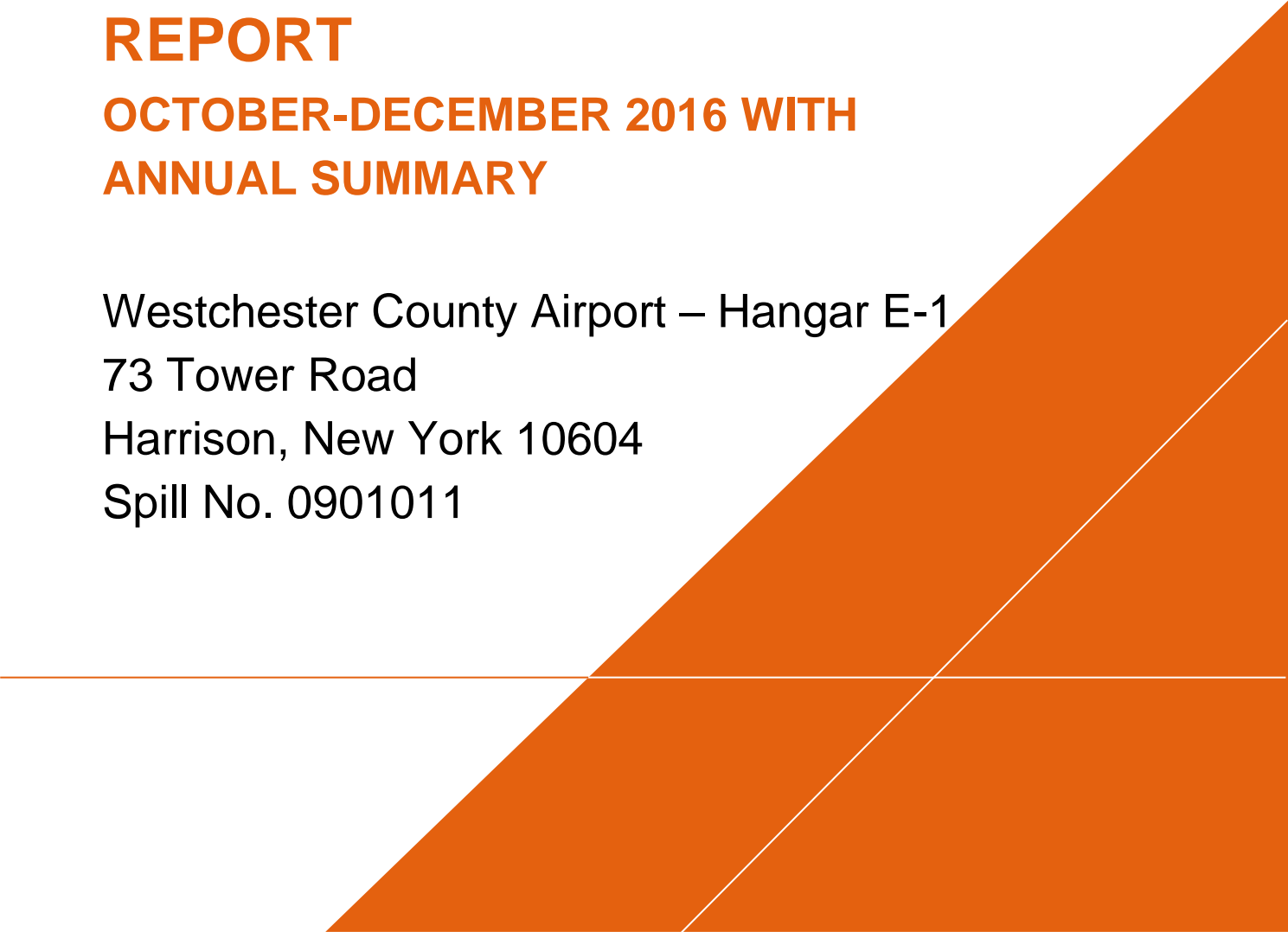


Westchester County Airport

**REMEDIAL ACTION PROGRESS
REPORT
OCTOBER-DECEMBER 2016 WITH
ANNUAL SUMMARY**

Westchester County Airport – Hangar E-1
73 Tower Road
Harrison, New York 10604
Spill No. 0901011



REMEDIAL ACTION PROGRESS REPORT

Westchester County Airport – Hangar E-1

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BB018238.0000.00001

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1 INTRODUCTION

Arcadis CE, Inc. (Arcadis) is submitting this Remedial Action Progress Report (RAPR) to Westchester County Department of Public Works and Transportation, Division of Engineering (Westchester County) to document the operation of the soil vapor extraction (SVE) system and the groundwater monitoring activities being conducted at Hangar E-1 at the White Plains Westchester County Airport (HPN) located at 73 Tower Road in the Town of Harrison, Westchester County, New York (“the Site”).

The RAPR was developed based on the findings of Arcadis’ Site Characterization sampling program, which was implemented in the summer of 2010. Arcadis previously issued various Site Characterization Reports (SCRs) to document the findings at the Site. The SCR investigations and Remedial Action (RA) were completed in accordance with the New York State Department of Environmental Conservation (NYSDEC) DER-10 Technical Guidance for Site Investigation and Remediation (DER-10).

The initial Remedial Action was developed based on the findings of Arcadis’ Phase II Environmental Site Assessment (Phase II ESA) and Supplemental Environmental Site Investigation (Supplemental SI) which identified the presence of soil and groundwater impacts at the Site. As part of the RA, Arcadis installed a soil vapor extraction system to remediate contaminated soils below the hangar slab and monitoring wells to monitor concentrations of contaminants in groundwater.

2 PHYSICAL SETTING

2.1 Property Description

The Site is comprised of approximately 200,000 square-feet of leased land improved with an approximately 50,000 square-foot aircraft hangar (Hangar E-1). Additional improvements include asphalt paved automobile and aircraft parking areas, concrete covered taxi-way areas and landscaped areas. The Site and surrounding 702-acre associated airport property are owned by Westchester County. According to the Westchester County Clerk’s Office, the parcel number is 0971-008.

A Site Location Map and Site Plan are provided as Figures 1 and 2, respectively.

2.2 Soils and Geology

According to the USGS topographic map, Glenville, Connecticut Quadrangle, the Site is located at an elevation of approximately 400 feet above mean sea level. Area topography is relatively flat. The topography at the Site is essentially level with a slight slope to the north and west.

The environmental soil sampling at the Site confirmed that the Site is underlain by brown fine to medium sands or silty sands, and gravelly sands that are likely native materials. The deeper geologic conditions observed during the installation of the soil borings consisted of native fine to medium sands, silty sands, sandy silt, peat and gravelly sands.

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According to the New York State Geologic Map (1989), the Site is underlain by amphibolite or schist of the Ordovician and Silurian Manhattan Formation. The bedrock is overlain by gravelly and sandy soils which were encountered by Arcadis during geotechnical drilling and environmental drilling activities at the Site.

2.3 Hydrogeology and Topography

Based on topography and the location of the closest body of surface water, groundwater is inferred to flow in a northwesterly direction. During Arcadis' drilling activities, groundwater at the Site was encountered at a depth of approximately 8 to 12 feet below grade.

No surface water bodies were observed on Site. Storm water flow at the Site is overland towards the north until it infiltrates the ground in the vegetated portions of the Site. A wetlands area is located approximately 250 feet south of the hangar and Rye Lake is located approximately 0.5 miles to the northwest.

3 SITE BACKGROUND AND HISTORY

The Site consisting of Hangar E-1 is used by JPMorgan Chase for the storage and maintenance of a number of jet aircraft and portions of the building are used as a passenger terminal for JPMorgan Chase employees. The Site is currently leased by JPMorgan Chase from Westchester County Airport, who is the owner of the property. JPMorgan Chase completed a major renovation of the hangar interior and exterior areas in 2010. As part of the Site renovation activities, an environmental investigation was conducted to identify potential environmental impacts to the Site.

From November 2009 through March 2010, Arcadis performed environmental investigation activities at Hangar E-1. Based on the findings of the environmental investigation activities, three potential areas of concern (AOCs) were identified at the Site. These included the following:

- Jet fueling and storage areas on the exterior concrete apron and asphalt paved areas.
- Trench drains and associated oil interceptor within the hangar.
- 5,000 gallon No. 2 fuel oil underground storage tank (UST).

Environmental investigation activities including soil and groundwater sampling were completed in these three areas to evaluate the past impacts of facility operations and current conditions. The investigation activities identified petroleum contamination in the soil and groundwater adjacent to the exterior concrete apron; solvent and petroleum contamination in the soil and groundwater beneath the hangar floor adjacent to the trench drain system; and petroleum contamination also was identified in the groundwater adjacent to the 5,000 gallon fuel oil UST.

Arcadis proposed remedial actions to address the soil impacts that included excavation in the concrete apron area and hangar trench drain, and the installation of a SVE system to address the contamination identified beneath the hangar floor.

The fuel oil UST system was removed in August and September 2010. Based on the findings of the UST closure site assessment investigation, no release was detected from the tank or associated piping.

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During the repairs to the apron, impacted soils in this area were excavated and disposed off-site. Arcadis determined that no additional removal of impacted soil was necessary.

The presence of petroleum and solvent impacts in the soil beneath the hangar floor adjacent to the trench drain and oil interceptor indicated that the former trench drain and/or the former oil interceptor had leaked. The presence of impacted areas further from the trench drain system may indicate that substances were spilled on the concrete floor and leaked into the subsurface soil through the construction joints located between the slabs. The drain system was replaced during the renovation activities by JPMorgan Chase to eliminate this source of impact. Additionally, the existing concrete floor was sealed to prevent future releases of any materials from potentially migrating into the subsurface soil through the floor joints or concrete.

Impacted soils were excavated during the replacement of the hangar floor drain system. SVE piping was installed beneath the hangar floor within the excavated area to address the residual impacted soil.

4 SVE SYSTEM

4.1 Description of SVE System

The SVE system consists of a skid-mounted SVE unit and an extraction piping system located beneath a portion of the hangar floor. The SVE unit includes a vacuum extraction blower that provides the necessary vacuum and air flow to remove the contaminated soil vapors from the subsurface impacted soils. The extraction piping below the hangar concrete slab includes seven separate subsurface extraction zones (Zones A to G) that can be operated simultaneously or separately. A figure illustrating the SVE system, extraction zones and manifold piping are provided in Figure 2.

The extraction zones consist of horizontal sections of 2-inch and 3-inch diameter slotted polyvinyl chloride (PVC) piping located approximately 8 feet below the surface of the hangar floor. The approximate length of slotted pipe in Zone A is 35 feet, Zone B is 30 feet, Zone C is 25 feet, and 40 feet in Zones D, E, F and G. The seven zones connect above grade to a 4-inch diameter PVC extraction manifold located on the eastern wall of the hangar. The manifold is connected by 4-inch diameter PVC piping to the SVE unit located outside within an enclosure on the southern side of the building.

The SVE unit includes a 7.5-hp extraction blower. The SVE unit also includes a water separator that is heat traced and insulated for winter operation. Two activated carbon treatment canisters are installed adjacent to the SVE unit for the removal of volatile organic compounds from the vapor stream prior to discharging to the atmosphere. The carbon canisters each contain 1,000 pounds of activated carbon and are approximately 4 feet in diameter by 5.5 feet in height. These carbon units are also insulated and heat traced. The system has been operational since October 2010.

4.2 SVE System Operation & Maintenance

Routine maintenance activities were completed in the 4th Quarter of 2018 (October, November, and December 2018). The SVE system was operational with no shutdowns experienced. No condensate accumulated in the tank during the monitoring period. The system was winterized in preparation for the cold weather.

4.3 SVE System Vapor Monitoring

Monthly monitoring of the vapor concentrations was conducted on various portions of the SVE system. The extracted soil vapors were screened for the presence of solvents and petroleum hydrocarbons using a PID that is capable of measuring in the parts per billion (ppb) range. The instrument is calibrated to 100 ppb of isobutylene per the manufacturer's specifications prior to each measurement event.

In addition to the monthly monitoring, semi-annual vapor samples were collected from the system on December 18, 2018 for laboratory analysis. The samples were collected to supplement the monthly monitoring measurements of VOC concentrations with a PID and assist in the evaluation of the performance of the system. The vapor samples were collected from sample ports located prior to the carbon treatment units (influent), between the carbon units (mid-point) and after the carbon units (effluent) using summa canisters. The samples were submitted to a New York certified laboratory and analyzed for VOCs. The results are summarized in Table 3.

The total extracted volatile organic compound (VOC) concentration as measured by the PID was 134,000 ppb when the SVE system was initially commissioned on October 12, 2010. Arcadis was retained in July 2011 to perform O&M activities. The estimated VOCs removed during the monitoring period based on PID readings and laboratory sampling results were 0.12 pounds in October, 14.28 pounds in November and 0.45 pounds in December. Since startup of the system in 2010, approximately 812.21 pounds of VOCs have been removed.

Zones A, B, C, D, E, F, and G were fully opened for October, November, and December 2018.

5 DESCRIPTION OF MONITORING WELL NETWORK

Arcadis installed four permanent groundwater monitoring wells (MW-1, MW-2, MW-3 and MW-4) within the hangar area to monitor natural attenuation of the groundwater contaminants. One well was installed upgradient of the trench drains/oil interceptor (MW-3) and two wells were installed downgradient of the impacted area (MW-1 and MW-4). In addition, one well was installed within the area of greatest impact in the eastern area of the hangar near the former oil interceptor (MW-2). A Site Plan showing the monitoring wells is provided as Figure 2.

The monitoring wells consist of 2-inch diameter PVC permanent wells installed with 15 feet of 0.010-slotted screened intervals to a total depth of approximately 20 feet below grade surface (bgs). The screened interval was installed to straddle the water table, which locally has been measured at depths of 10-12 feet bgs. A sand filter pack was constructed from approximately 1 foot above the screened interval to the bottom of the well. The wells were finished as flush-mount wells.

Arcadis sampled the monitoring wells using a standard three-volume purge sampling method. Field parameters such as pH, conductivity, temperature, and dissolved oxygen were recorded prior to and after purging and after sample collection. The field parameters and sampling information were recorded on field sampling forms. The samples were submitted to a NYSDOH certified laboratory for analysis.

6 GROUNDWATER MONITORING ACTIVITIES

The following procedures were used to purge and sample the wells during each monitoring event. The SVE system was turned off prior to purging. Well headspace VOC readings were measured using a photoionization detector (PID) upon removing the expansion cap. The total depth of the well, the depth to water and depth to any floating product, if present, were measured using a Solinst oil/water interface meter. Dissolved oxygen, specific conductance, temperature, and pH were measured using a Horiba water quality meter.

The volume of water in the well was calculated from the depth to water and the total depth measurements of the well. The wells were then purged using a submersible pump with polyethylene tubing, which was wiped using paper towels and distilled water as it was placed into the well. New dedicated tubing was used and the tubing in the pump was replaced for each well. Each well was purged of three volumes. Upon completion of the well purging, the field analytical parameters were measured again. The wells were then sampled using disposable bailers dedicated to each well. Bailers were lowered into the well using nylon twine. Field personnel wore disposable gloves for purging and sampling. Gloves were changed between each well. After completion of the sampling, field parameters were measured again. All data was recorded on monitoring well purge forms.

Groundwater samples collected from the monitoring wells were placed into new laboratory supplied sample containers, which contained the appropriate preservative. The samples were stored in a cooler with ice and transported under chain of custody to a NY State Department of Health-certified analytical laboratory. All samples were analyzed for VOCs using United States Environmental Protection Agency (U.S. EPA) Method 624, including calibration for MTBE.

7 GROUNDWATER ANALYTICAL RESULTS

Monitoring wells MW-1, MW-2, MW-3 and MW-4 were sampled during the December 17, 2015 groundwater sampling event. The compounds present at concentrations that exceeded the NYSDEC Groundwater Quality Standards, and the ranges of these contaminants in the wells, are as follows: 1,1-dichloroethane (1.1 to 34.1 ug/L), 1,1-dichloroethene (1.2 to 130 ug/L), 1,2-dichloroethane (undetected to 6.1 ug/L), benzene (undetected to estimated 0.62 ug/L), chloroethane (undetected to 64.2 ug/L), cis-1,2-dichloroethene (estimated 0.7 to 17.5 ug/L), methylene chloride (undetected to 1.6 ug/L), and vinyl chloride (undetected to 18 ug/L).

No measurable free product or petroleum sheens were observed during this sampling event.

Table 1 summarizes the December 2018 groundwater sampling results. Table 2 summarizes the historic groundwater sampling results for each well. Figure 3 depicts the groundwater contour for the sampling event. The groundwater contours fluctuate and are influenced by the SVE system operation and which zones are active. The laboratory data pages and chain of custody form are provided as Appendix A.

8 DATA EVALUATION

Arcadis prepared a groundwater elevation contour map and isoconcentration maps for the monitoring wells MW-1, MW-2, MW-3, and MW-4 so data trends can be established. Concentrations of total BTEX

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(benzene, toluene, ethylbenzene, total xylenes) compounds and total chlorinated volatile organic compounds (1,1-DCA, 1,1-DCE, 1,2-DCE, chloroethane, methylene chloride, and vinyl chloride) which represent the greatest mass of the on-site contamination are presented on Figures 4 and 5, respectively.

The concentrations of VOCs in MW-1, MW-2, and MW-3 generally decreased from the prior sampling events. Concentrations within MW-4 remain below the GWQS.

9 CONCLUSIONS AND RECOMMENDATIONS

The data obtained by Arcadis indicate the following:

- The concentrations of VOCs in MW-1, MW-2, and MW-3 generally decreased from the prior sampling events. Concentrations within MW-4 remain below the GWQS.
- Approximately 14.86 lbs. of VOCs were removed during the 4th quarter of 2018, and approximately 36.59 lbs. of VOCs were removed during the year.
- An estimated 812.21 lbs. of VOCs have been removed since startup of the system in October 2010.
- The system has been operating effectively throughout the year.

TABLES



Table 1
 Summary of Groundwater Sampling Results Q4-VOCs
 December 2018
 JP Morgan-Westchester County Airport
 Hanger E-1, Harrison, New York

Sample ID	NY TOGS	MW-1	MW-2	DUP-1	MW-3	MW-4	FIELD-BLANK	TRIP-BLANK
Lab Sample Number	Class GA GW	J6479-01	J6479-02	J6479-04	J6479-07	J6479-03	J6479-05	J6479-06
Sampling Date	Standards	12/18/2018	12/18/2018	12/18/2018	12/18/2018	12/18/2018	12/18/2018	12/17/2018
Matrix	(NYSDEC 6/2004)	Water	Water	Water	Water	Water	Water	Water
Units		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Volatiles Organic Compounds								
1,1,1-Trichloroethane	5	0.2	U	2.4	2.3	0.2	U	0.2
1,1,2,2-Tetrachloroethane	5	0.2	U	0.2	U	0.2	U	0.2
1,1,2-Trichloroethane	1	0.2	U	0.2	U	0.2	U	0.2
1,1,2-Trichlorotrifluoroethane	5	0.2	U	0.2	U	0.2	U	0.2
1,1-Dichloroethane	5	34.1		18.5	18.7	7.8		1.1
1,1-Dichloroethene	5	130		38.8	37.9	11.3		1.2
1,2,3-Trichlorobenzene	5	0.2	U	0.2	U	0.2	U	0.2
1,2,4-Trichlorobenzene	5	0.2	U	0.2	U	0.2	U	0.2
1,2-Dibromo-3-Chloropropane	0.04	0.2	U	0.2	U	0.2	U	0.2
1,2-Dibromoethane	0.0006	0.2	U	0.2	U	0.2	U	0.2
1,2-Dichlorobenzene	3	0.2	U	0.2	U	0.2	U	0.2
1,2-Dichloroethane	0.6	6.1		1.4	1.4			0.2
1,2-Dichloropropane	1	0.2	U	0.2	U	0.2	U	0.2
1,3-Dichlorobenzene	3	0.2	U	0.2	U	0.2	U	0.2
1,4-Dichlorobenzene	3	0.2	U	0.2	U	0.2	U	0.2
2-Butanone	NS	1.3	U	1.3	U	1.3	U	1.3
2-Hexanone	NS	1.9	U	1.9	U	1.9	U	1.9
4-Methyl-2-Pentanone	NS	1	U	1	U	1	U	1
Acetone	NS	0.5	U	0.5	U	0.5	U	0.5
Benzene	1	0.62	J	0.31	J	0.27	J	0.2
Bromochloromethane	5	0.2	U	0.2	U	0.2	U	0.2
Bromodichloromethane	NS	0.2	U	0.2	U	0.2	U	0.2
Bromoform	NS	0.2	U	0.2	U	0.2	U	0.2
Bromomethane	5	0.2	U	0.2	U	0.2	U	0.2
Carbon Disulfide	60	0.2	U	0.2	U	0.2	U	0.2
Carbon Tetrachloride	5	0.2	U	0.2	U	0.2	U	0.2
Chlorobenzene	5	0.2	U	0.2	U	0.2	U	0.2
Chloroethane	5	64.2		0.2	U	0.2	U	0.2
Chloroform	7	0.2	U	0.2	U	0.2	U	0.2
Chloromethane	5	0.2	U	0.2	U	0.2	U	0.2
cis-1,2-Dichloroethene	5	17.5		5.6	5.3	2.1	0.7	J
cis-1,3-Dichloropropene	NS	0.2	U	0.2	U	0.2	U	0.2
Cyclohexane	NS	0.2	U	0.2	U	0.2	U	0.2
Dibromochloromethane	NS	0.2	U	0.2	U	0.2	U	0.2
Dichlorodifluoromethane	5	0.2	U	0.2	U	0.2	U	0.2
Ethyl Benzene	5	0.2	U	0.2	U	0.2	U	0.2
Isopropylbenzene	5	0.2	U	0.2	U	0.2	U	0.2
m/p-Xylenes	NS	0.4	U	0.4	U	0.4	U	0.4
Methyl Acetate	NS	0.2	U	0.2	U	0.2	U	0.2
Methyl tert-butyl Ether	10	0.35	U	0.35	U	0.35	U	0.35
Methylcyclohexane	NS	0.39	J	0.41	J	0.33	J	0.2
Methylene Chloride	5	1.6		0.2	U	0.2	U	0.2
o-Xylene	5	0.42	J	0.2	U	0.2	U	0.2
Styrene	5	0.2	U	0.2	U	0.2	U	0.2
t-1,3-Dichloropropene	NS	0.2	U	0.2	U	0.2	U	0.2
Tetrachloroethene	5	0.2	U	0.2	U	0.2	U	0.2
Toluene	5	0.2	U	0.2	U	0.2	U	0.2
trans-1,2-Dichloroethene	5	0.2	U	0.2	U	0.2	U	0.2
Trichloroethene	5	1.1		0.65	J	0.65	J	0.2
Trichlorofluoromethane	5	0.2	U	0.2	U	0.2	U	0.2
Vinyl Chloride	2	18		3.2	3.1	2.6		0.2
Total TICs	NS	1840.7		240	240	7.9		U
Total Detected VOCs	NS	274.03		71.27	69.95	23.8		3
Total BTEX Compounds	NS	1.04		0.31	0.27	0		0
Total Chlorinated Compounds	NS	272.6		70.55	69.35	23.8		3

Qualifiers

- U - The compound was not detected at the indicated concentration.
- N (Organics) - Presumptive Evidence of a Compound
- N (Inorganics) - The matrix spike recovery was outside control limits
- J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL.
 The concentration given is an approximate value.
- B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
- P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.
- *(Organics) - For dual column analysis, the lowest quantitated concentration is being reported due to coeluting interference.
- *(Inorganics) - The sample/duplicate %RPD was above the control limit.
- E (Organics) - Indicates the analyte 's concentration exceeds the calibrated range of the instrument for that specific analysis.
- E (Inorganics) - The reported value is estimated because of the presence of interference.
- D - The reported value is from a secondary analysis with a dilution factor. The original analysis exceeded the calibration range.
- Q - indicates LCS control criteria did not meet requirements.
- NR - Not analyzed

The compound exceeded the NY TOGS Class GA GW Standard

Table 2
Summary of Groundwater Sampling Results - VOCs
JP Morgan - Westchester County Airport
Hangar E-1, Harrison, New York

Sample ID	NY TOGS	L1013365-01	C3743-03	C5122-03	D1961-03	D3227-03	D4337-03	D5268-03	E1687-05	E2667-03	E3920-03	E4852-03	F1626-03	F2558-03	F4137-03	F5160-03	G1612-03	G2637-03	G3960-05	G4894-03	H1954-03	H3841-03	H4888-03	H6241-03	I2346-03	I3873-03	I5336-03	I6906-03	J2127-03	J3752-03	J4939-03	J6479-07					
Lab Sample Number	1.1 Ambient	8/27/2010	9/16/2011	12/22/2011	3/22/2012	6/26/2012	9/24/2012	12/19/2012	3/28/2013	6/20/2013	9/26/2013	12/16/2013	3/28/2014	6/3/2014	10/2/2014	12/18/2014	3/20/2015	6/29/2015	10/6/2015	12/17/2015	3/24/2016	6/28/2016	9/21/2016	12/22/2016	3/21/2017	6/22/2017	9/28/2017	12/13/2017	3/28/2018	6/27/2018	9/14/2018	12/19/2018					
Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water				
Dilution Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L			
MW-3																																					
Volatile Organic Compounds																																					
1,1,1-Trichloroethane	5	1.2	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,1,2,2-Tetrachloroethane	5	0.5	0.31	0.31	0.31	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,1,2-Trichloroethane	1	0.75	0.38	0.38	0.38	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,1,2-Trichlorofluoroethane	5	-	0.45	0.45	0.45	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,1-Dichloroethane	5	1.4	3	1.9	2.7	6.5	5.7	3.7	3.8	3.8	2.9	2.3	3.7	4.3	2.7	2.4	3.9	7.2	2.8	2	3.1	2.6	2.1	2	2.5	4.5	2.9	1.3	10.6	3.8	4	7.8					
1,1-Dichloroethene	5	14	28	22	21	31	25	20	24.3	17.8	15.9	13.8	22.7	28.2	19.1	16	18	37	12.8	9.4	13.8	12	10.2	11.2	13.5	23.1	13.9	7.2	9.1	18	18.4	11.3					
1,2,3-Trichlorobenzene	5	2.5	-	-	2.5	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,2,4-Trichlorobenzene	5	2.5	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,2-Dibromo-3-Chloropropane	0.04	2.5	0.46	0.46	0.46	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,2-Dibromoethane	0.0006	2	0.41	0.41	0.41	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,2-Dichlorobenzene	3	2.5	0.45	0.45	0.45	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,2-Dichloroethene	0.6	0.5	0.48	0.48	0.48	0.5	0.5	0.5	0.5	0.5	0.2	0.31	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.23	0.2	0.2	0.22	0.2	0.2	0.2	0.2	0.2	0.2	0.34	0.2		
1,2-Dichloropropane	1	1.8	0.46	0.46	0.46	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,3-Dichlorobenzene	3	2.5	0.43	0.43	0.43	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,4-Dichlorobenzene	3	2.5	0.32	0.32	0.32	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
1,4-Dioxane	NS	-	-	-	10	42	10	35	100	100	100	100	100	100	100	100	100	100	100	100	100	9.3	J	-	-	-	-	-	-	-	-	-	-	-	-		
2-Butanone	50	5	1.3	1.3	1.3	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3		
2-Hexanone	50	5	1.9	1.9	1.9	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
4-Methyl-2-Pentanone	NS	5	2.1	2.1	2.1	2.5	2.5	2.5	2.5	2.5	2.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Acetone	50	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
Benzene	1	0.5	0.32	0.32	0.32	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.27	J	0.2	0.25	J	0.27	J	0.47	J	0.21	J	0.2	0.24	J	0.2	0.22	J	0.5	J	0.23	J	0.2	0.33	J	
Bromochloromethane	5	2.5	-	-	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
Bromodichloromethane	50	0.5	0.36	0.36	0.36	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
Bromoform	50	2	0.47	0.47	0.47	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
Bromomethane	5	1	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
Carbon Disulfide	60	5	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
Carbon Tetrachloride	5	0.5	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
Chlorobenzene	5	0.5	0.49	0.49	0.49	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
Chloroethane	5	1	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
Chloroform	7	0.75	0.34	0.34	0.34	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
Chloromethane	5	2.5	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
cis-1,2-Dichloroethane	5	1.4	2.8	3.2	2.4	4.1	3.5	2.9	1.5	2.3	2.1	1.9	3.2	3.3	2.5	2.2	2.7	5.2	1.9	1.6	2.1	1.7	1.8	2.1	2.1	3.6	2.3	1.2	1.5	2.9	3.2						

Table 3
 Summary of Vapor Sampling Data-December 2018
 JP Morgan-Westchester County Airport
 Hangar E-1, Harrison, New York

Sample ID	INFLUENT		MID		EFFLUENT	
Lab Sample Number	J6480-01		J6480-02		J6480-03	
Sampling Date	12/18/2018		12/18/2018		12/18/2018	
Matrix	Air		Air		Air	
Dilution Factor	PPBV		PPBV		PPBV	
Units	Ug/M3		Ug/M3		Ug/M3	
Volatile Organic Compounds						
1,1,1-Trichloroethane	504	D	4.91		31.1	
1,1,2,2-Tetrachloroethane	0.07	U	0.07	U	0.07	U
1,1,2-Trichloroethane	0.11	U	0.11	U	0.11	U
1,1,2-Trichlorotrifluoroethane	7.66		0.15	U	1.92	J
1,1-Dichloroethane	44.5		0.65	J	5.67	
1,1-Dichloroethene	5.55		0.08	U	0.71	J
1,2,4-Trichlorobenzene	0.22	U	0.22	U	0.22	U
1,2,4-Trimethylbenzene	2.51		0.1	U	0.1	U
1,2-Dibromoethane	0.15	U	0.15	U	0.15	U
1,2-Dichlorobenzene	0.12	U	0.12	U	0.12	U
1,2-Dichloroethane	0.08	U	0.08	U	0.08	U
1,2-Dichloropropane	0.09	U	0.09	U	0.09	U
1,3,5-Trimethylbenzene	0.1	U	0.1	U	0.1	U
1,3-Butadiene	0.07	U	0.07	U	0.07	U
1,3-Dichlorobenzene	0.12	U	0.12	U	0.12	U
1,4-Dichlorobenzene	0.12	U	0.12	U	0.12	U
1,4-Dioxane	0.25	U	0.25	U	0.25	U
2,2,4-Trimethylpentane	0.05	U	0.05	U	0.05	U
2-Butanone	1.36	J	0.06	U	0.71	J
2-Chlorotoluene	0.1	U	0.1	U	0.1	U
4-Ethyltoluene	0.1	U	0.1	U	0.1	U
4-Methyl-2-Pentanone	0.08	U	0.08	U	0.08	U
Acetone	11.6		4.75		10.7	
Allyl Chloride	0.06	U	0.06	U	0.06	U
Benzene	0.03	U	0.03	U	0.29	J
Bromodichloromethane	0.13	U	0.13	U	0.13	U
Bromoethene	0.13	U	0.13	U	0.13	U
Bromoform	0.21	U	0.21	U	0.21	U
Bromomethane	0.12	U	0.12	U	0.12	U
Carbon Disulfide	0.06	U	0.06	U	0.06	U
Carbon Tetrachloride	0.06	U	0.5		0.5	
Chlorobenzene	0.09	U	0.09	U	0.09	U
Chloroethane	4.22		0.11	U	0.11	U
Chloroform	0.59	J	0.1	U	0.1	U
Chloromethane	0.5	J	1.09		1.59	
cis-1,2-Dichloroethene	0.56	J	0.08	U	0.08	U
cis-1,3-Dichloropropene	0.09	U	0.09	U	0.09	U
Cyclohexane	0.07	U	0.07	U	0.07	U
Dibromochloromethane	0.17	U	0.17	U	0.17	U
Dichlorodifluoromethane	2.32	J	2.37	J	1.34	J
Dichlorotetrafluoroethane	0.07	U	0.07	U	0.07	U
Ethyl Benzene	0.74	J	0.04	U	0.04	U
Heptane	0.04	U	0.04	U	0.04	U
Hexachloro-1,3-Butadiene	0.21	U	0.21	U	0.21	U
Hexane	1.66	J	3.52		2.93	
m/p-Xylene	3.08	J	0.17	U	0.17	U
Methyl Methacrylate	0.08	U	0.08	U	0.08	U
Methyl tert-Butyl Ether	0.04	U	0.04	U	0.04	U
Methylene Chloride	4.17		7.64		17.4	
Naphthalene	0.21	U	0.21	U	0.21	U
o-Xylene	1.39	J	0.09	U	0.09	U
Styrene	0.09	U	0.09	U	0.09	U
t-1,3-Dichloropropene	0.09	U	0.09	U	0.09	U
tert-Butyl alcohol	4.24		0.12	U	0.12	U
Tetrachloroethene	0.14	U	0.14	U	0.14	U
Tetrahydrofuran	0.03	U	0.03	U	0.03	U
Toluene	9.42		0.49	J	3.09	
trans-1,2-Dichloroethene	7.14		0.12	U	0.12	U
Trichloroethene	0.43		0.11	U	0.43	
Trichlorofluoromethane	2.53	J	1.4	J	2.36	J
Vinyl Chloride	0.03	U	0.03	U	0.03	U
Total Detected VOCs	620.17		27.32		80.74	

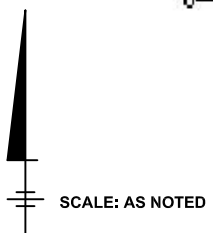
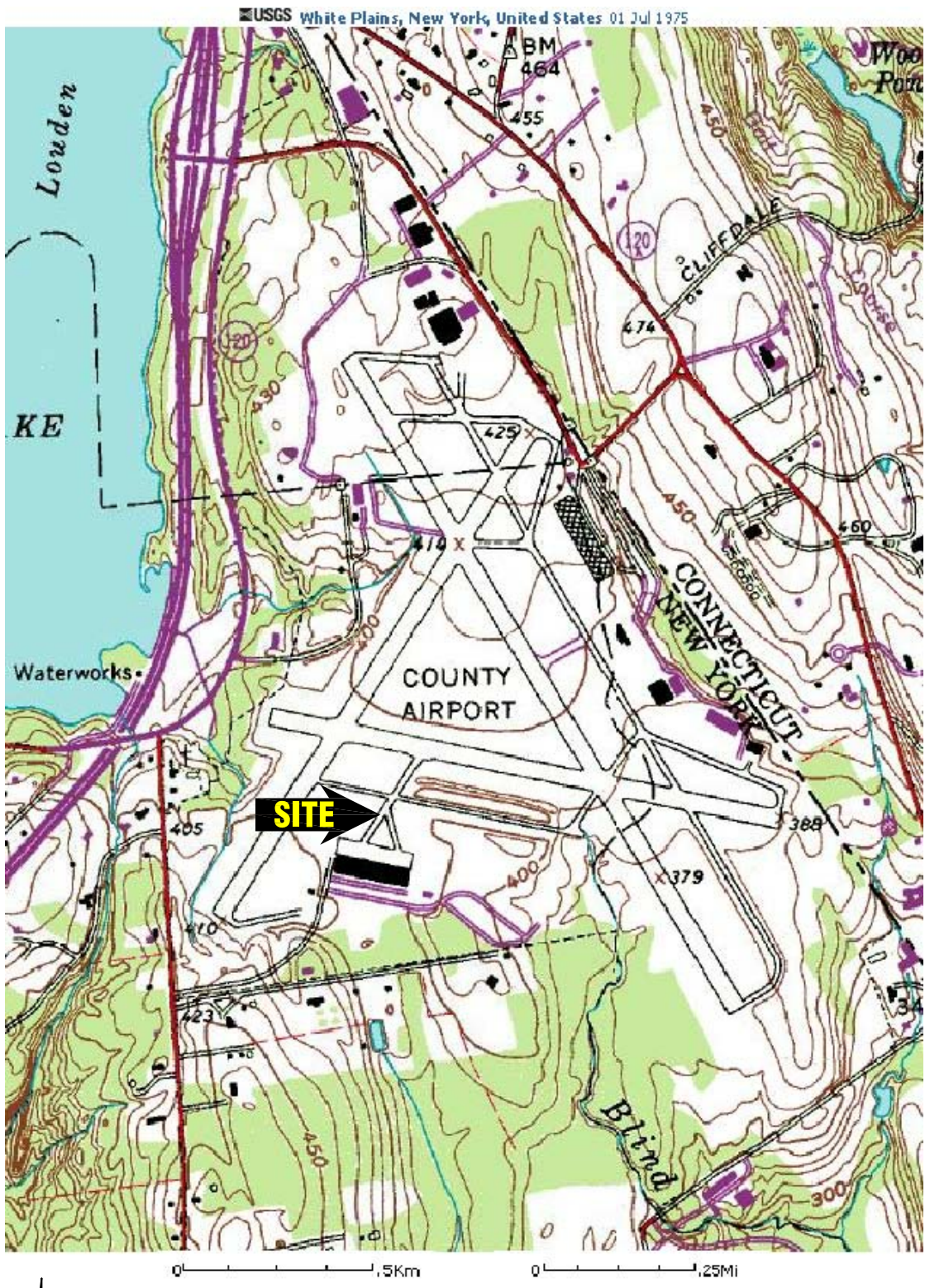
Qualifiers

- U - The compound was not detected at the indicated concentration.
- N (Organics) - Presumptive Evidence of a Compound
- N (Inorganics) - The matrix spike recovery was outside control limits
- J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL. The concentration given is an approximate value.
- B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
- P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.
- *(Organics) - For dual column analysis, the lowest quantitated concentration is being reported due to coeluting interference.
- *(Inorganics) - The sample/duplicate %RPD was above the control limit.
- E (Organics) - Indicates the analyte 's concentration exceeds the calibrated range of the instrument for that specific analysis.
- E (Inorganics) - The reported value is estimated because of the presence of interference.
- D - The reported value is from a secondary analysis with a dilution factor. The original analysis exceeded the calibration range.
- Q - indicates LCS control criteria did not meet requirements.
- NR - Not analyzed

FIGURES



CITY: DIV/GRUPO: DB: LD: PIC: PM: TM: LYRON=OFF=REF*
 G:ENV/CAD/Fairhwa/ACT/B8018238/0000003/2014-03/VEIFIG 01-SITE LOCATION MAP_Hangar.dwg LAYOUT: 1 SAVED: 4/2/2014 11:13 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 4/2/2014 11:14 AM BY: GONZALEZ, JAMES
 XREFS: IMAGES: PROJECTNAME: ---
 Topographic Map.jpg



ARCADIS U.S., INC.

HANGAR E-1 WESTCHESTER COUNTY AIRPORT • 73 TOWER ROAD, HARRISON, NEW YORK

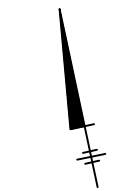
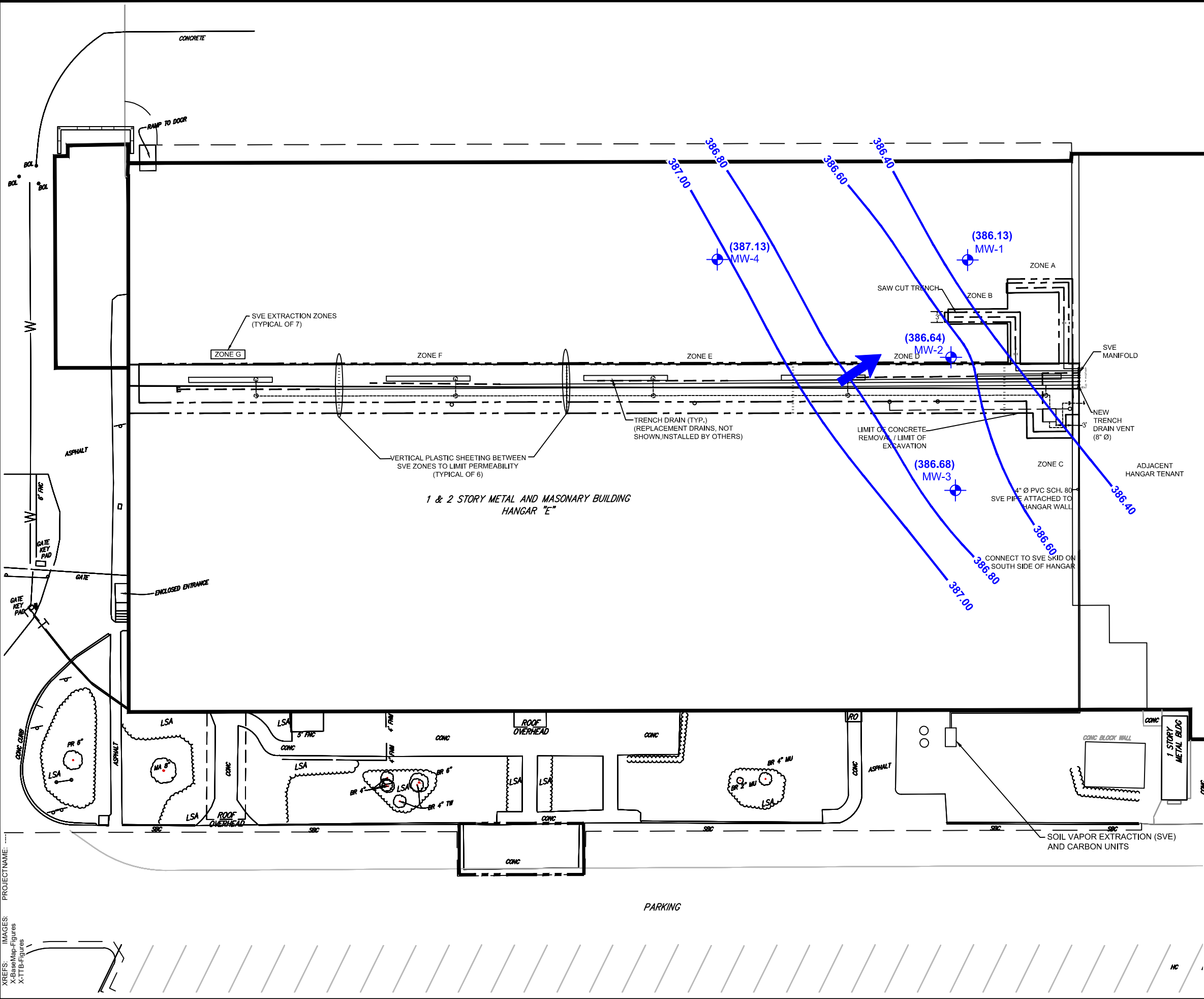
SITE LOCATION MAP





ARCADIS Project No.
B8018238.0000.0003

Date
04/02/2014

ARCADIS
35 COLUMBIA ROAD
BRANCHBURG, NJ 08876
TEL. 908.526.1000

CITY: MANCHESTER DIV/GROUP: ENVCAD_DB: T.HALLIWELL PM: L.BRUNT
 C:\Users\PHH\OneDrive - ARCADIS\OneDrive - ARCADIS\BIM\360 Docs\WESTCHESTER COUNTY NY\Westchester Vapor Monitoring\2019\BBO18238.000001-1-DWG\WVR-Fig3-4-5-GW Dec 2018.dwg LAYOUT: 3 SAVED: 1/11/2019 11:54 AM ACADVER: 21.05 (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 1/11/2019 11:54 AM BY: HALLIWELL, TRISH
 XREFS: IMAGES: PROJECTNAME: X-BaseMap-Figures X-TTB-Figures



- LEGEND:**
-  MONITORING WELL LOCATION
 -  (386.13) GROUNDWATER ELEVATION
 -  386.40 GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
 -  GROUNDWATER FLOW DIRECTION

- NOTES:**
1. THE FOLLOWING MAPS ARE REFERENCED:
 - A. SCHEMATIC SITE DEMOLITION PLAN DRAWINGS, AIRCRAFT OPERATIONS AT HANGAR E-1, PREPARED FOR JPMORGAN CHASE, ELECTRONIC FILE PREPARED BY SULLIVAN ARCHITECTURE, P.C., DATED 6-12-09.
 - B. MONITORING WELL LOCATION MAP, PREPARED FOR ARCADIS, SITE, WESTCHESTER COUNTY AIRPORT (HANGER E-1), 73 TOWER ROAD, HARRISON, NEW YORK, PREPARED BY DPK CONSULTING LLC., DATED 9/9/10, SCALE 1"=40'.



HANGAR E-1 WESTCHESTER COUNTY AIRPORT
 73 TOWER ROAD
 HARRISON, NEW YORK

**GROUNDWATER ELEVATION CONTOURS
 DECEMBER 18, 2018**


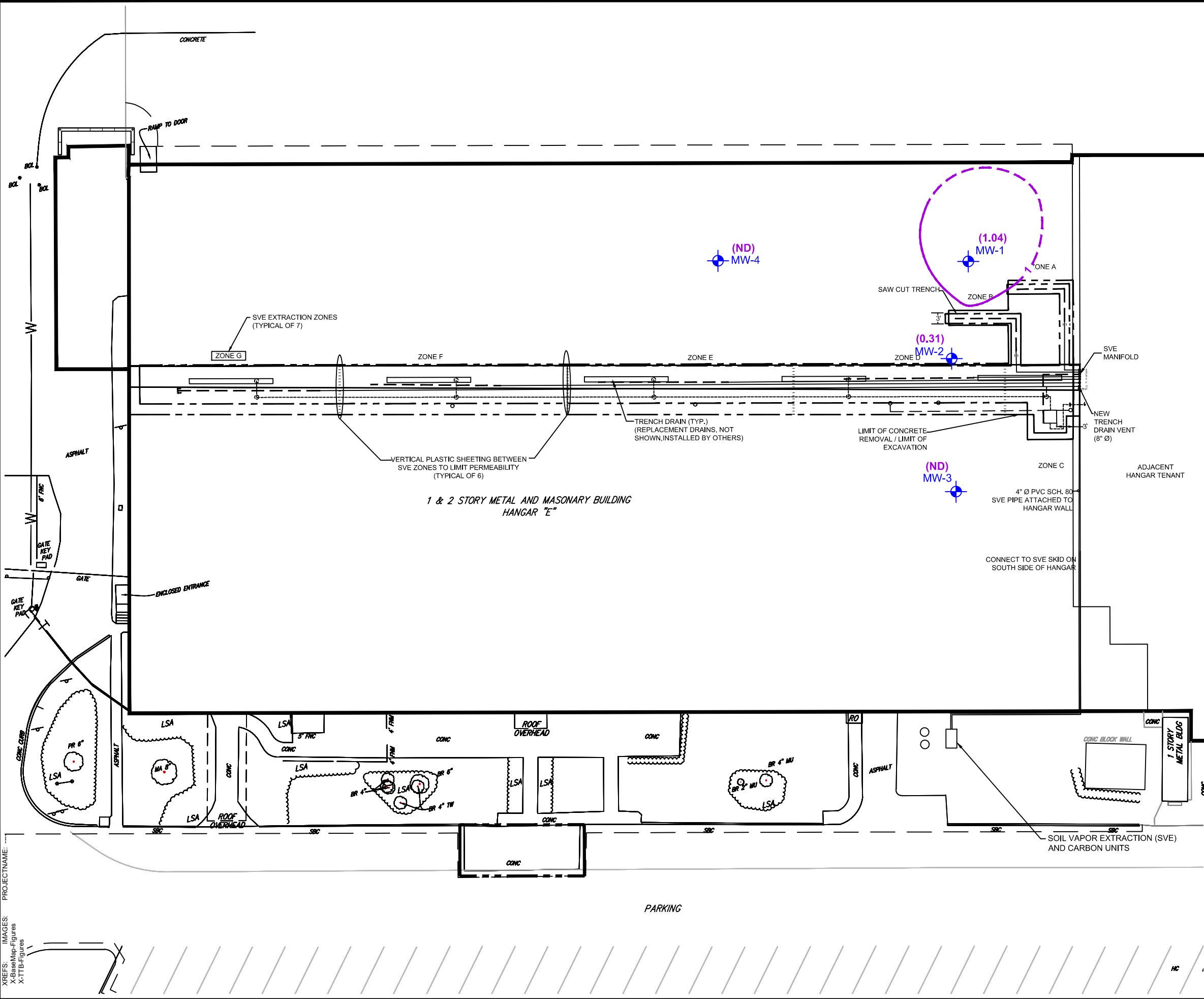
 **ARCADIS** Design & Consultancy
 for natural and built assets

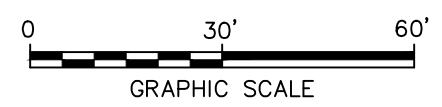
FIGURE
3

CITY: MANCHESTER DIV/GROUP: ENVCAD DB: T.HALLIWELL PM: L.BRUNT
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- LEGEND:**
- MONITORING WELL LOCATION
 - (0.31) TOTAL BTEX CONCENTRATION
 - 1 TOTAL BTEX ISOPLETH (DASHED WHERE INFERRED)
 - ND NON-DETECT

- NOTES:**
1. THE FOLLOWING MAPS ARE REFERENCED:
 - A. SCHEMATIC SITE DEMOLITION PLAN DRAWINGS, AIRCRAFT OPERATIONS AT HANGAR E-1, PREPARED FOR JPMORGAN CHASE, ELECTRONIC FILE PREPARED BY SULLIVAN ARCHITECTURE, P.C., DATED 6-12-09.
 - B. MONITORING WELL LOCATION MAP, PREPARED FOR ARCADIS, SITE, WESTCHESTER COUNTY AIRPORT (HANGER E-1), 73 TOWER ROAD, HARRISON, NEW YORK, PREPARED BY DPK CONSULTING LLC., DATED 9/9/10, SCALE 1"=40'.



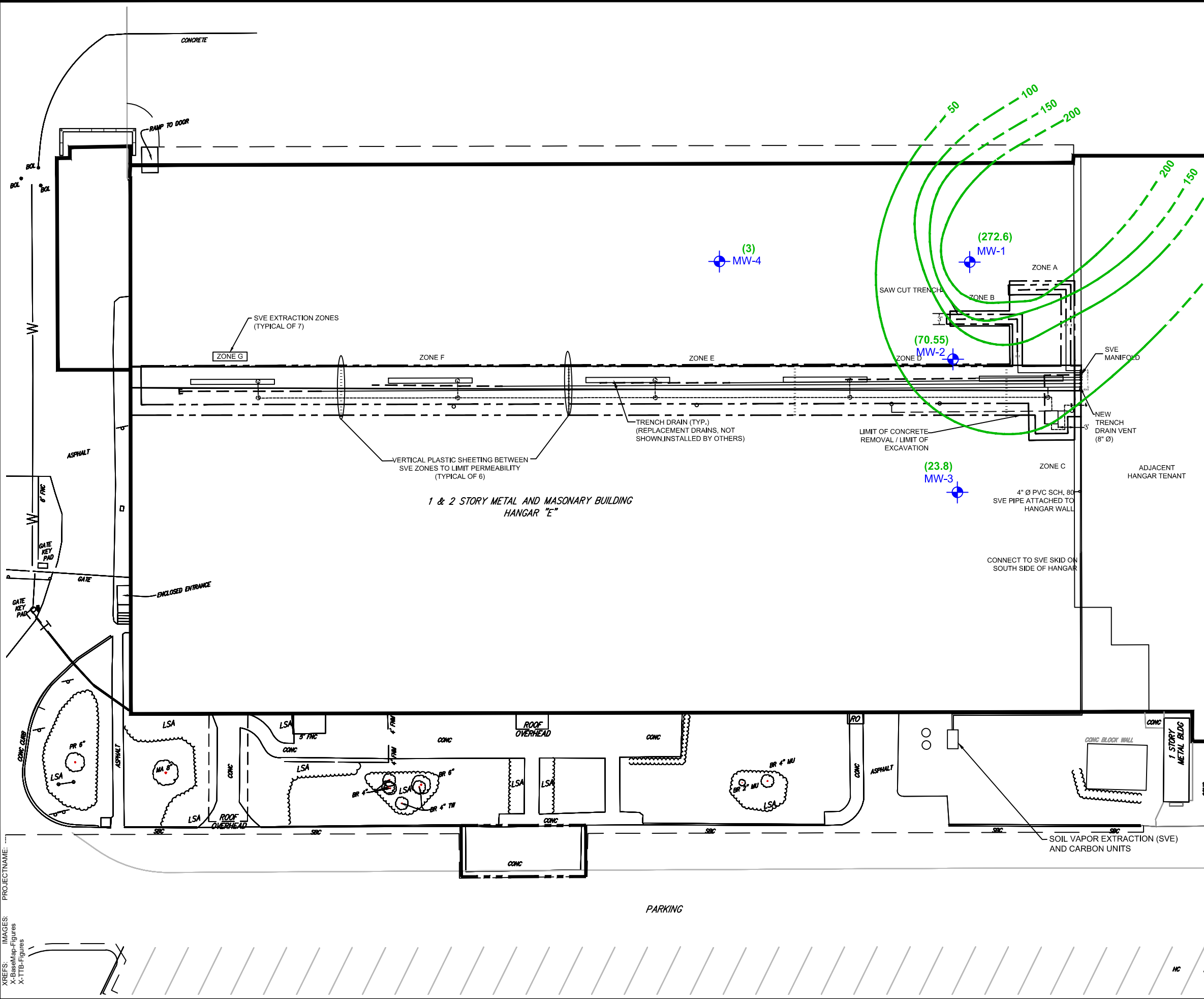
HANGAR E-1 WESTCHESTER COUNTY AIRPORT
 73 TOWER ROAD
 HARRISON, NEW YORK

**TOTAL BTEX COMPOUNDS ISOPLETHS
 DECEMBER 18, 2018**

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FIGURE
4

CITY: MANCHESTER DIV/GROUP: ENVCAD DB: T.HALLIWELL PM: L.BRUNT
 C:\Users\PHalliw@arcadis.com\OneDrive - ARCADIS\BIM_360 Docs\WESTCHESTER COUNTY NY\Westchester Vapor Monitoring\2019\BBO18238.0000101-DWG\WVR-Fig3-4-5-GW Dec 2018.dwg LAYOUT: 5 SAVED: 1/11/2019 12:15 PM ACADVER: 21.05 (LMS TECH) PAGESETUP: ---- PLOTTSTYLETABLE: ---- PLOTTED: 1/11/2019 12:15 PM BY: HALLIWELL, TRISH



- LEGEND:**
- MONITORING WELL LOCATION
 - (23.8)** TOTAL CHLORINATED COMPOUND CONCENTRATION
 - TOTAL CHLORINATED COMPOUND ISOPLETH (DASHED WHERE INFERRED)
 - ND** NON-DETECT

- NOTES:**
1. THE FOLLOWING MAPS ARE REFERENCED:
 - A. SCHEMATIC SITE DEMOLITION PLAN DRAWINGS, AIRCRAFT OPERATIONS AT HANGAR E-1, PREPARED FOR JPMORGAN CHASE, ELECTRONIC FILE PREPARED BY SULLIVAN ARCHITECTURE, P.C., DATED 6-12-09.
 - B. MONITORING WELL LOCATION MAP, PREPARED FOR ARCADIS, SITE, WESTCHESTER COUNTY AIRPORT (HANGAR E-1), 73 TOWER ROAD, HARRISON, NEW YORK, PREPARED BY DPK CONSULTING LLC., DATED 9/9/10, SCALE 1"=40'.



HANGAR E-1 WESTCHESTER COUNTY AIRPORT
 73 TOWER ROAD
 HARRISON, NEW YORK

**TOTAL CHLORINATED COMPOUNDS ISOPLETHS
 DECEMBER 18, 2018**

ARCADIS Design & Consultancy
 for natural and built assets

FIGURE **5**