Seneca Ave
Olean, NY 14760

1. Head west on Seneca Ave toward Cherry St — 1.2 mi
2. Turn right onto Front St — 0.7 mi
3. Turn right onto Main St — 0.1 mi

515 Main St
Olean, NY 14760

Site Type

The project site is an inactive facility which historically had the following attributes:

Construction	
Railroad	

For class I railroads, work within 25 ft of the rails is prohibited unless FRA On-Track Safety and railroad specific trained. For other railroads (i.e. short line railorads), the project or task manager will specify any special training needs. For all rail related work, field staff will have access to the Arcadis Railroad Safety Handbook and/or client rail safety handbook.

Surrounding Land Use and Topography

Surrounding area is generally residential, with some mixed commercial/industrial. Topography is generally flat at north portion of site, but sloping to the south on the south, wooded portion of the site.

Simultaneous Operations (SimOps)

Planned Arcadis site work will not be in proximity to SimOps work activities performed by non Arcadis employees or subcontractors. Arcadis will initiate stop work and evaluate the work activities through the JSA process if during the course of work a SimOps activity is identified that could reasonably affect health and safety of Arcadis employees and subcontractors.

Site Background

The AVX Corporation (AVX) property located at 1695 Seneca Avenue in Olean, Cattaraugus County, New York (Facility or AVX site) is an inactive former electronic components manufacturer located in a mixed-used area in the Town of Olean, Cattaraugus County, New York. The Facility comprises two principal areas: the former operations area located in the northern portion of property, which includes the former manufacturing building concrete slab, parking areas, and driveways, and the southern undeveloped area located south of the operations area and north of an active railroad is a largely wooded part of the property. Manufacturing at the Facility began in 1950 and continued uninterrupted until the site shut down in 2019. The vicinity of the Facility includes a variety of other industrial facilities, interspersed with residential and commercial properties. The Facility overlies a sand and gravel unit known as the City Aquifer. The City Aquifer is the primary water supply for the City of Olean and several adjacent municipalities. The Olean Well Field Superfund Site (Site) comprises approximately 800 acres in the parts of three municipalities, the City of Olean and Towns of Olean and Portville in Cattaraugus County, New York. The City of Olean operates three supply wells within the Site, the nearest located approximately 2,400 feet southwest of the AVX manufacturing facilities. The complete history of environmental investigation and remediation is described within the Remedial Design Work Plan. The current site COCs are TCE and associated dissolved VOCs (1,1,1-TCA, cis-1,2-DCE, PCE, VC).

Project Tasks
The following tasks are identified for this project:

1	Sampling - Well sampling using bailers
2	Excavation - Using mechanical methods
3	Construction - Construction contractor oversight
4	Construction - Performing construction work
5	Operation and maintenance - Temporary, small or mobile system
6	Waste - Solid waste sampling using manual methods
7	Waste - Soil/debris containment in a soil stockpile
8	Utilities - Clearance
9	Select
10	Select
11	Select
12	Select
13	Select
14	Select
15	Select
16	Select
17	Select
18	Select
19	Select
20	Select

Supplemental requirements associated with the above task(s):
The Arcadis Utility Clearance Checklist must be used for utility clearance activities.

Site access agreements and/or a discussion of proper procedures for accessing off-site non-client owned private property must be provided to the field team.

[X] Required Checklists/Work Forms

Tailgate Safety Briefing Form
Vehicle Inspection Checklist
Utility and Structures Checklist

[ ] Required Permits

Not Applicable

[X] Required H&S Standards

First Aid/CPR_ARC HSGE004
Utility Location Procedures_ARC HSFS019
Excavation and Trenching_ARC HSCS005

Short Service Employees (SSEs)
SSEs (employees who are employed with Arcadis for less than 1 year or are Inexperienced Workers) have the potential to work on this project. If SSEs are utilized, the project team working in conjunction with the SSE's administrative supervisor will ensure requirements of ARC HSGE019 "Short Service Employees" are completed. SSE's will be identified on the project Tailgate Safety Meeting Form.

Roles and Responsibilities

	Name	Role	Short Service Employee
1	Mark Hanish	Project Manager (PM)	No
2	Aaron Richardson	Associate Project Manager (APM)	No
3	Lyle Grant	Task Manager	No
4	Ryan Clare	Field Technical Lead	No
5	Ryan Clare	Site Safety Officer (SSO)	No
6			
7			
8			
9			
10			

Training

All Arcadis employees are required to have the following training to be on site:

Hazwoper 40-Hour
Hazwoper 8-Hour Annual Refresher
HAZCOM GHS/EAP (non-certificate)
Defensive Driving - Smith On-Line
PPE (non-certificate)
H&S Program Orientation (non-certifica
Silica General Awareness
Heat Stress
None
None
None
None
None
Client specific:
Other:

Selected Arcadis employees are required to have the following additional training:

	Names or Numbers from above
DOT HazMat #1	Clare
First Aid/CPR	Clare
Fire Extinguisher (non-certificate)	Clare
Hazwoper 8-Hour Supervisor	Grant
None	
None	
None	
None	
None	
None	
None	
None	
None	
None	
None	
Other:	

The Arcadis Fundamental H&S Principles

Staff working on any of the task(s) listed above must utilize the six Arcadis Fundamental H&S Principles to ensure work is conducted safely. These principles include: 1) Use of TRACK, 2) H&S Planning, 3) Stop Work Authority, 4) "If Not Me Then Who", 5) Stewardship, and 6) Incident Reporting. Every project team member plays an important role in project health and safety. This is more than just having a HASP, training, or PPE. Proactive staff engagement with these principles is critical to a safe work environment.

General Task Hazard Assessment and Risk Control (HARC)

General:	Hazards Applicable to All Project Tasks

The 12 hazard category HARC ratings are not available in this General THA. The mitigated and unmitigated ratings for the hazards presented are based on the Risk Assessment Matrix below. Modify hazards and ratings as necessary to meet project needs.

Risk Assessment Matrix		Likelihood Ratings			
Consequences Ratings		A	B	C	D
People	Property	0 Almost Impossible	1 Possible but Unlikely	2 Likely to Happen	3 Almost Certain to Happen
1-Slight or No Health Effect	Slight or No Damage	0-Low	1-Low	2-Low	3-Low
2-Minor Health Effect	Minor Damage	0-Low	2-Low	4-Medium	6-Medium
3-Major Health Effect	Local Damage	0-Low	3-Low	6-Medium	9-High
4-Fatalities	Major Damage	0-Low	4-Medium	8-High	12-High

Hazard #1

Driving - On road - Injury or vehicle damage from motor vehicle accident or incident

Suggested FHSHB Ref:	3.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Smith System (on line)
Mitigated Risk:	MEDIUM	JSAs
Comments:	Use Smith System "5-Keys" when driving. See Driving JSA for details.	

Hazard #2

Driving - Driver - Injury, death or property damage due to driver distraction, fatigue, etc.

Suggested FHSHB Ref:	3.4, 3.21	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Smith System (on line)
Mitigated Risk:	LOW	Driver awareness and use of stop work authority
Comments:	Use route planning. Keep eyes moving while driving. See Driving JSA.	

Hazard #3

Biological - skin/eye irritation or damage from poisonous plants

Suggested FHSHB Ref:	3.17.11	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	See HASP Tick/Poisonous Plant Section
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Use skin pre-treatment lotions when available.	

Hazard #4

Biological - bites or stings from exposure to insects or arachnids

Suggested FHSHB Ref:	3.17: 2,3,7,8,9,10	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Do body check daily. For ticks see also HASP Tick/Poisonous Plant section	

Hazard #5

Biological - cuts, scrapes, skin/eye puncture from exposure to physically damaging plants

Suggested FHSHB Ref:	3.17.11	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:		

General Task HARC (continued)

Hazard #6		
Environmental - Thermal stress - Injury or illness from heat or cold		
Suggested FHSHB Ref:	3.16	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Field H&S Handbook (see ref. above)
Mitigated Risk:	LOW	JSAs
Comments:	Use job rotation or rest breaks. Stay hydrated and eat regularly.	
Hazard #7		
Environmental - Inclement weather -Injury or equipment damage from inclement weather		
Suggested FHSHB Ref:	3.12	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Weather Monitoring
Mitigated Risk:	LOW	Cont./Emerg. Planning
Comments:	Use 30/30 rule for lightning. See FHSHB for details.	
Hazard #8		
Motion - Musculoskeletal - Injury from lifting, twisting , stooping, or awkward body positions		
Suggested FHSHB Ref:	3.29.1	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Use proper lifting techniques. Use job rotation when applicable. See FHSHB for details.	
Hazard #9		
Motion - Musculoskeletal - Injury from repeated work activity or body motion		
Suggested FHSHB Ref:	3.29.2	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Use proper lifting techniques. Use job rotation when applicable. See FHSHB for details.	
Hazard #10		
Sound - Noise - Injury or illness due to noise exposure		
Suggested FHSHB Ref:	3.15	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Increase distance from source if possible. Maintain equipment.	
Hazard #11		
Gravity - Falls - Injury due to slips and trips		
Suggested FHSHB Ref:	3.26.4, 4.11	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Housekeeping
Comments:	Use footwear appropriate for site conditions, plan routes and do not hurry while walking.	
Hazard #12		
None		
Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task Specific HARC

Task 1:	Sampling - Well sampling using bailers								
HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low):							FHSHB Ref:		3.9
Biological	L	Chemical	M	Driving	-	Electrical	-		
Environmental	M	Gravity	M	Mechanical	-	Motion	M		
Personal Safety	L	Pressure	L	Radiation	-	Sound	L		

Hazard #1

Chemical - liquids, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	3.9, 3.22, 3.30, 3.33	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	preservatives, use caution when handling	

Hazard #2

Motion - Cuts and scrapes - Injury from moving object impacting skin or eye

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	JSAs
Comments:	bottleware, use caution when handling	

Hazard #3

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	3.27.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	well lids	

Task Specific HARC (continued)

Task 2:	Excavation - Using mechanical methods

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 4.4

Biological	L	Chemical	L	Driving	-	Electrical	M
Environmental	L	Gravity	L	Mechanical	M	Motion	M
Personal Safety	-	Pressure	L	Radiation	-	Sound	L

Hazard #1

Mechanical - Crushing - Injury by crushing body part in mechanical process

Suggested FHSHB Ref:	3.27.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Inspections
Comments:	use of excavators, use spotters and working radius/exclusion zone	

Hazard #2

Pressure - Hydraulic - Injury from hydraulic process or device failure

Suggested FHSHB Ref:	2.5, 4.5, 4.6	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	H&S Standards
Mitigated Risk:	LOW	Specialized Training per Standard
Comments:	inspect all hydraulic lines before each shift	

Hazard #3

Driving - Off road - Injury or vehicle damage from object impact/vehicle rollover/improper load securement

Suggested FHSHB Ref:	3.4.2.1	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	JSAs
Mitigated Risk:	LOW	Specialized Training per Standard
Comments:	operate from stable work surface	

Hazard #4

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Select
Mitigated Risk:	LOW	Select
Comments:	moving equipment	

Task Specific HARC (continued)

Task 3:	Construction - Construction contractor oversight							
HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low):						FHSHB Ref:	4	
Biological	L	Chemical	L	Driving	-	Electrical	M	
Environmental	L	Gravity	M	Mechanical	M	Motion	M	
Personal Safety	-	Pressure	L	Radiation	-	Sound	M	

Hazard #1

Driving - Off road - Injury or vehicle damage from object impact/vehicle rollover/improper load securement

Suggested FHSHB Ref:	3.4.2.1	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	JSAs
Mitigated Risk:	LOW	Specialized Training per Standard
Comments:	driving on access road to observe trench installation; stay on road but out of the way	

Hazard #2

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	JSAs
Comments:	stay out of travel paths and swing radius while observing trench installation	

Task Specific HARC (continued)

Task 4:	Construction - Performing construction work							
HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low):						FHSHB Ref:	4	
Biological	L	Chemical	L	Driving	-	Electrical	M	
Environmental	L	Gravity	H	Mechanical	M	Motion	M	
Personal Safety	-	Pressure	L	Radiation	-	Sound	M	

Hazard #1

Gravity - Struck by - Injury from falling object

Suggested FHSHB Ref:	3.26.2	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	H&S Standards
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	potential overhead work during construction of treatment building	

Hazard #2

Electrical - Electrocution or arc flash - Injury or death from electrocution or arc flash from electrical

Suggested FHSHB Ref:	3.25,	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Lockout/Tagout
Mitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Comments:	installation of electrical components of treatment system	

Hazard #3

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	3.27.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	installation of mechanical components of treatment system	

Task Specific HARC (continued)

Task 5:	Operation and maintenance - Temporary, small or mobile system							
HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low):						FHSHB Ref:	4	
Biological	L	Chemical	M	Driving	-	Electrical	M	
Environmental	L	Gravity	M	Mechanical	H	Motion	H	
Personal Safety	L	Pressure	M	Radiation	L	Sound	H	

Hazard #1

Chemical - liquids, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	3.9, 3.22, 3.30, 3.33	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	HASP
Comments:	contact with potentially impacted treatment system process water	

Hazard #2

Electrical - Housekeeping - Injury or property damage due to frayed wiring, improperly mounted wiring,

Suggested FHSHB Ref:	3.25	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Housekeeping
Comments:	inspect/maintain electrical wiring components and connections	

Hazard #3

Pressure - Hydraulic - Injury from hydraulic process or device failure

Suggested FHSHB Ref:	2.5, 4.5, 4.6	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Lockout/Tagout Training
Mitigated Risk:	LOW	H&S Standards
Comments:	potential leaks and/or weak connections in system may cause pressure release	

Task Specific HARC (continued)

Task 6:	Waste - Solid waste sampling using manual methods

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.31

Biological	L	Chemical	L	Driving	-	Electrical	-
Environmental	M	Gravity	M	Mechanical	-	Motion	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Chemical - solids/particulates, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	3.9, 3.22, 3.30, 3.33	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	HASP
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	collecting solid waste sample from stockpile, wear nitrile gloves	

Hazard #2

Motion - Cuts and scrapes - Injury from moving object impacting skin or eye

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Site Awareness
Comments:	bottleware, use caution when handling	

Task Specific HARC (continued)

Task 7:	Waste - Soil/debris containment in a soil stockpile

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.31

Biological	L	Chemical	M	Driving	-	Electrical	-
Environmental	M	Gravity	M	Mechanical	-	Motion	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	JSAs
Comments:		

Hazard #2

Chemical - solids/particulates, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	3.9, 3.22, 3.30, 3.33	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	watch for dust excessive generation, and mitigate if necessary	

Task Specific HARC (continued)

Task 8:	Utilities - Clearance								
HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low):							FHSHB Ref:		3.36
Biological	L	Chemical	L	Driving	-	Electrical	M		
Environmental	L	Gravity	L	Mechanical	M	Motion	M		
Personal Safety	L	Pressure	L	Radiation	-	Sound	L		

Hazard #1

Environmental - Utilities - Injury or property damage from utility strike/damage

Suggested FHSHB Ref:	3.36	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Inspections
Mitigated Risk:	MEDIUM	Specialized Checklist/Forms
Comments:	verify all locations are complete prior to breaking ground	

Hazard Communication (HAZCOM)/Global Harmonization System (GHS)

[ ] HAZCOM/GHS for this project is managed by the client or general contractor

List the chemicals anticipated to be used by Arcadis on this project per HAZCOM/GHS requirements.
(Modify quantities as needed)

	Preservatives	Qty
[ ]	Not applicable	
[x]	Hydrochloric acid	<500 ml
[ ]	Nitric acid	<500 ml
[ ]	Sulfuric acid	<500 ml
[ ]	Sodium hydroxide	<500 ml
[ ]	Zinc acetate	<500 ml
[ ]	Ascorbic acid	<500 ml
[ ]	Acetic acid	<500 ml
[ ]	Isopropyl alcohol	< 4 gal.
[ ]	Formalin (<10%)	< 4 gal.
[ ]	Methanol	<500 ml
[ ]	Sodium bisulfate	<500 ml

	Decontamination	Qty
[ ]	Not applicable	
[x]	Alconox	≤ 5 lbs
[ ]	Liquinox	≤ 1 gal
[ ]	Acetone	≤ 1 gal
[ ]	Methanol	≤ 1 gal
[ ]	Hexane	≤ 1 gal
[ ]	Isopropyl alcohol	≤ 4 gal
[ ]	Nitric acid	≤ 1 L
[ ]	Other:	

	Calibration	Qty.
[ ]	Not applicable	
[x]	Isobutylene/air	1 cyl
[ ]	Methane/air	1 cyl
[ ]	Pentane/air	1 cyl
[ ]	Hydrogen/air	1 cyl
[ ]	Propane/air	1 cyl
[ ]	Hydrogen sulfide/air	1 cyl
[ ]	Carbon monoxide/air	1 cyl
[ ]	pH standards (4,7,10)	≤ 1 gal
[ ]	Conductivity standards	≤ 1 gal
[ ]	Other:	

	Fuels	Qty.
[ ]	Not applicable	
[x]	Gasoline	≤ 5 gal
[x]	Diesel	≤ 5 gal
[ ]	Kerosene	≤ 5 gal
[ ]	Propane	1 cyl
[ ]	Other:	

	Kits	Qty.
[x]	Not applicable	
[ ]	Hach (specify):	1 kit
[ ]	DTECH (specify):	1 kit
[ ]	Other:	1 kit

	Remediation	Qty.
[x]	Not applicable	
[ ]		
[ ]		
[ ]		
[ ]		
[ ]		

	Other:	Qty.
[ ]	Not applicable	
[x]	Spray paint	≤ 6 cans
[ ]	WD-40	≤ 1 can
[x]	Pipe cement	≤ 1 can
[x]	Pipe primer	≤ 1 can
[ ]	Mineral spirits	≤ 1 gal

	DOT(1):	Qty.
[ ]	MOT eligible soils	
[ ]	MOT eligible water	
[ ]	MOT eligible solids	
[ ]	MOT eligible liquids	
[ ]		
[ ]		
[ ]		

(1) Attach applicable Materials of Trade (MOT) generic shipping determination. SDS not generally applicable to this category.

SDSs for this project will be available in printed form in the company vehicle. All project workers will be notified of the SDS location in their initial safety briefing.

Contractor SDSs will be submitted to Arcadis in advance of work and will be filed with Arcadis SDSs as indicated above.

This project will store materials subject to the HAZCOM Standard in bulk storage. Storage requirements and limitations for this this material is addressed in a supplement attached to the this HASP.

Air Monitoring

☐ There are no atmospheric chemical, radiological, or particulate hazards on this project requiring air monitoring.
☐ Air monitoring is the responsibility of the client or subcontractor.

Constituents of Interest:

Time Weighted Averages (TWAs) are ACGIH 8-Hr Threshold Limit Values (TLVs) unless noted.

TCE			
TWA	10 ppm	LEL/UEL (%):	8/10.5
STEL	25 ppm	VD (Air = 1):	NA
IDLH	1000 ppm, NIOSH	VP (mmHg):	58
cis 1,2-Dichloroethene			
TWA	200 ppm	LEL/UEL (%):	5.6/12.8
STEL	NA	VD (Air = 1):	NA
IDLH	1000 ppm, NIOSH	VP (mmHg):	180-265
1,1-Dichloroethane			
TWA	100 ppm, LAMP NOTICE See Notes	LEL/UEL (%):	5.4/11.4
STEL	N/A	VD (Air = 1):	NA
IDLH	3000 ppm, NIOSH	VP (mmHg):	182
1,1,1-Trichloroethane			
TWA	350 ppm, LAMP NOTICE See Notes	LEL/UEL (%):	7.5/12.5
STEL	450 ppm	VD (Air = 1):	4.6
IDLH	700 ppm, NIOSH	VP (mmHg):	100
Particulates n.o.s.	Anticipated Breathing Zone Concentration <= 150 mg/m3		
TWA	3 mg/m3, respirable	LEL/UEL (%):	NA/NA
STEL	NA	VD (Air = 1):	NA
IDLH	NA	VP (mmHg):	NA
None			
TWA	NA	LEL/UEL (%):	NA
STEL	NA	RGD (Air = 1):	NA
IDLH	NA	VP (mmHg):	NA

TWA - Time Weighted Average (ACGIH TLV unless noted)
STEL - Short Term Exposure Limit
IDLH - Immediately Dangerous to Life and Health
LEL/UEL - Lower /Upper Explosive Limit
RGD - Relative Gas Density
VP - Vapor Pressure

Notes:

Required Monitoring Instruments, Action Levels and Monitoring Frequency

Gray fields below are not automated. Make necessary selections from drop down menus.

Photoionization Detector Select Lamp: 10.6 eV

The lamp you selected does not have a correction factor for one or more constituents listed above. Action levels may require manual adjustment or, if required, select PID with different eV rating.

Computed action levels (PID units) (1):			Computed action levels have been manually adjusted.
<	13.2	Continue working	
	13.2 - 26.3	Levels sustained > 5 minutes, monitor continuously and review engineering controls and PPE. Proceed with caution.	
>	26.3	Stop work and contact SSO	

(1) Computed action levels are for PIDs which have not been programmed to correct TLVs for specific constituents or mixtures.

Particulate/aerosol monitoring is not required. Re-evaluate if visible dusts or aerosols cannot be controlled.

Action levels are in mg/m3			Computed action levels have been manually adjusted.
<	NA	Continue working	
	NA	Levels sustained > 5 minutes, monitor continuously and review engineering controls and PPE. Proceed with caution.	
>	NA	Stop work and contact SSO	

Breathing zone air monitoring using the above instruments will be performed at the following frequency:

Select

Multigas (including LEL/O2 and Hg vapor) monitoring is not required.

LEL/O2 Meter	0-5% LEL	Continue work
LEL/O2 Monitoring Not Required	>5-10% LEL	Continually monitor, review engineering controls, proceed with caution
	>10% LEL	Stop work, evacuate, contact SSO
	19.5%-23.5% O2	Normal, continue work
	<19.5% O2	O2 deficient, stop work, evacuate, contact SSO
	>23.5% O2	O2 enriched, stop work, evacuate, contact SSO

Additional Gas/Vapor Monitoring is Not Required

		1/2 TLV	Stop Work Action Level	Comments
☐	Ammonia	12.5 ppm	25 ppm	
☐	Carbon dioxide	2500 ppm	5000 ppm	
☐	Carbon monoxide	12.5 ppm	25 ppm	
☐	Chlorine	0.05 ppm	0.1 ppm	
☐	Hydrogen cyanide	2.35 ppm (skin)	4.7 ppm* (skin)	
☐	Hydrogen sulfide	0.5 ppm	1 ppm	
☐	Nitrogen dioxide	0.1 ppm	0.2 ppm	
☐	Phosphine	0.025 ppm	0.05 ppm	
☐	Sulfur dioxide	0.125 ppm	0.25* ppm	
☐	Mercury vapor	0.0125 mg/m3	0.025 mg/m3	

* Ceiling or STEL value

All air-monitoring instruments must be calibration checked daily, if used, per manufacturer's instructions. Calibration checks, including calibration gases used, must be documented.

Compound specific monitoring using indicator tubes or chips is not required.

Indicator:		≤TWA	Continue work
☐ Tube	☐ Chip	>TWA	Stop work, review engineering controls and PPE, contact SSO
Compound(s):			

Indicator tube/chip monitoring frequency: Not applicable

Tick and Poisonous Plant Hazards

For all projects with outdoor work, biological hazards must be addressed in the tailgate safety meeting each day. The following controls must be used to mitigate biological hazards while working and must also be discussed in the tailgate safety meeting.

Controlling Tick Hazards

Risk Guide for Ticks:

Low	Paved areas; parking lots; well manicured lawns and fields; no work taking place within 15 feet of vegetated areas; work in REGIONS with no tick populations; sub-freezing temperatures, snow or ice cover on ground.*
Medium	Brush hogged fields, wetlands, and grasslands; forested areas with little undergrowth; weeds less than knee height; moderately dense foliage; sporadic or moderately vegetated shaded areas; average leaf accumulation and decaying material on the ground; work taking place in fields after application of insecticide; work in REGIONS with a recognized moderate tick populations; outdoor work during spring, summer and fall months.*
High	Uncut fields, wetlands, forested areas, and grasslands; weeds taller than knee height; heavy dense foliage; heavily vegetated shaded areas; excessive accumulations of leaves and decaying material on the ground; work in REGIONS with recognized heavy tick populations; areas with posted tick hazard warnings; outdoor work during spring, summer and fall months.*

*Cold weather does not eliminate risk of exposure to deer ticks as they may be active all year in areas that experience subfreezing temperatures.

Ticks are ranked as a **Medium** risk for this project

Care should be taken to avoid walking through or working in tall grasses, overgrown or bushy vegetation to the extent reasonable and practical. No single control is effective against ticks.

Select required controls below:

Engineering Controls

- [x] Mowing of work area
- [x] Clearing overgrown vegetation
- [ ] Pesticide application
- [ ] Other: _____

Administrative Controls

- [x] Complete tick check morning/evening
- [ ] Scheduled tick check: _____
- [ ] Inspect backpacks, equipment cases, etc. daily
- [x] Vehicle cab - maintain good housekeeping
- [ ] Other: _____

Personal Protective Equipment

- [ ] Light colored clothing
- [ ] Light colored hat/hardhat
- [x] Pants tucked in boots
- [x] Shirt tucked into pants
- [ ] Long sleeved shirt and long pants
- [ ] White Tyvek pants
- [ ] White coveralls/Tyvek
- [ ] Taped cuffs/pant legs
- [ ] Tick gators
- [ ] Double sided tape/duct tape sticky side out
- [ ] Insect mesh/netting for face/head or whole body suit
- [ ] Other: _____

Repellents

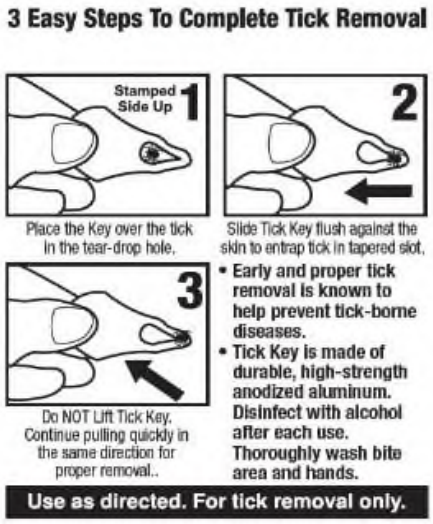
- [ ] Repellents will not be used
- [ ] Permethrin impregnated clothing (purchased)
- [x] Permethrin (0.5% self applied/treated to clothing)
- [x] Deet 20-40% applied to skin
- [ ] Other: _____

Permethrin must be applied to clothing within the past 6 weeks or within 6 garment washings. Do not apply permethrin directly to skin. Follow manufacturer's application instructions.

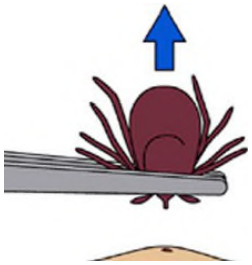
Tick Removal and First Aid

Ticks removed within 24 hours of embedment represent a very low risk for adverse outcomes. Perform tick checks as directed above. To properly remove a tick:

Using a Tick Removal Tool



Using Tweezers



1) Use point tip tweezers, if available, to reduce potential of crushing the ticks body
2) Grasp the tick as close to skin as possible
3) Pull upward with even pressure.

Do not crush tick with fingers

After removal, wash affected area with alcohol or iodine. Wash hands thoroughly after removal.
Document date/time of the removal in field notes, field form or H&S app.
If rash or fever develops, call WorkCare

Poisonous Plants (Poison Ivy, Poison Oak, Poison Sumac)

All work outdoors, regardless of time of year, must address poisonous plant hazards and controls in the tailgate safety meeting.

Controlling Exposure to Poisonous Plants

Poisonous Plants are ranked as a **High** risk on this project

Select required controls below:

Engineering Controls

	Not applicable
	Mowing of work area
x	Clearing overgrown vegetation
	Herbicide application
	Other: _____

Administrative Controls

x	Identify and avoid (see ID Quick Guide below)
	Watch for signs or symptoms of exposure
	Vehicle cab - maintain good housekeeping
	Other: _____

A specific JSA is required that must address controls to be used to prevent exposure to poisonous plants during mowing/cutting/removal activities. Burning cleared vegetation not recommended.

Personal Protective Equipment

x	Gloves
	Hat/hardhat/head covering
x	Pants tucked in boots
x	Shirt tucked into pants
	Long sleeved shirt and long pants

	White coveralls/Tyvek
	Taped cuffs/pant legs
	Dust mask (during burning activities, etc.)
	Other: _____

Repellents

- [ ] Repellents will not be used
- [ ] Barrier creams
- [ ] Other: _____

Skin Decontamination

- [x] Wash with post-exposure soap and water
- [x] Wash with soap and water (use hot water if available)
- [ ] Hot shower at end of day
- [ ] Other: _____

Equipment Decontamination

Due to the high risk associated with poisonous plants on this project, portable equipment and tools should be considered contaminated with urushiol (the oil that causes allergic reactions and dermatitis in poisonous plants covered by this plan). Decontaminate by using post-exposure soap and water or alcohol spray if safe to do so for the equipment/tool being cleaned. Larger equipment should be decontaminated prior to performing maintenance by pressure washing or spraying with alcohol spray in area of maintenance (i.e. tires, etc.).

Clothing Decontamination

Wash work clothing in hot water separate from other clothing. Since the project has a high risk for poisonous plants, work boots must be considered contaminated with urushiol. Decontaminate with post-exposure soap and water or hot soap and water. If safe for the boot, consider spraying with alcohol spray if post-exposure soap is not available. Place disposable outer clothing (coveralls, Tyvek, etc.) and disposable gloves in plastic bag for disposal. Wear gloves while removing disposable outer clothing.

First Aid

If skin irritation or other signs of allergic reaction develops contact WorkCare for assistance. Document date and time of exposure, if known, in field notes, field form or H&S app.

Identification Quick Guide

Ticks:

American Dog Tick

Blacklegged (Deer) Tick

Brown Dog Tick

Groundhog Tick

Gulf Coast Tick

Lone Star Tick

Rocky Mountain Wood Tick

Soft Tick

Poison Ivy:

Poison Oak:

Poison Sumac:

For other biological hazards, address the hazards and controls in the JSA for the work task.

Personal Protective Equipment (PPE)

See JSA or Permit for the task being performed for required PPE. If work is not conducted under a JSA or Permit, refer to the governing document for PPE requirements. At a minimum, the following checked PPE is required for all tasks during field work (outside of field office trailers and vehicles) not covered by a JSA or Permit on this project:

Minimum PPE required to be worn by all staff on project:

						Specify Type:
X	Hard hat		Snake chaps/guards		Coveralls:	
X	Safety glasses		Briar chaps		Apron:	
	Safety goggles		Chainsaw chaps		Chem. resistant gloves:	
	Face shield		Sturdy boot		Gloves other:	
	Hearing protection	X	Steel or comp. toe boot		Chemical boot:	
	Rain suit		Metatarsal boot		Boot other:	
	Other:			X	Traffic vest, shirt or coat:	Class II
					Life vest:	

Task specific PPE: Nitrile gloves and Leather Work Gloves

Comments:

See Tick and Poisonous Plant Hazards section for addtional PPE information.

Task specific PPE - worn when applicable hazards are present as described in the corresponding JSA.

Medical Surveillance

All project workers will be required to be participants in HAZWOPER medical surveillance except employees and/or subcontractors listed below.

Client and DOT mandated drug and alcohol testing is not required for this project and will not be performed.

Specify Companies:

Hazardous Materials Shipping and Transportation

A shipping determination package has been prepared, reviewed and provided to Arcadis field staff for this project.

Traffic Safety and Traffic Safety Plans (TSPs)

The scope of work on this project will not expose Arcadis workers or subcontractors to vehicular traffic. A traffic safety plan will not be required.

Arcadis Commercial Motor Vehicles (CMVs)

CMVs operated by Arcadis employees on public roadways will not be utilized on this project. Arcadis defines a CMV as any single vehicle with a gross vehicle weight rating (GVWR) ≥10,001 pounds or a truck and trailer combination with a combined GVWR ≥10,001 pounds (GVWR of truck + GVWR of trailer = ≥10,001 pounds).

Site Control

Site control requirements are addressed in the applicable task JSA for this project. JSAs requiring site control are attached to this HASP.

Decontamination

Decontamination protocols are addressed in the applicable task JSA(s) for this project. The applicable JSAs are attached to this HASP.

Sanitation

Restroom facilities and potable water will be provided by an Arcadis contractor for this project. Unless alternate requirements are stipulated in a plan supplement (i.e. Heat Injury and Illness Prevention Plan), permit or JSA, temporary restroom facilities will be provided with one toilet for every 20 project workers and bottled or non-plumbed potable water will be provided to project workers at 1 gallon/worker/day.

Safety Briefings

Arcadis will lead all safety briefings on this project and will document the safety briefing on a Tailgate Safety Briefing form or logbook. Safety briefings will be conducted once at the beginning of each work day unless the Site Safety Officer deems more frequent safety briefings will be required based on work being conducted. All project workers, including Arcadis subcontractors, will be required to attend the safety briefing. Site visitors and project workers not on duty during the morning safety briefing will receive the safety briefing upon their arrival onto the project site for the day.

Employee Health and Safety Engagement

The CPM or APM is responsible for reviewing and establishing H&S engagement goals for the project. These goals are summarized below.

Hazard Observations (via H&S App or TIP) required at the following frequency on this project:

1/200 manhours
Close Call reporting (via H&S app) goals for this project:
NA
Other (specify):

Safety Equipment and Supplies

Safety equipment/supply requirements are addressed in the JSA or Permit for the task being performed. If work is not performed under a JSA or Permit, the following safety equipment is required to be present on site in good condition unless otherwise noted (Check all that apply):

X	First aid kit	X	Insect repellent: DEET and/or permethrin
	Bloodborne pathogens kit	X	Sunscreen
X	Fire extinguisher		Air horn
	Eyewash (ANSI compliant)	X	Traffic cones
X	Eyewash (bottle)	X	2-way radios
X	Drinking water		Heat stress monitor
	Other:	X	See Tick and Poisonous Plant Hazards section for addtional equipment/supply information.

International Travel

International travel is not required for this project.

Spill Control and Containment

Spill control and containment protocols, including required equipment and supplies, are located in a JSA prepared by Arcadis. Implementation of the JSA requirements are the responsiblity of Arcadis.

Use of Electronic Devices in Areas of Increased Safety Risk

The intent of this section is to ensure use of standard computer tablets, laptops, or cell phones (collectively referred to in this HASP as a digital device) is performed in a manner that is effective in preventing or mitigating injury to the user of the digital device.

Use of electronic devices within 25 ft of a railroad track requires approval of the railroad owning or operating on the track. Railroad On-Track Safety rules for use of electronic devices must be followed without exception even if not under contract to the railroad (Arcadis policy). Refer to the Arcadis Railroad Safety Handbook for more information.

Electronic device use and distractions to be discussed and documented in the job briefing/safety briefing.

Signatures

I have read, understand and agree to abide by the requirements presented in this health and safety plan. I understand that I have the absolute right to stop work if I recognize an unsafe condition affecting my work until corrected.

Printed Name	Signature	Date

Add additional sheets if necessary

You have an absolute right to STOP WORK if unsafe conditions exist!

Attachment A

Control Number: TSM- 30009085

TSM + project number plus date as follows: xxxxxxxx.xxxx.xxxxx - dd/mm/year

TAILGATE HEALTH & SAFETY MEETING FORM

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**

Issues or concerns from previous day's activities:

Task anticipated to be performed today:

☐ Additional permits/checklists attached

USE TRACK! Evaluate the hazards (h) for the tasks being performed today and rank as Low (L), Medium (M) or High (H). Use relevant JSAs, FHSHB, permit or other work standard to communicate controls (c) to be used to eliminate or mitigate identified hazards.

☐ Gravity (i.e., ladder, trips) (L M H) h: c:	☐ Motion (i.e., traffic, machinery) (L M H) h: c:	☐ Mechanical (i.e., augers, motors) (L M H) h: c:
☐ Electrical (i.e., utilities) (L M H) h: c:	☐ Pressure (i.e., gas cyl., wells) (L M H) h: c:	☐ Environment (i.e., heat, cold) (L M H) h: c:
☐ Chemical (i.e., fuel, acid, paint) (L M H) h: c:	☐ Biological (i.e., ticks, poison ivy) (L M H) h: c:	☐ Radiation (i.e., alpha, sun, laser) (L M H) h: c:
☐ Sound (i.e., machinery) (L M H) h: c:	☐ Personal (i.e. alone, night) (L M H) h: c:	☐ Driving (i.e. car, ATV, boat) (L M H) h: c:

☐ Refer to the attached Hazard Analysis Sheet(s) or JSA

Comments:

Signature and Certification: I have read and understand the project specific HASP for this project.

SSE Employee*

Non-Life Threatening Injury or Illness
Call WorkCare 1-888-449-7787

	Printed Name/Signature/Company	Sign In Time	Sign Out Time

***Short Service Employee (SSE) working for Arcadis <1 year.**

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to **STOP THE JOB,** I will perform **TRACK**; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call **WorkCare at 1.888.449-7787** and then notify the field supervisor.

Utility strike, motor vehicle accident or 3rd party property damage - field supervisor will immediately notify the Project or Task Manager

Arcadis Weekly Vehicle Inspection Form

ARCADIS

Vehicle # / License Plate # | **Lease Plan # / Last 6 of Vin #**

Inspection Date												
Odometer reading												
Driver / Inspector Name												
Check the appropriate box and enter repair date for identified repairs:	OK	Needs Repair	Repair Date	OK	Needs Repair	Repair Date	OK	Needs Repair	Repair Date	OK	Needs Repair	Repair Date
Interior	Horn operational												
	Door Locks operational												
	Seat Belts in good repair												
	Seats and Seating Controls												
	Steering Wheel - No Excessive Play												
	Interior Lights and Light Controls												
	Instrument Panel/Gauges												
	Wiper Controls operational												
	Heat/Defrost/Air Conditioning working												
	Rear View Mirror present												
	Backup Camera/Sensors working												
	Jack and Lug Wrench present												
Exterior[1]	Lights and Signals operational												
	ires properly inflated/good tread depth												
	Spare Tire properly inflated												
	Doors operational												
	Windows Not Cracked/Damaged												
	Side View Mirrors												
	Body Panels and Bumpers												
Engine & Brakes	Engine Start & Running Smoothly												
	Fluid Levels, No Noticeable Leaks												
	Belts tight, no cracks												
	Brakes operational, no squeaking												
Emergency Equipment[2]	First Aid Kit, inspected weekly												
	Fire Extinguisher properly secured												
	Fire Extinguisher inspected weekly												
	range/Yellow emergency warning light												
	Roadside Assistance Information												
	Recommend spotter cones available												
Cargo	Cargo Secure and Properly Distributed												
	Securing Devices in Good Condition												
Registration	License Plate /Tags												
	Registration and Insurance												
	City/State Inspection Decal												
	Lease Plan information/Fuel Card												

[1] **Note all damages to the vehicle on the back of this page**

[2] **Emergency Equipment required per Motor Vehicle Standard ARC HSGE024**

Note All Vehicle Damage Below

All Vehicle Damage must be reported to Sue Berndt (Corporate Legal), Andrew McDonald (Corporate H&S), and Roger Elliot (Corporate Fleet Manger)

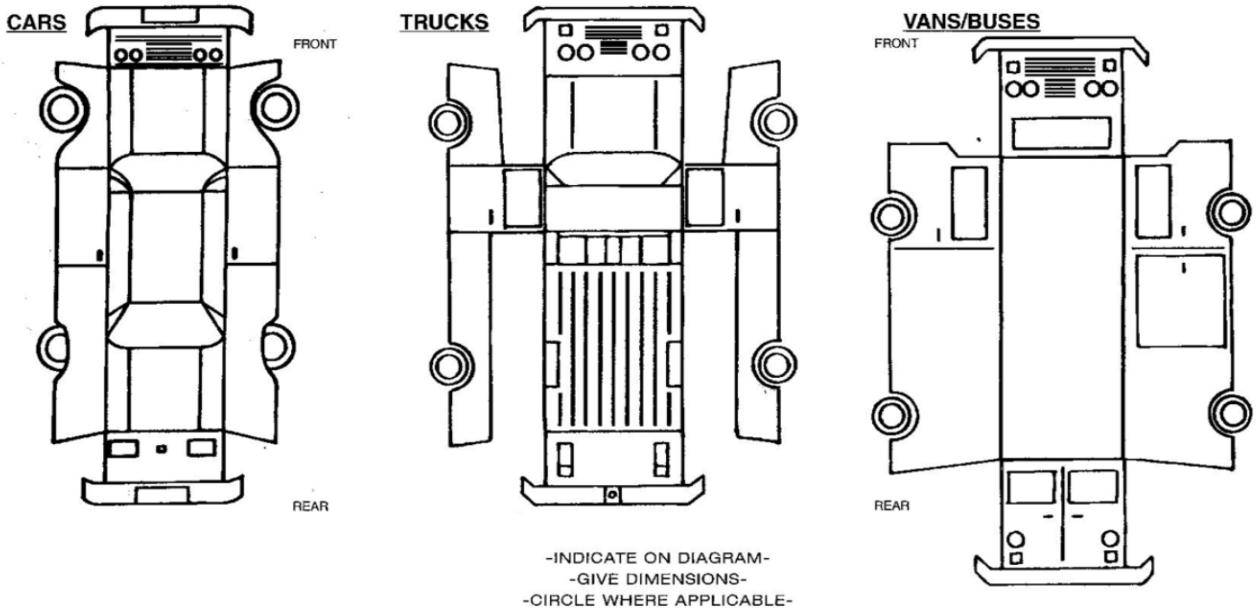
CODES:

B-BENT
BR-BROKEN
BU-BULGE
C-CHAFED
CH-CHIPPED

CPM-COVERED WITH PROTECTIVE MATERIAL-UNABLE TO DETERMINE DEFECTS IF ANY
CSA-CHAFED AND SCRATCHED ALL OVER
CR-CRACKED
D-DENTED

DMC-DUST AND MUD COVERED UNABLE TO DETERMINE OTHER DEFECTS IF ANY
G-GOUGED OR CUT
GC-GLASS CRACKED
HS-HAIRLINE SCRATCH
M-MISSING

P-PUNCTURED
R-RUSTY
S-SCRATCHED
SC-SCRAPED
SM-SMASHED
ST-STAINED AND/OR SOILED
T-TORN



Notes:

Tread guide: If a tread gauge is not available coins may be used to determine remaining tread. 2/32” is the minimum by law in most states (top of Lincoln’s head on penny), 4/32” is minimum recommended for wet surfaces (top of Washington’s head on quarter), 6/32” is minimum recommended for snowy surfaces (top of Lincoln Memorial on penny).Vehicle tires should be replaced if the tread depth is less than 6/32”.

2/32” remaining 4/32” remaining 6/32” remaining

Reference JSA 10907 For Weekly Vehicle Inspection

AUS Personal Protective Equipment List by Business Area

This matrix outlines **basic** PPE requirements for each Business Area. **Specific client, task, or regulatory requirements may dictate the type of PPE beyond what is listed in this matrix.** Additionally, task specific PPE requirements may also be included in the HASP or JSA. Hazard/task specific PPE or emergency supply recommendations are outlined by hazard/task in the Field H&S Handbook. PPE and equipment should be charged to the project. For any supplies that the PM determines cannot be billed, the equipment should be charged to the employee's overhead charge number. PPE associated with specialized training such as NFPA 70E Arc Flash is not included in this matrix. Refer to the specific training program for a description of the necessary PPE for tasks involving such requirements.

Listed "General PPE" is required for field staff, the last column specifies PPE for Arcadis staff visiting project sites. Revised 7/9/2021	Environment/ Resilience [1]	Infrastructure/ Mobility [1]	Water/ Places [1]	Staff Visiting Project Sites
Minimum PPE Required to Be Worn				
Hard Hat	R	R	R	R
Reflective Traffic Vest (Minimum Class 2)	R	R	R	R
Safety Glasses - Clear and Tinted	R	R	R	R
ANSI Compliant Safety - Toe Boots	R	R	R	R
Minimum PPE Required to Have On Hand				
Hearing Protection - Ear plugs (Need for ear muffs TBD)	R	R	R	R
Leather gloves and glove clip	R	R	R	R
First Aid Supplies [2]				
Small first aid kit	R	R	R	O
16 oz. bottle of Eye Wash	R	R	R	O
Tick Remover (fine tip tweezers) (See HASP Tick/Poisonous Plant Section)	O	O	O	O
PPE Supplies Required As Appropriate				
PPE duffel bag with logo, or equivalent	O	O	O	O
Half Face or Full-Face Respirator [3] (See THA)	O [3]	O [3]	O [3]	O [3]
Insect Repellent (See THA.) (Recommended 20-30% DEET)	O	O	O	O
Sunscreen	O	O	O	O
Hand sanitizer	O	O	O	O
Cut Resistant or Chemical Resistant Gloves [4]	O	O	O	O
Poison Ivy pre-exposure wipes or post exposure cleanser (i.e., Tecnu or Zanfel) (see THA for high risk locations)	O	O	O	O
Other specialized protective equipment (See THA for Work Tasks)	O	O	O	O
Outdoor wilderness survival kit [5]	O	O	O	O

Notes:

R - Required

O - Optional. Based on HASP Task Hazard Analysis (THA) or geographic location of work.

THA - Task Hazard Analysis.
Review the HASP Task Hazard Analysis (THA) in making this determination. Certain specific factors can influence the determination for requiring this PPE for the site or task. For example, certain geographic regions may have a higher incidence of the hazard or associated risk, the proximity of the site relative to emergency services may require such, previous observations of the hazard at the site, or where unknown hazard conditions apply. Modifications to the minimum required PPE are required to be communicated via the HASP and/or JSA.

1. The Business Area Director, Operations Manager, Project Manager, or Employee Supervisor is responsible for making the decision to provide Arcadis branded shirts to employees. Billing of such shirts is related to the authority level of the decision maker.

2. For project sites with an office/trailer, first aid/emergency response supplies can be kept in a central location, and may not be required to be carried by each Arcadis employee.

3. Staff must comply with the Arcadis Respiratory Protection H&S Standard before a respirator can be worn. The H&S Standard is available on the H&S Team webpage via the H&S Standards Library link.

Arcadis Standards

4. Determination for use of cut resistant, chemical resistant gloves or other specialized hand protection are to be based on THA in the project HASP.

5. Outdoor survival kits are generally required when working in remote wilderness locations. See the HASP THA and the Field H&S Handbook for requirements and supply list.

Task Improvement Process

General

Observed Company:
Observation Type:
TIP Form: H&S Field Multi-Task (General)
Task Observed:
Observee Name:
Observer Name:
Observation Date:
Project Number: 30009085
Project Name: AVX Olean
Supervisor:
Equipment On Site:
Pertinent Information:

Observation

Task	Correct	Questionable	Comments
General			
PPE worn according to HASP/JLA specifications and inspected before use?			
STOP work authority used where appropriate?			
Body Use/Positioning			
Proper lifting/pushing/pulling techniques used (no awkward positions/posture; no twisting or excessive reaching; no straining; no excessive weight; load under control/stable; etc.)?			
Body parts away from pinch points (clear or protected from being caught between objects/equipment or from contacting sharp objects/edges, etc.)?			
Body parts not in the Line of Fire (protected from being struck by traffic, equipment, falling/flying objects, etc.)?			
Work Procedures/Environment			
Correct type and number of barricades/warning devices/cones?			

Communication with others when necessary (hand signals, flags, etc.)?			
Right tools and equipment selected for the job and inspected before use?			
Tools and equipment used properly?			
Housekeeping performed (work areas and pathways clear of hazards, uneven surfaces addressed, etc.)?			
Slip/trip/fall hazards addressed (path selected and cleared, eyes on path, speed footing, etc.)?			
Proper energy control (electrical systems grounded, lock out/tag out performed, isolated, cords/fixtures in good condition, GFCI inspected and utilized when appropriate and used properly, etc.)?			
Protected from overhead/underground utilities (proper clearance, properly marked, spotters as necessary, etc.)?			
Safe work on/near water (appropriate flotation device, appropriate boat for body of water and operation of boat, etc.)?			
Chemical/Radiation protection (decontamination zones set up properly, air monitoring, completed, and logged, etc.)?			
Fall from elevated height prevention (maintains 3-points of contact, appropriate ladder, mounting/dismounting vehicle/equipment, fall arrest system, etc.)?			
Any additional safety issues identified:			

Tip Summary **Enter details of the TIP and follow up discussion provide details on how any questionable items were resolved.**

Discussion following the TIP led by: _____

Date of follow-up discussion: _____

Positive Comments:

Discussion Summary Completed:

- ☐ Supervisor Led
- ☐ Peer to Peer
- ☐ Arcadis Employee to Subcontractor

Summary of Questionable Items

Action Items (Optional) Assign appropriate action items based on the observations made. You can add more than one action item if needed.

Item #	Action Item	Responsible Person	Due Date	Comp. Date
1				
2				
3				

Standard Review

Reviews to be performed after entry of this TIP into 4-Sight.

Quality Review

Quality Reviews to be performed after entry of this TIP into 4-Sight.

Field Validation and Verification

Use the 4-Sight generated copy of this TIP to perform field V&V activities.

Job Safety Analysis

General

JSA ID	HASP 1	**Status**	Complete
Job Name	General Industry-Driving - passenger vehicles	**Created Date**	9/20/2021
Task Description	Driving a car, van, or truck on public roadways.	**Completed Date**	09/20/2021

Client / Project

Client	KYOCERA AVX Components Corporation
Project Number	30009085
Project Name	AVX Olean
Project Manager	Mark Hanish

User Roles

Role	Employee	Due Date	Completed Date
Developer	Aaron Richardson	9/20/2021	9/20/2021
HASP Reviewer	Monico, Nicholas	9/20/2021	9/20/2021
Quality Reviewer			

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Pre-Trip Inspection	1	Failing to perform pre-trip inspections may cause mechanical failure, accident or injury.	Perform walk around of vehicle with particular attention to tire inflation and condition. Check lights, wipers, seatbelts for proper operating condition. Properly adjust seat and mirrors prior to vehicle operation. Use or review vehicle inspection checklist as required under the MVSP.	ARC HSGE024 Motor Vehicle Safety Standard (MVSP)
		2	Scrapes, cuts, burns to hand if inspecting engine fluids and/or tires. Eye splash hazard if inspecting engine fluids. Pinch or crush hazards when opening or closing hood, trunk, or tailgate.	Wear protective gloves and safety glasses as described below when checking under hood or tires. Use TRACK and keep hands clear when opening/closing hood, trunk, or tailgate to avoid crush or pinch hazard.	
		3	Struck by other vehicles while walking around vehicle performing inspections.	Wear high visibility vest, shirt, or coat while performing inspections in parking lots or other areas with a traffic hazard. Remain vigilant of moving vehicles or equipment in area, face oncoming vehicles to extent practical.	
		4	Improperly secured cargo may dislodge creating injury, property damage, or road hazard.	Ensure all cargo is properly secured to prevent movement while the vehicle is in operation. This includes cargo in the cab of the vehicle.	
2	Driving a motor vehicle on public streets	1	Failing to observe traffic flow ahead increases risk of hard braking resulting in potential impact of vehicle ahead, being struck by another vehicle from behind, and decreases decision making time.	Use Smith System Key #1, "Aim High in Steering". **Look ahead (15 seconds if possible) to observe traffic flow and traffic signals.** Adjust speed accordingly to keep vehicle moving and avoid frequent braking. Select lane of least traffic and adjust speed based on observed signal timing when possible. Avoid following directly behind large vehicles that obscure view ahead.	Smith System "5-Keys" is a registered trademark of Smith System Driver Improvement Institute, Inc.

		2	Failing to observe vehicles, pedestrians, bicyclists, and other relevant objects in vicinity of your vehicle increases risk of side swipes, rear ending, and third party injury.	Use Smith System Key #2, "Get the Big Picture". **Maintain 360 degrees of awareness around vehicle.** Check a mirror every 6-8 seconds, maintain space around the vehicle, choose a lane that avoids being boxed in. Look for pedestrian activity ahead in crosswalks or sidewalks. Watch for construction zone approach signs and act early by executing lane changes and reducing speed.	
		3	Failing to keep your eyes moving increases risk of not seeing relevant vehicles, pedestrians, and objects in your vicinity that may impair your ability to make timely and appropriate driving decisions and also increases risk of accident.	Use Smith System Key #3, "Keep Your Eyes Moving". **Move your eyes every 2 seconds and avoid staring while evaluating relevant objects.** Scan major and minor intersections prior to entering them. Check mirrors.	
		4	Failing to maintain space around and in front of your vehicle increases risk of striking another vehicle or being struck by another vehicle. Insufficient space shortens time for effective driving decision making resulting in increased accident risk.	Use Smith System #4, "Leave Yourself an Out". **Use 4 second rule when following a vehicle.** Avoid driving in vehicle clusters by adjusting speed and using lanes that permit maximum space and visibility. When stopped, keep one car length space in front of vehicle ahead or white line.	
		5	Failing to communicate with other drivers and pedestrians increases risk of striking vehicles, pedestrians, or being struck by other vehicles, especially from the rear.	Use Smith System Key #5, "Make Sure They See You". **Brake early and gradually when stopping to reduce potential of being rear ended.** Keep foot on brake while stopped. Use turn signals and horn effectively. Establish eye contact with other drivers and pedestrians to extent practical. Use vehicle positioning that promotes being seen.	
		6	Distractions within the vehicle takes focus off driving, increases risk of accident decreases time for making effective driving decisions.	**Cell phone use (any type or configuration) is prohibited while the vehicle is in motion.** Familiarize yourself with vehicle layout and controls (radio, temperature controls, etc.) prior to operating unfamiliar vehicles. Set controls prior to operating vehicle. Use GPS in unfamiliar areas to avoid use of paper maps/directions while driving. Set GPS prior to vehicle operation. Pull over and stop to modify GPS functions. Avoid consuming food or drink while driving.	
3	Parking	1	Parking vehicle in areas of clustered parked vehicles or near facility entrance may impair visibility to oncoming traffic in lot and increase exposure to pedestrian traffic.	**Use pull through parking or back into parking space when permitted or practical.** When practical and safe to do so, park away from other vehicles and avoid parking near the facility entrance or loading docks. If available, use a spotter to aid in backing activity. Back no further than necessary and back slowly. Get out and look (GOAL) if uncertain of immediate surroundings. Tap horn prior to backing.	

PPE Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses	While checking engine or tires	Required
Hand Protection	work gloves (specify type)	Leather or equivalent checking engine or	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
	other	Vehicle kit (applies to company trucks)	Required
Miscellaneous	fire extinguisher	Applies to company trucks	Required
	first aid kit	Applies to company trucks	Required

Job Safety Analysis

General

JSA ID	45- REVISED	**Status**	(3) Completed
Job Name	Environment-Groundwater Sampling and free product recovery	**Created Date**	2/4/2009
Task Description	Groundwater sampling	**Completed Date**	02/06/2009
Template	True	**Auto Closed**	False

Client / Project

Client	AVX CORPORATION
Project Number	B0007385.0001
Project Name	AVX OLEAN
PIC	
Project Manager	MARK HANISH

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Coppola, Mija A	6/12/2012	2/4/2009	Ebert, Joachim	☐
HASP Reviewer	Coppola, Mija A	2/6/2009	2/6/2009	Ebert, Joachim	☐

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Stage at pre-determined sampling location and set up work zone and sampling equipment	1	Personnel could be hit by vehicular traffic	Set up cones and establish work area. Position vehicle so that field crew is protected from site traffic. Unload as close to work area as safely possible.	
		2	Sampling equipment, tools and monitoring well covers can cause tripping hazard	Keep equipment picked up and use TRACK to assess changes.	
2	Open wells to equilibrate and gauge wells	1	When squatting, personnel can be difficult to see by vehicular traffic.	Wear class II traffic vest if wells are located proximal to vehicular traffic. Use tall cones and the buddy system if practicable.	
		2	Pinchpoints on well vault can pinch or lacerate fingers	Use correct tools to open well vault/cap. Wear leather gloves when removing well vault lids, and chemical protective gloves while gauging. Wear proper PPE including safety boots, knee pads and safety glasses.	
		3	Lifting sampling equipment can cause muscle strain	Unload as close to work area as safely possible; use proper lifting and reaching techniques and body positioning; don't carry more than you can handle, and get help moving heavy or awkward objects.	
		4	Pressure can build up inside well causing cap to release under pressure	Keep head away from well cap when removing. If pressure relief valves are on well use prior to opening well	
3	Begin Purging Well and Collecting Parameter Measurements	1	Electrical shock can occur when connecting/disconnecting pump from the battery.	Make sure equipment is turned off when connecting/disconnecting. Wear leather gloves. Use GFCIs when using powered tools and pumps. Do not use in the rain or run electrical cords through wet areas.	
		2	Purge water can spill or leak from equipment	Stop purging activities immediately, stop leakage and block any drainage grate with absorbent pads. Call PM to notify them of any reportable spill.	
		3	Water spilling on the ground can cause muddy/slippery conditions	Be careful walking in work area when using plastic around well to protect from spillage	
		4	Lacerations can occur when cutting materials such as plastic tubing	When cutting tubing, use tubing cutter. No open fixed blades should ever be used. When possible wear work gloves, leather type.	
		5	Purge water can splash into eyes	Pour water slowly into buckets/drums to minimize splashing. Wear safety glasses.	
4	Collect GW or Free Product Sample	1	Working with bailer rope can cause rope burns on hands.	Slowly raise and lower the rope or string for the bailer. Wear appropriate gloves for the task.	

4	Collect GW or Free Product Sample	2	Sample containers could break or leak preservative	Discard any broken sampleware or glass properly. Do not overtighten sample containers. Wear chemical protective gloves.	
5	Recovery of Free Product from well	1	Exposure to free product	Additional chemical protection may be necessary based on the type of product. Additionally, safety goggles, a faceshield, or respiratory protection may be required. Verify in the HASP.	
6	Staging of Well Purge water and/or Free Product	1	Muscle strains can occur when moving purge water or drums	If using buckets, do not fill buckets up to the top. Always keep lid on buckets when traveling or moving them to another location. Only half fill buckets so when dumping the buckets weigh less. See drum handling JSA for movement of drums.	Drum handling JSA

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Recommended
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Recommended
Miscellaneous PPE	other	Knee pads	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	alconox, DI water, spray bottle	Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	flashlight		Required
Personal	eye wash (specify type)	bottle	Required
	insect repellant		Recommended
	sunscreen		Recommended
Traffic Control	barricades		Recommended
	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Coppola, Mija A HASP Reviewer Approve 2/6/2009	

Job Safety Analysis

General

JSA ID	13304- REVISED	**Status**	(3) Completed
Job Name	Environment-Groundwater Sampling and free product recovery	**Created Date**	10/23/2015
Task Description	PDB groundwater sampling will take place in the parking lot of the site. PDBs will be deployed and retrieved to grab a VOC sample.	**Completed Date**	10/27/2015
Template	False	**Auto Closed**	False

Client / Project

Client	AVX CORPORATION
Project Number	B0007385.0001
Project Name	AVX OLEAN
PIC	
Project Manager	MARK HANISH

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Maloney, Kaitlin Nichole	11/13/2015	10/23/2015	Bonsteel, Jeffrey J	☑
HASP Reviewer	Grogg, John T	11/6/2015	10/27/2015	Merkle, Kurt J	☑
Quality Reviewer	Jay, Kevin W	11/17/2015	11/17/2015	Long, Allen R	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Stage at pre-determined sampling location and set up work zone and sampling equipment	1	Personnel could be hit by vehicular traffic	Set up cones and establish work area. Position vehicle so that field crew is protected from site traffic. Unload as close to work area as safely possible.	
		2	Sampling equipment, tools and monitoring well covers can cause tripping hazard	Keep equipment picked up and use TRACK to assess changes.	
2	Open wells to equilibrate and gauge wells	1	When squatting, personnel can be difficult to see by vehicular traffic.	Wear class II traffic vest if wells are located proximal to vehicular traffic. Use tall cones and the buddy system if practicable.	
		2	Pinchpoints on well vault can pinch or lacerate fingers	Use correct tools to open well vault/cap. Wear leather gloves when removing well vault lids, and chemical protective gloves while gauging. Wear proper PPE including safety boots, knee pads and safety glasses.	
		3	Lifting sampling equipment can cause muscle strain	Unload as close to work area as safely possible; use proper lifting and reaching techniques and body positioning; don't carry more than you can handle, and get help moving heavy or awkward objects.	
		4	Pressure can build up inside well causing cap to release under pressure	Keep head away from well cap when removing. If pressure relief valves are on well use prior to opening well	
3	Collect GW Sample	1	Working with bailer rope can cause rope burns on hands.	Use PDB rope wheel and wear appropriate gloves for the task.	
		2	Sample containers could break or leak preservative	Discard any broken sampleware or glass properly. Do not overtighten sample containers. Wear chemical protective gloves.	
		3	Sample cooler could become heavy.	use proper lifting or team lift techniques. Refer to lifting H&S standard. Consider keeping cooler in bed/cabin of field vehicle to avoid constantly moving it and use assistance when moving the cooler.	
		4	Exposure to VOCs in groundwater through splashing from tether.	Wear chemical protective gloves and safety glasses.	
		5	Retrieving PDBs and gauging wells could lead to repetitive stress injures.	Using proper lifting techniques, good posture, and switch out tasks with field partner.	

4	Staging of Well Purge water and/or Free Product	1	Muscle strains can occur when moving purge water or drums	If using buckets, do not fill buckets up to the top. Always keep lid on buckets when traveling or moving them to another location. Only half fill buckets so when dumping the buckets weigh less. See drum handling JSA for movement of drums.	Drum handling JSA

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Recommended
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Recommended
Miscellaneous PPE	other	Knee pads	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	alconox, DI water, spray bottle	Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	flashlight		Required
Personal	eye wash (specify type)	bottle	Required
	insect repellant		Recommended
	sunscreen		Recommended
Traffic Control	barricades		Recommended
	Other	High visibility Class II vest.	Required
	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Grogg, John T HASP Reviewer Approve 10/27/2015	
Employee: **Role** **Review Type** **Completed Date**	Jay, Kevin W Quality Reviewer NA 11/17/2015	Nice JSA, it does a good job identifying potential hazards and critical actions. Some general comments that came to mind as I reviewed the JSA: 1. Step #2, PH#1: In addition to using the buddy system and high visible vest, field personnel can position the rental vehicle behind them, if possible, to protect their blind side from vehicular traffic. 2. Step #2, there is also a potential for scraping knuckles on pavement while loosening manhole bolts or prying open well vaults. Same PPE to prevent pinch points can be used to prevent scrapes. 3. Step #2, PH#4: There is mention of potential pressure build up within the well. I agree with the critical action but if pressure relief valves are not present, the sampler should keep head away form line of fire of the well cap while slowly loosen the j-plug, relieving pressure gradually from within the riser. If there is an AS/SVE remedial system onsite, there should be additional critical actions identified to de-energize the system and isolate the well prior to opening the well cap. 4. Step #3, PH#2: In addition to wear chemical resistant gloves, the samplers should also wear cut resistant gloves in the event the glass vials break while tightening the caps. 5. The JSA identifies product recovery as a task but potential hazards associated /corrective measures for handling the product are not identified. What type of product is it? what are it's hazards and is there any need for monitoring the breathing zone would completing sampling activities?

Job Safety Analysis

General

JSA ID	14266-MODIFIED	**Status**	(3) Completed
Job Name	Environment-Sample cooler handling	**Created Date**	8/3/2016- REVISED
Task Description	Packaging of samples for shipment	**Completed Date**	08/31/2016
Template	False	**Auto Closed**	True

Client / Project

Client	AVX CORPORATION
Project Number	B0007385.0001
Project Name	AVX OLEAN
PIC	
Project Manager	MARK HANISH

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Goetz, Luke A	8/24/2016	8/3/2016	Girard, Benjamin	☑
HASP Reviewer	Zuck, Daniel A.	8/17/2016		McCune, William T	☑
Quality Reviewer	Collins, Richard W.	9/1/2016	9/1/2016	Jones, Alison C.	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Transfer field samples to sample packing area	1	Lifting heavy coolers may result in muscle strain especially to lower back.	Use proper lifting techniques and keep back straight. Use buddy system for large coolers, Use mechanical aids like hand trucks if readily available to move coolers. Do not over fill coolers with full sample containers for temporary movement to the sample prep area. Ensure an adequate supply of sample coolers are in field.	
		2	Hazards to hands from broken glass caused by over tightening lids or improper placement in cooler	Inspect all bottles and bottle caps for cracks/leaks before and after filling container. Do not over tighten sample lids. Clean up any broken bottles immediately, avoid contact with sample preservatives. Wear leather gloves when handling broken glass.	
		3	Exposure to chemicals (acid preservatives or site contaminants) on the exterior of sample bottles after filling.	Wear protective gloves for acid preservatives and safety glasses with side shields during all sample container handling activities (before and after filling), Once filled follow project specific HASP PPE requirements for skin and eye protection.	
		4	Samples containing hazardous materials may violate DOT/IATA HazMat shipping regulations	All persons filling a sample bottle or preparing a cooler for shipment must have complete ARCADIS DOT HazMat shipping training. Compare the samples collected to the materials described in the Shipping Determination for the Project and ensure consistent. Re-perform all Shipping determinations if free product is collected and not anticipated during planning.	
2	Sample cooler selection	1	Sample coolers with defective handles, lid hinges, lid hasps cracked or otherwise damaged may result in injury (cuts to hands, crushing of feet if handle breaks etc)	Only use coolers that are new or in like new condition, No rope handled coolers unless part of the manufacturer's handle design.	ARCADIS Shipping Guide US-001
		2	Selection of excessively large coolers introduces lifting hazards once the cooler is filled.	Select coolers and instruct lab to only provide coolers of a size appropriate for the material being shipped. For ordinary sample shipping sample coolers should be 48 quart capacity or smaller to reduce lifting hazards.	

3	Pack Samples	1	Pinch points and abrasions to hands from cooler lid closing unexpectedly	Beware that lid could slam shut; block/brace if needed; be wary of packing in strong winds. New coolers may be more prone to self closing, tilt cooler back slightly to facilitate keeping lid open.	
		2	Awkward body positions and contact stress to legs and knees when preparing coolers on irregular or hard ground surfaces.	Plan cooler prep activities. Situate cooler where neutral body positions can be maintained if practical, like truck tailgate. Avoid cooler prep on rough gravel surfaces unless knees and legs protected during kneeling.	
		3	Frostbite or potential for oxygen deficiency when packing with dry ice. Contact cold stress to fingers handling blue ice or wet ice	Dry ice temperature is -109.30F. Wear thermal protective gloves. DO NOT TOUCH with bare skin! Dry ice sublimates at room temp and could create oxygen deficiency in closed environment. Maintain adequate ventilation! Do not keep dry ice in cab of truck. Wear gloves when handling blue ice or gaging wet ice. Dry Ice is DOT regulated for air shipping, follow procedures in Shipping Determination.	
4	Sealing, labeling and Marking Cooler	1	Cuts to hands and forearms from strapping tape placement or removing old tape and labels	Do not use a fixed, open-blade knife to remove old tags/labels, USE SCISSORS or other safety style cutting device. Only use devices designed for cutting. Do not hurry through task.	
		2	Lifting and awkward body position hazards from taping heavy coolers, dropping coolers on feet during taping.	Do not hurry through the taping tasks, ensure samples in cooler are evenly distributed in cooler to reduce potential for overhanging cooler falling off edge of tailgate/table when taping.	
		3	Improper labeling and marking may result in violation of DOT/IATA HazMat shipping regulations delaying shipment or resulting in regulatory penalty	Do not deviate from ARCADIS Shipping Guide or Shipping Determination marking or labeling requirements.	
5	Offering sample cooler to a carrier or lab courier for shipment.	1	Lifting heavy coolers may result in muscle strain especially to lower back.	See lifting hazard controls above.	
		2	Carrier refusal to accept cooler may cause shipping delay and/or result in violation of DOT HazMat shipping regulations.	Promptly report all rejected and refused shipments to the ARCADIS DOT Program Manager. Do Not re-offer shipment if carrier requires additional labels markings or paperwork inconsistent with your training or Shipping Determination without contacting the ARCADIS DOT Compliance Manager.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	nitrile	Required
	work gloves (specify type)	leather	Required

Supplies

Type	Supply	Description	Required
Miscellaneous	Other	Scissors	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Collins, Richard W. Quality Reviewer NA 9/1/2016	very thorough and complete, good job

Job Safety Analysis

General

JSA ID	2796- REVISED	**Status**	(3) Completed
Job Name	Construction-Oversight - excavation and construction	**Created Date**	6/14/2010
Task Description	Excavation/Trenching Oversight (Outdoors)	**Completed Date**	06/17/2010
Template	True	**Auto Closed**	False

Client / Project

Client	AVX CORPORATION
Project Number	B0007385.0001
Project Name	AVX OLEAN
PIC	
Project Manager	MARK HANISH

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Stewart, Ian D	5/21/2012	6/14/2010	Baxter, Jonathan P.	☑
HASP Reviewer	Tremblay, Tony	6/28/2010	6/17/2010	Jastrem, John	☑
Quality Reviewer	Crandall, James M.	6/25/2010	6/25/2010	Johnson, Gary W	☐

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Utility Clearance	1	Contact with utilities can cause injury, property damage, and cause releases of hazardous substances to the environment.	Establish a minimum of three lines of evidence, and obtain additional lines of evidence as needed for site specific conditions. Maintain utility markings, perform detailed site inspections, and keep open and constant communication between operators, onsite staff, and project management. Always Use Stop Work Authority if there is a question or concern about the location of a utility.	ARCHSFS019 - Utility Clearance HS Standard
		2	Slip trip and falls while performing site clearance activities	Focus on task at hand and do not hurry through task. Avoid reading maps/drawings while walking, stop walking when looking up for overhead utilities.	
2	Excavation/Trenching and Backfilling Oversight	1	Slips trips and falls from poor housekeeping around trench or excavation.	Maintain work area and minimize clutter near excavation. Place excavated material properly and at least 2 feet away from the edge of excavation. Remove potential hazards when possible. Mark hazards when it cannot be removed. Create and maintain awareness of hazard. Maintain barriers, fall hazard warning signage and traffic controls properly. Do not cross over caution tape, safety fencing etc. Follow Project specific STAR Plan	FHSHB IV(D)
		2	Excavation or trench collapse trapping workers or creating falls.	Excavation/Trench greater than five (5) feet deep in which subcontractor, employees or others will be entering must be properly sloped, benched, shored or have a trench box in place. Sloping, benching, shoring or use of trench box is not required IF an excavation is less than five (5) feet in depth and examination of the ground by a competent person provides no indication of a potential cave-in. Ensure a Competent Person is on site to inspect and oversee excavation/ trenching activities. Where feasible, stay six (6) feet from edge of excavation/trench. A safe means of egress, such as a stairway, ladder, or ramp, shall be located so that no more than twenty-five (25) feet of lateral travel is necessary for site workers conducting activities in trenches exceeding four (4) feet in depth.	

2	Excavation/Trenching and Backfilling Oversight	3	Potential high level of dust, fumes, vapors or particulates creating visibility or inhalation/contact hazards could result in exposure above occupational exposure limit or create an IDLH atmosphere.	Visually monitor air for dust, and wet excavated soil as needed to control dust. Monitor for chemical vapors if hazard exists. The atmosphere must be tested in excavations greater than four (4) feet in depth where oxygen deficiency or toxic or flammable gases are likely to be present, before workers will be permitted to enter. Ensure downwind and perimeter monitoring also performed, if atmospheric hazards exists.	
		4	Excessive noise from excavating equipment or pumps.	Make sure all authorized personnel including subcontractors are wearing hearing protection (ear plugs/muffs) when working around noisy equipment. Increase distance from noise hazard when practical.	
		5	Potential Leaks of Petroleum Fluids and Lubricants from excavating equipment and support equipment.	Make sure all authorized personnel including subcontractors perform equipment inspections looking for leaks, cracked hoses, and loose fittings. Promptly and properly repair all leaks.	
		6	Open Excavation, Unauthorized Entry, or Property Damage	Make sure all authorized personnel including subcontractors mark open excavation with demarcation tape, orange fencing, orange cones, etc. to prevent unauthorized / accidental entry. Make sure controls are adequate for traffic protection after dark or when the site is unstaffed. Backfill excavation area as soon as possible and fence off any excavation not backfilled at the end of the work day.	
		7	Contact with potentially impacted groundwater and soil.	Conduct task in a calm, cautious manner. Wear appropriate PPE. Ensure equipment is in working conditions before start of work every day. Stop work immediately and report to the site manager, if any life threatening conditions exist.	
		8	Working Around Heavy Machinery	Where feasible, maintain distance from excavation equipment in excess of the swing radius. Maintain eye contact with operators at all time. Ensure equipment is in good working condition before work begins. Wear appropriate PPE, including safety vest. Do not wear loose clothing and pull back long hair. Be aware of and avoid standing in red zones (equipment operator "blind-spots"). No personnel are permitted to stand underneath suspended loads.	
3	Stockpile Maintenance and Sampling	1	Falls climbing on or during covering of stockpile.	Avoid climbing on stockpiles when possible, keep hands free, do not hurry trough tasks such as pulling plastic sheeting up onto or over piles.	
		2	Overexertion placing plastic sheeting, weight, and straw bales.	Use proper lifting techniques, avoid twisting of body, and forceful pulling/pushing. Do not hurry through task.	
		3	Cuts, scrapes, impalement from debris in stockpiles.	Have excavation contractor remove/isolate large chunks of concrete, exposed rebar etc. from stockpile to extent practical. Inspect areas prior to kneeling or placing hands when sampling upon stockpile.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	When sampling groundwater	Required
	work gloves (specify type)	Leather when hand hazard exists; nitrile for soil/	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs	When working near heavy equipment	Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone	Remote area, check reception	Required
Decontamination	Decon supplies (specify type)		Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	flashlight		Required
Personal	eye wash (specify type)		Required
	insect repellant		Recommended
Traffic Control	Other	Cones/tape to delineate trenches prior to backfill	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Tremblay, Tony HASP Reviewer Approve 6/17/2010	
Employee: **Role** **Review Type** **Completed Date**	Crandall, James M. Quality Reviewer NA 6/25/2010	No additional comments. Very well done.

Job Safety Analysis

General

JSA ID	14570- REVISED	**Status**	(3) Completed
Job Name	Environment-Geophysical survey	**Created Date**	12/15/2016
Task Description	Utility Locating	**Completed Date**	02/07/2017
Template	False	**Auto Closed**	False

Client / Project

Client	AVX CORPORATION
Project Number	B0007385.0001
Project Name	AVX OLEAN
PIC	
Project Manager	MARK HANISH

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Lebron, Rita N	2/20/2017	2/7/2017	Calderon, Efrain	☑
HASP Reviewer	Hernandez Rivera, Gisela	2/21/2017	2/7/2017	Lebron, Rita N	☑
Quality Reviewer	Scillieri, Darren	2/17/2017	2/17/2017	Sawyers, Douglas E	☑
Reviewer	Hernandez, Abner	2/21/2017	2/7/2017	Calderon, Efrain	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Coordinate Subsurface Utility Survey Activities	1	Subsurface/overhead utilities, property damages	1. Complete Utility clearance Checklist 2. Review site locations and survey specifications 3. Call, coordinate, and get endorsement of the Puerto Rico Public Service Commision (as required)	ARCHSFS019
2	Mobilization of equipment to survey area	1	Lifting hazards (heavy or bulky equipment)	1. Use TRACK to plan lifts and routes to work location. 2. Use proper lifting techniques as described in FHSHB Section AF. Ergonomics 3. Use mechanical help or buddy system. Do not lift more than you are able to.	
		2	Awkward body positions and twisting	1. Plan lifting carrying activity. 2. Conduct lifting/carrying activities implementing proper posture, use FHSHB section AF. Ergonomics as reference. 3. Use mechanical help, buddy system and job rotation to reduce exposure to lifting/carrying in awkward conditions and twisting.	

2	Mobilization of equipment to survey area	3	Trip and fall hazards from uneven ground or restricted view when carrying equipment	1. Inspect pathway and placement area; remove/identify any trip hazards 2. Break loads down to manageable size that does not obstruct view of ground. 3. Plan route and use TRACK, wear footwear with good tread and ankle support. 4. Use buddy system for large or bulky items when carrying.	
3	Set up survey grid and control	1	Slip trip and fall hazards from wet, uneven ground or over vegetation.	1. Identify and remove or minimize trip hazards. Check for wet/slippery walking surface, pipes, equipment, open sumps, excavations, among others. 2. Select the less dangerous access routes. 3. Don't walk across barricaded, non-authorized areas.	
		2	Crush hazard or contact stress to hands/fingers from inserting pins or stakes.	1. Wear leather gloves when inseting pins, flaggng, or stakes into the ground. 2. Watch fingers and body parts position, avoid placing them in the "line of fire".	
		3	Struck by vehicles if working in traffic area	1. Establish traffic control and wear a Class II traffic vest if in traffic area. 2. Use vehicles to block work area when practical.	
		4	Repetitive stress from repeated bending or squatting during grid construction	1. Use job rotation when hazard exists, stretch before performing work activity. 2. Use telescopic painter device that allows employee to stand up while spraying.	
		5	Chemical exposure from using spray paint	1. Stand up wind of paint spraying activities 2. Be aware of the location of other workers	

4	Slips trips and falls on wet, uneven or steep sloped surfaces	1	Slips trips and falls on wet, uneven or steep sloped surfaces	1. Identify and remove or minimize trip hazards. Check for wet/slippery walking surface, pipes, equipment, open sumps, excavations, among others. 2. Select the less dangerous access routes. 3. Don't walk across barricaded, non-authorized areas.	
		2	Scrapes or cuts to hands, arms or legs from equipment or vegetation in area.	1. Wear leather or other suitable gloves when performing survey. 2. Clear area from vegetation before survey; verify area before the survey for equipment. 3. Wear long pants, wear heavy long sleeve shirt if arm hazard exists.	
		3	Noise hazards from survey equipment using percussion devices	1. Wear hearing protection, keep unnecessary workers away from devices when activated.	
		4	Ergonomic injury form improper or prolonged use of carried devices that are long or bulky	1. Use job rotation to reduce potential for injury. 2. Implement proper lifting and body position practices (see FHSHB Section AF. Ergonomy).	
5	Demobilization and clean up	1	Muscle strain from removing pins or stakes	1. Use devices that maintain neutral body positions to remove pins when practical. 2. Do not bend at waist when removing. 3. Use knee pads if you are kneeling.	
		2	Pinch hazards to fingers from equipment cases	1. Verify and be knowledgeable of pinch points on equipment cases, such as lids, drawers, doors, hinges. 2. Avoid placing fingers, hands or body parts on the "line of fire"	
		3	Lifting/carrying hazards from demobilizing equipment from work area	1. Seek for help or mechanical devices when practical. Use buddy system. 2. Implement good lifting/carrying techniques and proper body positioning practices (see FHSHB Section AF. Ergonomy	

5	Demobilization and clean up	4	Slip, trip and falls carrying equipment that obstructs view or on wet or uneven surfaces.	1. Identify and remove or minimize trip hazards. Check for wet/slippery walking surface, pipes, equipment, open sumps, excavations, among others. 2. Select the less dangerous access routes. 3. Don't walk across barricaded, non-authorized areas.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants	Long pants required; long sleeve shirt recommended	Required
	On road - HASP prescribed PPE	Class II or III high vis reflective vest	Required
Eye Protection	safety glasses		Required
Foot Protection	rubber boots	if muddy	Required
	steel-toe boots		Required
Hand Protection	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear muffs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone	only in allowed areas; never when driving	Required
Decontamination	Decon supplies (specify type)	Alconox	Required
Miscellaneous	fire extinguisher	small size abc	Required
	first aid kit	10 people construction	Required
	flashlight		Required
Personal	eye wash (specify type)	16oz. Bottle	Required
	insect repellant		Required
	sunscreen		Required
Traffic Control	barricades		Required
	Other	Signage and additional barriers for road work	Required
	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Hernandez Rivera, Gisela HASP Reviewer Revise 2/6/2017	Please refer to comment indicated previously.
Employee: **Role** **Review Type** **Completed Date**	Hernandez Rivera, Gisela HASP Reviewer Approve 2/7/2017	Comprehensive JSA.
Employee: **Role** **Review Type** **Completed Date**	Hernandez, Abner Reviewer Approve 2/7/2017	
Employee: **Role** **Review Type** **Completed Date**	Scillieri, Darren Quality Reviewer NA 2/17/2017	Good identification of safety precautions associated with a repetitive task where its easy to lose site of potential hazards.

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