PERFORMANCE MONITORING REPORT

IN SITU CHEMICAL OXIDATION

6 –MONTHS POST-TREATMENT

ESSEX/HOPE JAMESTOWN SITE

129 HOPKINS AVENUE

JAMESTOWN, NY

NYDEC Site ID No. 9-07-015

Prepared for:

ESSEX SPECIALTY PRODUCTS INC.

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1.0 BACKGROUND

This Performance Monitoring Report present the results and evaluation of the groundwater and soil sampling conducted to assess the performance of the insitu chemical oxidation (ISCO) project implemented in November, 2011 at the Essex Hope Site located in Jamestown, New York. The focus of the treatment was the UST Area. The acetone hotspot area near recovery well RW-6D was also treated.

The Essex Hope Site is a NYDEC Superfund Site that has been undergoing remedial actions since 1997. Essex Specialty Products was a former subsidiary company of The Dow Chemical Company (Dow). The property is currently owned and operated by Custom Production Manufacturing (CPM) as a metals fabrication business. Some of the site property is currently leased to Master Machine.

The original remedial investigation (RI) of the site occurred in 1988-1989. The UST Area is on the southern end of the site area behind CPM Building No.5. Five (5) underground storage tanks in the UST Area had been reported to be backfilled with concrete and closed by previous site owners around 1980. The USTs were not investigated during the site RI. Soil and groundwater sampling in the RI was limited to the area adjoining the tanks. Based on these investigations, a SVE/sparging system was installed in 1997 for extraction of VOCs. Ongoing monitoring of this system indicated that VOC removal was not effective and another contributing source of contamination was suspected. Supplemental site investigations indicated that the tanks contained paint by-products and solvents and they were not properly closed. Subsequently the five (5) tanks and approximately 1200 tons of contaminated soil were removed in December, 2003. Further investigations conducted from 2003 through 2009 indicated a more extensive VOC presence in soil and shallow groundwater across most of the UST Area, up to 200 feet from the original tank locations.

A Remedial Action Work Plan (RAWP) for ISCO treatment of the UST Area was prepared by URS in 2011 and approved by NYDEC. Treatment of the acetone hotspot was added after approval of the RAWP based on the recent appearance of elevated acetone in RW-6D.

Injection of activated sodium persulfate (ASP) oxidant was conducted from November 8 through November 18, 2011. Oxidants were injected where VOCs cumene, toluene, ethylbenzene and xylenes were present in shallow soils and groundwater, generally from 4 to 12 feet below ground surface (BGS). An acetone hot spot in the deep groundwater zone around recovery well RW-6D was also treated by injection of ASP. Injections in this area were in the 16-40 feet BGS interval.

This report contains performance monitoring data from samples collected pre-injection (baseline) and through 6-months post-injection. Sampling was conducted as follows:

- Baseline groundwater samples- November 3, 2011
- Post-injection groundwater samples- December 2, 2011, March 13, 2012, June 13, 2012 (3 rounds)
- Post-injection soil samples (UST Area only)- August 15, 2012

Other soil sampling has been performed in the UST Area prior to 2011 and provides a historic reference. These data are also presented in the report for comparative purposes.

1.1 Remedial Action Objectives

The primary objectives of the ISCO remedial actions are to:

- Reduce or eliminate volatile organic compounds (VOCs) present in soil and groundwater above the site remedial action objectives (RAOs) described in the Consent Order.
- Minimize Dow's long-term liabilities, O&M costs/efforts and constraints on potential future site use or reuse due to VOC-contaminated soils and groundwater on site.

The ROD Remedial Action Objectives (RAOs) for site cleanup as outlined in the NYDEC Consent Order are as follows:

Soil RAOs:

Total VOCs = 10 ppm

Individual VOCs = 1 ppm

Total Semi-VOCs = 500 ppm

Individual Semi-VOCs = 50 ppm

PCBs = 10 ppm

Groundwater RAOs:

Trans-1, 2- Dichloroethylene = 5 ppb

Trichloroethene = 5 ppb

Vinyl Chloride = 5 ppb

Ethylbenzene = 5 ppb

Toluene = 5 ppb

Xylene = 5 ppb

PCBs = 0.1 ppb

For other compounds not listed groundwater RAOs default to compliance with NYDEC Ambient Groundwater Quality Standards. For Site VOCs these would be at 5 ppb.

1.2 Chemical Oxidation Operations

From November 8 through 18, 2011, insitu chemical oxidation was implemented in the UST Area and acetone hot spots by Innovative Environmental Technologies Inc., (IET) as subcontractor to URS. The oxidant solution was injected by direct-push drilling equipment (Geoprobe) and consisted of:

- Sodium persulfate (Klozur ^{R}) - 66,575 pounds mixed with 15,815 gallons of water
- Zero-valent iron (ZVI), micron scale mixed with 8015 gallons of water
- Hydrogen peroxide solution (50%) diluted to 2.5-5% solution with water.

The oxidation approach employed the integration of Fenton's chemistry and persulfate oxidation, using zero-valent iron (ZVI)/hydrogen peroxide as catalysts for both reactions. Catalyzed persulfate (S_2O_8) results in the formation of short-lived free sulfate radicals that are available to oxidize VOCs and other naturally oxidizable matter (NOM). Reaction endpoints include organic (VOC) transformation to carbon dioxide, dissolved and mineralized sulfate ($CaSO_4$), and mineralized iron (various species, including pyrite Fe_2S). Inorganic species formation depends on the subsurface geochemical conditions, including acidity/alkalinity and pH. Sodium persulfate oxidation also has a tendency to reduce pH depending on the buffering capacity of the subsurface.

The hydrogen peroxide will also generate hydroxyl radicals that directly oxidize VOCs and other NOM.

After reaction of the oxidants and depletion of dissolved oxygen, the sulfate and ferric iron act as electron acceptors for facultative bacteria that may further degrade VOCs under reducing conditions. In this process, sulfide and ferrous iron are indicators of anaerobic activity, in addition to negative ORP (reducing).

A total of 123 injection points were used to deliver the oxidant to the groundwater and vadose soil zones. Injection spacing's were generally on 10 foot centers. The shallow zone injections were over the interval 6-16 feet BGS, which included 2-4 foot of vadose zone. The upper 4 foot of the site was not treated. The vadose zone injections were only in part of the UST Area, West 1 and 2 and East 1, where the elevated VOCs were present. The deep zone (acetone area) injections were over the interval 16-40 feet BGS. The general site map of the UST Area and acetone hot spot injection areas and sampling points is shown on Drawing C-1.

The IET Field Reports are included as Appendices A and B.

1.3 Performance Monitoring Plan

Monitoring wells and soil sampling were used to evaluate the effects of the oxidant injections. Samples were collected prior to injections (baseline) and at quarterly (3-month) intervals following the oxidant injections. All of the water samples underwent the same analytical suite, including field parameters for general water quality assessment. The monitoring parameters included:

- Field analyses by flow-through cell (Horiba) - pH, conductivity, oxidation/reduction potential (ORP), dissolved oxygen (DO).

- VOCs- EPA Method 8260

- Sulfate/sulfide- ASTM Method D516-90.02/SM-4500.S- Indicator of oxidant (sodium persulfate) presence and reductive state

- Ferrous/Ferric Iron- EPA Method 6010B-ICP (Total Fe) with SM 3500- Indicator of iron catalyst reductive state. Groundwater samples were not filtered in the lab (< 0.45 um) prior to analyses.

- Alkalinity- SM 2320B
- Total Petroleum Hydrocarbons (TPH)- EPA Method 1664A

Soil analyses was for VOCs and TPH.

The performance monitoring sampling plan is summarized on Table 1-1.

2.0 HYDROGEOLOGIC CONDTIONS

In the UST Area the subsurface zone of interest is from 4 foot BGS to the top of a clayey- silt semi-confining layer which comprises the lower limit of the shallow groundwater zone. The upper 5 feet consists of fine-grained, silty clay soils, with silty fill and concrete/fill present in the upper 2 ft. in some borings. Below the upper 5 feet is dominantly a sand and gravel, with clayey-silt lenses. The shallow water table is approximately 8-10 feet below ground surface (BGS).

The clayey-silt semi-confining layer is approximately 9-21 ft. below the ground surface (BGS). Its depth varies with surface elevation and the sloped surface of the layer. The layer was present throughout the UST Area, and generally exhibited an eroded surface feature that sloped to the east. The semi-confining layer was encountered at all boring locations across the site and ranged in thickness from 3 to 5 feet. This layer is thickest beneath Plant #5 and the UST Area and thins towards the north, east and south of this area. A map of the elevation of top of the upper semi-confining clay in the UST Area is contained on Figure 2-1.

In the acetone hotspot area near RW-6D, the subsurface zone of interest is below the shallow semi-confining layer where the lower (deep) water-bearing zone is present. This zone has been found across the site and is composed of fine sandy silt to silty fine sand with occasional silty clay laminations. This zone has historically been referred to as the lower water-bearing zone, or “deep zone”, The thickness of this unit ranged between approximately 17 feet in the UST Area (MW-23D) to 14.5-21.5 ft. the area northeast of CPM Plant #5 Building near RW-6D. A thick clayey confining layer occurs at the base of the lower water-bearing zone. Drilling for the deep zone monitoring wells stopped at the top of the lower confining layer so additional data on this layer’s thickness has not been obtained during previous investigations.

Existing site remedial actions include groundwater recovery in the deep groundwater zone, primarily to the north and northeast of the UST Area. These wells have been in operation since 1997. No recovery wells are present in the shallow groundwater zone. Groundwater contours representing normal recovery well pumping conditions are contained in the Annual Reports and have been depicted in other site investigation reports. The most recent (September, 2012) groundwater potentiometric surface maps for the shallow and deep groundwater zones are shown on Figures 2-2 and 2-3. These plots represent deep zone groundwater extraction with RW-6D in operation. From August, 2011 through June, 2012, the recovery well was shut down because of issues with elevated acetone. This shutdown temporarily affected the deep groundwater potentiometric surface during this period by reducing drawdown and the overall well field capture area in the northeast part of the site. Monitoring data during and after RW-6D shutdown indicates that the deep groundwater VOC plume has not migrated significantly beyond the overall deep zone capture area as demonstrated by MWs-22D and -25D.

3.0 PRE-TREATMENT CONTAMINANT CONDITIONS

Pre-treatment conditions have been established by historic site investigations and year 2011 pre-injection (baseline) monitoring. In the UST Area, the historic investigations occurred from 2003 through 2006, after removal of the five (5) underground tanks. The focus of these investigations was to determine the extent of residual VOCs in soils and groundwater. Direct-push soil and groundwater samples were collected and monitoring wells (MW-23S and -24S) were installed. Composite soil sampling was performed in November, 2009 to characterize the soil contaminants for the chemical oxidation treatability study. In November, 2011 four (4) additional monitoring wells were installed (MWs-26S through -29S) and baseline groundwater sampling was conducted, approximately 1-week prior to oxidant injection.

The historic soils data (2003-2006) was considered reasonably representative of pre-treatment baseline conditions since the main UST Area is paved with concrete and the vadose zone soils (4-8 foot BGS) are not subject to migration/degradation processes that would significantly reduce the contaminant characteristics. The 2009 composite soil sampling provided data that confirmed the historic soil contaminant conditions.

Historic (2003-2006) soil and groundwater data are summarized on Tables 3-1 and 3-2. Soils data are presented on isoconcentration plots in Figures 3-1 through 3-4. Groundwater data isoconcentration plots are shown on Figures 3-5 through 3-7.

Pre-treatment baseline sampling (November, 2011) was conducted for groundwater only. Baseline data are summarized on Tables 3-3 through 3-16. Figures 3-8 through 3-15 contain the isoconcentration plots for VOCs and oxidation indicator parameters sulfate/sulfide, ferrous (+2)/ferric (+3) iron and ORP. Sampling locations are shown on Drawing C-1.

The acetone hot spot in the deep groundwater zone was a relatively recent phenomenon (2008-2009) that was discovered as part of the routine annual groundwater monitoring conducted at the site since startup of the groundwater recovery system in 1997. Acetone detections in these wells are presented on Figure 3-16.

Note: Isocontour plots were prepared using Golden Surfer V.10 software. The contours are based on linear interpolation using the existing database. In areas where no data has been obtained, or *monitoring points are not present, the contouring program estimates a value based on the closest surrounding data values. In the case where the areal boundary of the data values has not been determined, i.e. where the boundary values are greater than zero, the contouring program will project a data value beyond the limits of the investigation data.*

3.1 <u>Historic Soil Analytical Results Years 2003-2006- UST Area</u>

From the period 2003-2006 a total of 43 test borings (TBUSTs) were drilled in the UST Area using direct-push drilling techniques. Samples were collected over a depth interval of 0-15 feet BGS. It is noted that some of the soil samples were from the interval at or near the saturated zone (8-10 feet BGS) and are suspected to include groundwater contaminants from the capillary/smear zone. These samples were not included in the historical soil data graphical presentations. The distribution of total CTEX and individual VOCs toluene, ethylbenzene and xylenes in shallow soils are depicted on Figures 3-1 through 3-4.

The data indicates that VOC's cumene, toluene, ethylbenzene and xylenes (CTEX) were most frequently detected in the soils and in total comprised 99-100% of the VOCs detected. Xylenes and ethylbenzene were the predominant compounds. Chlorinated VOCs were not found. In the western end of the UST Area the CTEX compounds were generally at levels 2 to 3 orders of magnitude above the Remedial Action Objectives (RAOs) of 1/10 mg/kg (individual/total). VOCs toluene, ethylbenzene and xylenes were found at concentrations up to 660 mg/kg, 250 mg/kg and 1520 mg/kg respectively. Cumene was generally found at lower concentrations, the maximum being at 5.9 mg/kg. The east UST Area had CTEX levels typically less than 10 mg/kg with the exception of TBUST 16 which had a level of 29.2 mg/kg (xylenes at 25 mg/kg). The elevated CTEX soil areas generally correlate with the elevated CTEX in shallow groundwater. See Section 3.2.

3.1.1 Historical CTEX Mass-Vadose Zone Soils

The soil contaminant mass for four (4) VOC compounds (CTEX) in the UST Area was estimated as follows:

Vadose Zone Soils- CTEX Mass Estimate

CTEX, mg/kg	Contour Area, sf	CTEX Mass, kg

0	24436	
5	21555	1.80
10	20593	1.80
50	17622	22.28
100	15299	43.56
500	4235	829.80
1000	919	621.75
1500	296	194.69
2000	51	107.19
2300	0.12	27.35
	TOTAL Mass, kg	**1850.22**

Notes:
1. Mass estimate based on 5 foot thick vadose zone interval, average 4-9 feet BGS. Reference Figure 3-1.

Mass = avg. conc (mg/kg) x 110 lbs/cf soil x soil vol (cf) x kg/2.2 lbs

3.2 Historic Groundwater Analytical Results Years 2003-2006- UST Area

Shallow zone groundwater samples have been taken from existing monitoring wells and direct-push dual-screen sampling in the UST Area. Samples were collected from a short screened interval (~ 4 ft. or less) either near the top of the semi-confining layer (average 16 ft. BGS) or the top of the saturated zone (approximately 8-12 ft. BGS). Existing monitoring wells were also sampled. Only one monitoring well (MW-20) in the UST Area has been routinely sampled in as part of the annual performance monitoring plan for the site which commenced in 1997. The newer monitoring wells (MWs 23-S through -29S) were constructed from 2006- 2011 to provide better delineation of shallow groundwater contamination. The historic groundwater analyses for the UST Area are summarized on Table 3-2.

Consistent with the UST soils analyses, groundwater analyses indicates that the CTEX volatile organics (cumene, toluene, ethylbenzene and xylenes) were the predominant compounds detected in the UST Area. Chlorinated VOCs were found at relatively low levels.

The CTEX groundwater plume (1 ppm isocontour) extended from across the entire UST Area to the former tank farm to the east, north to MW-20 (beneath Plant #5), and to the southwest at and likely beneath the Master Machine building. The extent of the plume to the eastern areas has been determined to be offsite onto adjoining properties. The mean CTEX concentrations in the western portion of the UST Area are 1 to 2 orders of magnitude greater than the mean CTEX concentrations in the eastern part of the UST Area. See Figures 3-5 through 3-7.

3.3 Historic Groundwater Analytical Results - Acetone Hot Spot

Deep zone groundwater data has been obtained from routine groundwater monitoring performed since 1998 and supplemental site investigations.

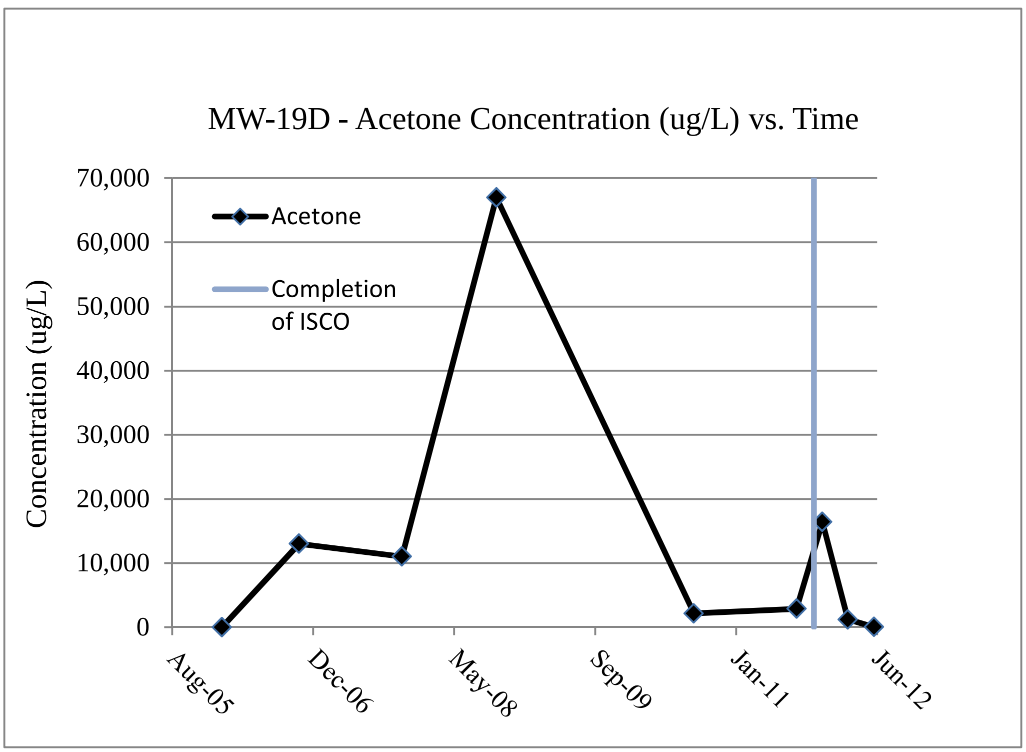
In 2001, acetone was found to be present in deep groundwater zone samples at PZ-5D and PZ-6D in the area southeast of Plant #5 (northeast of the UST Area). Concentrations ranged from 1,600 ug/l at PZ-6D to 14,000 μg/l at PZ-5D. PZ-9D in the UST Area had an acetone level of 240 μg/l. The acetone source appeared to originate in the deep zone at the northeast end of UST Area near PZ-9D, since acetone was not present in the shallow zone in the UST Area. Acetone in deep groundwater was limited to the area southeast of Plant #5 as evidenced by the non-detect levels in MW-19D and VP-6D. Additionally, the acetone was apparently concentrated in the upper interval of the deep water-bearing zone, which is the screened interval in PZ-5D and PZ-6D. The adjacent monitoring well MW-19D, directly north of PZ-6D, and screened in the lower interval of the deep water-bearing zone, historically has not had detectable levels of acetone.

In 2006, acetone was found in existing deep zone monitoring points PZ-5D and PZ-6D at concentrations of 960 mg/l and 190 mg/l, respectively. These points are located directly east of CPM Plant #5 and represented the highest acetone concentrations found onsite to that time. In addition, these levels represented increases of more than one order of magnitude compared to levels found in the same monitoring points from previous (2001) investigations.

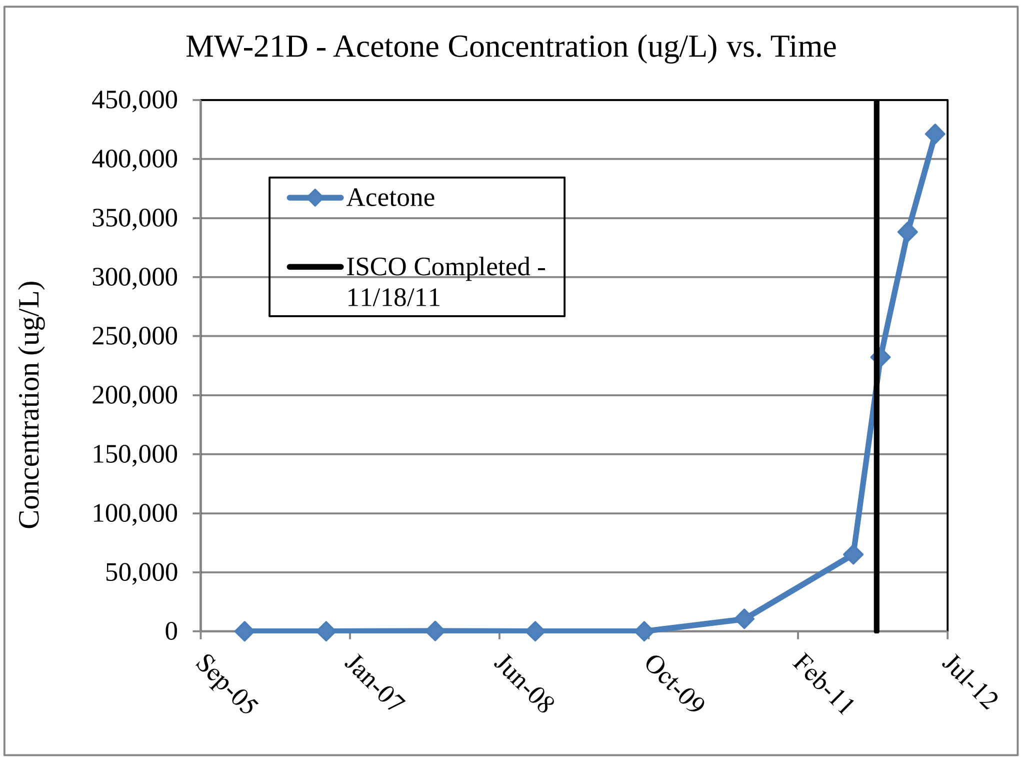
The 2006 groundwater samples confirmed the historic acetone detections in deep groundwater. The only performance monitoring well that had historic acetone detections was MW-19D, located directly east of CPM Building No. 5, and north of the UST Area. Acetone was first detected in MW-19D in 2006 with a level of approximately 12 mg/l. No other routinely monitored wells or recovery wells had detectable levels of acetone up to that date.

The acetone presence in the upper interval of the deep groundwater zone suggested either a historic upgradient source, or a historic onsite release that has migrated to the deep zone, and was not present in its original shallow source area (UST Area). No sources of acetone were reported in the original RFI or other previous site investigations. The migration of acetone was expected to be limited to the area east of CPM Building No. 5 by both the ongoing deep zone recovery well pumping and the natural attenuation of acetone in groundwater.

MW-19D is directly downgradient of the UST Area in both the shallow and deep groundwater zones, including under the condition of RW-6D pumping. RW-6D started operations in Q1 2008. Acetone levels continued to be detected in MW-19D and were found to fluctuate greatly since 2006, in some instances greater than 2 orders of magnitude. See the acetone versus time plot below. The source of the acetone and the reasons for these fluctuations have not yet been determined.



Recovery well RW-6D, approximately 40 foot north of MW-19D has indicated a continuous increase in acetone levels since 2008. This increasing trend is similar to the MW-19D increases but with an approximate 2-year lag time. This suggests a slug-type plume that has migrated from the MW-19D area, and possibly from beneath CPM Building No. 5 to the RW-6D area. The only other monitoring well near RW-6D with detectable levels of acetone was MW-21D, which is 50 feet due west. Acetone was initially detected in this well in 2010. See the acetone versus time plot below. Monitoring wells 19-D and 21-D are currently within the capture zone of recovery well RW-6D and the acetone plume is being contained and removed by pumping withdrawal.



3.4 Treatability Study Soil Sampling Results- November, 2009

Chemical oxidation treatability study soil samples were collected from the west UST Area in 2009 by composite sampling of six (6) test borings: TBOX-1 through TBOX-7. TBOX-2 was not sampled because of limited recovery. See Drawing C-1. Two (2) 5-gallon bulk composites were prepared by collecting all of the recovered sample from each test boring over the interval of approximately 4-8 feet BGS.

The samples were primarily sand and gravel with clayey silts from interspersed lenses. Field sample logs are contained in Appendix C. The clayey silt fraction was manually separated from the samples for characterization to prepare a fine-grained composite sample for chemical analyses. Coarse-grained samples were also collected from each composite container for analyses. A summary of the chemical analyses data is as follows:

Treatability Study- Soil Sample Characterization

Analyses	S1- Sand/Gravel	S2- Sand/Gravel	S3- Clayey Silt
VOCs, ug/kg			
Ethylbenzene	1,100	7,900	12,000
Benzene	2,700	BDL	6,200
Methylene chloride	BDL	BDL	17,000
n-Butylbenzene	180	480	1,000
n-Propylbenzene	110	410	870
Cumene	500	610	3,800
tert-butylbenzene	BDL	BDL	10,000
Toluene	940	980	7,800
Xylenes	19,500	28,000	263,000
Total VOCs, mg/kg	28.64	41.96	328.67
Total TPH, mg/kg	149	310	3,030

The clayey-silt composite had total VOCs of approximately 329 mg/kg, with xylenes the primary constituent. The VOC levels found in the coarse-grained samples were about 1 order of magnitude lower concentration than the fine-grained sample. The VOC levels and detected compounds were in general agreement with the vadose zone soil results obtained in the 2003-2006 investigations as reported on Table 3-1.

3.5 Baseline Groundwater Sampling Results- November, 2011

Groundwater samples were collected on November 3, 2011 approximately 1 week prior to the start of the oxidant injections. Existing shallow monitoring wells in the UST area were used. Deep zone monitoring wells and piezometers in the RW-6D area provided suitable points for baseline groundwater sampling for the acetone hotspot. All monitoring point locations are shown on Drawing C-1.

Samples were analyzed for VOCs and water quality parameters indicative of chemical oxidant presence and behavior: ORP, sulfate/sulfide, and ferrous (+2)/ferric iron(+3).

Baseline groundwater data is presented on Tables 3-3 through 3-16 and Figures 3-11 through 3-19. Monitoring well construction logs are contained in Appendix D. Laboratory analyses reports are contained in Appendix E (CD).

3.5.1 UST Area –Shallow Groundwater

3.5.1.1 VOCs

VOCs ethylbenzene and xylenes were the predominant compounds detected in the baseline groundwater sampling. Cumene was found at lower concentrations and toluene was not detected in any of the samples. In all of the baseline samples the total CTEX concentration comprised 100% of the detected VOCs with the exception of MW-20 and MW-29S. Other VOCs were found at lower concentrations and are considered not related to the UST Area.

Cumene

Baseline cumene levels ranged from non-detect (ND) to 325 ug/l (MW-29S in the west UST Area). Cumene was generally evenly distributed within one (1) order of magnitude across the entire UST Area. See Figure 3-11.

The baseline levels matched the historic cumene distribution across the site with the exception of the MW-20 area beneath CPM building #5. Historically cumene was elevated in this area (350 ug/l) whereas it has reduced approximately 70% by 2011.

Ethylbenzene

Baseline ethylbenzene levels ranged from non-detect (ND) to 8700 ug/l (MW-29S in the west UST Area). Ethylbenzene was generally one (1) order of magnitude higher in the western side. See Figure 3-12.

The baseline levels matched the historic ethylbenzene distribution across the site with the exception of the west UST Area where ethylbenzene levels are about one (1) order of magnitude lower than maximum historic levels of 21,000 ug/l (TBUST-22).

Xylenes (Total)

Baseline total xylene levels ranged from non-detect (ND) to 52,900 ug/l (MW-29S in the west). Xylenes were generally one (1) order of magnitude higher in the western side. See Figure 3-13.

The baseline levels matched the historic xylene distribution across the site with the exception of the west UST Area where xylene levels are generally about one (1) order of magnitude lower than historic levels which had a maximum xylene concentration of 134,000 ug/l (TBUST-22).

Other VOCs

TCE and by-product cis-1,2- DCE were detected at 79 and 403 ug/l respectively in MW-20. These chlorinated VOCs are expected to be related to the historic TCE plume that originated in the northwest area of the Essex/Hope Site known as the NPL Area. This plume is being remediated by ongoing pumping of extraction wells in that area.

MIBK (4-methyl-2-pentanone), acetone and benzene were detected at 45.2, 26.5 and 135 ug/l, respectively in MW-29S, in the west UST Area. These VOCs were only detected in this monitoring well and are considered isolated contaminants local to this well area.

3.5.1.2 CTEX Mass in Shallow Groundwater

The shallow groundwater pre-treatment contaminant mass for four (4) VOC compounds (CTEX) was estimated as follows:

Shallow Groundwater Mass CTEX Estimate- Baseline Data

CTEX, ug/l	Contour Area, sf	CTEX Mass, kg

0	29116	
100	28063	0.003
500	24271	0.058
1000	20164	0.157
2500	12386	0.693
5000	6849	1.058
10000	3068	1.445
20000	1924	0.874
30000	1229	0.885
40000	684	0.972
50000	213	1.080
	TOTAL Mass, kg	**7.22**

Notes:
1. Mass estimate based on average 6 foot thick saturated zone interval, average 8-14 feet BGS. Assumed uniform vertical distribution of CTEX.
Mass = avg. conc (ug/l) x 28.3 l/cf x aquifer vol (cf) x porosity (0.3)
2. Ref Figure 3-11

3.5.1.3 Water Quality Parameters- Shallow Groundwater

Baseline data is summarized on Tables 3-3 through 3-12 by individual wells. Isoconcentration plots of sulfate, ferric/ferrous iron and ORP are shown on Figures 3-12 through 3-15.

Baseline sulfate levels ranged from 10-60 mg/l across the UST Area with the maximum level at MW-13 near Blackstone Avenue. It is noted that a city sewer is present on Blackstone Avenue and sewage exfiltration may be influencing the local shallow groundwater near MW-13. Sulfide, indicative of reducing groundwater conditions, was detected in only two (2) monitoring wells, MWs-24S and -26S, at 1.0 mg/l. See Figures 3-14 and 3-15.

Baseline total iron levels ranged from 8-33 mg/l. Naturally-occurring iron in shallow groundwater is expected to occur predominantly in the oxidized ferric (+3) form. This was the case for all monitoring wells except PZ-5S to the north of the UST Area. See Figure 3-16.

Baseline ORP was predominately negative across the site (-10 to -100mV) indicative of mildly reducing conditions. An exception was the south-central area mainly east of the metal hut which had mildly oxidizing conditions. The furthest east area at MW-27S had the lowest ORP at -163.5 mV. See Figure 3-17.

3.5.1.4 Total Petroleum Hydrocarbons (TPH)

TPH was non-detect in all baseline monitoring well samples.

3.5.2 Acetone Hot Spot- Deep Groundwater

Acetone was detected in deep groundwater baseline samples at levels up to 65 mg/l in monitoring well MW-21D, located on Hopkins Avenue directly north of CPM Plant Building #5. The acetone hotspot appeared to be centered at the northeast corner of the building around MW-21D and RW-6D. See Figure 3-16.

3.5.2.1 Acetone Mass in Deep Groundwater Hot Spot

The acetone mass in the deep groundwater hot spot was estimated as follows:

Deep Groundwater Mass Acetone Estimate- Baseline Data,
November 2, 2011

Acetone, ug/l	Contour Area, sf	Acetone Mass, kg
0	34670	
1000	28317	0.485
5000	19513	4.036
10000	14800	5.402
20000	9562	12.007
30000	5674	14.854
40000	2644	16.207
50000	848	12.351
60000	68	6.556
	TOTAL Mass, kg	**71.90**

Notes:

1. Mass estimate based on average 18 foot thick saturated zone interval, average 20-38 feet BGS.

Mass = avg. conc (ug/l) x 28.3 l/cf x aquifer vol (cf) x porosity (0.3)

2. Ref Figure 3-16

3.5.2.2 Water Quality Parameters- Deep Groundwater

Baseline data is summarized on Tables 3-13 through 3-17 by individual wells.

Baseline sulfate levels were non-detect with the exception of MW-22D which had a concentration of 24.1 mg/l. Sulfide, indicative of reducing groundwater conditions, was not detected in any of the deep zone monitoring wells.

Baseline total iron levels ranged from 5.1-594 mg/l. The highest iron concentration was found in PZ-6D, directly east of CPM Building #5. All iron was predominantly in the oxidized ferric (+3) form.

Baseline ORP was predominately negative across the site (-33 to -87mV) indicative of moderately reducing conditions. An exception was at MW-22D furthest downgradient to the north which had mildly oxidizing conditions.

4.0 POST-TREATMENT CONTAMINANT CONDITIONS

Post-treatment conditions and percentage changes in VOCs focus on the 180-day results (Round 3, June 13, 2012) as compared to the baseline and historic contaminant conditions. The interim monitoring results are presented on the data tables. The treatment performance is presented for three (3) areas:

- UST Area East (low VOCs in shallow soils/groundwater)
- UST Area West (high VOCs in shallow soils/groundwater),
- Acetone Hot Spot near RW-6D (elevated acetone in deep groundwater)

Post-treatment sampling was conducted over three (3) quarterly rounds primarily for groundwater. Soils sampling was conducted in August, 2012 in the UST Area. Contaminant data summaries for the designated ISCO monitoring wells are summarized on Tables 3-3 through 3-16. Post-treatment soil analytical results are summarized on Table 4-1. Sampling locations are shown on Drawing C-1.

4.1 UST Area East

4.1.1 Groundwater

Five (5) monitoring wells have been sampled in the UST Area East. Graphical presentations of VOC and indicator parameter distribution in groundwater for Round 3 sampling are presented on Figures 3-17 through 3-24. Tabular and graphical summaries of the VOC data are presented below.

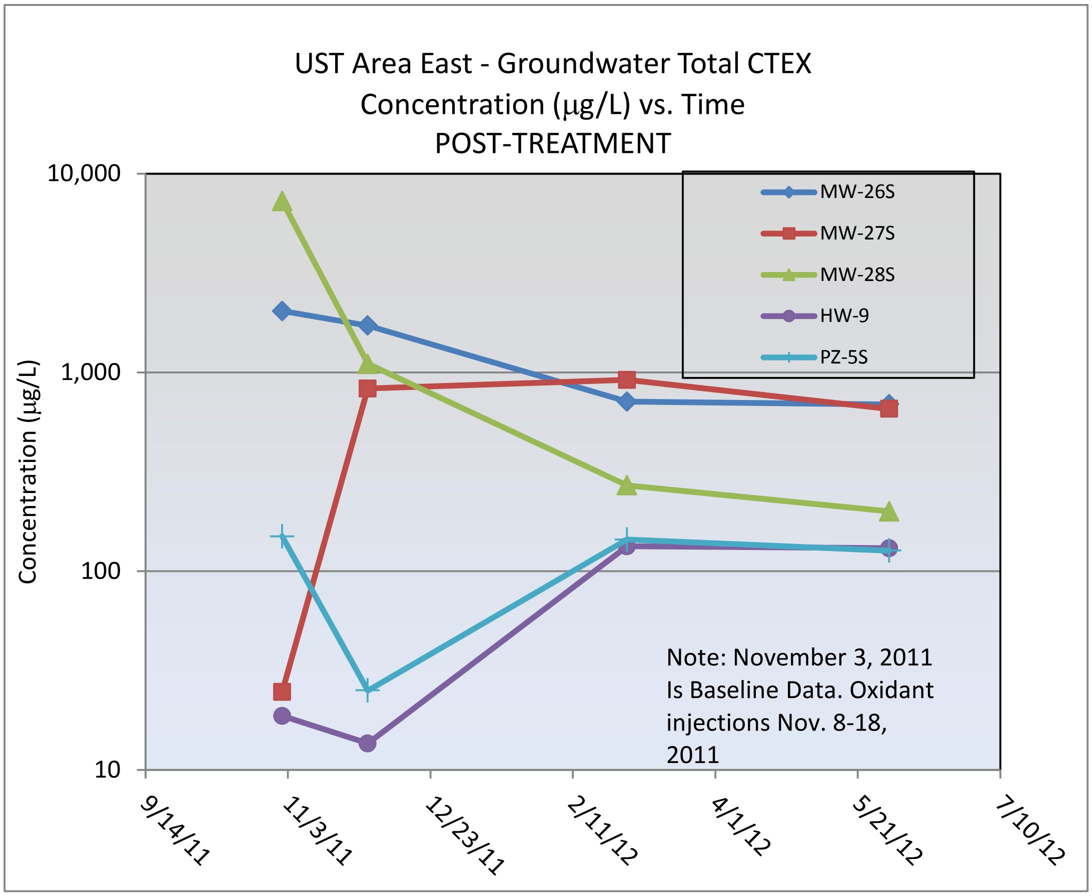
The monitoring data indicates that ISCO has significantly reduced and simultaneously redistributed VOCs in groundwater in the East UST Area. Individual VOCs are at 400 ug/l or less as compared to individual baseline VOCs over 5000 ug/l. CTEX percent reductions vary by monitoring point and range from 15.3 to 97.3 percent. CTEX increases are evident mainly at MW-27S and to a lesser degree at HW-9 and PZ-5S. The increases are expected to be a result of both vadose zone soil VOC desorption/flushing and groundwater zone fluid displacement by injection of oxidant solutions.

UST Area East- Groundwater Monitoring Summary- VOCs, ug/l

Monitoring Point	Parameter	Baseline- 11/3/11	Round 3- 6/13/12	% Change
MW-26S	**CTEX**	**2033**	**691**	-66.0
	Cumene	225	1	-99.6
	Toluene	1	1	0.0
	Ethylbenzene	398	290	-27.1
	Xylenes	1410	401	-71.6
MW-27S	**CTEX**	**25**	**655**	Increase
	Cumene	24.7	106	Increase
	Toluene	1	1	ND
	Ethylbenzene	1	313	Increase
	Xylenes	1	236	Increase
MW-28S	**CTEX**	**7286**	**200**	-97.3
	Cumene	316	69.9	-77.9
	Toluene	1	1	0.0
	Ethylbenzene	1490	96.5	-93.5
	Xylenes	5480	33.5	-99.4
HW-9	**CTEX**	**19**	**131**	Increase
	Cumene	18.7	40	Increase
	Toluene	1	1	ND
	Ethylbenzene	1	84.1	Increase
	Xylenes	1	6.4	Increase
PZ-5S	**CTEX**	**150**	**127**	-15.3
	Cumene	4.4	27.4	Increase
	Toluene	1	1	ND
	Ethylbenzene	20.4	45.5	Increase
	Xylenes	125	53.9	-56.9

Note: Non-detect (ND) entered as 1.0 ug/l

Other VOCs of interest detected included acetone, which was found up to 441 ug/l (MW-26S), only in the Round 1 samples (12/5/11). All acetone results were non-detect in Round 3. Acetone is suspected to be an intermediate by-product of cumene oxidation.



Round 3 sulfate levels ranged from 311-1130 mg/l across the UST Area East which represented a significant increase above baseline levels of non-detect. Sulfate is the primary indicator of persulfate oxidant presence from the ASP injections. It is noted that the UST Area east had lower oxidant doses, on average 25% solutions, by weight compared to the east UST Area. Sulfide was not detected. See Figures 3-21 and 3-22.

Round 3 total iron levels ranged from 47.7- 153 mg/l. Total iron increased above baseline levels as a result of the ZVI catalyst injected with the oxidant. Baseline iron occurred predominantly in the oxidized ferric (+3) form. All Round 3 monitoring wells exhibited predominantly ferrous (+2) iron indicative of reducing conditions and/or facultative bacteria utilization of ferric iron as an electron acceptor. See Figure 3-23.

Round 3 ORP was predominately negative across the east side of the site (0.6 to -53 mV) indicative of slightly reducing conditions. Baseline conditions were moderately reducing. See Figure 3-24.

Post-treatment monitoring data at 6 months indicates that the east UST Area has transitioned from persulfate-based oxidation to the facultative biological stage. The oxidation phase occurred primarily within the first month after injection as indicated by maximum sulfate and ferric iron levels and increased ORPs. See Round 1 monitoring well data in Tables 3-7 through 3-9.

Rounds 2 and 3 monitoring indicated a decline in sulfate, and increase in ferrous iron (reduced) and decreased ORPs. Sulfide, as an indicator of anaerobic biodegradation was not yet detected in groundwater.

4.2 UST Area West

4.2.1 Groundwater

Five (5) monitoring wells have been sampled in the UST Area West. Graphical presentations of VOC and indicator parameter distribution in groundwater for Round 3 sampling are presented on Figures 3-20 through 3-27. Tabular and graphical summaries of the VOC data are presented below.

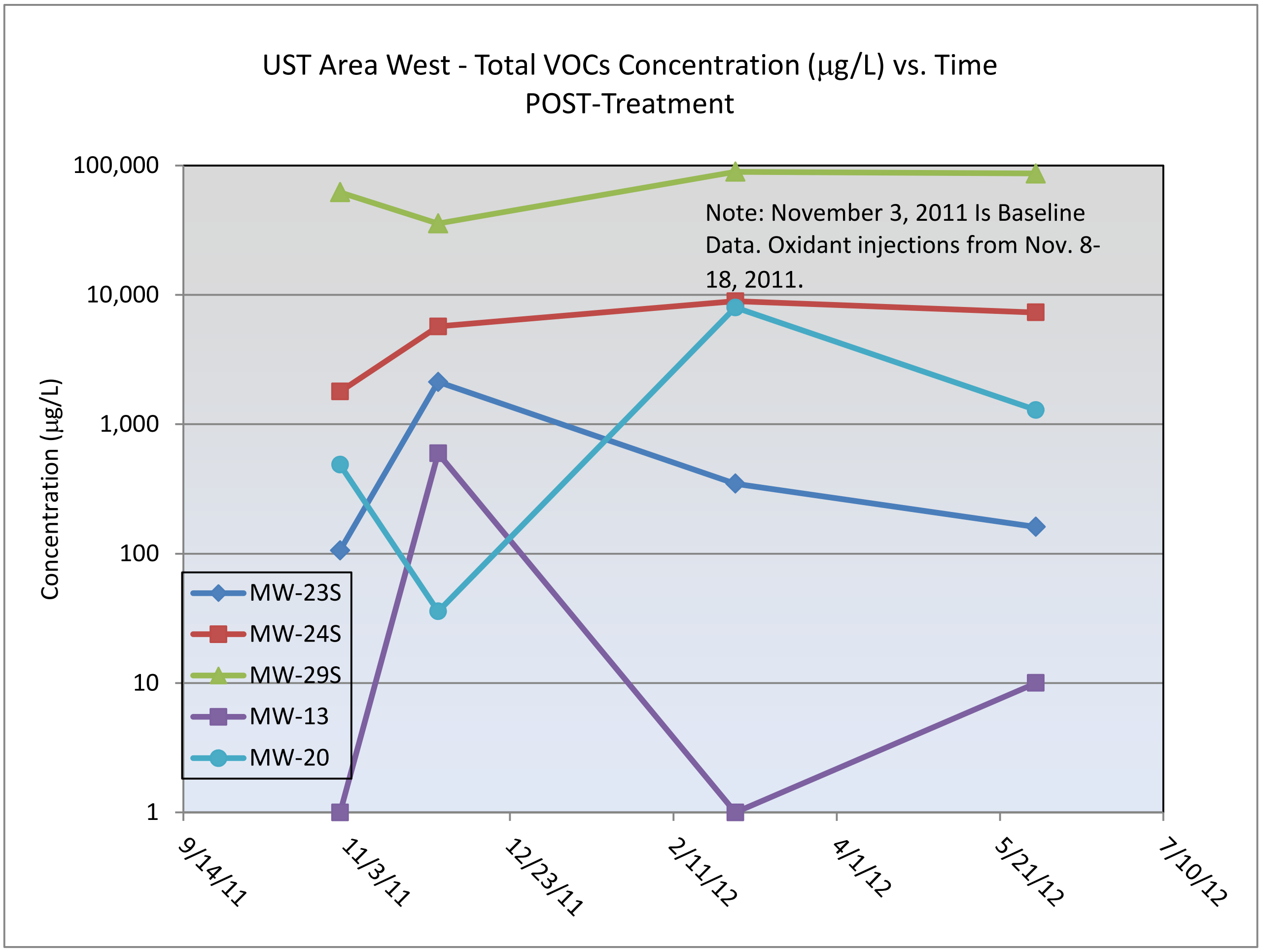
The monitoring data indicates that ISCO has significantly redistributed VOCs in the West UST Area with minimal reductions in groundwater VOC levels. This area underlies the vadose zone area with the highest VOCs found in the UST Area, and it is suspected that oxidant injections in this zone has caused VOC desorption/flushing into the shallow groundwater simultaneously with VOC oxidation. Individual VOCs have increased above baseline levels in three (3) of the wells and have decreased in MW-23S. CTEX percent reduction was 17.7 percent. CTEX increases are evident throughout most of the west area, primarily in the area of the elevated soil VOCs. Xylenes continued to be the predominant VOC and are concentrated in the southwest area of the UST Area, near the Master Machine building (MW-29S).

UST Area West- Groundwater Monitoring Summary- VOCs, ug/l

Monitoring Point	Parameter	Baseline- 11/3/11	Round 3- 6/13/12	% Change
MW-13	**CTEX**	1	1	0.0
	Cumene	1	1	0.0
	Toluene	1	1	0.0
	Ethylbenzene	1	1	0.0
	Xylenes	1	1	0.0
MW-20	**CTEX**	0	1288	Increase
	Cumene	1	71	Increase
	Toluene	1	1	ND
	Ethylbenzene	1	482	Increase

	Xylenes	1	735	Increase
MW-23S	**CTEX**	106	87.2	-17.7
	Cumene	57.5	8.2	-85.7
	Toluene	1	1	ND
	Ethylbenzene	15.9	33.5	Increase
	Xylenes	32.7	45.5	Increase
MW-24S	**CTEX**	1789	7286	Increase
	Cumene	229	201	-12.2
	Toluene	1	8.7	Increase
	Ethylbenzene	94.1	1900	Increase
	Xylenes	1465	5176	Increase
MW-29S	**CTEX**	61925	85555	Increase
	Cumene	325	275	-15.4
	Toluene	1	3480	Increase
	Ethylbenzene	8700	11900	Increase
	Xylenes	52900	69900	Increase

Other VOCs of interest included TCE and by-products cis-1,2 dichloroethylene and vinyl chloride in MW-20 which were detected in the baseline samples. The post-treatment samples were all non-detect for these constituents. Acetone was elevated in post-treatment samples in MW-23, MW-24 and MW-29. Baseline acetone levels ranged from non-detect to 26.5 ug/l in these wells, significantly lower (1-2 orders of magnitude) than the concentrations found in post-treatment monitoring. In all cases the acetone was highest in the round 1 samples (12/1/11) and declined over time. Round 3 acetone levels ranged from 24.7 to 531 ug/l. The highest level was found in MW-29S which also had the highest VOC levels in groundwater. This acetone behavior is consistent with its generation as an intermediate by-product of cumene oxidation.



Round 3 sulfate levels ranged from 232-6400 mg/l across the UST Area West which represented a significant increase above baseline levels of non-detect. Sulfate is the primary indicator of persulfate oxidant presence from the ASP injections. It is noted that the UST Area west had the highest oxidant doses, on average 60% solutions, by weight. Sulfide was detected only in MW-29-S (3.2 mg/l). This well had a sulfate level of 6400 mg/l which indicates limited reduction of sulfate. See Figures 3-21 and 3-22.

Round 3 total iron levels ranged from 22.1- 372 mg/l. Total iron increased above baseline levels as a result of the ZVI catalyst injected with the oxidant. Baseline iron occurred predominantly in the oxidized ferric (+3) form. All Round 3 monitoring wells except MW-29S exhibited predominantly ferrous (+2) iron indicative of reducing conditions and/or facultative bacteria utilization of ferric iron as an electron acceptor. MW-29S was over 99% ferric iron indicating ongoing oxidizing conditions. See Figure 3-23.

Round 3 ORP was predominately positive across the west side of the site (4.9 to 175.8 mV) indicative of slight to strong oxidizing conditions. The highest ORP was at MW-29S, in the area of the highest VOCs. The exceptions were at MW-13 and MW-20 which had mildly reducing conditions. Baseline conditions were more reducing. See Figure 3-24.

Post-treatment monitoring data at 6 months indicates that the west UST Area has partially transitioned from persulfate-based oxidation to the facultative biological stage. MW-29S in the area of the highest CTEX levels, appears to be undergoing continued oxidation. In all west areas the oxidation phase occurred primarily within the first month after injection as indicated by maximum sulfate and ferric iron levels and increased ORPs. See Round 1 monitoring well data in Tables 3-3 through 3-12.

Rounds 2 and 3 monitoring indicated a decline in sulfate, and increase in ferrous (+2) iron (reduced) and decreased ORPs. Sulfide, as an indicator of anaerobic biodegradation was not yet detected in groundwater. MW-29S has continued to indicate strongly oxidizing conditions (ORP at 175.8 mV), predominantly ferric iron, and elevated sulfate (6400 mg/l). Sulfide was also detected in MW-29S, although the oxidizing conditions likely preclude anaerobic bioactivity.

The estimated groundwater CTEX mass in the UST Area after oxidant treatment based on 180-days is as follows:

Shallow Groundwater Mass CTEX Estimate- Post Treatment Data, June 13, 2012

CTEX, ug/l	Contour Area, sf	CTEX Mass, kg
0	22908	
100	21185	0.004
500	11392	0.150
1000	9552	0.070
2500	7695	0.166
5000	5368	0.445
10000	3835	0.586
20000	2566	0.970
30000	1846	0.917
40000	1327	0.925
50000	903	0.972
60000	506	1.112
70000	196	1.026

TOTAL Mass, kg	**7.34**

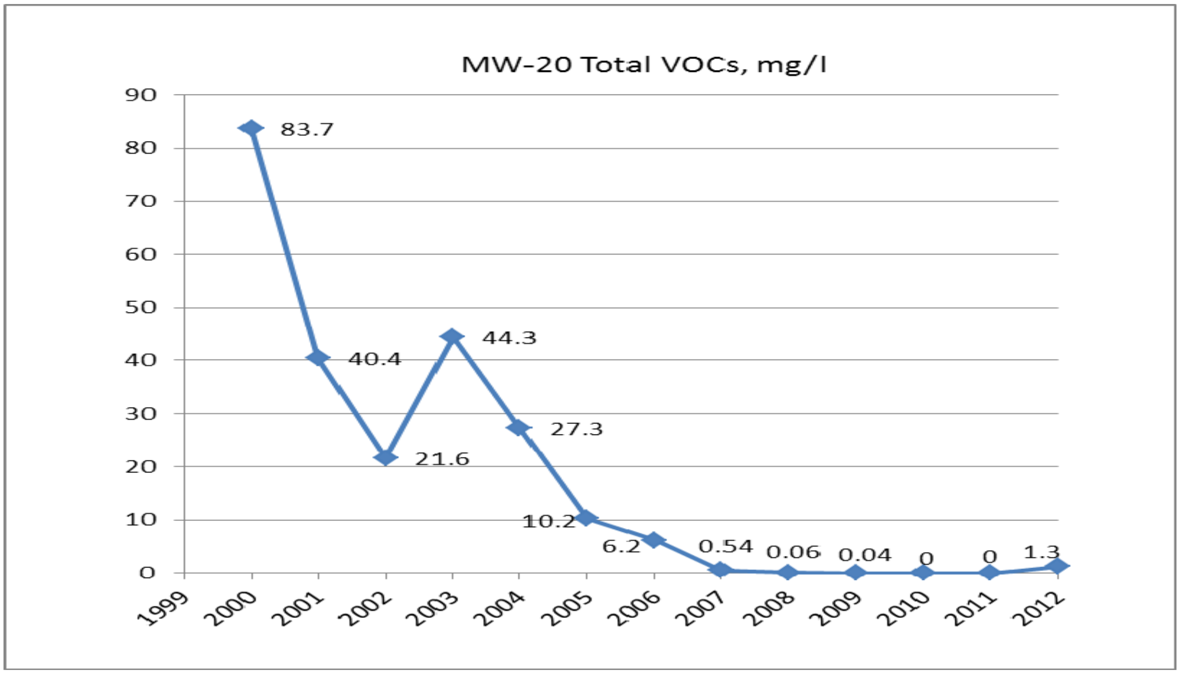
Notes:
1. Mass estimate based on average 6 foot thick saturated zone interval, average 8-14 feet BGS.

Mass = avg. conc (ug/l) x 28.3 l/cf x aquifer vol (cf) x porosity (0.3)
2. Ref Figure 3-20

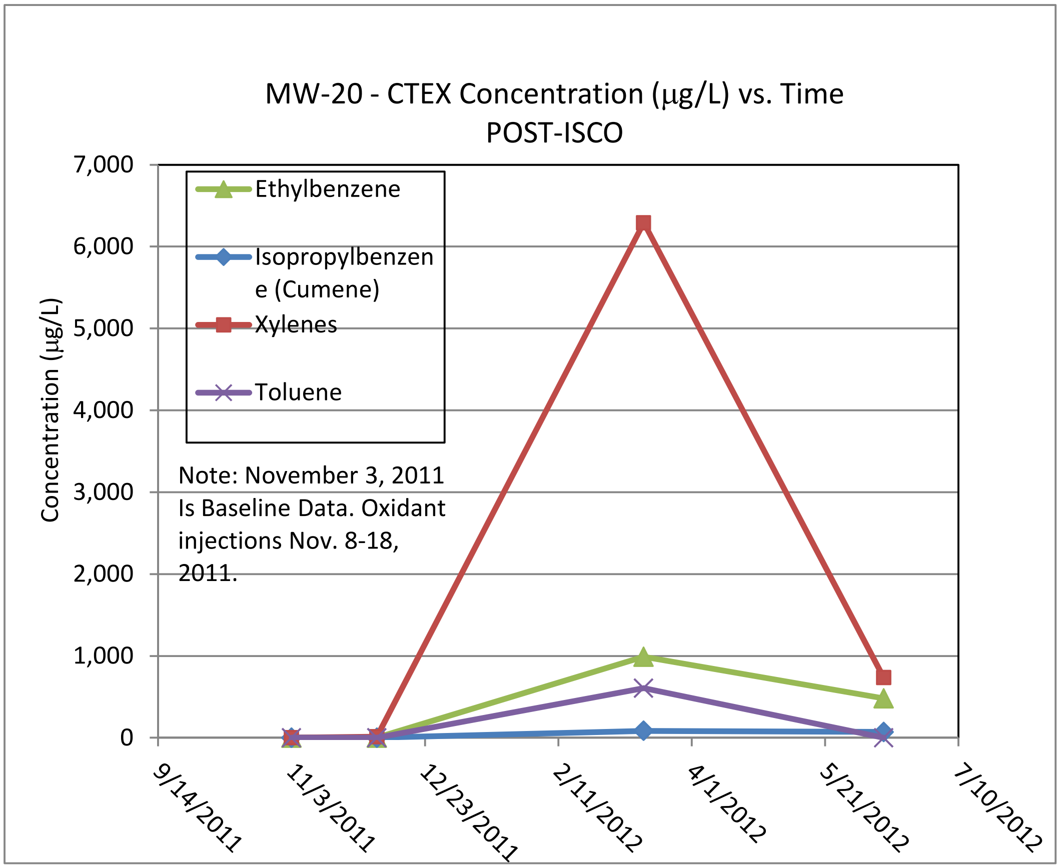
The 180-day post-treatment CTEX groundwater mass of 7.34 kg represents a 1.6 percent increase in CTEX mass compared to baseline conditions of 7.22 kg.

4.2.2 Monitoring Well MW-20

The only monitoring well in or near the UST Area that has been routinely sampled since the start of the site remedial action in 1997 is MW-20, beneath CPM Building No. 5. This well is in the shallow groundwater zone and is hydraulically downgradient of the UST Area. The year 2010 data shows that CTEX levels decreased to below detection limits (BDL). The total VOC levels in MW-20 have been decreasing continuously since a maximum recorded value of 83.7 ppm in 2000. The reason for the significant decline in CTEX up to 2010 has not been determined. The recent increase of VOCs is attributed to CTEX displacement by oxidant injections in November, 2011. This effect is illustrated by the MW-20 CTEX concentrations over three (3) rounds of ISCO monitoring. MW-20 VOC data from years 2000 to 2012 is as follows:



Post-treatment ISCO monitoring data for MW-20 is as follows:



4.2.3 Soils

Post treatment soil samples in the UST Area were taken in August, 2012 by direct-push test borings on approximately 20 foot grid spacing's. The test borings (TBUST-100 through -113) were advanced in the UST Area West in the area of the historically highest soil VOC concentrations. Borings were located equidistant of oxidant injection points. Samples were collected by compositing the 4-8 foot BGS interval. Test borings were not drilled in the east area because of drill rig inaccessibility. The east area vadose soils had CTEX levels 1 to 2 orders of magnitude lower than the west area and post-treatment CTEX levels are expected to be at or below the performance of the west area. Future sampling will be required to confirm the east area vadose soil CTEX. Soils VOC distributions are presented on Figures 3-25 through 3-27. Soil analyses is summarized on Table 4-1. Test boring locations are shown on Drawing C-1.

VOC levels were significantly reduced in vadose zone soils in the west UST Area. All samples had VOC concentrations below the RAOs of 1/10 mg/kg (individual/total). The maximum VOC detected was xylenes (total) at 0.97 mg/kg in TBUST-112. The 180-day post-treatment CTEX soil mass in the west UST Area was estimated at 0.13 kg. See calculation below. This mass represents a 99.9 percent decrease in CTEX compared to baseline (historic) conditions of 1850 kg (Section 3.1.1).

Vadose Zone Soils West UST Area- Mass CTEX Estimate
Post-Treatment Data, August, 2012

CTEX, ug/kg	Contour Area, sf	CTEX Mass, kg
0	3584	
50	2160	0.009
100	1515	0.012
200	917	0.022
300	444	0.030
400	273	0.015
500	179	0.011
800	27	0.025
1000	0.6	0.006
	TOTAL Mass, kg	**0.13**

Notes:
1. Mass estimate based on 5 foot thick vadose zone interval, average 4-9 feet BGS.
Mass = avg. conc (ug/kg) x 110 lbs./cf soil x soil vol (cf) x kg/2.2 lbs.

2. Ref Figure 3-25

This significant reduction in vadose soil VOCs is expected to be caused by a combination of desorption/flushing and chemical oxidation caused by the oxidant injections. Field examination of the soil sample cores indicated no visual contamination or odors from 0-8 foot BGS. Samples were not collected from below this interval to avoid the capillary/smear zone.

Residual TPH was present in the west area vadose zone and ranged from 127 to 2790 mg/kg. Average TPH from 14 samples was 542 mg/kg .

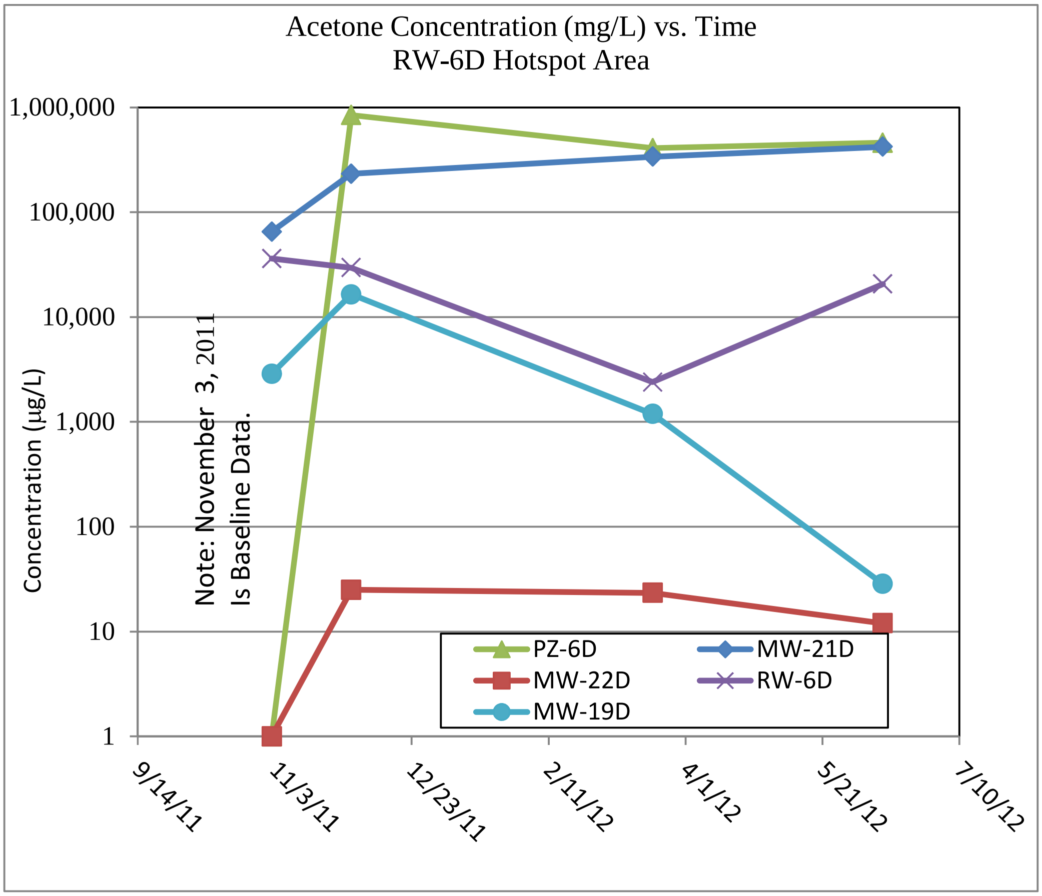
4.3 Acetone Hot Spot near RW-6D

Five (5) groundwater monitoring points have been sampled from the deep groundwater zone in the acetone hot spot area near RW-6D. These include monitoring wells (2-in diameter) MW-19D, MW-21D and MW-22D , piezometer PZ-6D (1-in diameter) and recovery well RW-6D (6-in diameter). The monitoring wells and piezometer have a 10-foot long screen across the lower interval of the deep groundwater zone, generally 32-42 feet BGS. The recovery well has a 20 foot screen set across most of the deep water-bearing zone. A graphical presentation of acetone for Round 3 sampling is presented on Figure 3-28. Tabular and graphical summaries of the acetone levels over time are presented below.

The monitoring data indicates that ISCO has significantly redistributed acetone in the RW-6D area with minimal reductions in overall groundwater concentrations. Acetone has decreased 99% in MW-19D and increased above baseline levels in MW-21D and PZ-6D. Baseline PZ-6D levels were non-detect. MW-21D and PZ-6D are on the opposite ends of the oxidant injection area and the acetone levels are expected to be elevated because of displacement of the plume by injection solution.

Acetone-Groundwater Analytical Results - (ug/L)

Monitoring Location	Baseline- 11/2/2011	Round 1- 12/1/2011	Round 2- 3/20/2012	Round 3- 6/12/2012	% Change- Round 3 vs. Baseline
RW-6D	36,000	29,500	2,390	20,600	-42.78
MW-19D	2,870	16,400	1,190	28.5	-99.01
PZ-6D	ND	843,000	407,000	460,000	Increase
MW-21D	65,100	232,000	338,000	421,000	Increase
MW-22D	ND	25.0	23.4	12.0	Increase



The acetone mass in the deep groundwater hot spot was estimated at 648.61 kg. See calculation below. The baseline acetone mass was estimated at 71.9 kg (See Section 3.5.2.1). This represents an 800% increase in acetone mass post-treatment. This significant increase in acetone mass is expected to be accounted for by redistribution of the acetone plume by injection. It is also expected that the baseline acetone data and mass estimate was not representative of the acetone hot spot distribution. All of the groundwater monitoring points are located outside of CPM Building No. 5. The area upgradient of RW-6D is primarily the CPM Building No. 5 where there are limited groundwater monitoring points. The entire northeast corner of the building, up to 100 feet from RW-6D, does not have any groundwater monitoring locations. The acetone plume in this area was estimated by linear interpolation using isocontour plotting software (Surfer 10).

Deep Groundwater Acetone Mass Estimate- Post Treatment
June 13, 2012

Acetone, ug/l	Contour Area, sf	Acetone Mass, kg
0	38717	
1000	37717	0.076
5000	34714	1.377
10000	32094	3.003
50000	22685	43.137
100000	16543	70.397
200000	8016	195.464
300000	2413	214.063
400000	149	121.095
	TOTAL Mass, kg	**648.61**

Notes:
1. Mass estimate based on average 18 foot thick saturated zone interval, average 20-38 feet BGS.
Mass = avg. conc (ug/l) x 28.3 l/cf x aquifer vol (cf) x porosity (0.3)
2. Ref Figure 3-28

Chlorinated VOCs are present in the acetone hot spot area and have been the focus of pump and treat operations since startup of the remedial actions in 1997. The area of the highest TCE/cis-1,2-DCE in this area has been at MW-21D. TCE and cis-1,2- DCE Round 3 levels were 95% and 38% lower, respectively compared to baseline. These VOCs both had declining concentration trends over time which suggests that ongoing reductions have occurred by recovery well pumping and likely chemical oxidation over the ISCO monitoring period. Vinyl chloride, a by-product of TCE degradation, increased slightly over this period. In MW-22D, TCE and cis-1,2- DCE levels were reduced 59% and 68% respectively. This well is north of RW-6D. Vinyl chloride was also reduced 86% in MW-19D. TCE and DCE were not detected in this well. Recovery well RW-6D TCE and vinyl chloride levels increased slightly (~ 10%), however cis-1,2-DCE decreased 30%.

These results indicate that the ISCO had a positive reduction in chlorinated VOCs in the RW-6D area, and this decline is expected to continue over time.

The oxidant indicator data appears to be inconsistent and possibly in error. The primary markers of oxidant presence, sulfate and iron, were not increased above baseline levels for all three (3) rounds of post-injection sampling in the three (3) primary monitoring points within or adjoining the injection areas:

MW-19D, MW-21D and RW-6D. Sulfate was detected in MW-22D and PZ-6D, further from the injection area, however the data is inconsistent and does not correlate with expected increases in iron levels. Additional monitoring is required to confirm the indicator parameter values and data quality in the acetone hot spot area.

5.0 CONCLUSIONS AT 180-DAYS POST-TREATMENT

Summary

In the UST Area shallow groundwater, CTEX has not yet been reduced to RAO levels, and it has been redistributed in the groundwater zones by ISCO injections. ISCO has been more effective in the east UST Area than in the west where historic CTEX levels are higher. The groundwater CTEX mass post-treatment has not changed significantly in the west UST Area and is expected to be a result of CTEX desorption/flushing from the vadose zone soils into the shallow groundwater. Groundwater post-treatment CTEX levels are highest at MW-29S (86 mg/l) in the west UST Area.

The UST Area soil CTEX levels have been reduced to below RAO levels in the west area, and likely in the east area. The west area soil CTEX mass has been reduced over 99%.

In the deep groundwater hotspot area acetone has been redistributed , and levels have increased in some wells and have decreased in others. Post-treatment acetone mass is estimated to have increased, however the baseline acetone data and acetone mass estimate are not expected to be representative of the acetone distribution, mainly because data is unavailable from beneath the CPM Building No. 5 area. Chlorinated VOCs have declined in the acetone hot spot area around RW-6D.

Historic and Baseline Contaminant Conditions

VOCs ethylbenzene and xylenes were the predominant compounds detected in historic and baseline groundwater and soil sampling in the UST Area. CTEX concentration comprised 100% of the detected VOCs with the exception of MW-20 and MW-29S. Baseline groundwater ethylbenzene levels across the UST Area ranged from non-detect (ND) to 8700 ug/l in MW-29S in the west UST Area. Ethylbenzene was generally one (1) order of magnitude higher in the western side. Baseline total xylene levels ranged from non-detect (ND) to 52,900 ug/l in MW-29S in the west. Xylenes were generally one (1) order of magnitude higher in the western side.

Historic soil CTEX levels in the western end of the UST Area had VOCs toluene, ethylbenzene and xylenes at concentrations up to 660 mg/kg, 250 mg/kg and 1520 mg/kg respectively. Cumene was generally found at lower concentrations, the maximum being at 5.9 mg/kg. The eastern UST Area had soil CTEX levels typically less than 10 mg/kg with the exception of TBUST 16 which had a level of 29.2 mg/kg (xylenes at 25 mg/kg). The elevated CTEX soil areas generally correlate with the elevated CTEX in shallow groundwater.

Acetone was detected in deep groundwater baseline samples at levels up to 65 mg/l in monitoring well MW-21D, located on Hopkins Avenue directly north of CPM Plant Building #5. The acetone hotspot appeared to be centered at the northeast corner of the building around MW-21D and RW-6D. No data was available from the area inside of the building.

<u>UST East Area ISCO Treatment</u>

CTEX levels in soils and groundwater have been reduced and redistributed by oxidant treatment. Individual VOCs are at 0.4 mg/l or less as compared to individual baseline VOCs over 5.0 mg/l. CTEX percent reductions vary by monitoring point and range from 15.3 to 97.3 percent. CTEX increases are evident mainly at MW-27S and to a lesser degree at HW-9 and PZ-5S. The extent of CTEX east of the area (offsite at Rollform) has not been confirmed.

Post-treatment soil sampling was not performed in the east area because of site access limitations for the direct-push drill rig.

<u>UST West Area ISCO Treatment</u>

VOCs have been significantly redistributed with minimal net reductions in groundwater levels. This area underlies the vadose zone area with the highest VOCs found in the UST Area, and it is suspected that oxidant injections have caused VOC desorption/flushing into the shallow groundwater simultaneously with VOC oxidation. Individual VOCs have increased above baseline levels in most of the wells. The highest CTEX levels post-treatment are 85.6 mg/l and 7.3 mg/l at monitoring wells MW-29S and MW-24S, respectively, on the far west side of the UST Area adjoining the Master Machine building.

The extent of the VOCs in the shallow groundwater have not been fully defined. In the area west of the UST Area beneath Master Machine no monitoring wells are available and no groundwater samples have been taken within the building area.

Oxidation reactions are ongoing in the UST west area groundwater around the highest VOC zone near MW-29D. Other UST area groundwater has transitioned to more biological (facultative/anaerobic) reducing conditions.

Vadose zone soils VOC levels were significantly reduced in the west area. All samples had VOC concentrations below the RAOs of 1/10 mg/kg (individual/total). The maximum VOC detected was xylenes (total) at 0.97 mg/kg in TBUST-112. The 180-day post-treatment CTEX soil mass in the west area was estimated at 0.13 kg. This mass represents a 99.9 percent decrease in CTEX compared to baseline (historic) conditions of 1850 kg.

This significant reduction in vadose soil VOCs is expected to be caused by a combination of desorption/flushing and chemical oxidation caused by the oxidant injections.

Residual TPH was present in the west area vadose zone and ranged from 127 to 2790 mg/kg after ISCO treatment. Average TPH from 14 samples was 542 mg/kg. These samples were field composites of the 4-8 foot BGS interval. Pre-treatment soil samples used for the treatability study were analyzed for TPH. The coarse fraction (sand and gravel) samples had TPH from 149-310 mg/kg. The silty clay fraction had a TPH of 3030 mg/kg. Baseline soil samples were not collected. From this limited historic data, the ISCO had minimal effect on the soil TPH levels.

ISCO Treatment of Acetone Hotspot at RW-6D

The acetone hot spot has been significantly redistributed with minimal reductions in groundwater acetone levels. Acetone has decreased 99% in MW-19D and increased above baseline levels in MW-21D, Acetone hotspot mass was estimated to increase approximately 700% post-treatment. This increase is expected to be accounted for by redistribution of the acetone plume by injection. It is also expected that the baseline and post-treatment acetone data used to estimate mass quantities was not representative of the acetone hot spot distribution. The deep groundwater zone in this area is continuing to exist under reducing conditions and oxidant injections have not had a significant effect on groundwater chemistry.

Chlorinated VOCs TCE and cis-1,2-DCE in the acetone plume area have been reduced by ISCO. TCE and cis-1,2- DCE Round 3 levels were 95% and 38% lower, respectively compared to baseline. These VOCs both had declining concentration trends over time which suggests that further reductions are likely. In MW-22D, TCE and cis-1,2- DCE levels were reduced 59% and 68% respectively. This well is north of RW-6D. Vinyl chloride was also reduced 86% in MW-19D. TCE and DCE were not detected in this well. Recovery well RW-6D TCE and vinyl chloride levels increased slightly (~ 10%), however cis-1,2-DCE decreased 30%.

The extent of the VOCs in the acetone plume deep groundwater zone have not been fully defined. In the area upgradient of the RW-6D deep groundwater zone beneath CPM building No. 5 no monitoring wells are available and no groundwater samples have been taken within the building area.

TABLES

Table 1-1
Essex Jamestown Site
UST Area ISCO
ISCO Performance Monitoring Summary

ISCO Performance Monitoring Summary

Work Phase	Objective	Monitoring Locations	Parameters	Frequency
seline (Pre-Operatior	Measure Groundwater Levels and Water Quality Indicators and VOCs to establish baseline conditions.	**Wells-** HW-9, MWs- 20, 23S, 24S, 26S, 27S and 28S, and PZ-5S	VOCs (EPA 8260), pH, cond, ORP, DO, sulfate, alkalinity, iron, and water levels	Within 2 weeks prior to the start of site oxidant applications
Post-Operations	**Groundwater-** Measure Well Water Levels, Water Quality Indicators and VOCs to evaluate ISCO performance. **Soils-** Measure soil organic constituents to evaluate ISCO performance.	**Wells**- HW-9, MWs- 20, 23S, 24S, 26S, 27S and 28S, and PZ-5S. **Soils**- Continuous samples, 4 ft to water table. Select sample based on VOC headspace (HS) result. Sample vadose soils in west treatment area on 20 ft center grid and in east treatment area at centerline (E-W) on 10 ft centers.	**Groundwater-** VOCs (EPA 8260), pH, cond, ORP, DO, sulfate, alkalinity, iron and water levels. **Soils**- Field HS, VOCs and TPH.	**Wells**- Quarterly for 1-year after the end of site operations monitoring. **Soils-** 180 days after treatment

Table 3-1
Soil Analytical Results- UST Area
Volatile Organics
UST Area and Vinyl Chloride Groundwater Investigations
Samples taken December 16-22, 2003

SAMPLE ID:	TBUST 1	TBUST 1	TBUST 2	TBUST 4	TBUST 5	TBUST 6	TBUST 6 (4)	TBUST 7 (4)	TBUST 7 (4)	TBUST 8	TBUST 9 (4)	TBUST 9 (4)	TBUST 10	TBUST 11 (4)	TBUST 12 (4)
Depth Interval, ft BGS	4-5 ft	6.5-8 ft	4-4.5 ft	4-5 ft	4-6.2 ft	5.4-7.3 ft	8-10.1 ft	8-8.9 ft	8.9-10.5 ft	6-6.5 ft	6.7-8.9 ft	14-15 ft	5.3-7 ft	9.2-11.4 ft	8-10 ft
DATE SAMPLED:	03-Nov-03	03-Nov-03	03-Nov-03	03-Nov-03	03-Nov-03	03-Nov-03	04-Nov-03	11-Nov-03	11-Nov-03	05-Nov-03	05-Nov-03	05-Nov-03	05-Nov-03	11-Nov-03	11-Nov-03
COMPOUND															
Acetone	89		26	37	38	57				28		1300			
Benzene			7.9												
Bromodichloromethane															
Bromoform															
Bromomethane															
2-Butanone	11														
Carbon Disulfide			8.8		9.7	18									
Carbon Tetrachloride															
Chlorobenzene															
Chloroethane															
Chloroform															
Chloromethane															
Cumene		1900					6100		380	2100	3700	6100		1200	
Dibromochloromethane															
1,2-Dichlorobenzene															
1,3-Dichlorobenzene															
1,4-Dichlorobenzene															
1,1-Dichloroethane															
1,2-Dichloroethane															
1,1-Dichloroethene															
cis-1,2-Dichloroethene															
trans-1,2-Dichloroethene															
1,2-Dichloropropane															
cis-1,3-Dichloropropene															
trans-1,3-Dichloropropene															
Ethylbenzene	25	14000	28		63	6.6	15000		980	18000	40000	160000	1100	8000	
2-Hexanone															
4-Methyl-2-pentanone															
Methylene chloride															
Styrene															
1,1,2,2-Tetrachloroethane															
Tetrachloroethene															
Toluene	6.6	800	22	6.3	13					190	3300	26000			
1,1,1-Trichloroethane															
1,1,2-Trichloroethane															
Trichloroethene															
Trichlorofluoromethane															
Vinyl chloride															
m,p-Xylene	130	330000	95	9.3	260	26	70000	940	2900	160000	350000	620000	6900	35000	530
o-Xylene	33	140000	35		24		2700			46000	150000	190000	1700		
Total CTEX, mg/kg (note 3)	0.19	486.70	0.18	0.02	0.36	0.03	93.80	0.94	4.26	226.29	547.00	1002.10	9.70	44.20	0.53
Total VOCs, mg/kg	0.29	486.70	0.22	0.05	0.41	0.11	93.80	0.94	4.26	226.32	547.00	1003.40	9.70	44.20	0.53
CTEX/Total VOCs, %	66.1	100.0	80.8	29.7	88.3	30.3	100.0	100.0	100.0	100.0	100.0	99.9	100.0	100.0	100.0

Note:
1. All units are ug/kg, unless noted otherwise
2. Blank entry indicates below analytical detection limits
3. C= cumene, T= toluene, E= ethylbenzene, X= total xylenes
4. Soil sample taken in shallow water-bearing zone capillary fringe or saturated zone
5. Shaded value indicates exceedance of NYDEC RAOs for VOCs- 10/1 ppm for total/each VOC.

Table 3-1
UST Area Shallow Soils (see Note 1)
VOCs Analytical Results (ug/kg)
2005-2006

	UST Area East (tank pad area)									UST Area West (former UST area)					
Sample ID	**TBUST-13 (4.3-6.4)**	**TBUST-14 (5-7.2)**	**TBUST-15 (6.4-7.6)**	**TBUST-16 (6.2-7.7)**	**TBUST-17 (4-6.7)**	**TBUST-18 (4-8)**	**TBUST-19 (4-6)**	**TBUST-20 (4-7)**	**TBUST-34 (4-6.8)**	**TBUST-21 (6-6.6)**	**TBUST-22 (4.8.-5.4)**	**TBUST-23 (8-8.7)**	**TBUST-29 (5.4-6.7)**	**TBUST-30 (4.9-6.6)**	**TBUST-31 (4.8-6.4)**
Date Sampled	**4/14/05**	**4/14/05**	**4/27/05**	**4/27/05**	**4/14/05**	**4/27/05**	**4/14/05**	**4/14/05**	**5/9/05**	5/3/05	**5/3/05**	**4/28/05**	**5/5/05**	**5/5/05**	**5/4/05**
VOC compound:															
Acetone	<10	<11	<520	<530	<12	**39.0**	<10	<11	<10	<490	<430	<510	<490	<540	<460
Benzene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	**6,300.0**	<240	<270	<230
Bromodichloromethane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Bromoform	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Bromomethane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
2-Butanone	<10	<11	<520	<530	<12	<11	<10	<11	<10	<490	<430	<510	<490	<540	<460
Carbon Disulfide	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Carbon Tetrachloride	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Chlorobenzene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Chloroethane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Chloroform	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Chloromethane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Isopropylbenzene (Cumene)	<5.1	<5.6	**1,000.0**	**1,200.0**	<6.0	**200.0**	<5.0	<5.3	<5.0	**3,400.0**	4,500.0	**5,100.0**	**3,800.0**	**4,400.0**	5,900.0
Dibromochloromethane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
1,2-Dichlorobenzene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
1,3-Dichlorobenzene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
1,4-Dichlorobenzene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
1,1-Dichloroethane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
1,2-Dichloroethane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
1,1-Dichloroethene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
cis-1,2-Dichloroethene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
trans-1,2-Dichloroethene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
1,2-Dichloropropane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
cis-1,3-Dichoropropene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
trans-1,3-Dichloropropene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Ethylbenzene	<5.1	<5.6	**670.0**	**3,000.0**	<6.0	**430.0**	<5.0	<5.3	<5.0	**10,000.0**	120,000.0	**14,000.0**	**110,000.0**	**65,000.0**	**250,000.0**
2-Hexanone	<10	<11	<520	<530	<12	<11	<10	<11	<10	<490	<430	<510	<490	<540	<460
4-methyl-2-pentanone	<10	<11	<520	<530	<12	<11	<10	<11	<10	<490	<430	<510	<490	<540	<460
Methylene Chloride	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Styrene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
1,1,2,2-Tetrachloroethane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Tetrachloroethene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Toluene	<5.1	<5.6	260.0	270.0	<6.0	5.4	<5.0	<5.3	<5.0	**2,300.0**	**15,000.0**	4,300.0	**12,000.0**	**2,500.0**	**660,000.0**
1,1,1-Trichloroethane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
1,1,2-Trichloroethane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Trichloroethene	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Trichlorofluoromethane	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Vinyl Chloride	<5.1	<5.6	<260	<270	<6.0	<5.4	<5.0	<5.3	<5.0	<240	<210	<250	<240	<270	<230
Xylenes (total)	<5.1	<5.6	**8,200.0**	**25,000.0**	<6.0	**1,827.0**	<5.0	<5.3	<5.0	**580,000.0**	**780,000.0**	**373,000.0**	**980,000.0**	**470,000.0**	**1,520,000.0**
Total VOCs	***ND***	***ND***	***10,130.0***	***29,470.0***	***ND***	***2,501.4***	***ND***	***ND***	***ND***	***595,700***	***919,500***	***402,700***	***1,105,800***	***541,900***	***2,435,900***
% CTEX			*100.0%*	*100.0%*		*98.4%*				*100.0%*	*100.0%*	*98.4%*	*100.0%*	*100.0%*	*100.0%*

Notes:
1. Soil samples not taken at UST Area test borings TBUST24 through -28, TBUST32 and -33, and TBUST35 and -43.
< = Below minimum laboratory reporting limit
ND = Non-Detect

PLANT NO. 5 EAST AREA INVESTIGATION
SOIL ANALYTICAL RESULTS - SHALLOW ZONE[(1)]

Essex/Hope SMAART Investigation
Jamestown, New York
Project No. 804041.21

SAMPLE ID	PZ-10D	PZ-11D	
DEPTH INTERVAL	11-12 ft	10.5-11.5 ft	11.5-12 ft
DATE / COMPOUND	02-Aug-00	02-Aug-00	02-Aug-00
Chloromethane	<6	<6	<6
Vinyl Chloride	<6	<6	<6
Bromomethane	<6	<6	<6
Chloroethane	<6	<6	<6
Trichlorofluoromethane	<6	<6	<6
Acetone	**19**	**43**	**7 J**
1,1-Dichloroethene	<6	<6	<6
Methylene Chloride	**8**	**11**	**10**
trans-1,2-Dichloroethene	<6	<6	<6
1,1-Dichloroethane	<6	<6	<6
2-Butanone	<11	<12	<11
Chloroform	<6	<6	<6
1,1,1-Trichloroethane	<6	<6	<6
Carbon Tetrachloride	<6	<6	<6
1,2-Dichloroethane	<6	<6	<6
Benzene	<6	<6	<6
Trichloroethene	<6	<6	<6
1,2-Dichloropropane	<6	<6	<6
Bromodichloromethane	<6	<6	<6
cis-1,3-Dichloropropene	<6	<6	<6
Toluene	<6	<6	<6
trans-1,3-Dichloropropene	<6	<6	<6
1,1,2-Trichloroethane	<6	<6	<6
Tetrachloroethene	<6	<6	<6
Dibromochloromethane	<6	<6	<6
Chlorobenzene	<6	<6	<6
Ethylbenzene	**120**	<6	<6
Xylenes (total)	**500 DJB**	**50 B**	**3 JB**
m,p-Xylenes	**350 DJB**	**48 B**	**3 JB**
o-Xylene	**190**	2 J	<6
Bromoform	<6	<6	<6
Isopropylbenzene	**43**	<6	<6
1,1,2,2-Tetrachloroethane	<6	<6	<6
1,3-Dichlorobenzene	<6	<6	<6
1,4-Dichlorobenzene	<6	<6	<6
1,2-Dichlorobenzene	<6	<6	<6

Notes:
1. Samples from PZ-11D are considered shallow zone based on elevation; no confining clay was encountered at this location.
2. Units are ug/kg.
3. [B] indicates constituent was detected in the associated method/trip blank
4. [J] indicates constituent was detected but below laboratory quantitation limits.
5. [D] indicates dilute analysis, see laboratory reports for dilution factors.

Table 3-2
Groundwater Analytical Results- Shallow Zone
Volatile Organics
UST Area and Vinyl Chloride Groundwater Investigations
Samples taken December 16-22, 2003

SAMPLE ID:	GP-2S	GP-3S	HW-6	HW-9	MW-13	MW-20	MW-23S	MW-24S	PZ-5S	RW-5S
DATE SAMPLED:	18-Dec-03	18-Dec-03	18-Dec-03	18-Dec-03	18-Dec-03	18-Dec-03	17-Dec-03	17-Dec-03	22-Dec-03	18-Dec-03
COMPOUND										
Acetone					12	31				
Benzene										
Bromodichloromethane										
Bromoform										
Bromomethane										
2-Butanone										
Carbon Disulfide										
Carbon Tetrachloride										
Chlorobenzene										
Chloroethane										
Chloroform										
Chloromethane										
Cumene			43			340	57	97		
Dibromochloromethane										
1,2-Dichlorobenzene										
1,3-Dichlorobenzene										
1,4-Dichlorobenzene										
1,1-Dichloroethane										
1,2-Dichloroethane										
1,1-Dichloroethene			9.6							
cis-1,2-Dichloroethene			2900		5	5		5		
trans-1,2-Dichloroethene			24							
1,2-Dichloropropane										
cis-1,3-Dichloropropene										
trans-1,3-Dichloropropene										
Ethylbenzene			12			2600	400	1000		
2-Hexanone										
4-Methyl-2-pentanone						14				
Methylene chloride										
Styrene										
1,1,2,2-Tetrachloroethane										
Tetrachloroethene										
Toluene						1700				
1,1,1-Trichloroethane										
1,1,2-Trichloroethane										
Trichloroethene			110		22	7.5		29		
Trichlorofluoromethane										
Vinyl chloride			1400			170				
m,p-Xylene			87	8.1	7.3	20000	1700	6500	8.3	
o-Xylene			13			50	350	77		
Total VOCs	*0*	*0*	*4599*	*8.1*	*46.3*	*24918*	*2507*	*7708*	*8.3*	*0.0*
Total CTEX (note 3)	*0*	*0*	*155*	*8.1*	*7.3*	*24690*	*2507*	*7674*	*8.3*	*0.0*
CTEX/Total VOCs, %	*#DIV/0!*	*#DIV/0!*	*3*	*100*	*16*	*99.1*	*100.00*	*99.6*	*100*	*#DIV/0!*

Note:
1. All units are ug/L
2. Blank entry indicates below analytical detection limits
3. C= cumene, T= toluene, E= ethylbenzene, X= total xylenes

Table 3-2
UST Area Shallow Groundwater
VOCs Analytical Results (ug/l)
2005-2006

Sample ID	TBUST-1 (4-5)	TBUST-1 (6.5-8)	TBUST-2 (4-4.5)	TBUST-4 (4-5)	TBUST-5 (4-6.2)	TBUST-6 (5.4-7.3)	TBUST-6 (8-10.1)	TBUST-7 (8-8.9)	TBUST-7 (8.9-10.5)	TBUST-8 (6-6.5)	TBUST-9 (6.7-8.9)	TBUST-9 (14-15)	TBUST-10 (5.3-7)	TBUST-11 (9.2-11.4)	TBUST-12 (8-10)	TBUST-13 (14-16)	TBUST-14 (15-17)
Date Sampled	11/3/03	11/3/03	11/3/03	11/3/03	11/3/03	11/3/03	11/4/03	11/3/03	11/3/03	11/5/03	11/5/03	11/5/03	11/5/03	11/3/03	11/3/03	4/22/05	4/22/05
VOC compound:																	
Acetone	89.0	<10	26.0	37.0	38.0	57.0	<10	<10	<10	28.0	<10	1,300.0	<10	<10	<10	<10	11.0
Benzene	<1.0	<1.0	7.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	<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
Bromoform	<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
Bromomethane	<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
2-Butanone	11.0	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	11.0	<10	<10	<10	<10	<10
Carbon Disulfide	<5.0	<5.0	8.8	<5.0	9.7	18.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon Tetrachloride	<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
Chlorobenzene	<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
Chloroethane	<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
Chloroform	<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
Chloromethane	<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
Isopropylbenzene (Cumene)	5.0	1,900.0	5.0	5.0	5.0	5.0	6,100.0	5.0	380.0	2,100.0	3,700.0	6,100.0	5.0	1,200.0	5.0	6.3	5.0
Dibromochloromethane	<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
1,2-Dichlorobenzene	<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
1,3-Dichlorobenzene	<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
1,4-Dichlorobenzene	<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
1,1-Dichloroethane	<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
1,2-Dichloroethane	<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
1,1-Dichloroethene	<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
cis-1,2-Dichloroethene	<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
trans-1,2-Dichloroethene	<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
1,2-Dichloropropane	<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
cis-1,3-Dichoropropene	<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
trans-1,3-Dichloropropene	<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
Ethylbenzene	25.0	14,000.0	28.0	5.0	63.0	6.6	15,000.0	5.0	980.0	18,000.0	40,000.0	160,000.0	1,100.0	8,000.0	5.0	5.0	5.0
2-Hexanone	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-methyl-2-pentanone	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Methylene Chloride	<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
Styrene	<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
1,1,2,2-Tetrachloroethane	<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
Tetrachloroethene	<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
Toluene	6.6	800.0	22.0	6.3	13.0	5.0	5.0	5.0	5.0	190.0	3,300.0	26,000.0	5.0	5.0	5.0	5.0	5.0
1,1,1-Trichloroethane	<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
1,1,2-Trichloroethane	<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
Trichloroethene	<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
Trichlorofluoromethane	<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
Vinyl Chloride	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Xylenes (total)	163.0	470,000.0	130.0	9.3	284.0	26.0	72,700.0	<5.0	2,900	206,000	500,000	810,000	8,600	35,000	530.0	5.0	5.0
Total VOCs	*299.6*	*486,700.0*	*227.7*	*62.6*	*412.7*	*117.6*	*93,805.0*	*ND*	*4,265*	*226,318*	*547,000*	*1,003,411*	*9,710*	*44,205*	*545.0*	*21.3*	*31.0*
% CTEX	*66.6%*	*100.0%*	*81.2%*	*40.9%*	*88.4%*	*36.2%*	*100.0%*		*100.0%*	*100.0%*	*100.0%*	*99.9%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*64.5%*

Table 3-2
UST Area Shallow Groundwater
VOCs Analytical Results (ug/l)
2005-2006

Sample ID	TBUST-15 (13-15)	TBUST-16 (12-14)	TBUST-17 (16-18)	TBUST-18 (16-18)	TBUST-19 (19-21)	TBUST-20 (16-18)	TBUST-21 (9-11)	TBUST-22 (9-11)	TBUST-23 (7-9)	TBUST-24 (8-12)	TBUST-25 (10-12)	TBUST-26 (9-11)	TBUST-27 (8-10)	TBUST-28 (7-9)	TBUST-29 (9-11)	TBUST-30 (8-9)	TBUST-31 (8-10)
Date Sampled	4/27/05	4/27/05	4/15/05	4/27/05	4/15/05	4/18/05	5/3/05	5/3/05	4/28/05	5/3/05	5/2/05	5/2/05	5/2/05	5/3/05	5/5/05	5/5/05	5/4/05
VOC compound:																	
Acetone	<10	<10	<10	<10	<10	<10	<10	<10	**180.0**	<10	<10	<10	<10	<10	<10	**23.0**	<10
Benzene	**1.1**	**1.0**	<1.0	<1.0	<1.0	<1.0	**55.0**	**120.0**	**21,000.0**	<1.0	**2.4**	<1.0	**1.2**	**1.2**	**27.0**	**10.0**	**9.4**
Bromodichloromethane	<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
Bromoform	<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
Bromomethane	<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
2-Butanone	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Carbon Disulfide	<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
Carbon Tetrachloride	<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
Chlorobenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**18.0**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane	<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
Chloroform	<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
Chloromethane	<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
Isopropylbenzene (Cumene)	**210.0**	**140.0**	**250.0**	**120.0**	**180.0**	**190.0**	**320.0**	**320.0**	**310.0**	5.0	**59.0**	5.0	5.0	**130.0**	**180.0**	**320.0**	**220.0**
Dibromochloromethane	<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
1,2-Dichlorobenzene	<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
1,3-Dichlorobenzene	<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
1,4-Dichlorobenzene	<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
1,1-Dichloroethane	<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
1,2-Dichloroethane	<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
1,1-Dichloroethene	<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
cis-1,2-Dichloroethene	<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
trans-1,2-Dichloroethene	<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
1,2-Dichloropropane	<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
cis-1,3-Dichoropropene	<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	**54.0**	<5.0
trans-1,3-Dichloropropene	<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
Ethylbenzene	**880.0**	**550.0**	**1,700.0**	**550.0**	**190.0**	**1,600.0**	**17,000.0**	**21,000.0**	**2,100.0**	**31.0**	**890.0**	5.0	5.0	**5,900.0**	**11,000.0**	**16,000.0**	**9,800.0**
2-Hexanone	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-methyl-2-pentanone	<10	<10	<10	<10	<10	<10	**31.0**	**18.0**	**100.0**	<10	<10	<10	<10	<10	**29.0**	**25.0**	<10
Methylene Chloride	<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
Styrene	<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
1,1,2,2-Tetrachloroethane	<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
Tetrachloroethene	<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
Toluene	5.0	5.0	**16.0**	5.0	5.0	5.0	**6,500.0**	**12,000.0**	**2,800.0**	**6.2**	**21.0**	<5.0	5.0	**1,300.0**	**6,700.0**	**3,000.0**	**34,000.0**
1,1,1-Trichloroethane	<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
1,1,2-Trichloroethane	<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
Trichloroethene	<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
Trichlorofluoromethane	<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
Vinyl Chloride	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Xylenes (total)	**1,848**	**2,100**	**6,190**	**2,406**	2,400	**9,727**	**107,000**	**134,000**	**34,000**	**289.0**	**3,790.0**	<5.0	5.0	**39,200**	**95,000**	**96,000**	**66,000**
Total VOCs	***2,944***	***2,796***	***8,156***	***3,081***	***2,775***	***11,522***	***130,906***	***167,458***	***60,508***	***331.2***	***4,762.4***	***ND***	***21.2***	***46,531***	***112,936***	***115,432***	***110,029***
% CTEX	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*99.9%*	*99.9%*	*64.8%*	*100.0%*	*99.9%*		*94.3%*	*100.0%*	*100.0%*	*99.9%*	*100.0%*

Table 3-2
UST Area Shallow Groundwater
VOCs Analytical Results (ug/l)
2005-2006

Sample ID	TBUST-32 (9-10)	TBUST-33 (9-11)	TBUST-34 (10-12)	TBUST-35 (11-13)	TBUST-36 (14-16)	TBUST-37	TBUST-38	TBUST-39	TBUST-40	TBUST-41	TBUST-42	TBUST-43
Date Sampled	**5/10/05**	**5/9/05**	**5/9/05**	**5/9/05**	**5/13/05**	**12/9/05**	**12/9/05**	**12/13/05**	**12/21/05**	**1/17/06**	**1/17/06**	**1/18/06**
VOC compound:												
Acetone	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	**12.0**
Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromoform	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2-Butanone	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Carbon Disulfide	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon Tetrachloride	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroform	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Isopropylbenzene (Cumene)	5.0	**370.0**	5.0	5.0	**6.5**	5.0	**76.0**	**6.4**	5.0	5.0	5.0	5.0
Dibromochloromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,4-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-Dichoropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	5.0	**8,200.0**	5.0	5.0	**69.0**	5.0	**7.0**	5.0	5.0	5.0	5.0	5.0
2-Hexanone	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-methyl-2-pentanone	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Methylene Chloride	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Styrene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	<5.0	5.0	<5.0	<5.0	5.0	<5.0	5.0	5.0	<5.0	<5.0	<5.0	5.0
1,1,1-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl Chloride	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Xylenes (total)	<5.0	**31,000**	<5.0	<5.0	**680.0**	<5.0	**19.0**	5.0	<5.0	<5.0	<5.0	5.0
Total VOCs	***ND***	***39,575***	***ND***	***ND***	***760.5***	***ND***	***108.1***	***21.4***	***ND***	***ND***	***ND***	***32.0***
% CTEX		*100.0%*			*100.0%*		*99.0%*	*100.0%*				*62.5%*

PLANT NO. 5 EAST AREA INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS-SHALLOW ZONE

Essex/Hope SMAART Investigation
Jamestown, New York
Project No. 804041.21

SAMPLE ID	PZ-5S	PZ-6S	TRIP BLANK
DATE / COMPOUND	8/17/00	8/17/00	8/17/00
Chloromethane	<1	<1	<1
Vinyl Chloride	<1	<1	<1
Bromomethane	<1	<1	<1
Chloroethane	<1	<1	<1
Trichlorofluoromethane	<1	<1	<1
Acetone	<5	<5	<5
1,1-Dichloroethene	<1	<1	<1
Methylene Chloride	15 B	15 B	13 B
trans-1,2-Dichloroethene	<1	<1	<1
1,1-Dichloroethane	<1	<1	<1
2-Butanone	<5	<5	<5
Chloroform	<1	<1	<1
1,1,1-Trichloroethane	<1	<1	<1
Carbon Tetrachloride	<1	<1	<1
1,2-Dichloroethane	<1	<1	<1
Benzene	<1	<1	<1
Trichloroethene	<1	<1	<1
1,2-Dichloropropane	<1	<1	<1
Bromodichloromethane	<1	<1	<1
cis-1,3-Dichloropropene	<1	<1	<1
Toluene	**7**	<1	<1
trans-1,3-Dichloropropene	<1	<1	<1
1,1,2-Trichloroethane	<1	<1	<1
Tetrachloroethene	<1	<1	<1
Dibromochloromethane	<1	<1	<1
Chlorobenzene	<1	<1	<1
Ethylbenzene	**33**	**3**	<1
Xylenes (total)	**69**	**7**	<3
m,p-Xylenes	**68**	**7**	<2
o-Xylene	<1	<1	<1
Bromoform	<1	<1	<1
Isopropylbenzene	**7**	**10**	<1
1,1,2,2-Tetrachloroethane	<1	<1	<1
1,3-Dichlorobenzene	<1	<1	<1
1,4-Dichlorobenzene	<1	<1	<1
1,2-Dichlorobenzene	<1	<1	<1

Note:
1. All units are ug/L
2. [B] indicates constituent was detected in the associated method/trip blank

Table 3-3
MW-26S - UST Area ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Groundwater Analytical Results[1] - (µg/L)			
	Baseline	Round 1	Round 2	Round 3
	11/2/2011	12/5/2011	3/13/2012	6/13/2012
VOCs				
Acetone	ND	441	10.8	ND
Bromomethane	ND	11.4	ND	ND
2-Butanone (MEK)	ND	55.2	ND	ND
Chloromethane	ND	27.7	ND	ND
Ethylbenzene	398	340	221	290
Isopropylbenzene (Cumene)	225	129	107	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	18.8
Xylenes	1,410	1,250	385	401
Inorganics				
Iron, Total	18,200	282,000	133,000	103,000
Iron, Ferric	9,200	280,000	47,100	39,000
Iron, Ferrous	9,000	2,100	86,300	64,300
TPH	ND	ND	ND	ND
Alkalinity	208,000	26,000	88,000	109,000
Sulfide	1,000	ND	ND	ND
Sulfate	ND	4,140,000	1,090,000	1,130,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.41	5.27	6.23	6.30
Temperature (°C)	14.31	13.35	7.84	11.01
Conductivity (mS/cm)	0.340	5.314	1.322	1.500
Dissolved Oxygen (mg/L)	0.24	0.33	0.87	0.70
ORP (mV)	-59.0	74.1	-100.1	-53.4

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

Injection activities were conducted between November 8 and 18, 2011.

Table 3-4
MW-27S - UST Area ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Groundwater Analytical Results[1] - (μg/L)			
	Baseline	Round 1	Round 2	Round 3
	11/2/2011	12/5/2011	3/13/2012	6/13/2012
VOCs				
Acetone	ND	392	ND	ND
2-Butanone (MEK)	ND	48.8	ND	ND
Ethylbenzene	ND	201	358	313
Isopropylbenzene (Cumene)	24.7	133	134	106
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	14.2
Xylenes	ND	496	425	236
Inorganics				
Iron, Total	20,300	404,000	116,000	47,700
Iron, Ferric	13,900	402,000	22,500	23,400
Iron, Ferrous	6,400	2,500	93,000	24,200
TPH	ND	ND	ND	ND
Alkalinity	122,000	38,000	110,000	113,000
Sulfide	ND	ND	ND	ND
Sulfate	ND	2,800,000	1,060,000	489,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.22	5.51	6.10	5.99
Temperature (°C)	15.70	14.71	10.08	11.78
Conductivity (mS/cm)	0.235	3.815	1.342	0.843
Dissolved Oxygen (mg/L)	0.30	0.32	1.08	1.68
ORP (mV)	-163.5	-21.5	-106.9	-11.1

Notes:
1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.
NA = Not Analyzed
ND = Non Detect

Injection activities were conducted between November 8 and 18, 2011.

Table 3-5
MW-28S - UST Area ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter(1)	Groundwater Analytical Results(1) - (μg/L)			
	Baseline	Round 1	Round 2	Round 3
	11/2/2011	12/5/2011	3/13/2012	6/13/2012
VOCs				
Acetone	ND	69.5	ND	ND
2-Butanone (MEK)	ND	12.3	ND	ND
Ethylbenzene	1,490	296	93.8	96.5
Isopropylbenzene (Cumene)	316	190	103	69.9
Toluene	ND	8.0	ND	ND
Xylenes	5,480	609	73.7	33.5
Inorganics				
Iron, Total	33,000	184,000	98,000	48,700
Iron, Ferric	21,000	181,000	34,800	23,200
Iron, Ferrous	11,900	2,900	63,200	25,500
TPH	ND	ND	ND	ND
Alkalinity	208,000	110,000	178,000	160,000
Sulfide	ND	ND	ND	ND
Sulfate	ND	1,260,000	454,000	311,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.28	6.01	6.29	6.06
Temperature (°C)	15.38	14.09	10.14	11.40
Conductivity (mS/cm)	0.360	2.076	0.857	0.614
Dissolved Oxygen (mg/L)	0.19	0.46	2.70	0.70
ORP (mV)	-31.5	-9.6	-88.4	0.60

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

Injection activities were conducted between November 8 and 18, 2011.

Table 3-6
MW-13 - UST Area ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter(1)	Groundwater Analytical Results(1) - (µg/L)			
	Baseline*	Round 1	Round 2	Round 3
	11/2/2011	12/1/2011	3/13/2012	6/13/2012
VOCs				
Acetone	ND	381	ND	10.0
Benzene	ND	3.3	ND	ND
2-Butanone (MEK)	ND	30.0	ND	ND
Carbon Disulfide	ND	11.1	ND	ND
Chloromethane	ND	64.8	ND	ND
Ethylbenzene	ND	15.7	ND	ND
Xylenes	ND	88.9	ND	ND
Inorganics				
Iron, Total	9,930	2,890,000	105,000	28,500
Iron, Ferric	6,100	2,890,000	3,800	14,900
Iron, Ferrous	3,800	260	101,000	13,600
TPH	ND	ND	ND	ND
Alkalinity	110,000	200,000	178,000	90,600
Sulfide	ND	ND	ND	ND
Sulfate	65,500	6,450,000	1,100,000	317,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.14	5.58	5.73	5.96
Temperature (°C)	14.45	14.46	12.18	14.24
Conductivity (mS/cm)	0.717	9.448	1.445	0.455
Dissolved Oxygen (mg/L)	0.98	0.67	0.36	0.51
ORP (mV)	11.5	37.5	-49.6	-22.1

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

*VOCs and Water Quality Data were collected on 6/30/11.

Injection activities were conducted between November 8 and 18, 2011.

Table 3-7
MW-20 - UST Area ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Groundwater Analytical Results[1] - (μg/L)			
	Baseline*	Round 1	Round 2	Round 3
	11/3/2011	12/5/2011	3/14/2012	6/12/2012
VOCs				
cis-1,2-Dichloroethene	403	17.5	5.5	ND
Ethylbenzene	ND	ND	990	482
Isopropylbenzene (Cumene)	ND	ND	83.5	71.0
Toluene	ND	ND	607	ND
Trichloroethene	79.0	6.2	ND	ND
Vinyl Chloride	5.1	ND	ND	ND
Xylenes	ND	12.1	6,290	735
Inorganics				
Iron, Total	16,300	88,700	63,800	22,100
Iron, Ferric	10,000	25,800	16,900	8,200
Iron, Ferrous	6,300	63,000	46,900	13,900
TPH	ND	ND	ND	ND
Alkalinity	82,000	20,000	114,000	154,000
Sulfide	ND	ND	ND	ND
Sulfate	14,100	620,000	680,000	232,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.42	6.29	6.26	5.74
Temperature (°C)	15.19	14.38	12.20	13.73
Conductivity (mS/cm)	0.245	1.036	1.057	0.553
Dissolved Oxygen (mg/L)	0.58	0.51	1.27	1.38
ORP (mV)	-42.5	-40.4	-95.0	-24.8

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

*VOCs and Water Quality Data were collected on 9/21/11.

Injection activities were conducted between November 8 and 18, 2011.

Table 3-8
MW-23S - UST Area ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Groundwater Analytical Results[1] - (μg/L)			
	Baseline*	Round 1	Round 2	Round 3
	11/2/2011	12/1/2011	3/13/2012	6/13/2012
VOCs				
Acetone	ND	1,200	216	64.0
Benzene	ND	3.1	ND	ND
Bromomethane	ND	31.0	5.9	ND
2-Butanone (MEK)	ND	94.9	19.0	ND
Carbon Disulfide	ND	136	14.9	ND
Chloroethane	ND	12.6	ND	ND
Chloromethane	ND	394	82.3	9.7
Ethylbenzene	15.9	38.7	7.8	33.5
Isopropylbenzene (Cumene)	57.5	12.2	1.8	8.2
Xylenes	32.7	198.9	ND	45.5
Inorganics				
Iron, Total	15,800	1,360,000	67,700	100,000
Iron, Ferric	14,400	1,360,000	16,300	ND
Iron, Ferrous	1,500	2,000	51,400	108,000
TPH	ND	ND	ND	ND
Alkalinity	304,000	ND	ND	54,000
Sulfide	ND	ND	ND	ND
Sulfate	14,800	12,900,000	6,040,000	4,390,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.64	2.59	3.29	5.07
Temperature (°C)	12.94	16.71	8.98	13.62
Conductivity (mS/cm)	0.649	20.56	5.673	4.924
Dissolved Oxygen (mg/L)	0.56	1.62	1.11	0.25
ORP (mV)	-60.4	442.3	466.3	104.2

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

*VOCs and Water Quality Data were collected on 6/30/11.

Injection activities were conducted between November 8 and 18, 2011.

Table 3-9
MW-24S - UST Area ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter(1)	Groundwater Analytical Results(1) - (μg/L)			
	Baseline*	Round 1	Round 2	Round 3
	11/2/2011	12/1/2011	3/13/2012	6/13/2012
VOCs				
Acetone	ND	1,300	116	24.7
Benzene	ND	3.9	1.1	ND
Bromomethane	ND	77.5	ND	ND
2-Butanone (MEK)	ND	115	ND	ND
Carbon Disulfide	ND	294	5.1	ND
Chloroethane	ND	6.9	ND	ND
Chloromethane	ND	377	ND	ND
Ethylbenzene	94.1	450	2,040	1,900
Isopropylbenzene (Cumene)	229	51.3	164	201
4-Methyl-2-Pentanone (MIBK)	ND	10.1	ND	ND
Toluene	ND	11.0	10.1	8.7
Xylenes	1,465	3,008	6,595	5,176
Inorganics				
Iron, Total	12,700	844,000	221,000	131,000
Iron, Ferric	7,700	842,000	218,000	ND
Iron, Ferrous	5,000	1,600	ND	144,000
TPH	ND	ND	ND	ND
Alkalinity	236,000	ND	632,000	126,000
Sulfide	1,000	ND	ND	ND
Sulfate	ND	13,300,000	3,390,000	1,760,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.58	2.72	5.24	5.56
Temperature (°C)	12.94	17.61	11.02	13.66
Conductivity (mS/cm)	0.414	18.51	3.301	2.404
Dissolved Oxygen (mg/L)	0.37	0.38	0.63	0.17
ORP (mV)	-51.5	412.7	-6.0	4.9

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

*VOCs and Water Quality Data were collected on 6/30/11.

Injection activities were conducted between November 8 and 18, 2011.

Table 3-10
MW-29S - UST Area ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Groundwater Analytical Results[1] - (μg/L)			
	Baseline	Round 1	Round 2	Round 3
	11/2/2011	12/1/2011	3/13/2012	6/13/2012
VOCs				
Acetone	26.5	5,360	1,360	531
Benzene	135	7.5	85.5	24.1
Bromomethane	ND	334	16.5	ND
2-Butanone (MEK)	ND	191	109	50.2
Carbon Disulfide	ND	136	46.8	ND
Chloroethane	ND	45.5	16.8	ND
Chloromethane	ND	2,730	665	144
1,1-Dichloroethane	ND	6.0	ND	ND
Ethylbenzene	8,700	3,660	12,500	11,900
2-Hexanone	ND	10.5	21.3	ND
Isopropylbenzene (Cumene)	325	113	218	275
Methylene Chloride	ND	8.3	ND	ND
4-Methyl-2-Pentanone (MIBK)	45.2	ND	45.8	ND
Styrene	ND	101	ND	466
Toluene	ND	ND	3,350	3,480
Xylenes	52,900	22,950	71,000	69,900
Inorganics				
Iron, Total	8,260	643,000	710,000	372,000
Iron, Ferric	5,400	641,000	708,000	370,000
Iron, Ferrous	2,900	2,300	1,700	2,100
TPH	ND	ND	ND	ND
Alkalinity	358,000	ND	ND	37,000
Sulfide	ND	1,200	ND	3,200
Sulfate	ND	18,100,000	12,200,000	6,400,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.31	2.50	4.13	4.75
Temperature (°C)	15.53	18.62	11.36	13.74
Conductivity (mS/cm)	0.945	27.98	10.031	8.057
Dissolved Oxygen (mg/L)	0.24	0.24	0.71	0.24
ORP (mV)	-8.0	475.9	219.3	175.8

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

Injection activities were conducted between November 8 and 18, 2011.

Table 3-11
HW-9 - UST Area ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Groundwater Analytical Results[1] - (μg/L)			
	Baseline	Round 1	Round 2	Round 3
	11/2/2011	12/5/2011	3/13/2012	6/13/2012
VOCs				
Acetone	ND	10.3	ND	ND
Ethylbenzene	ND	ND	48.9	84.1
Isopropylbenzene (Cumene)	18.7	13.6	26.5	40.0
Xylenes	ND	ND	58.1	6.4
Inorganics				
Iron, Total	11,300	29,600	177,000	153,000
Iron, Ferric	7,200	7,300	29,200	31,400
Iron, Ferrous	4,100	22,300	147,000	122,000
TPH	ND	ND	ND	ND
Alkalinity	166,000	110,000	138,000	135,000
Sulfide	ND	ND	ND	ND
Sulfate	ND	298,000	2,190,000	2,140,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.21	6.06	5.98	6.04
Temperature (°C)	13.35	12.06	8.68	10.32
Conductivity (mS/cm)	0.277	0.678	2.385	2.243
Dissolved Oxygen (mg/L)	1.61	0.70	2.43	1.63
ORP (mV)	29.7	31.5	-62.9	-4.0

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

Injection activities were conducted between November 8 and 18, 2011.

Table 3-12
PZ-5S - UST Area ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Groundwater Analytical Results[1] - (µg/L)			
	Baseline*	Round 1	Round 2	Round 3
	11/2/2011	12/5/2011	3/14/2012	6/12/2012
VOCs				
Acetone	ND	162	ND	ND
Carbon Disulfide	ND	8.8	ND	ND
Chloromethane	ND	13.0	ND	ND
Ethylbenzene	20.4	11.8	54.2	45.5
Isopropylbenzene (Cumene)	4.4	5.7	18.9	27.4
Xylenes	125	7.6	71.1	53.9
Inorganics				
Iron, Total	3,170	105,000	94,900	70,300
Iron, Ferric	800	54,100	ND	27,800
Iron, Ferrous	2,400	51,200	95,800	42,500
TPH	ND	ND	ND	ND
Alkalinity	68,000	ND	82,000	90,000
Sulfide	ND	ND	ND	ND
Sulfate	ND	2,710,000	52,800	1,020,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.65	5.30	5.91	5.74
Temperature (°C)	12.65	12.56	9.62	12.95
Conductivity (mS/cm)	0.145	3.760	1.983	1.439
Dissolved Oxygen (mg/L)	0.96	0.21	1.46	1.33
ORP (mV)	-10.4	82.8	-79.9	-42.5

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

*VOCs and Water Quality Data were collected on 6/30/11.

Injection activities were conducted between November 8 and 18, 2011.

Table 3-13
MW-19D - Acetone Plume ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Groundwater Analytical Results[1] - (µg/L)			
	Baseline	Round 1	Round 2	Round 3
	11/2/2011*	12/1/2011	3/14/2012	6/12/2012
VOCs				
Acetone	2,870	16,400	1,190	28.5
Benzene	ND	2.9	ND	ND
2-Butanone (MEK)	17.5	64.4	ND	ND
Vinyl Chloride	130	48.3	19.6	18.3
Inorganics				
Iron, Total	455,000	417,000	1,030,000	203,000
Iron, Ferric	446,000	411,000	1,030,000	197,000
Iron, Ferrous	8,800	6,200	6,300	6,000
TPH	NA	NA	NA	NA
Alkalinity	630,000	620,000	586,000	595,000
Sulfide	ND	ND	ND	ND
Sulfate	ND	ND	ND	ND
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.94	6.53	6.53	6.35
Temperature (°C)	12.15	12.75	12.71	12.67
Conductivity (mS/cm)	0.605	0.800	0.768	0.835
Dissolved Oxygen (mg/L)	0.96	0.22	0.72	2.76
ORP (mV)	-87.0	-53.8	-162.0	-93.2

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

*VOCs and Water Quality Data were collected on 10/3/11.

Injection activities were conducted between November 17 and 18, 2011.

Table 3-14
MW-21D - Acetone Plume ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Groundwater Analytical Results[1] - (µg/L)			
	Baseline	Round 1	Round 2	Round 3
	11/3/2011*	12/1/2011	3/14/2012	6/12/2012
VOCs				
Acetone	65,100	232,000	338,000	421,000
Benzene	73.8	55.7	67.7	77.6
2-Butanone (MEK)	582[E]	151	1,390	ND
1,1-Dichloroethene	593[E]	202	158	163
cis-1,2-Dichloroethene	185,000	76,200	120,000	115,000
trans-1,2-Dichloroethene	3,600	1,080	ND	ND
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	11.4
Toluene	26.6	ND	5.5	ND
Trichloroethene	30,000	2,050	2,390	1,570
Vinyl Chloride	36,200	30,700	39,200	37,400
Xylenes	ND	11.5	ND	ND
Inorganics				
Iron, Total	27,800	25,200	22,200	25,600
Iron, Ferric	22,500	19,200	10,900	15,400
Iron, Ferrous	5,300	6,000	11,400	10,200
TPH	NA	NA	NA	NA
Alkalinity	562,000	652,000	176,000	700,000
Sulfide	ND	ND	ND	ND
Sulfate	ND	ND	ND	ND
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.49	6.68	6.50	6.44
Temperature (°C)	11.59	12.55	12.42	12.71
Conductivity (mS/cm)	1.151	1.337	1.239	1.360
Dissolved Oxygen (mg/L)	0.54	0.56	0.86	0.97
ORP (mV)	-33.1	-64.3	-75.9	-60.5

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

*VOCs and Water Quality Data were collected on 9/21/11.

E = Analyte concentration exceeded the calibration range. The reported result is estimated.

Injection activities were conducted between November 17 and 18, 2011.

Table 3-15
MW-22D - Acetone Plume ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[(1)]	Groundwater Analytical Results[(1)] - (μg/L)			
	Baseline	Round 1	Round 2	Round 3
	11/3/2011*	12/1/2011	3/14/2012	6/12/2012
VOCs				
Acetone	ND	25.0	23.4	12.0
Benzene	2.2	4.4	1.2	ND
1,1-Dichloroethene	9.0	ND	ND	ND
cis-1,2-Dichloroethene	1,010	772	547	323
trans-1,2-Dichloroethene	8.7	31.1	12.9	ND
Trichloroethene	4,890	5,010	2,960	2,010
Vinyl Chloride	24.3	ND	9.9	5.6
Inorganics				
Iron, Total	5,110	942	247	242
Iron, Ferric	5,100	450	180	210
Iron, Ferrous	ND	490	ND	ND
TPH	NA	NA	NA	NA
Alkalinity	130,000	110,000	108,000	96,000
Sulfide	ND	ND	ND	ND
Sulfate	24,100	723,000	2,040,000	1,760,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.42	6.11	5.64	5.31
Temperature (°C)	10.93	12.07	11.94	11.74
Conductivity (mS/cm)	0.387	1.865	2.586	2.746
Dissolved Oxygen (mg/L)	0.59	1.34	1.02	8.76
ORP (mV)	85.3	82.0	-50.9	66.4

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

*VOCs and Water Quality Data were collected on 9/21/11.

Injection activities were conducted between November 17 and 18, 2011.

Table 3-16
RW-6D - Acetone Plume ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Groundwater Analytical Results[1] - (µg/L)			
	Baseline	Round 1	Round 2	Round 3
	11/2/2011*	12/1/2011	3/20/2012	6/12/2012
VOCs				
Acetone	36,000	29,500	2,390	20,600
Benzene	36.7	21.7	25.2	23.9
2-Butanone (MEK)	192	147	40.2	259
1,1-Dichloroethene	53.0	120	42.4	28.9
cis-1,2-Dichloroethene	24,200	15,000	19,800	16,700
trans-1,2-Dichloroethene	297	137	317	181
Trichloroethene	3,510	6,570	3,560	3,900
Vinyl Chloride	2,990	2,470	2,650	3,390
Inorganics				
Iron, Total	7,350	13,000	5,320	11,900
Iron, Ferric	6,300	12,300	4,200	8,900
Iron, Ferrous	1,000	720	1,200	2,900
TPH	NA	NA	NA	NA
Alkalinity	354,000	370,000	358,000	477,000
Sulfide	ND	ND	ND	ND
Sulfate	ND	21,600	ND	ND
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.76	6.70	6.76	6.69
Temperature (°C)	12.82	11.93	10.55	17.09
Conductivity (mS/cm)	0.565	0.636	0.531	0.844
Dissolved Oxygen (mg/L)	0.15	0.27	0.40	0.50
ORP (mV)	-69.9	-118.7	-104.0	-130.4

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

*VOCs were collected on 9/22/11.

Injection activities were conducted between November 17 and 18, 2011.

Table 3-17
PZ-6D - Acetone Plume ISCO
Monitoring Well Groundwater Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Groundwater Analytical Results[1] - (µg/L)			
	Baseline	Round 1	Round 2	Round 3
	11/3/2011	12/5/2011*	3/14/2012	6/12/2012
VOCs				
Acetone	ND	843,000	407,000	460,000
2-Butanone (MEK)	2,030	ND	1,850	ND
Carbon Disulfide	ND	68.4	ND	ND
Chloromethane	ND	8.7	ND	ND
cis-1,2-Dichloroethene	ND	ND	25.0	ND
4-Methyl-2-Pentanone (MIBK)	32.8	50.7	18.2	31.0
Vinyl Chloride	13.3	7.6	38.4	10.6
Inorganics				
Iron, Total	594,000	231,000	862,000	766,000
Iron, Ferric	588,000	230,000	852,000	761,000
Iron, Ferrous	5,100	550	10,000	5,300
TPH	NA	NA	NA	NA
Alkalinity	84,000	1,600,000	796,000	841,000
Sulfide	ND	1,000	ND	ND
Sulfate	ND	11,700,000	1,770,000	538,000
Parameter	**Water Quality Data - Field Measured - (units noted)**			
pH	6.60	NA	6.62	6.60
Temperature (°C)	11.90	NA	12.39	13.25
Conductivity (mS/cm)	0.383	NA	1.287	1.424
Dissolved Oxygen (mg/L)	0.23	NA	1.58	0.33
ORP (mV)	-50.7	NA	-240.3	-209.9

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

*Water Quality Data not collected due to heavy silt blockage in meter flow thru cell and tubing.

Injection activities were conducted between November 17 and 18, 2011.

Table 4-1
Post-Treatment Test Borings - UST Area ISCO
Soil Analyses Summary
Essex/Hope Site
Jamestown, NY

Chemical Parameter[1]	Soil Analytical Results[1] - (µg/kg)													
	TBUST-100	TBUST-101	TBUST-102	TBUST-103	TBUST-104	TBUST-105	TBUST-106	TBUST-107	TBUST-108	TBUST-109	TBUST-110	TBUST-111	TBUST-112	TBUST-113
	8/16/2012	8/16/2012	8/16/2012	8/15/2012	8/15/2012	8/15/2012	8/15/2012	8/15/2012	8/15/2012	8/15/2012	8/15/2012	8/15/2012	8/15/2012	8/15/2012
VOCs														
Acetone	ND	145	ND	ND	26.6	157	39.1	13.7	ND	133	222	59.8	245	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	88.0	ND
2-Butanone (MEK)	ND	18.4	ND	ND	ND	18.7	ND	ND	ND	ND	15.2	ND	17.7	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.0	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	12.6	ND	16.1	ND	ND	54.7	ND	50.5	74.2	ND
Isopropylbenzene (Cumene)	ND	68.3	ND	ND	ND	56.1	ND	ND	ND	9.3	ND	11.6	95.7	ND
Methylene Chloride	ND	ND	3.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	20.9	ND	ND	ND	19.1	ND	10.6	ND	ND
Xylenes (total)	ND	5.9	ND	ND	82.0	ND	220	ND	ND	425	17.1	318	967	ND
TPH	1,070,000	208,000	220,000	206,000	2,790,000	224,000	506,000	213,000	293,000	175,000	127,000	252,000	993,000	316,000

Notes:

1. Data summary for VOCs presents only parameters detected above laboratory MDLs, all others ND.

NA = Not Analyzed

ND = Non Detect

Samples were collected from the 4' to 8' interval.

Injection activities were conducted between November 8 and 18, 2011.

FIGURES

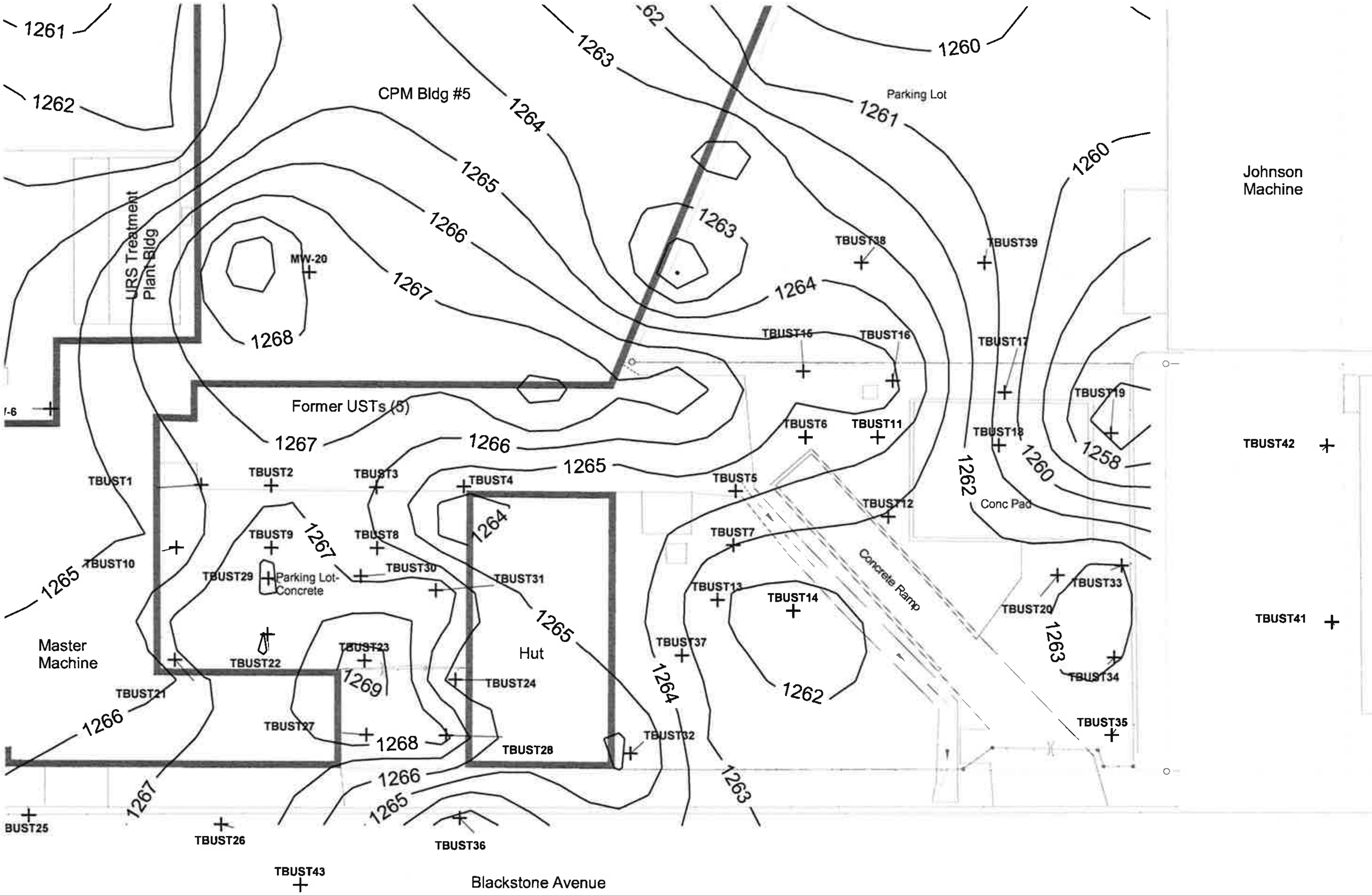


Figure 2-1- Upper Semi-Confining Layer Elevation

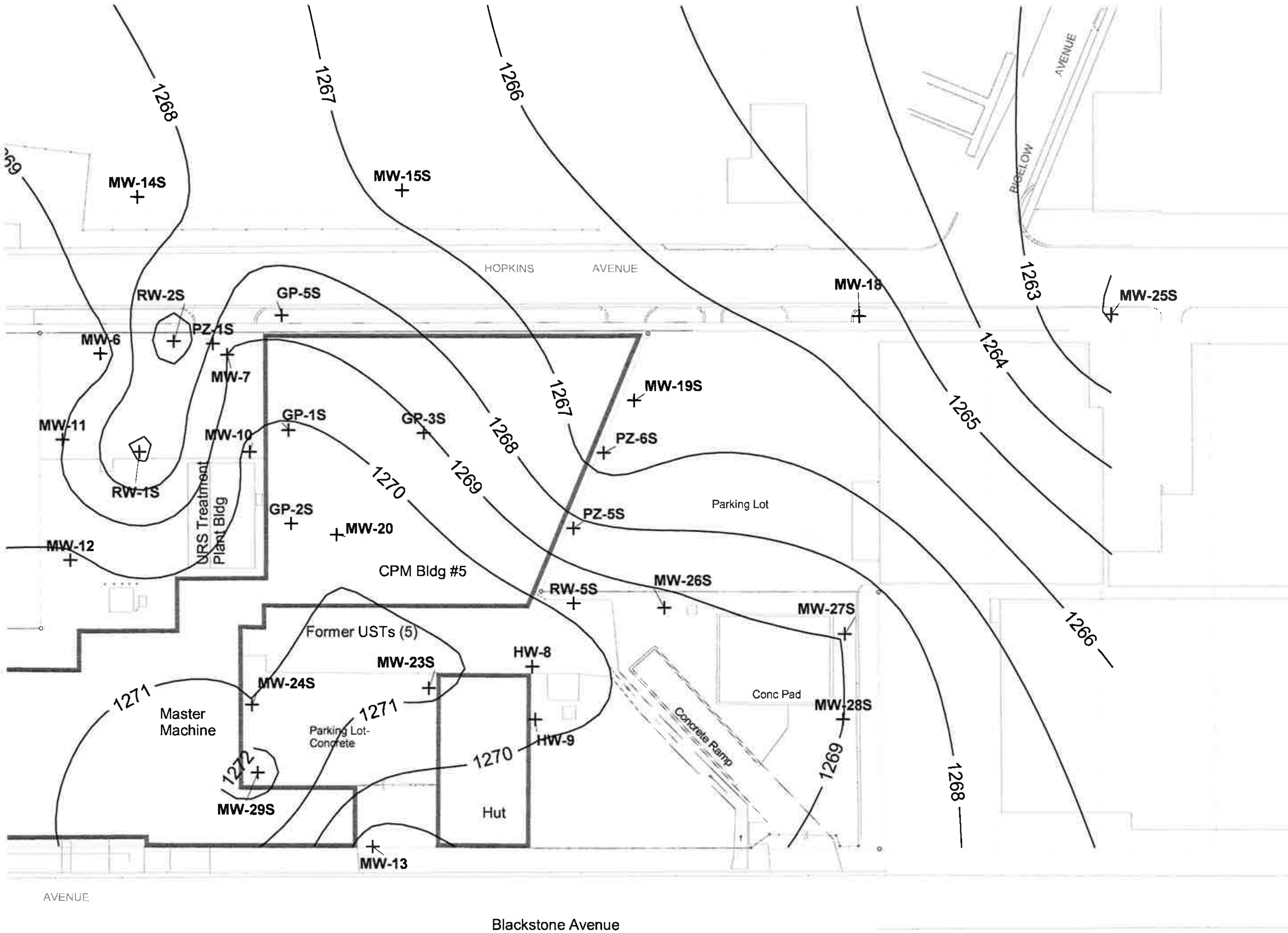


Figure 2-2-Shallow Groundwater Elevations
September 24, 2012

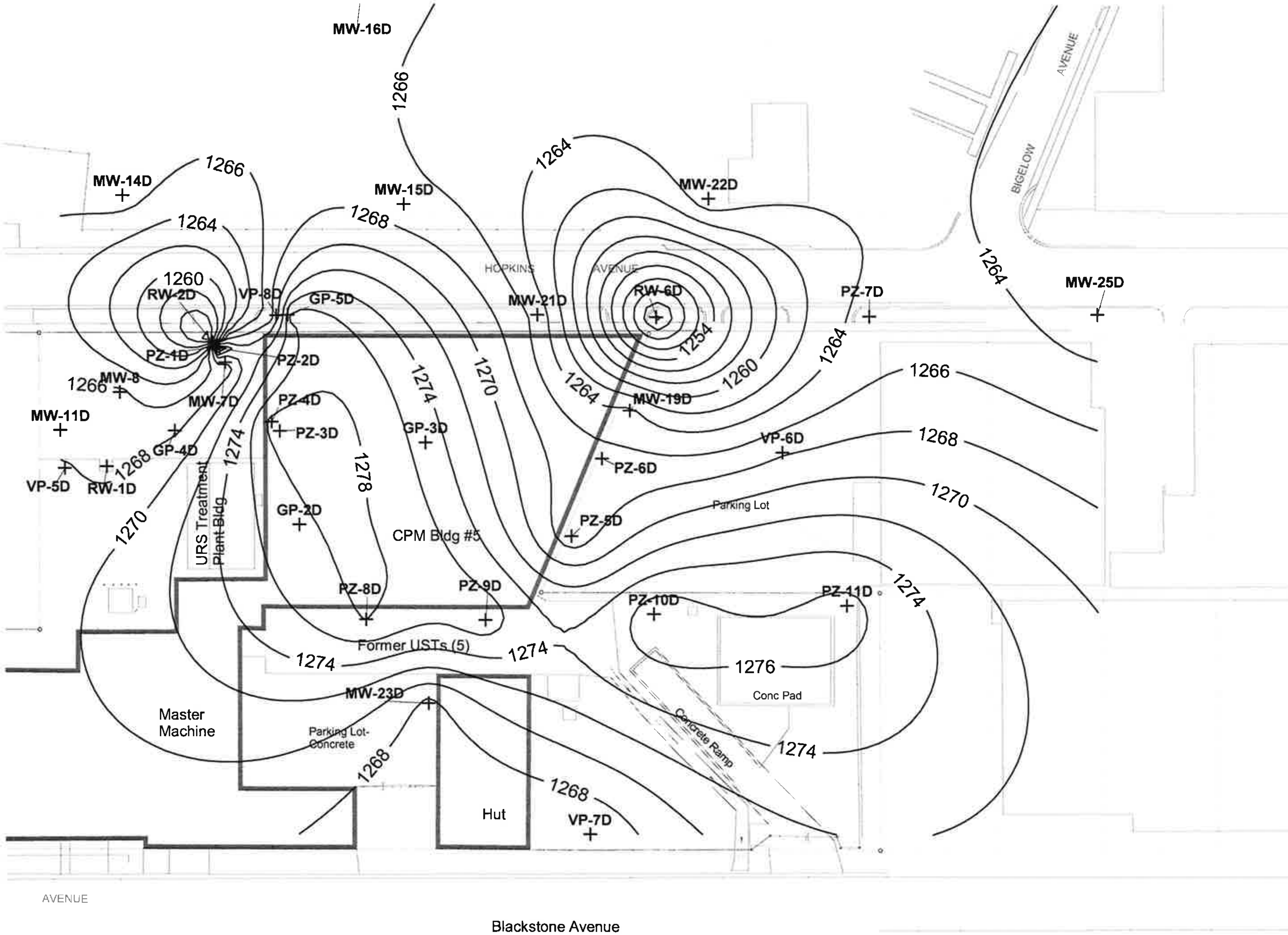
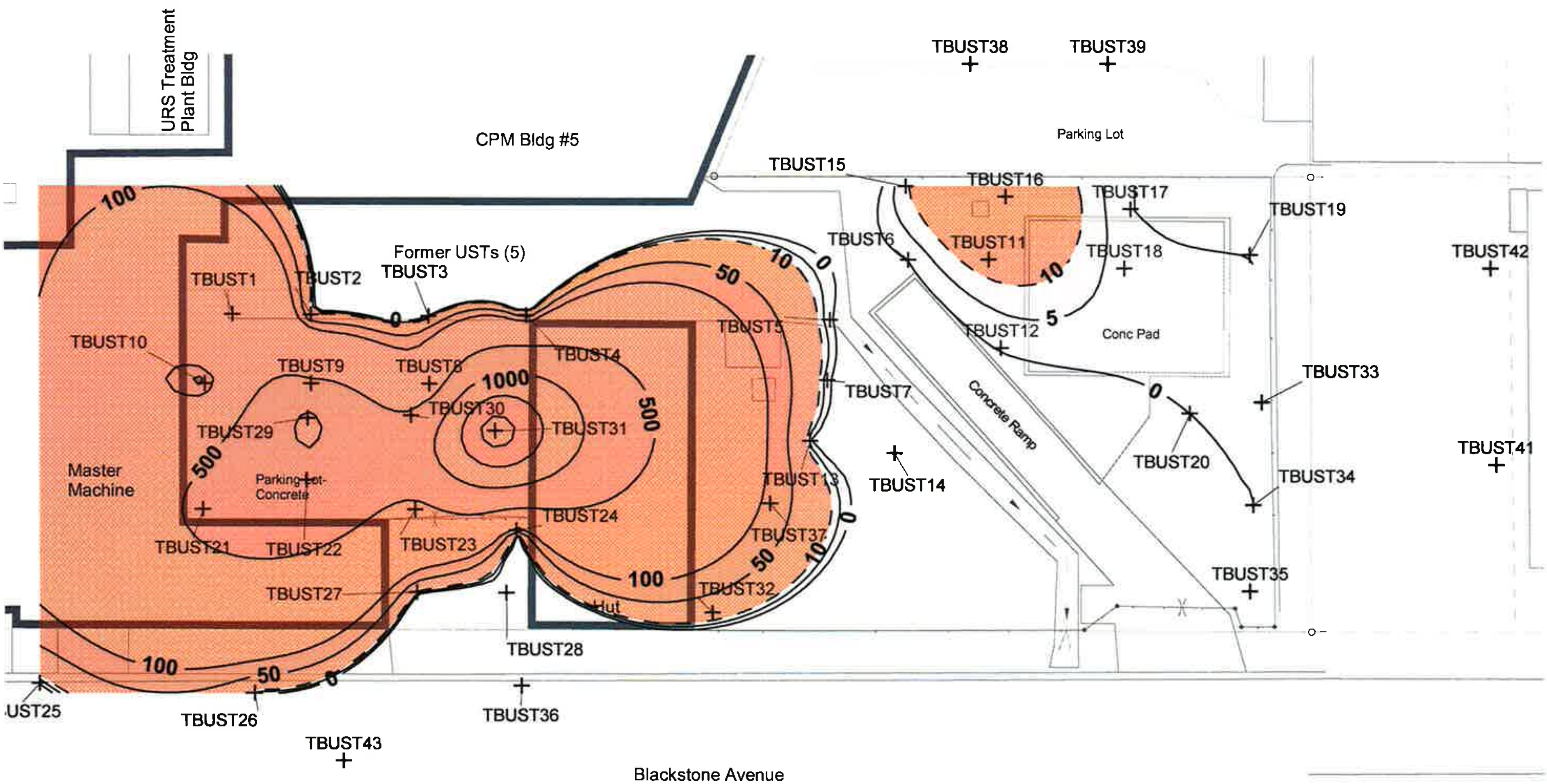


Figure 2-3- Deep Groundwater Elevations
September 24, 2012

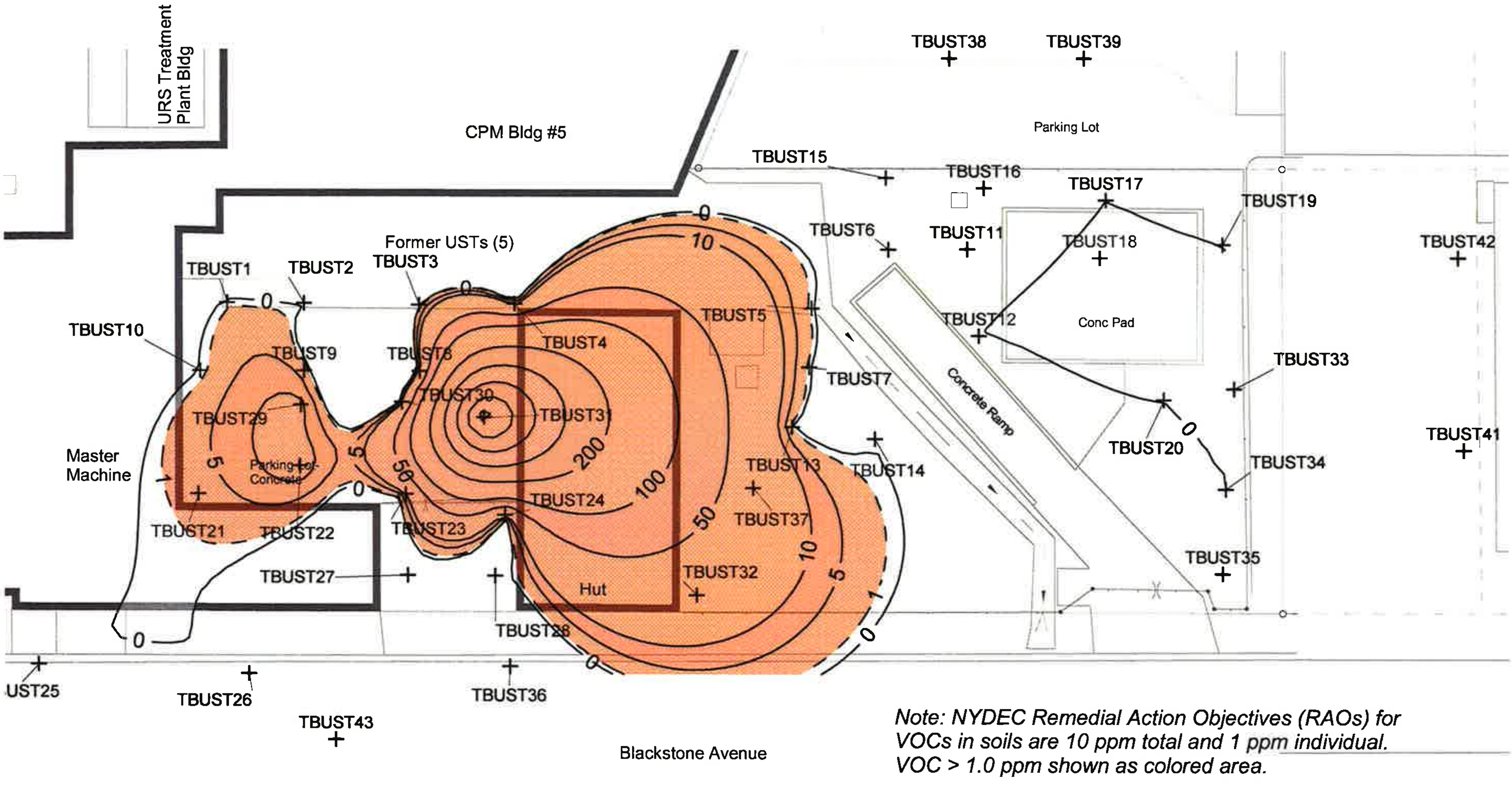


Note: NYDEC Remedial Action Objectives (RAOs) for VOCs in soils are 10 ppm total and 1 ppm individual. Soil total VOCs of > 10 ppm shown as red-colored area.

Essex Specialty Products, Inc.
Essex/Hope Site, Jamestown, NY
Chemical Oxidation Remedial Action Report
URS 41569123

UST Area- Shallow Soils
Total CTEX, mg/kg
Historic Data, 2003-2006

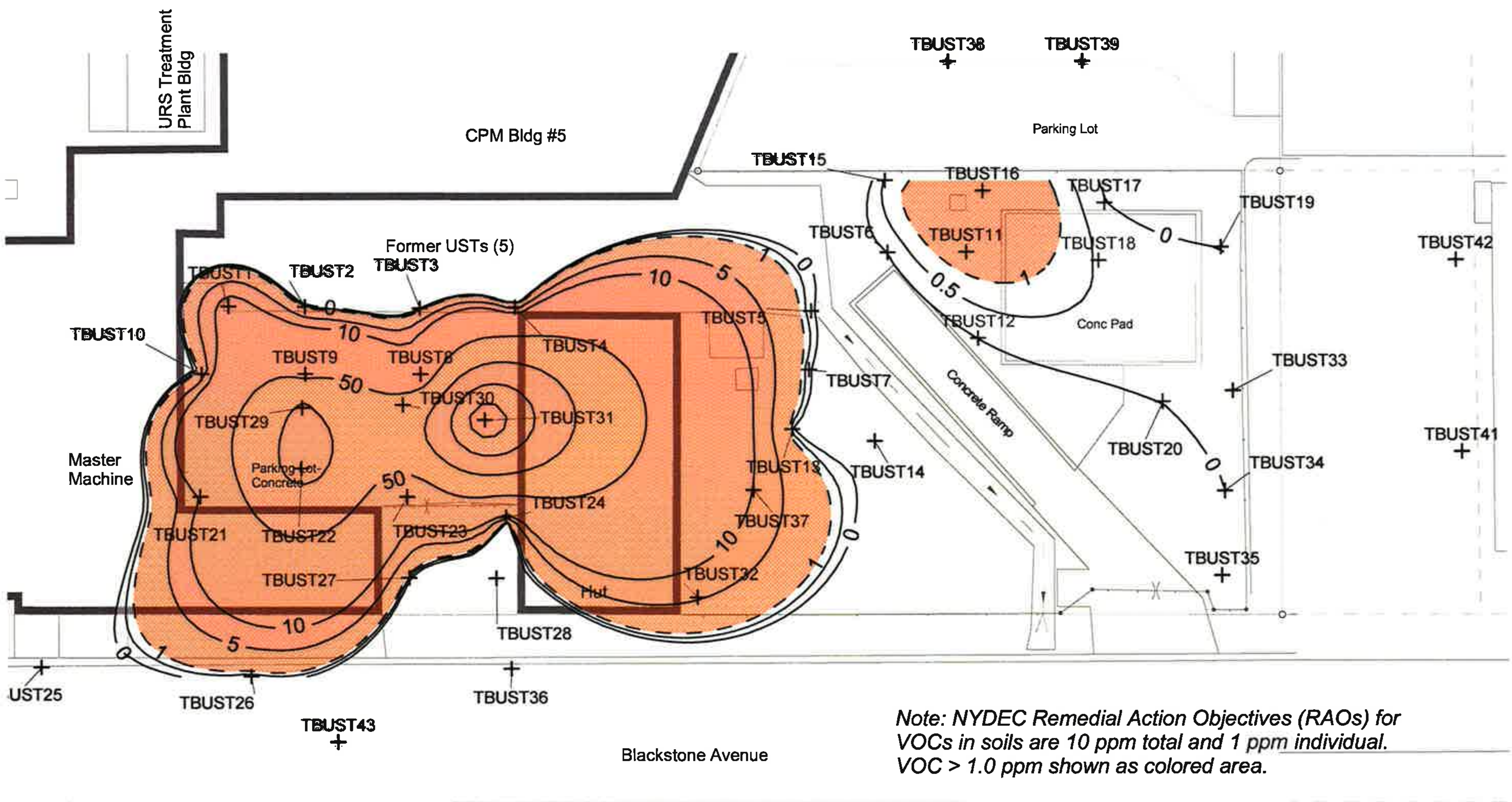
Figure 3-1



Essex Specialty Products, Inc.
Essex/Hope Site, Jamestown, NY
Chemical Oxidation Remedial Action Report
URS 41569123

UST Area- Shallow Soils
Toluene, mg/kg
Historic Data, 2003-2006

Figure 3-2

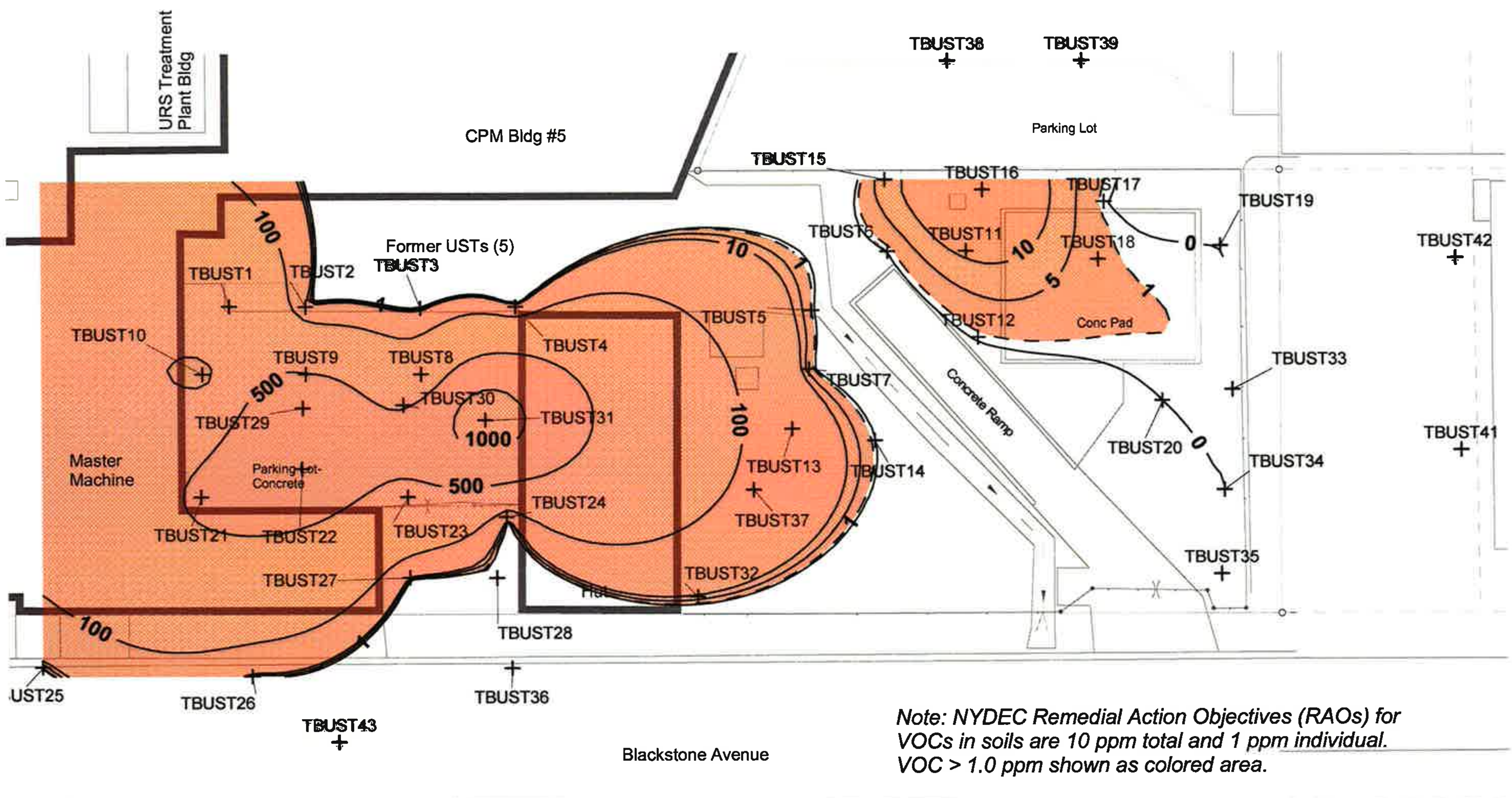


Note: NYDEC Remedial Action Objectives (RAOs) for VOCs in soils are 10 ppm total and 1 ppm individual. VOC > 1.0 ppm shown as colored area.

Essex Specialty Products, Inc.
Essex/Hope Site, Jamestown, NY
Chemical Oxidation Remedial Action Report
URS 41569123

UST Area- Shallow Soils
Ethylbenzene, mg/kg
Historic Data, 2003-2006

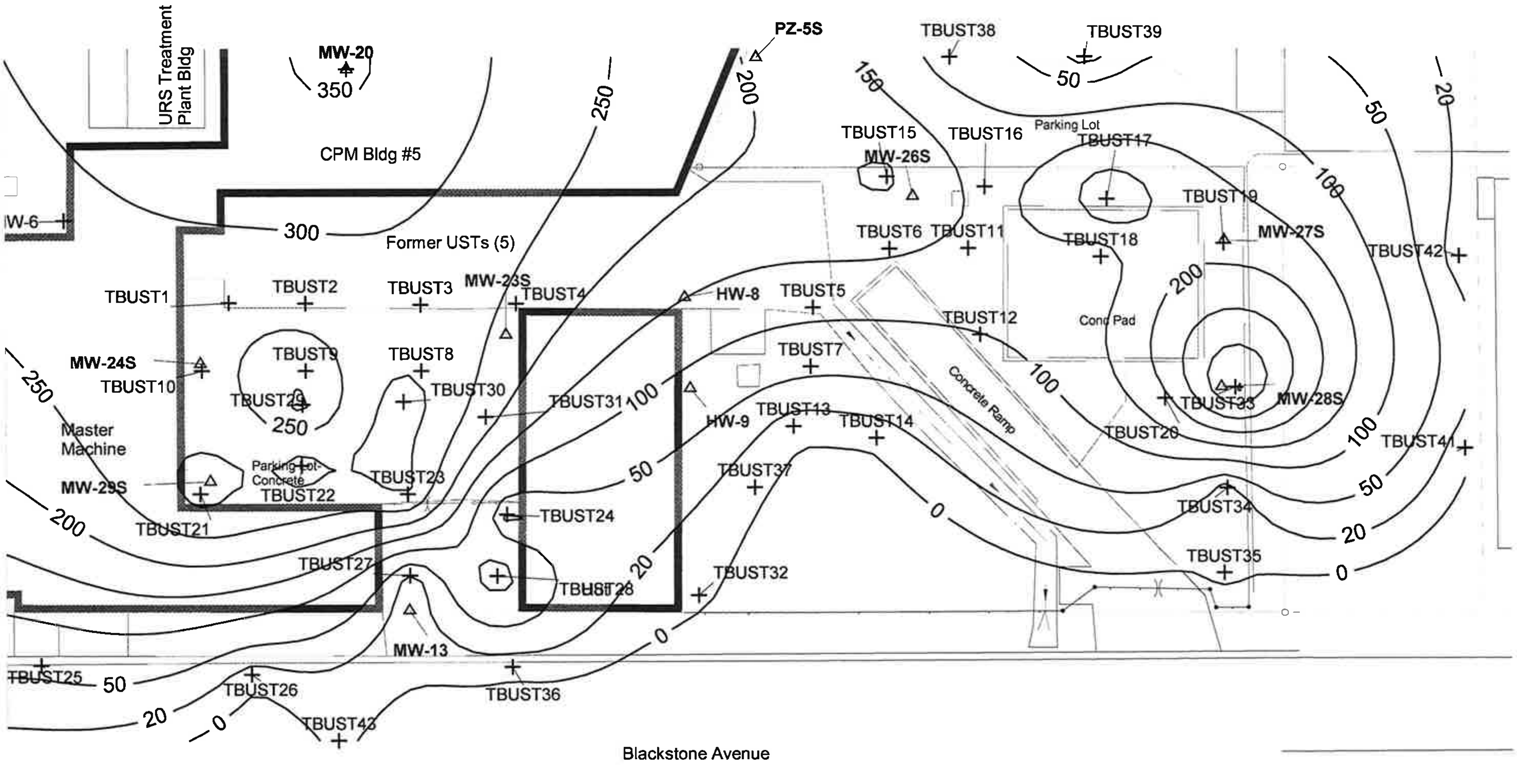
Figure 3-3



Essex Specialty Products, Inc.
Essex/Hope Site, Jamestown, NY
Chemical Oxidation Remedial Action Report
URS 41569123

UST Area- Shallow Soils
Total Xylenes, mg/kg
Historic Data, 2003-2006

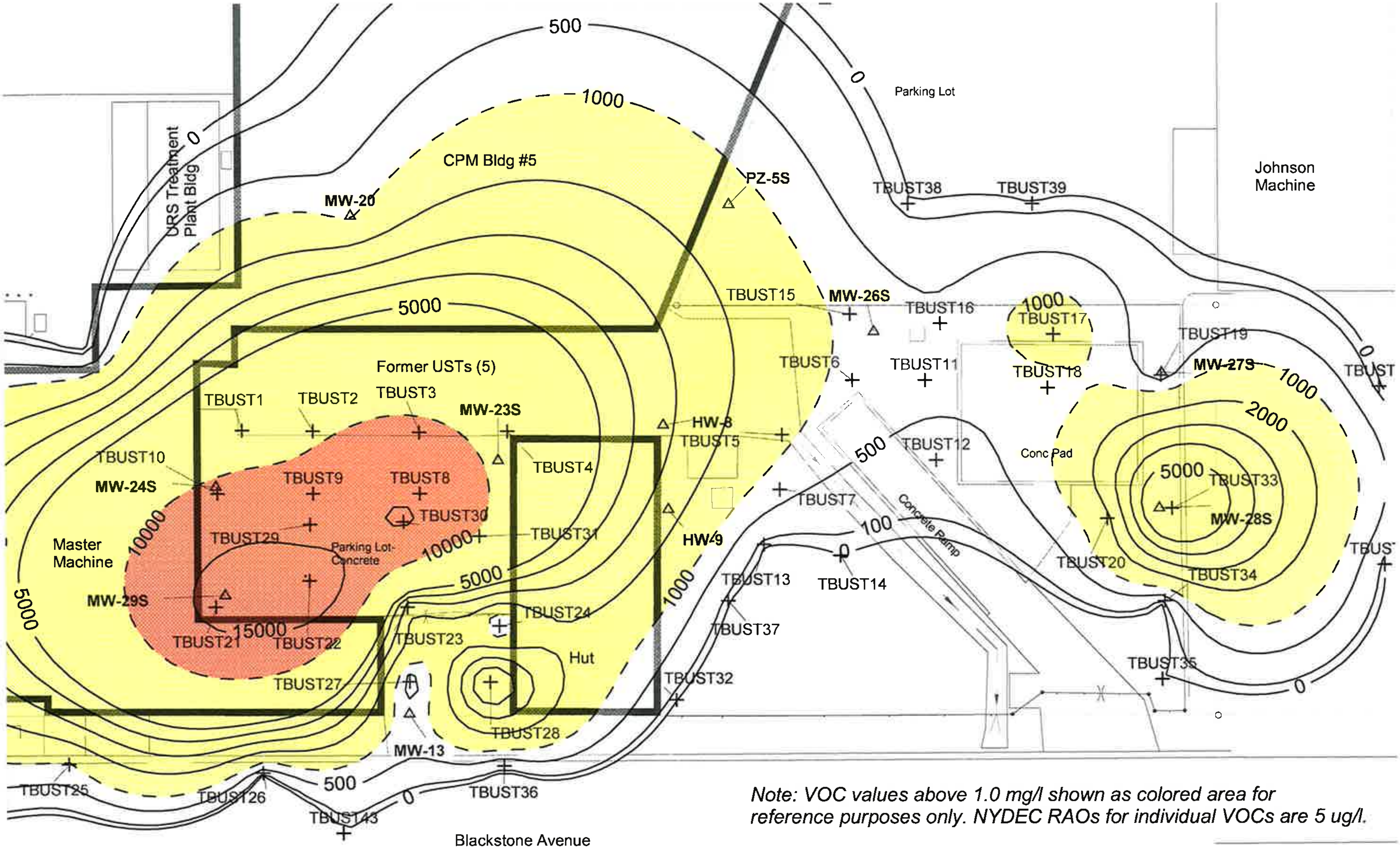
Figure 3-4



Essex Specialty Products, Inc.
Essex/Hope Site, Jamestown, NY
Chemical Oxidation Remedial Action Report
URS 41569123

UST Area- Shallow Groundwater
Cumene, ug/l
Historic Data, 2005-2006

Figure 3-5



Note: VOC values above 1.0 mg/l shown as colored area for reference purposes only. NYDEC RAOs for individual VOCs are 5 ug/l.

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sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
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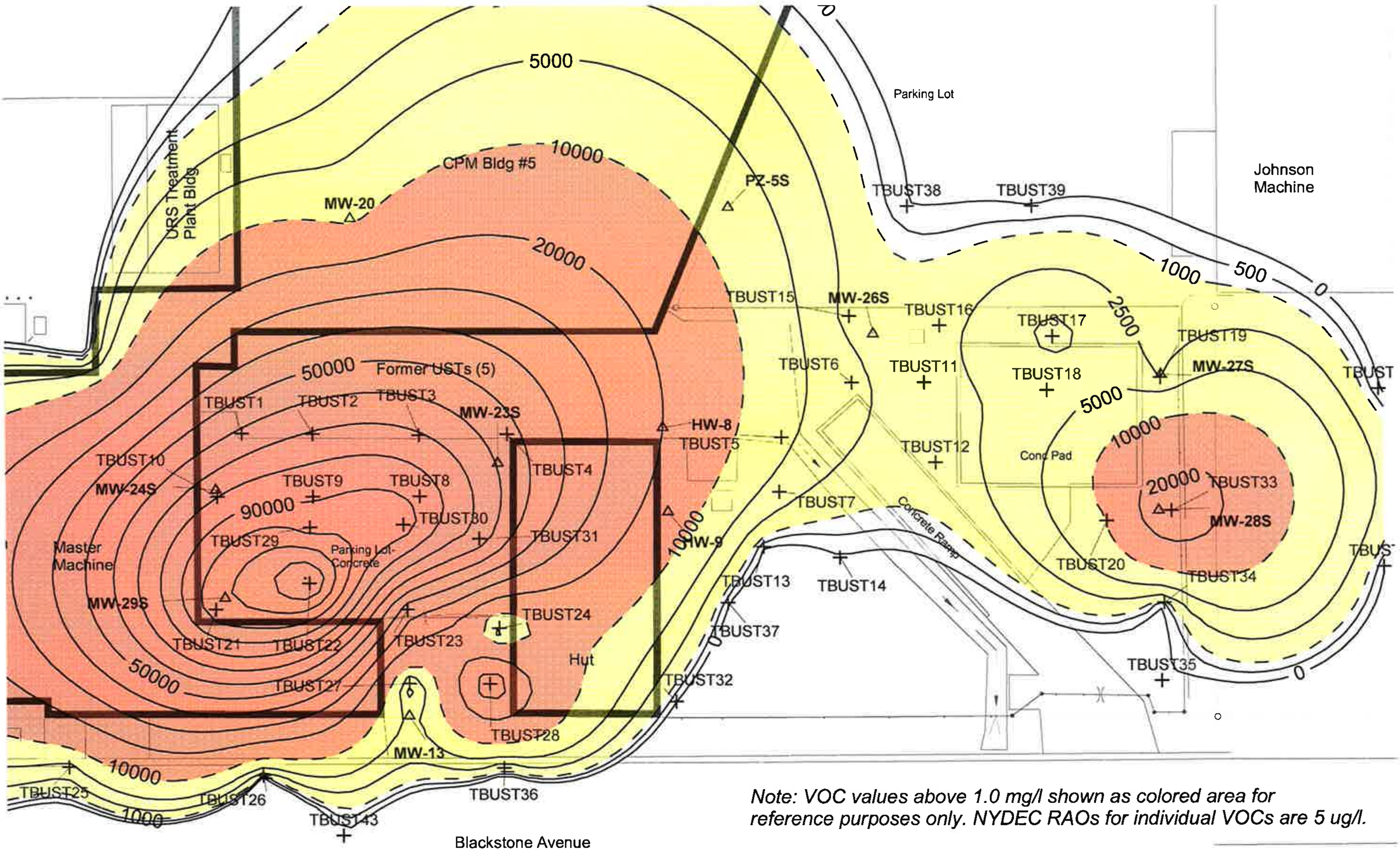
UST Area- Shallow Groundwater DP
Ethylbenzene, ug/l
Historic Data, 2005-2006

Figure 3-6



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sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
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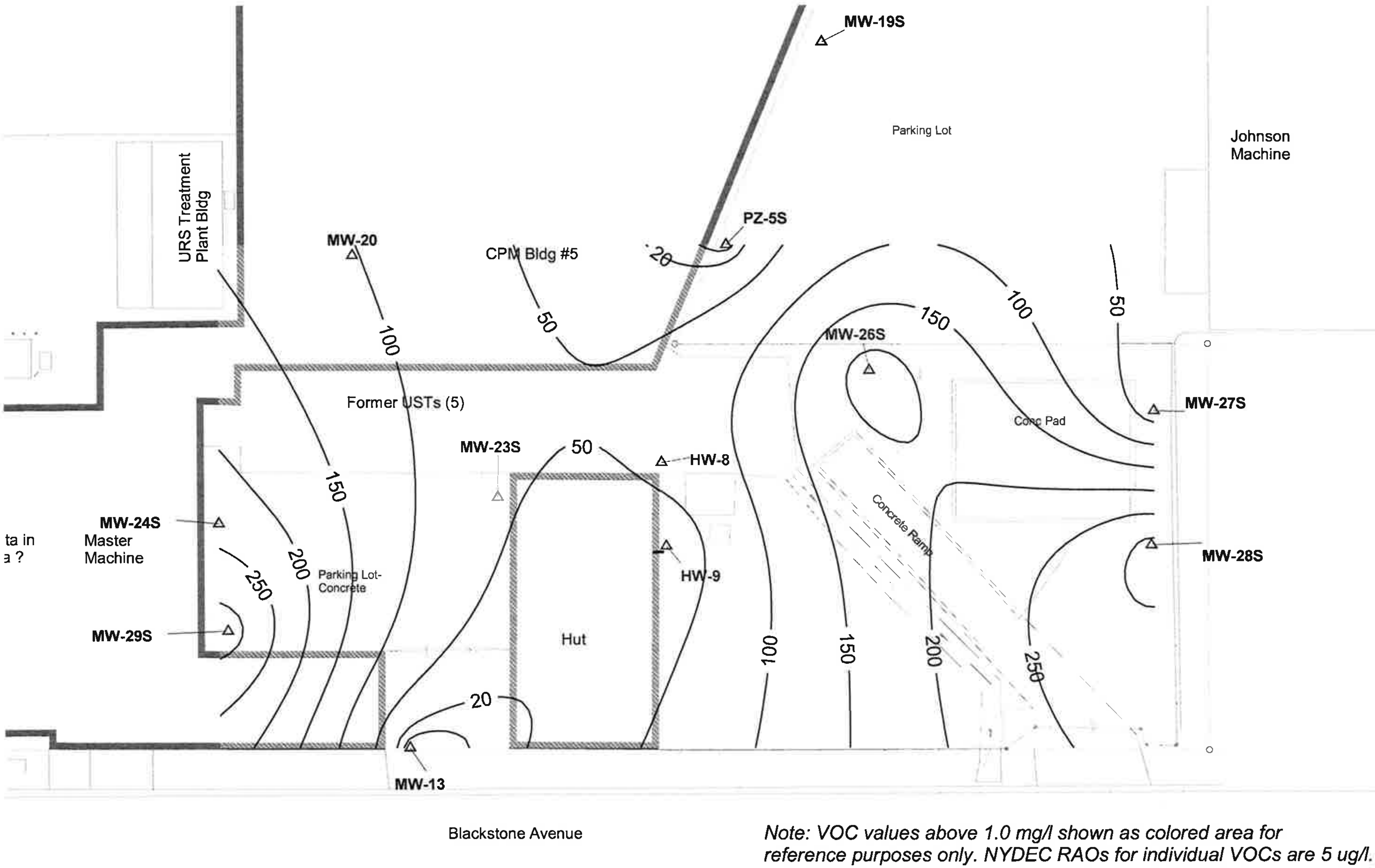
UST Area- Shallow Groundwater DP
Total Xylenes, ug/l
Historic Baseline, 2005-2006

Figure 3-7

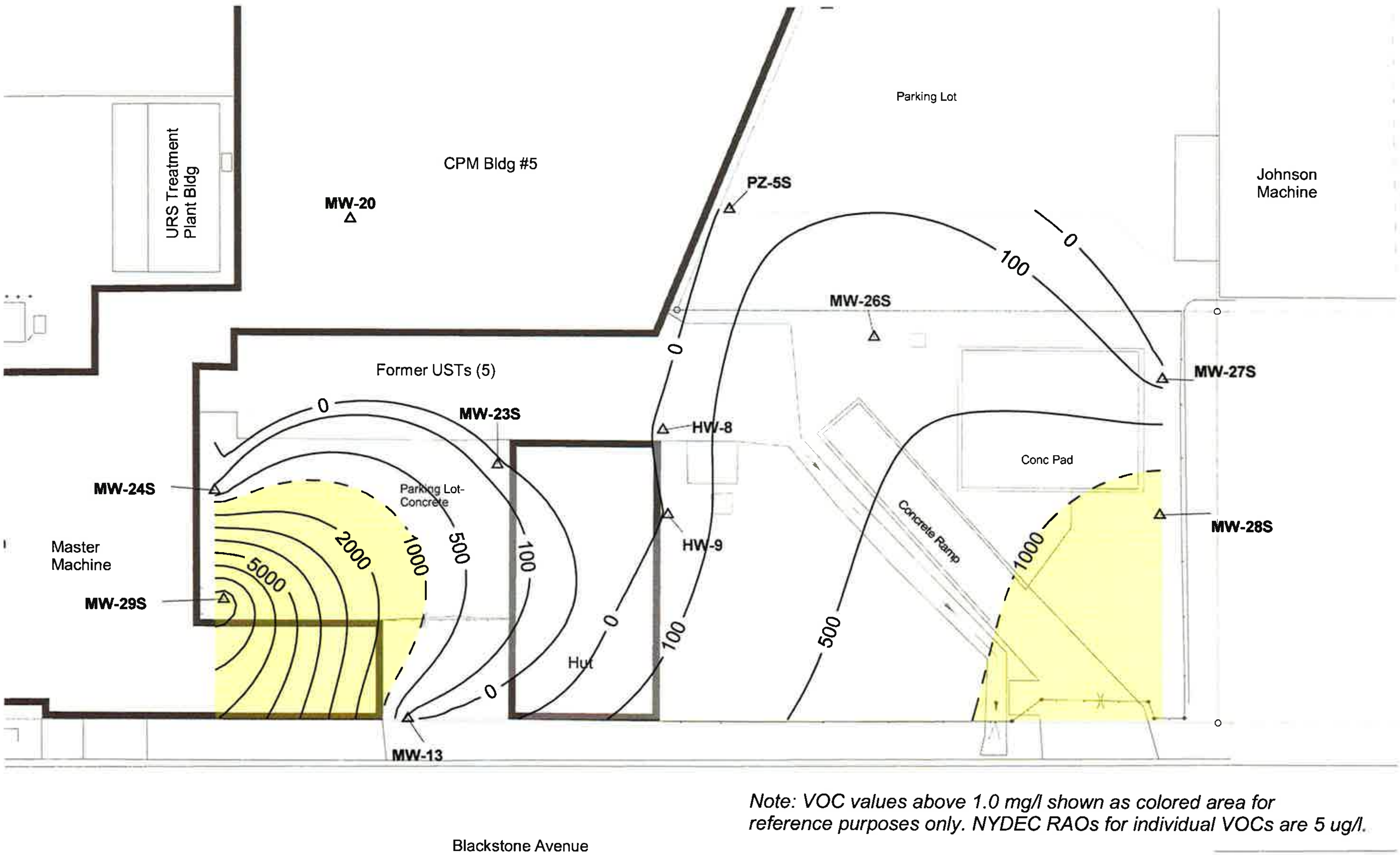


Note: VOC values above 1.0 mg/l shown as colored area for reference purposes only. NYDEC RAOs for individual VOCs are 5 ug/l.

sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
RS 41569123

UST Area-Shallow Groundwater
Cumene (Isopropylbenzene), ug/l
Baseline, 11/3/11

Figure 3-8



Note: VOC values above 1.0 mg/l shown as colored area for reference purposes only. NYDEC RAOs for individual VOCs are 5 ug/l.

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sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
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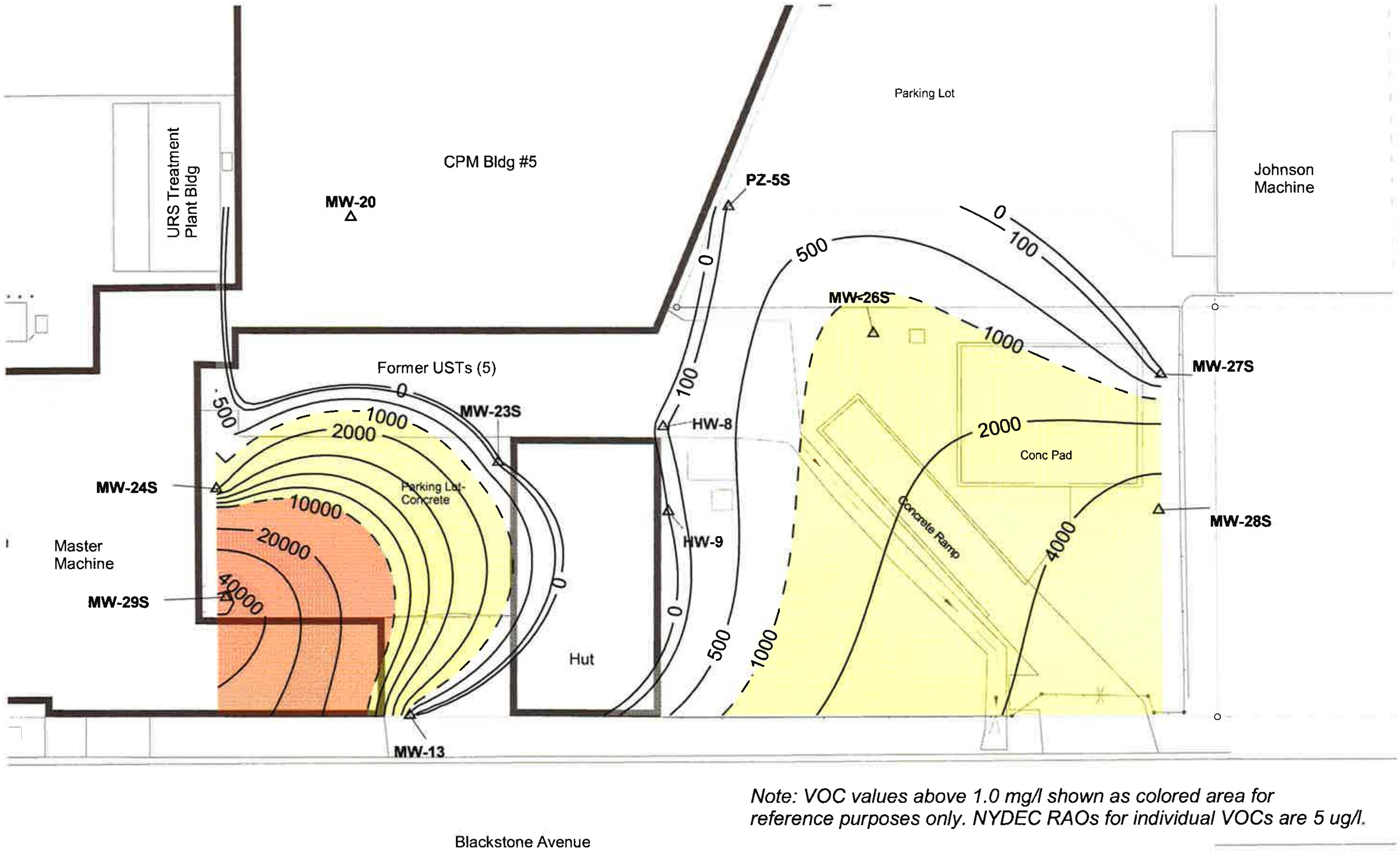
UST Area-Shallow Groundwater
Ethylbenzene, ug/l
Baseline, 11/3/11

Figure 3-9

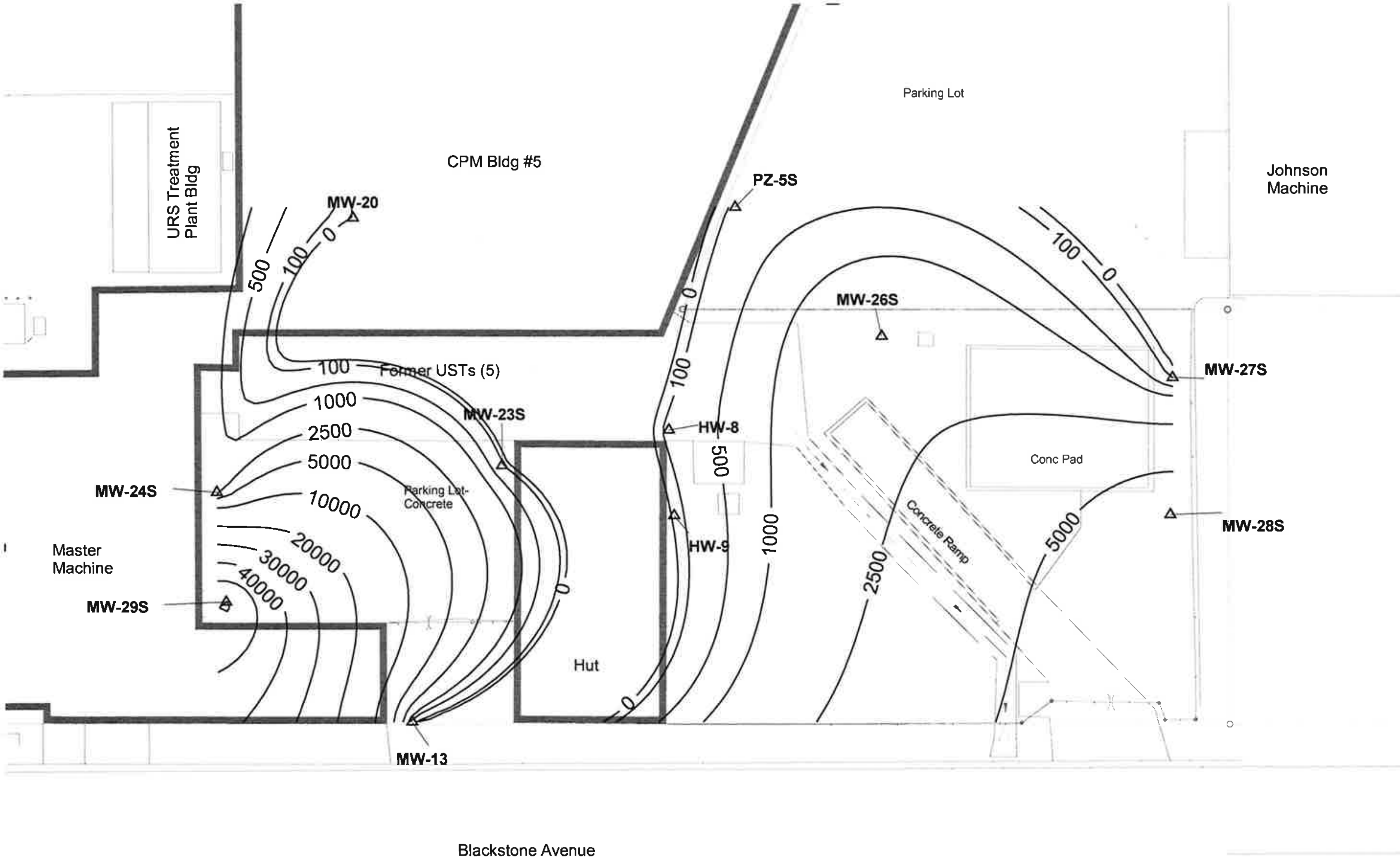


Note: VOC values above 1.0 mg/l shown as colored area for reference purposes only. NYDEC RAOs for individual VOCs are 5 ug/l.

sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
ꞦS 41569123

UST Area-Shallow Groundwater
Xylenes, Total, ug/l
Baseline, 11/3/11

Figure 3-10



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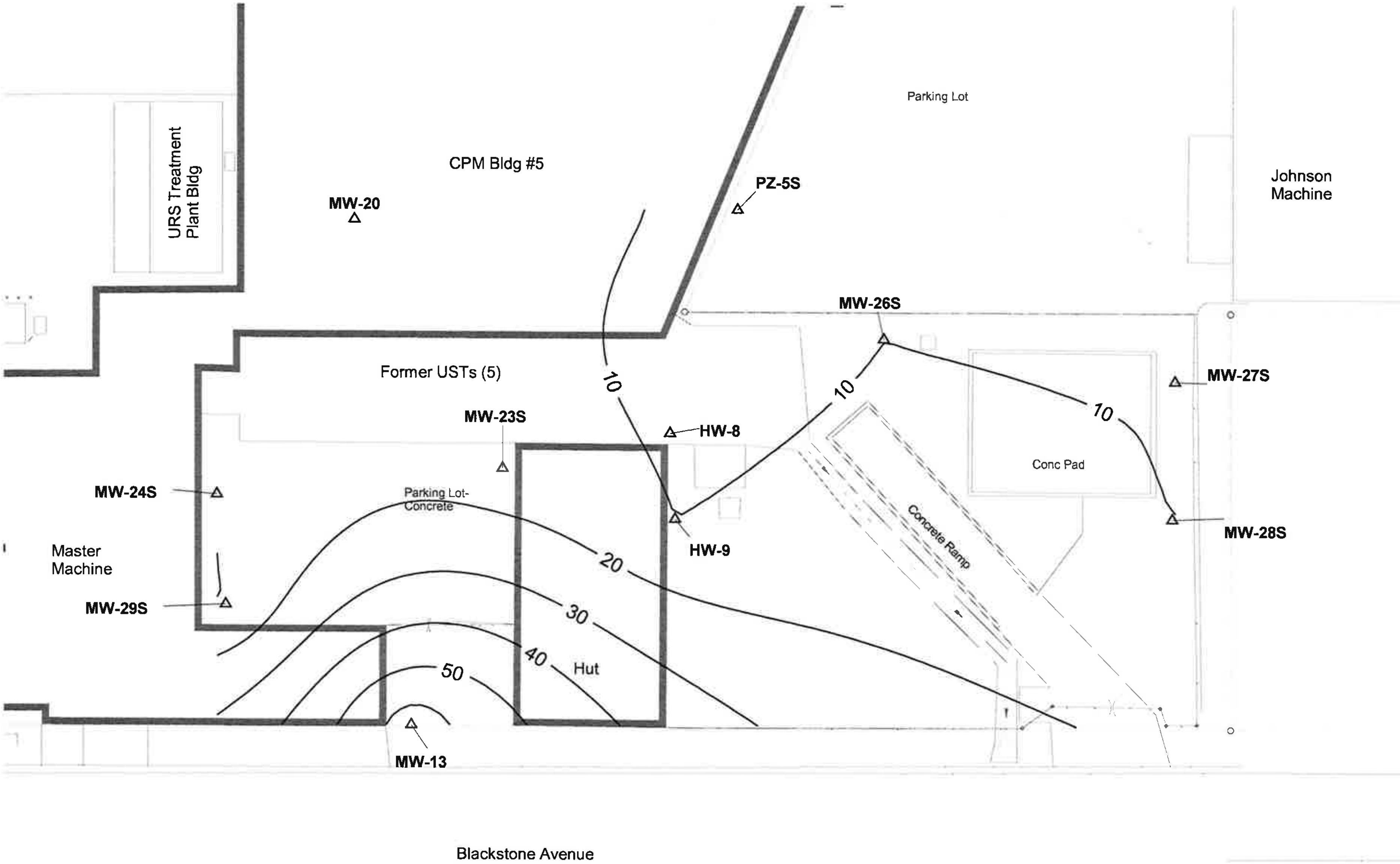
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
RS 41569123

UST Area-Shallow Groundwater
Total CTEX, ug/l
Baseline, 11/3/11

Figure 3-11



sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
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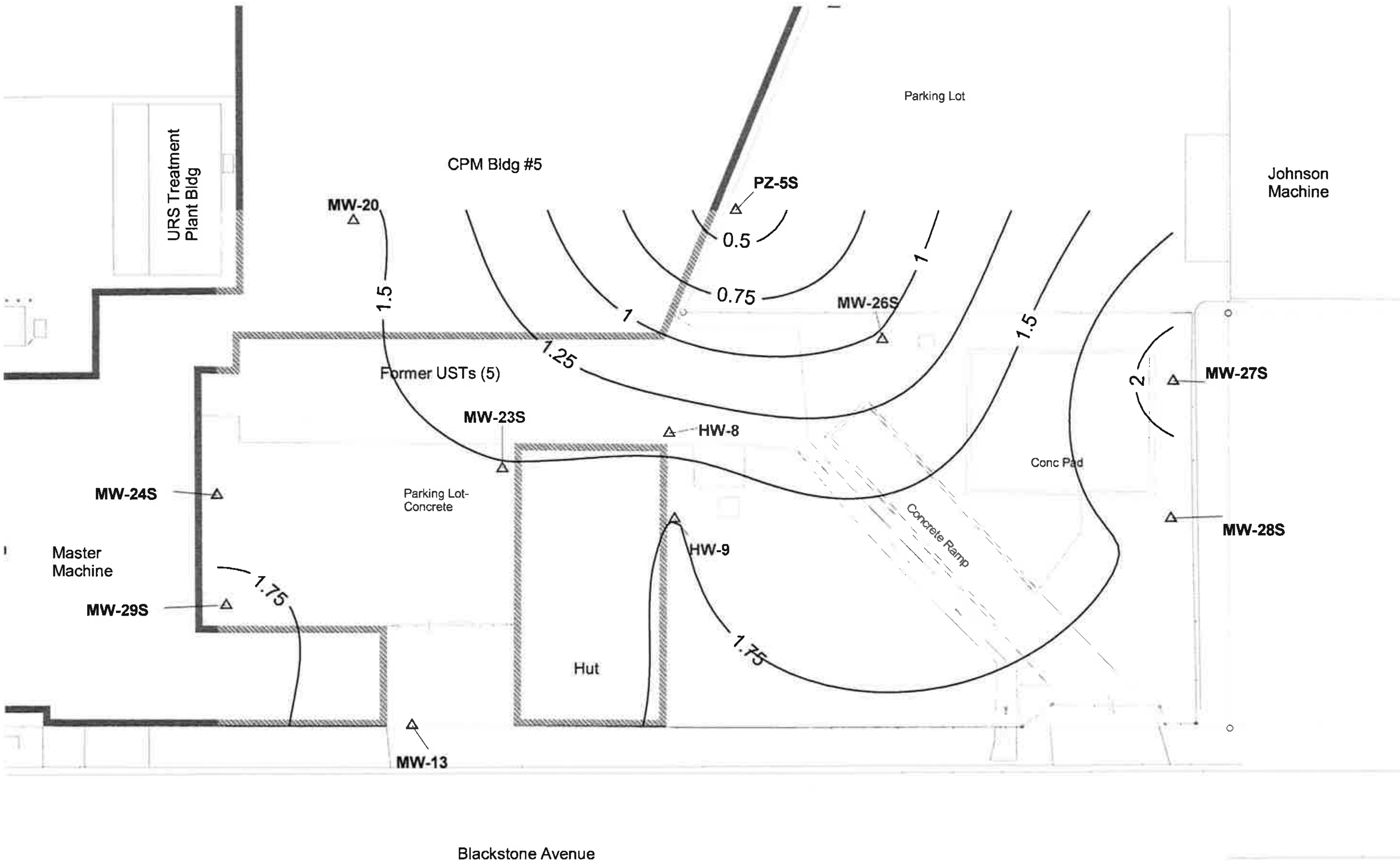
UST Area-Shallow Groundwater
Sulfate, mg/l
Baseline, 11/3/11

Figure 3-12



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emical Oxidation Remedial Action Report
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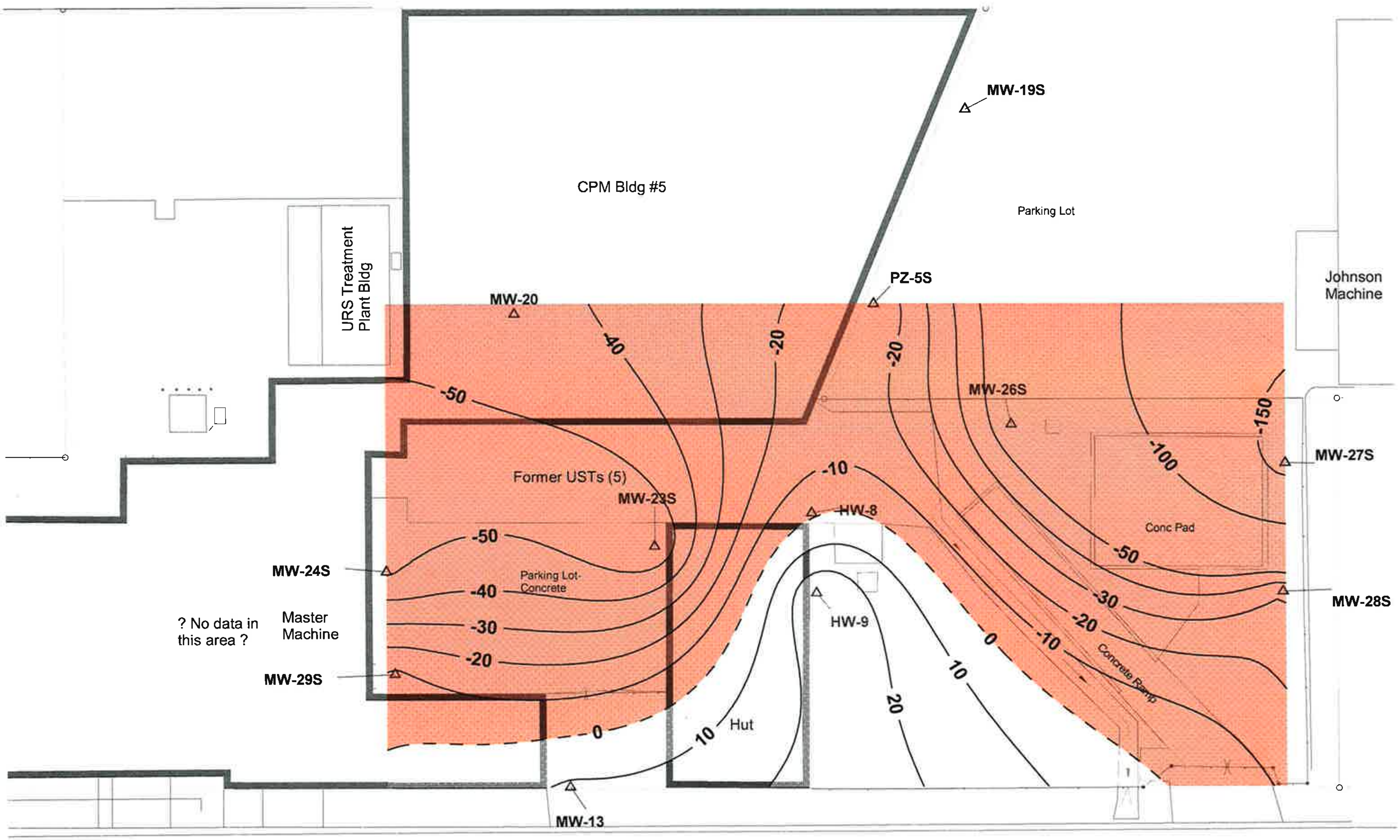
UST Area-Shallow Groundwater
Fe+3/Fe+2 Ratio
Baseline, 11/3/11

Figure 3-14

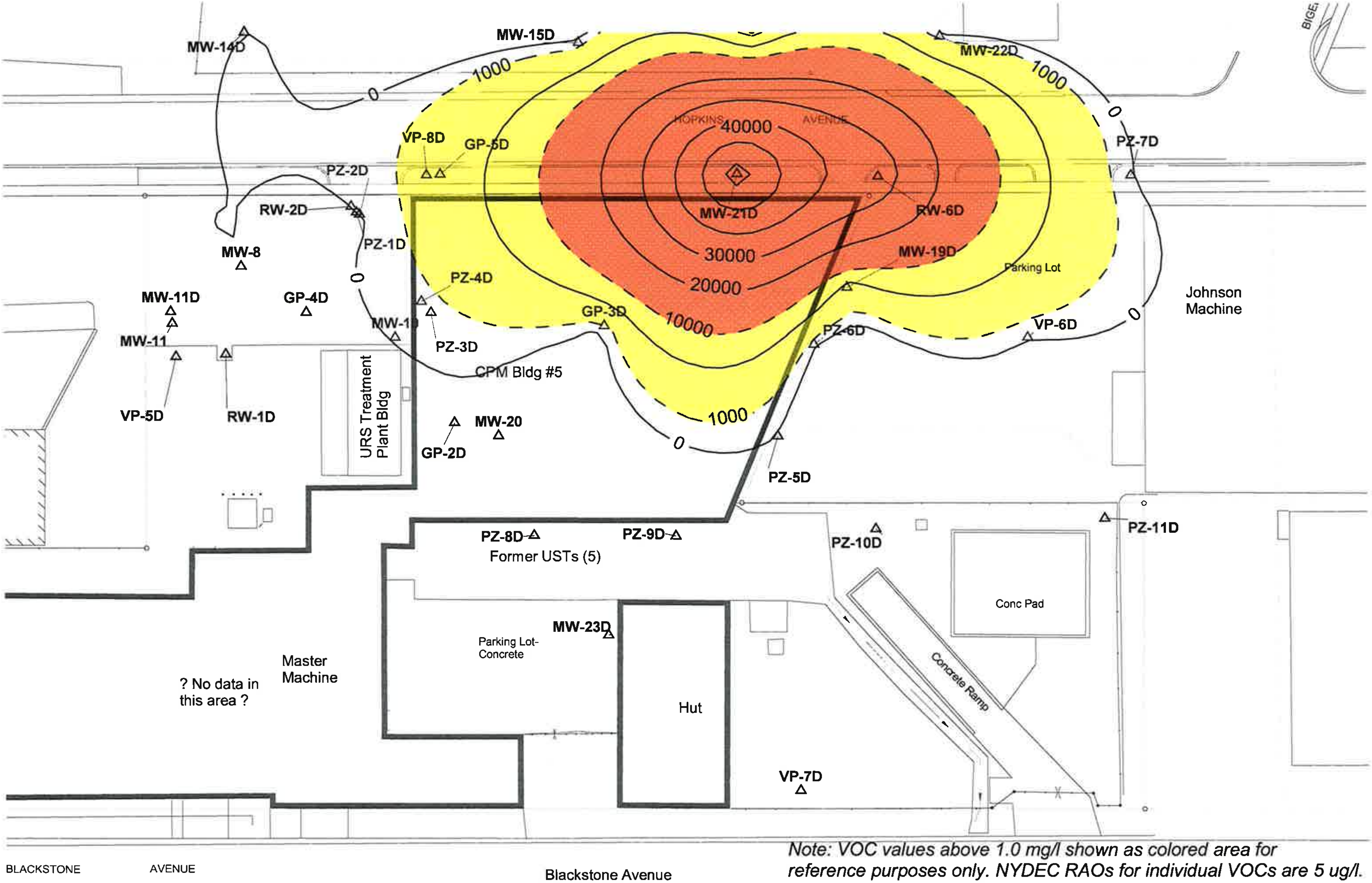


Note: Negative ORP (reducing conditions) shown as colored (red) area.

Essex Specialty Products, Inc.
Essex/Hope Site, Jamestown, NY
Chemical Oxidation Remedial Action Report
URS 41569123

UST Area-Shallow Groundwater
ORP, mV
Baseline, 11/3/11

Figure 3-15

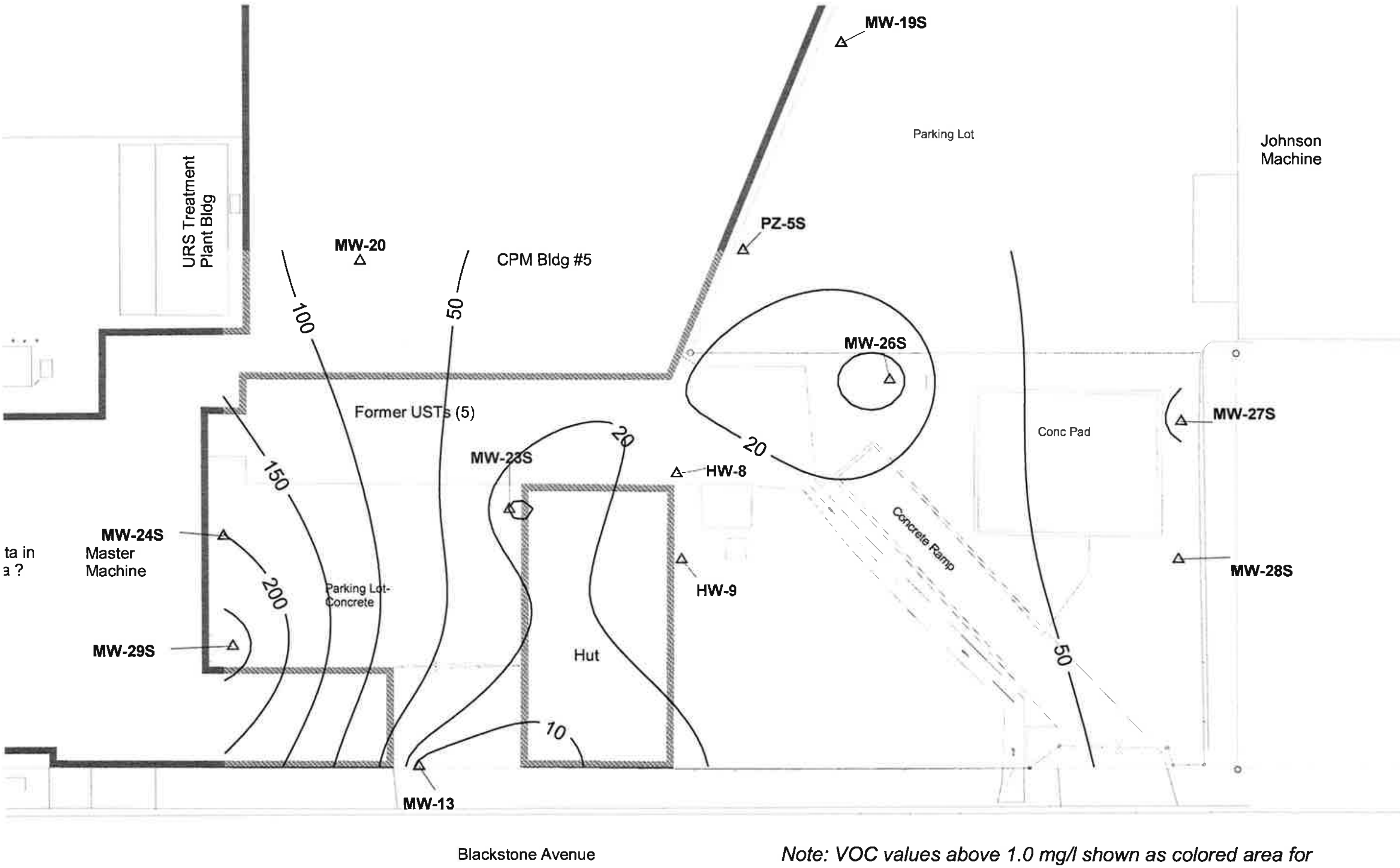


Note: VOC values above 1.0 mg/l shown as colored area for reference purposes only. NYDEC RAOs for individual VOCs are 5 ug/l.

Essex Specialty Products, Inc.
Essex/Hope Site, Jamestown, NY
Chemical Oxidation Remedial Action Report
URS 41569123

RW-6D Area- Deep Groundwater
Acetone, ug/l
Baseline, 11-12/11

Figure 3-16

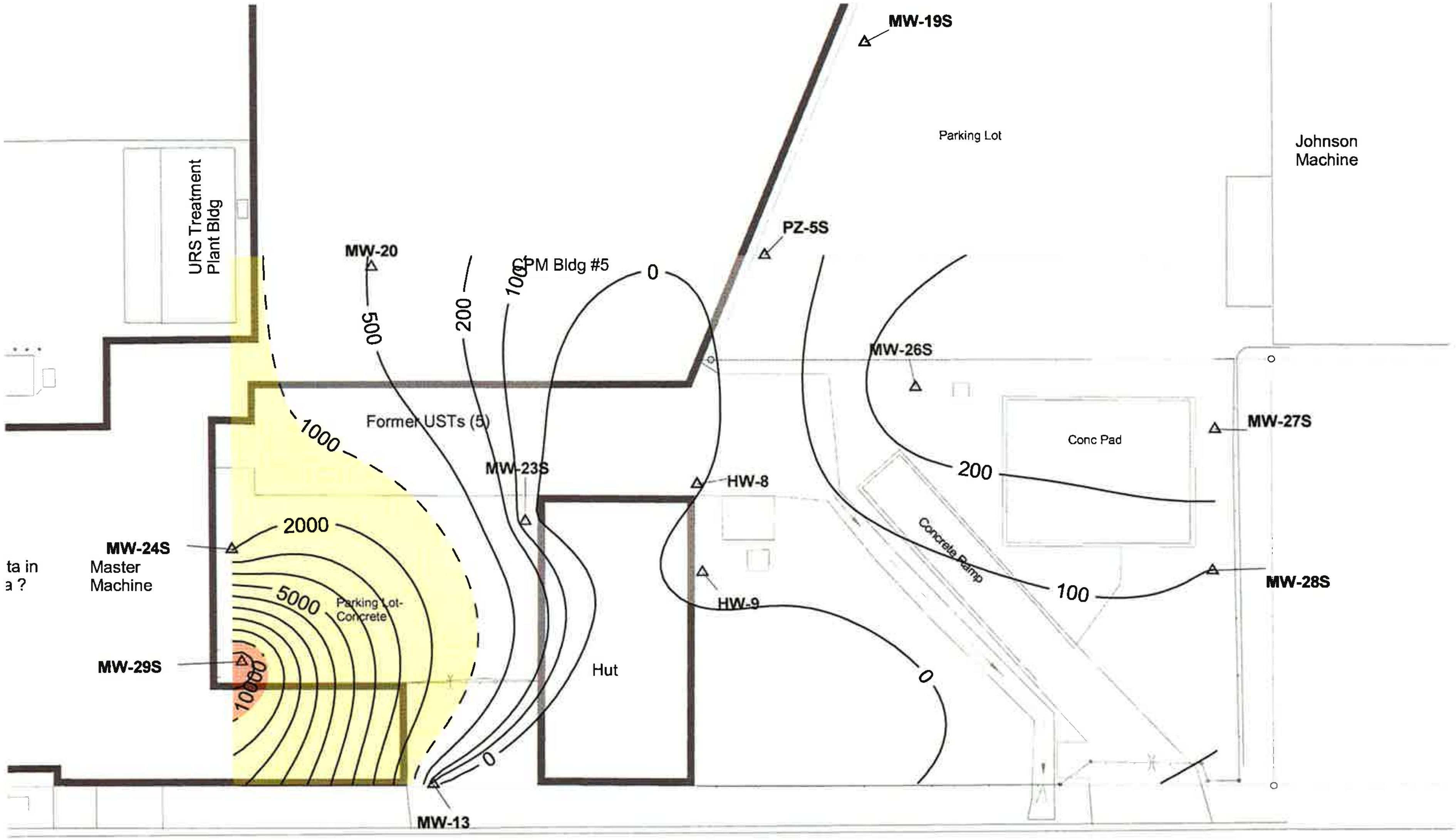


Note: VOC values above 1.0 mg/l shown as colored area for reference purposes only. NYDEC RAOs for individual VOCs are 5 ug/l.

sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
RS 41569123

UST Area-Shallow Groundwater
Cumene (Isopropylbenzene), ug/l
Round 3, 6/13/12

Figure 3-17



Note: VOC values above 1.0 mg/l shown as colored area for reference purposes only. NYDEC RAOs for individual VOCs are 5 ug/l.

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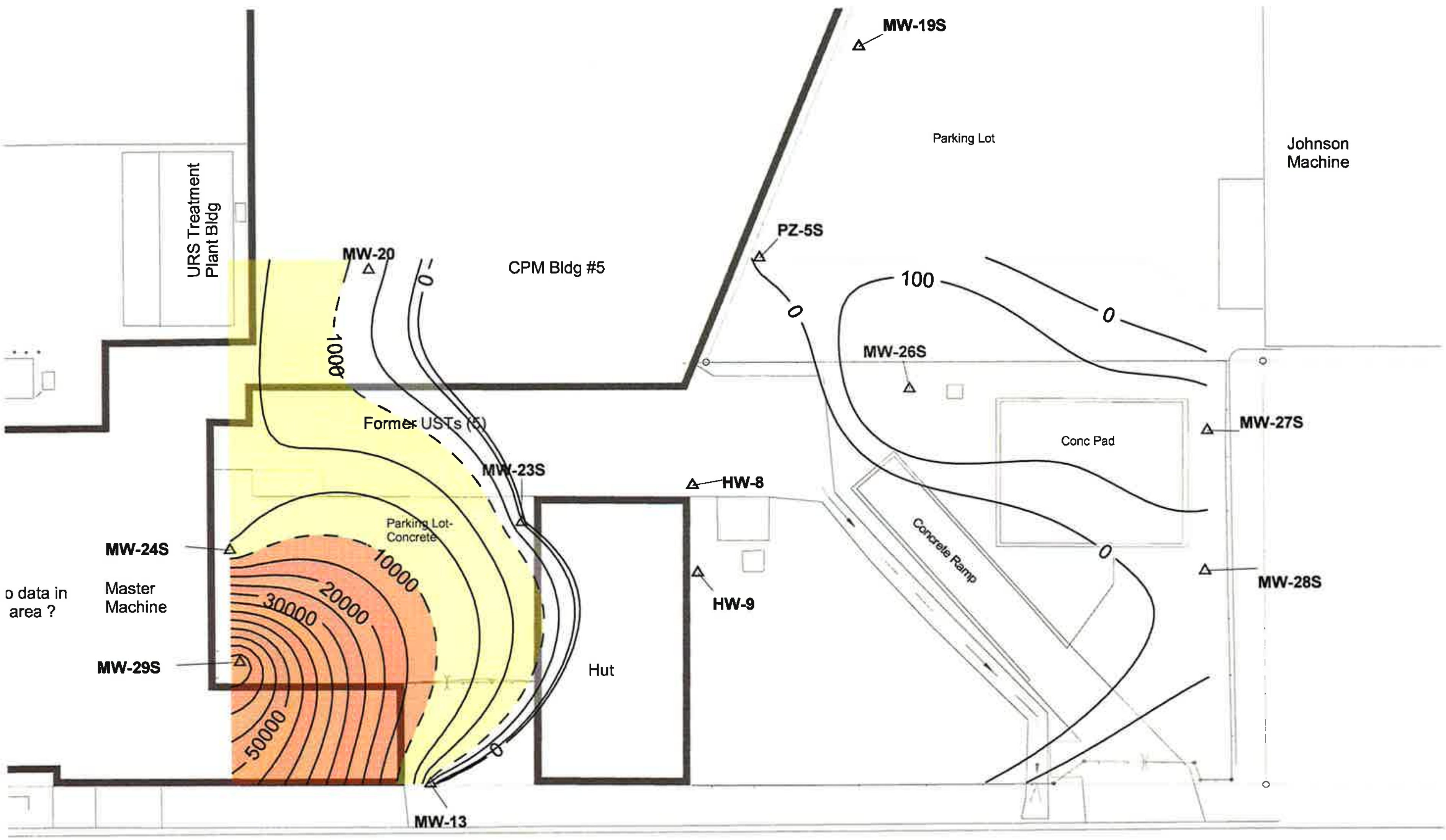
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
{S 41569123

UST Area-Shallow Groundwater
Ethylbenzene, ug/l
Round 3, 6/13/12

Figure 3-18

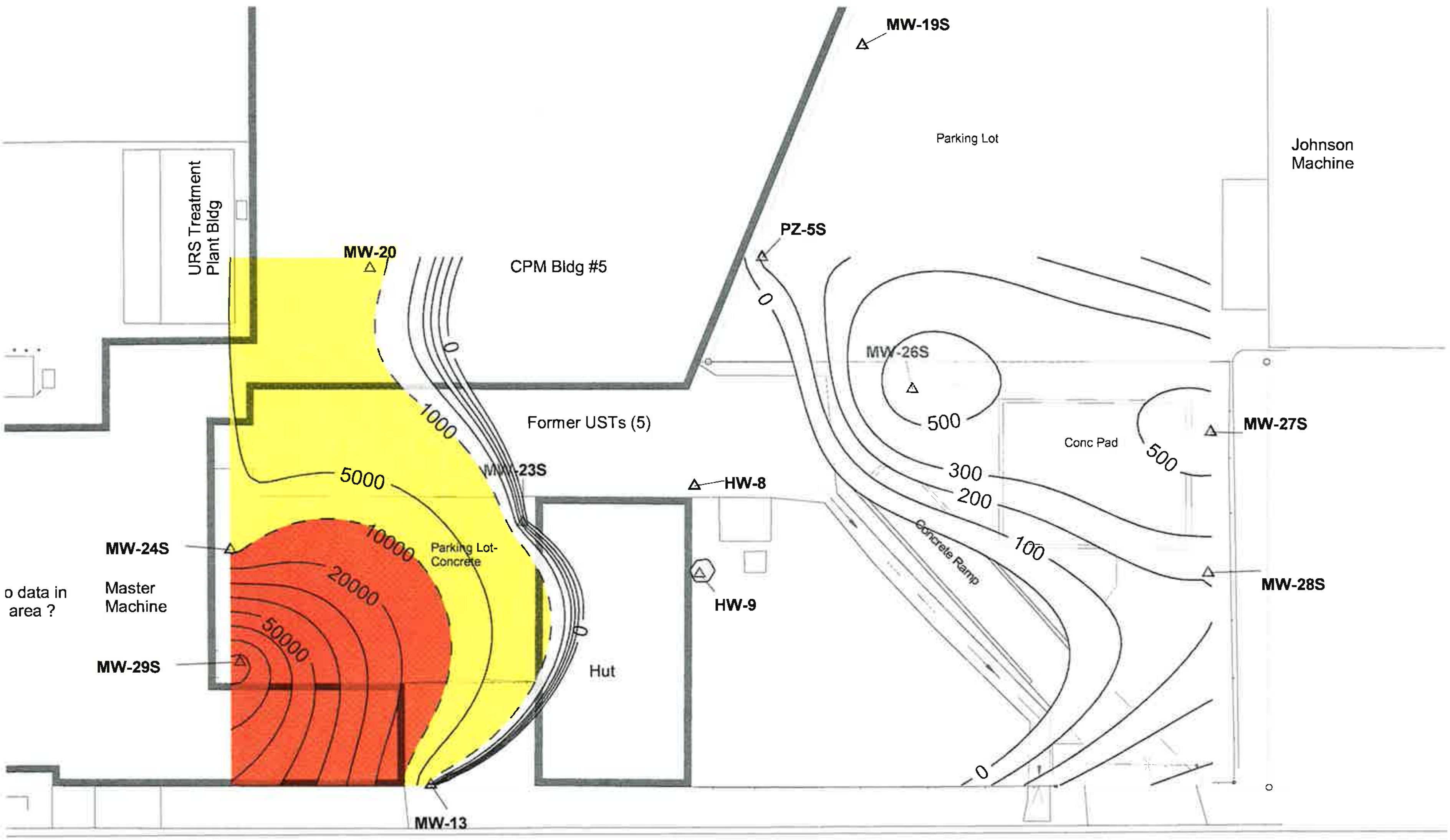


Note: VOC values above 1.0 mg/l shown as colored area for reference purposes only. NYDEC RAOs for individual VOCs are 5 ug/l.

sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
:S 41569123

UST Area-Shallow Groundwater
Xylenes, Total, ug/l
Round 3, 6/13/12

Figure 3-19



Note: VOC values above 1.0 mg/l shown as colored area for reference purposes only. NYDEC RAOs for individual VOCs are 5 ug/l.

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sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
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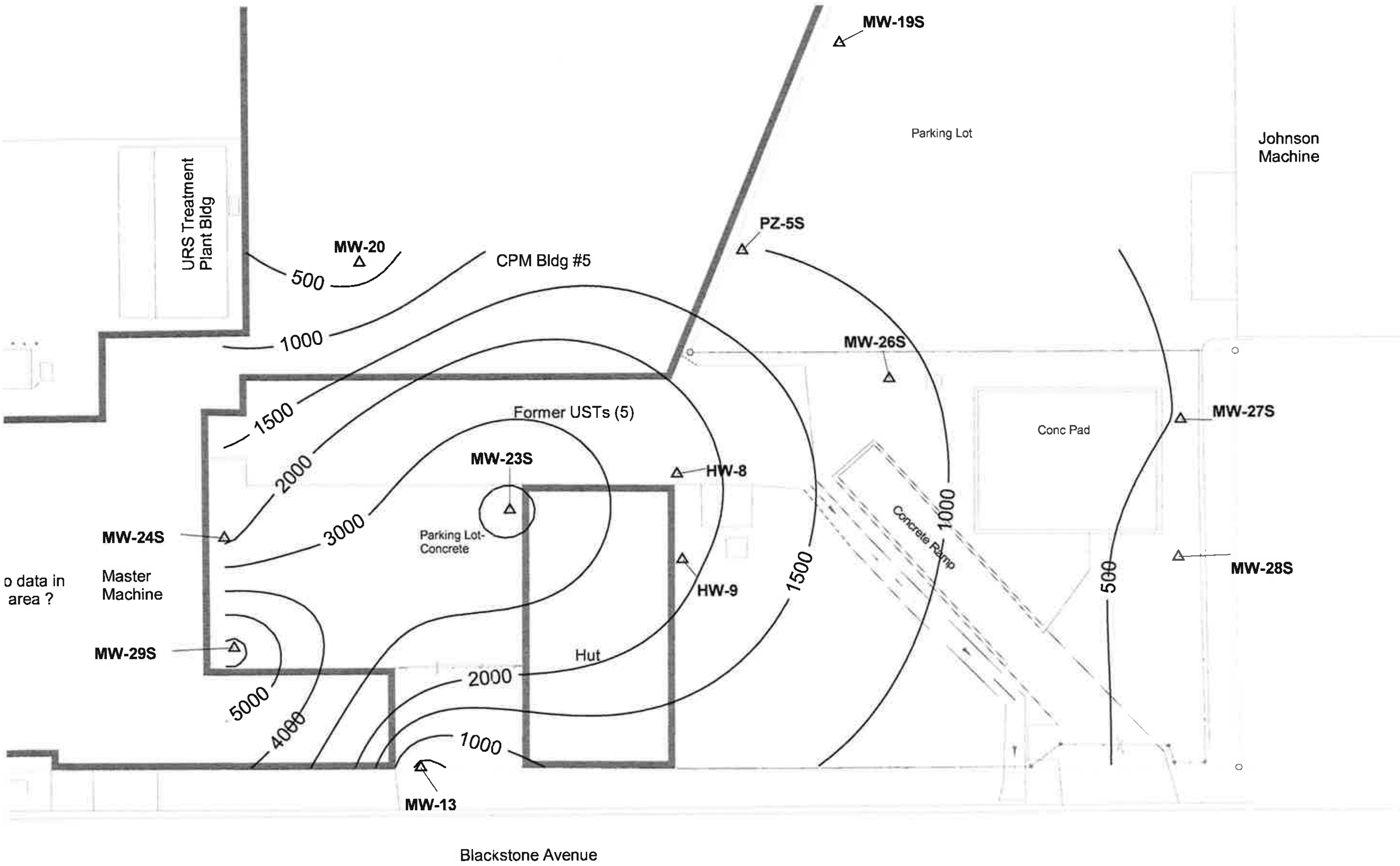
UST Area-Shallow Groundwater
Total CTEX, ug/l
Round 3, 6/13/12

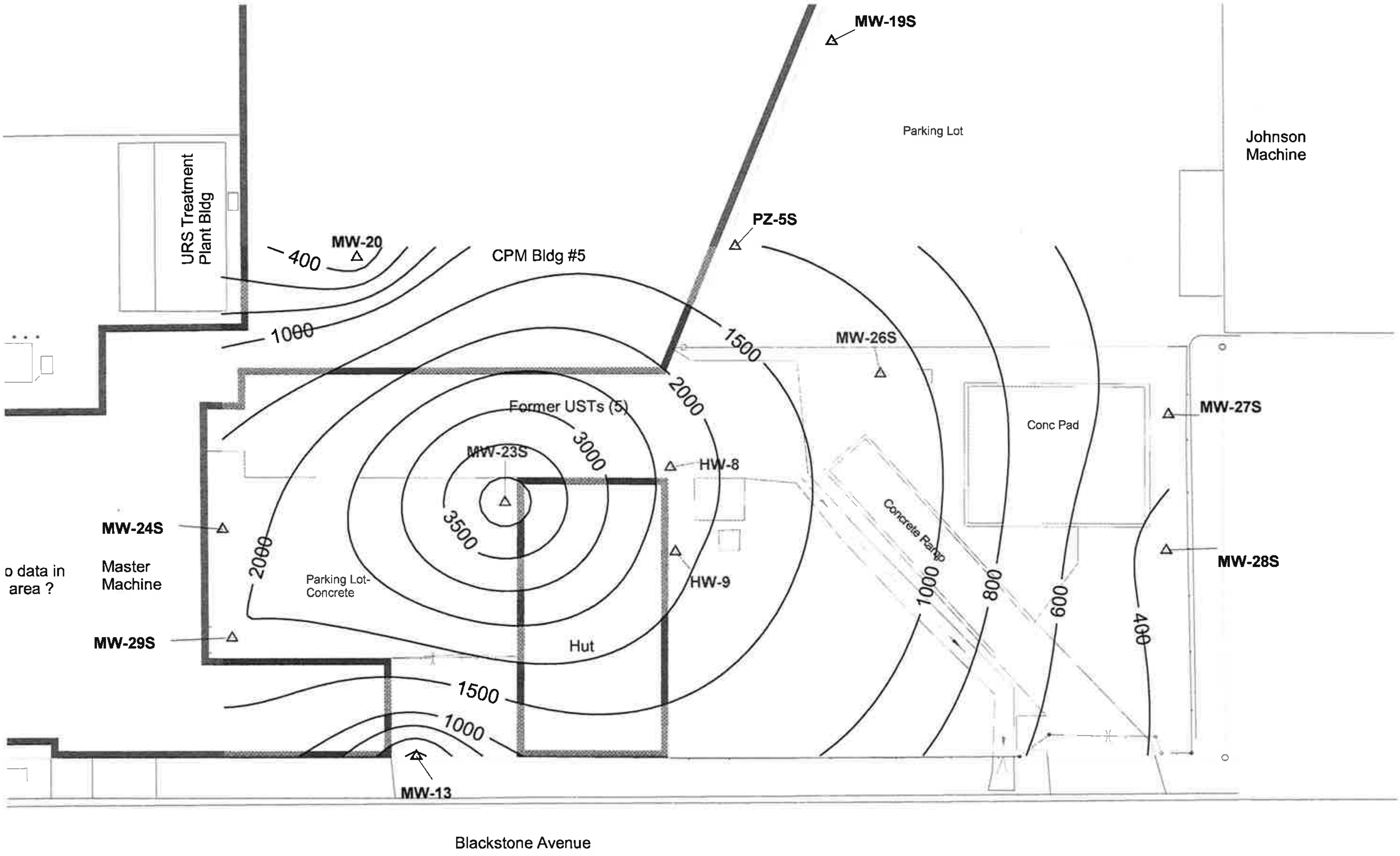
Figure 3-20



sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
ꞮS 41569123

UST Area-Shallow Groundwater
Sulfate, mg/l
Round 3, 6/13/12

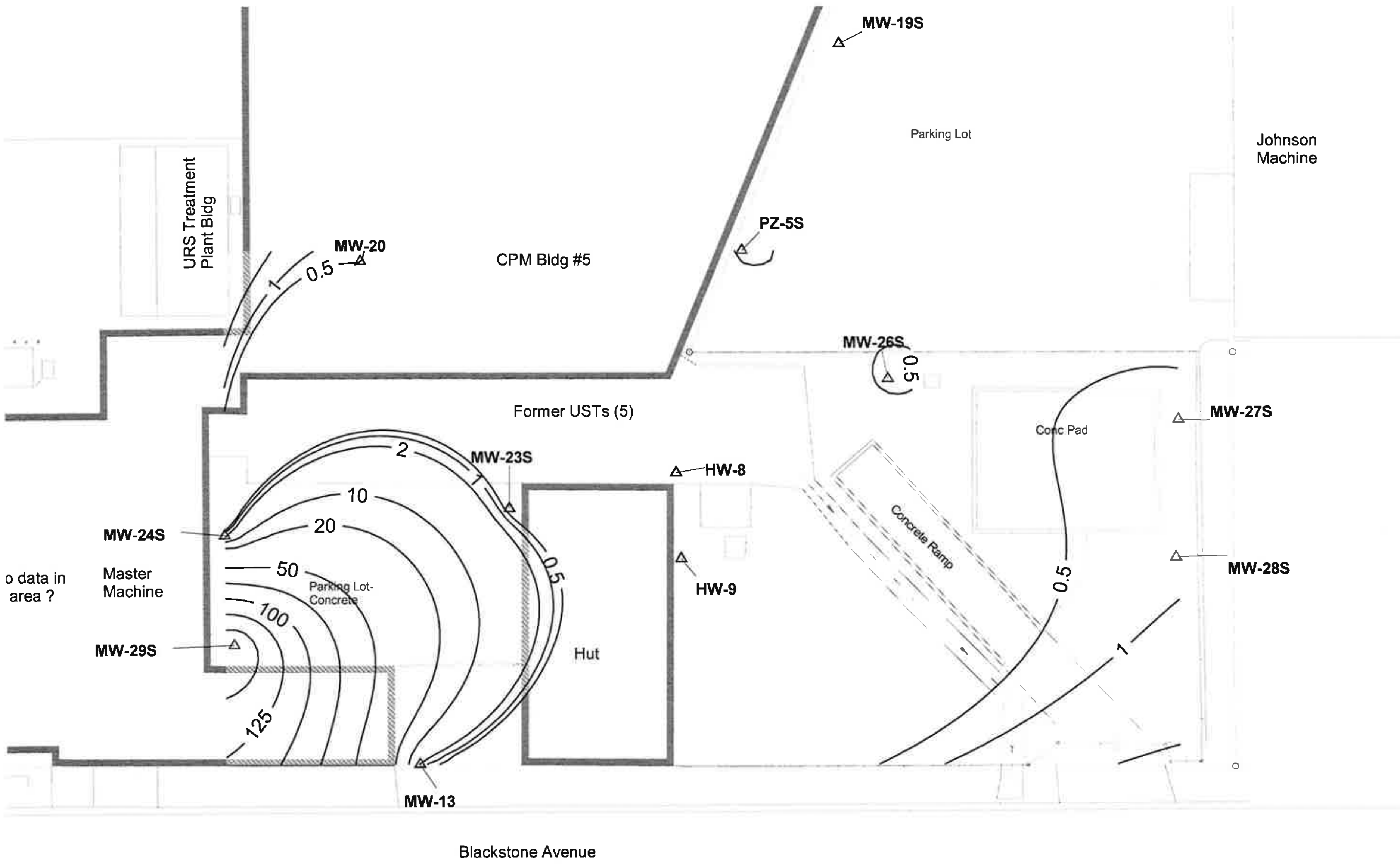
Figure 3-21



sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
ꓤS 41569123

UST Area-Shallow Groundwater
Sulfate /Sulfide Ratio
Round 3, 6/13/12

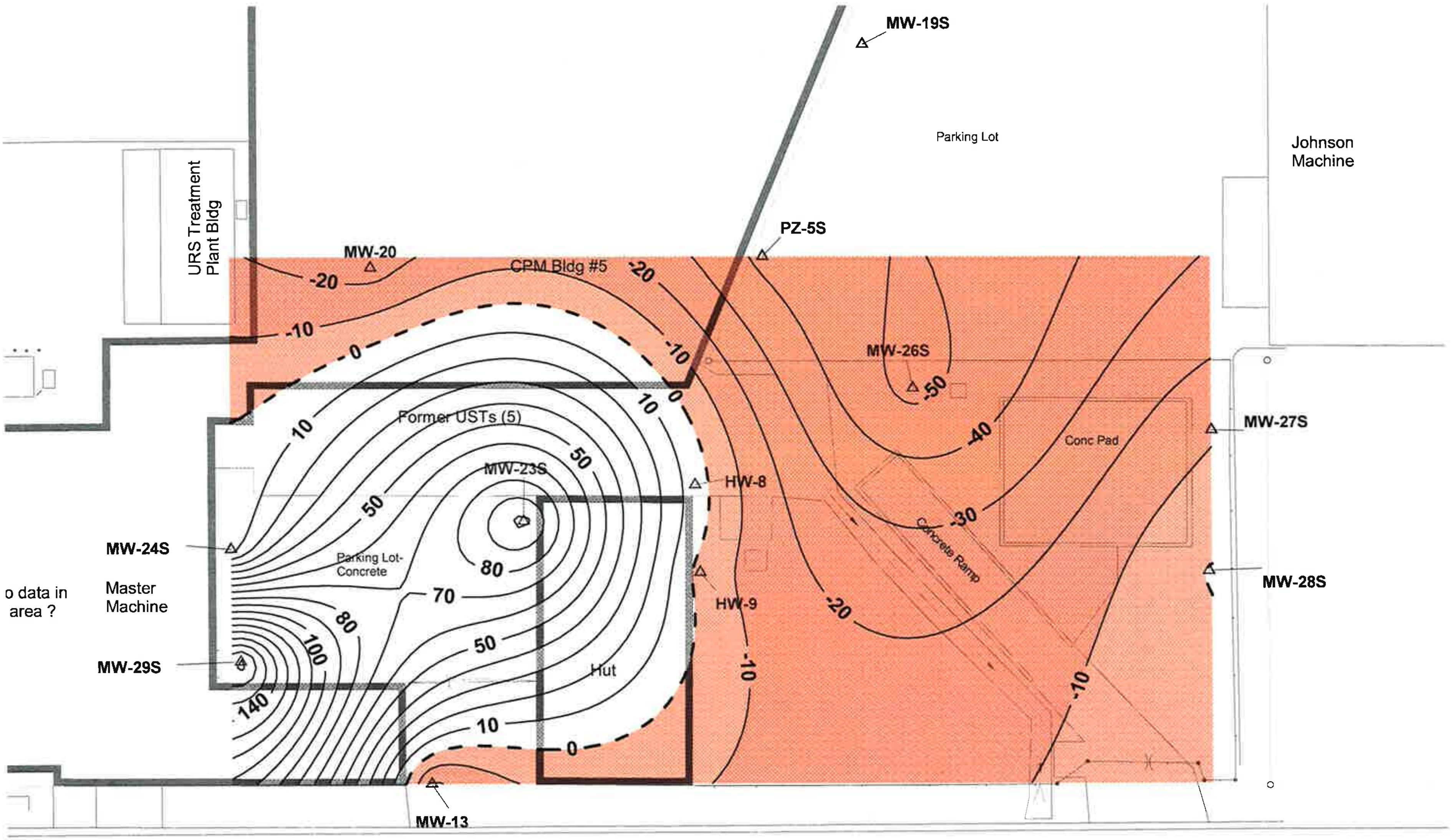
Figure 3-22



sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
ꞦS 41569123

UST Area-Shallow Groundwater
Fe+3/Fe+2 Ratio
Round 3, 6/13/12

Figure 3-23



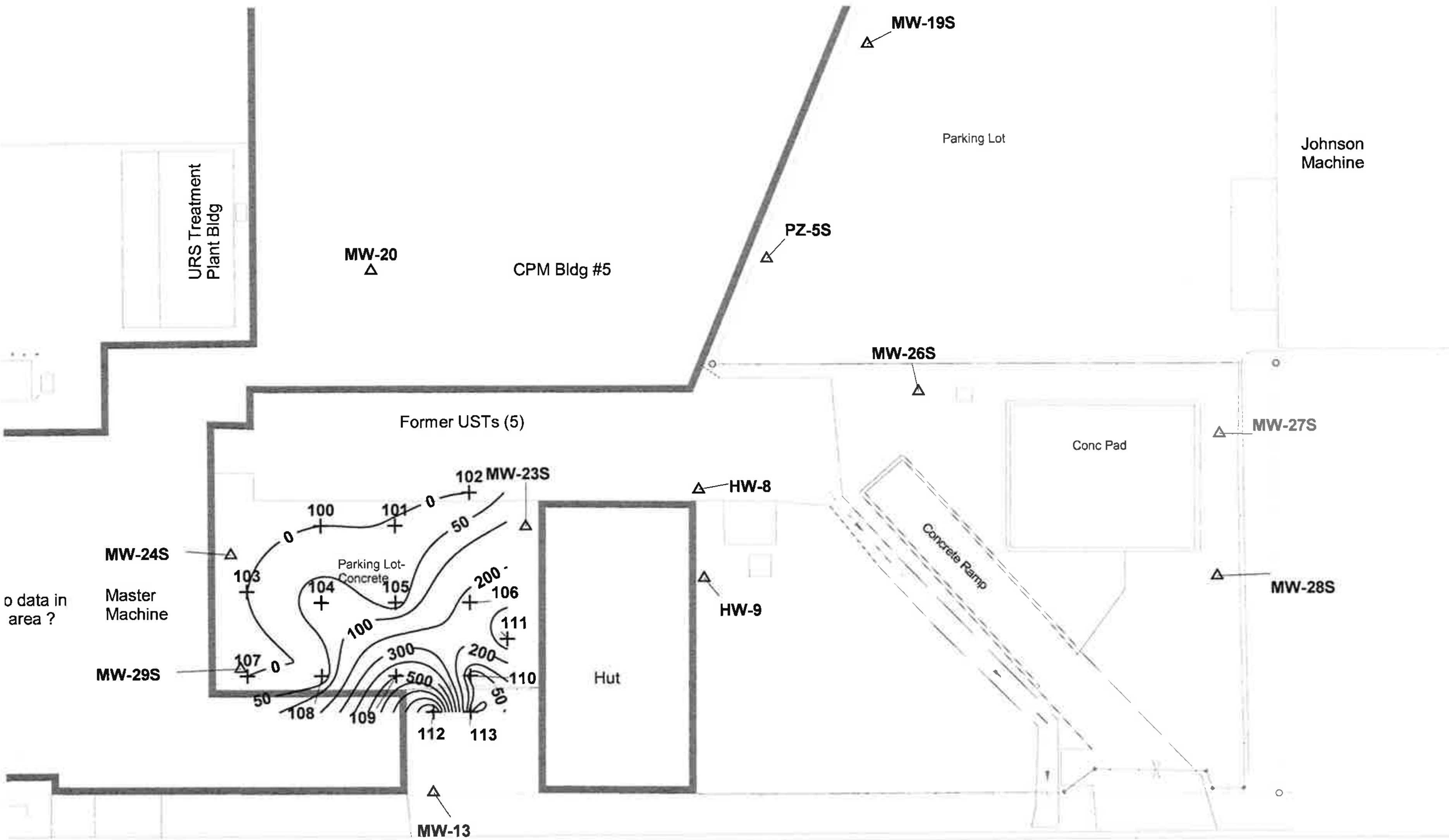
Blackstone Avenue

Note: Negative ORP (reducing conditions) shown as colored (red) area.

sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
ꓤS 41569123

UST Area-Shallow Groundwater
ORP, mV
Round 3, 6/13/12

Figure 3-24

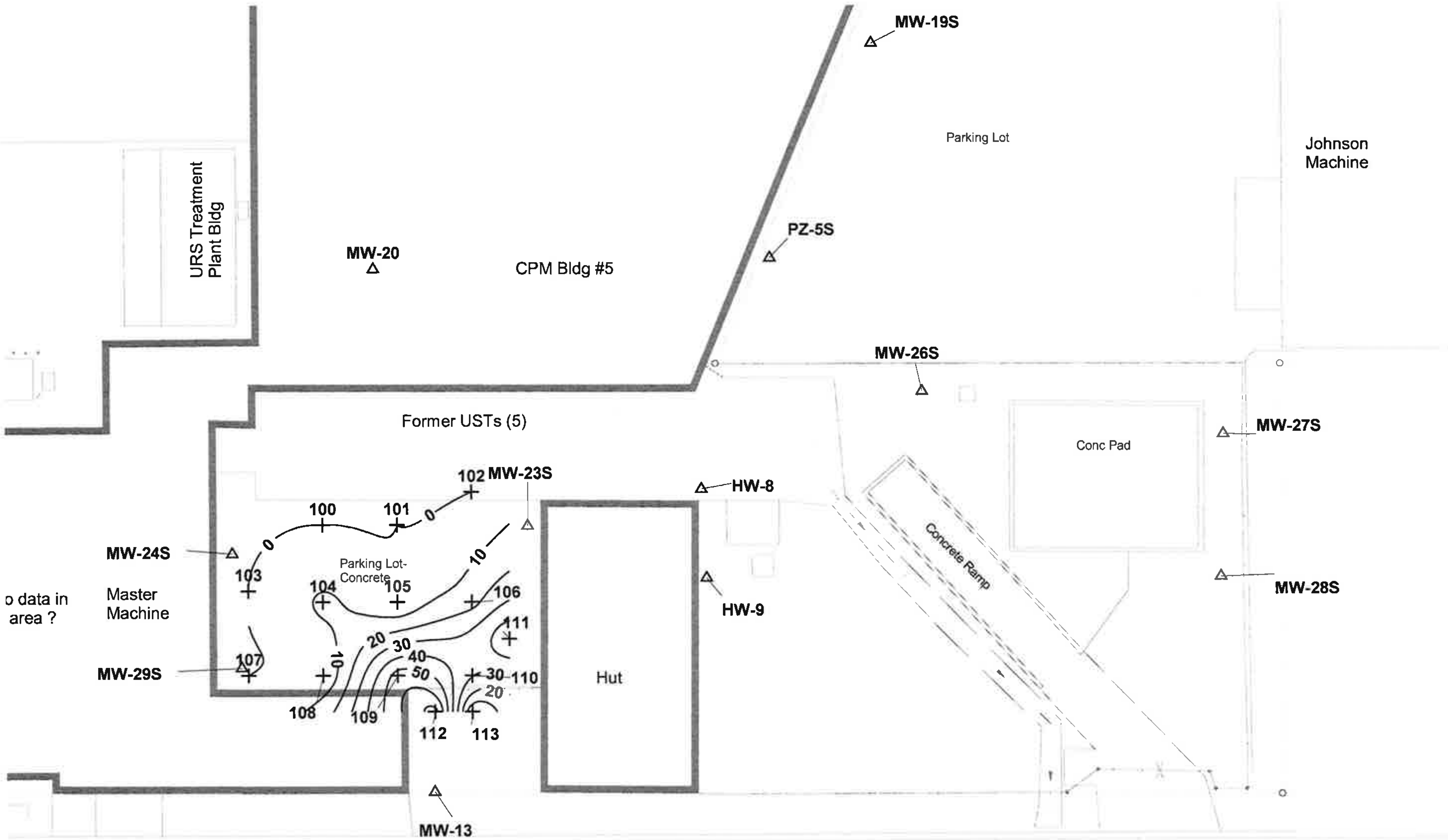


Note: NYDEC Remedial Action Objectives (RAOs) for VOCs in soils are 10 ppm total and 1 ppm individual. Soil total VOCs of > 10 ppm shown as red-colored area.

sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
ꞮS 41569123

UST Area- Shallow Soils
Total CTEX, ug/kg
Post-Treatment, August, 2012

Figure 3-25

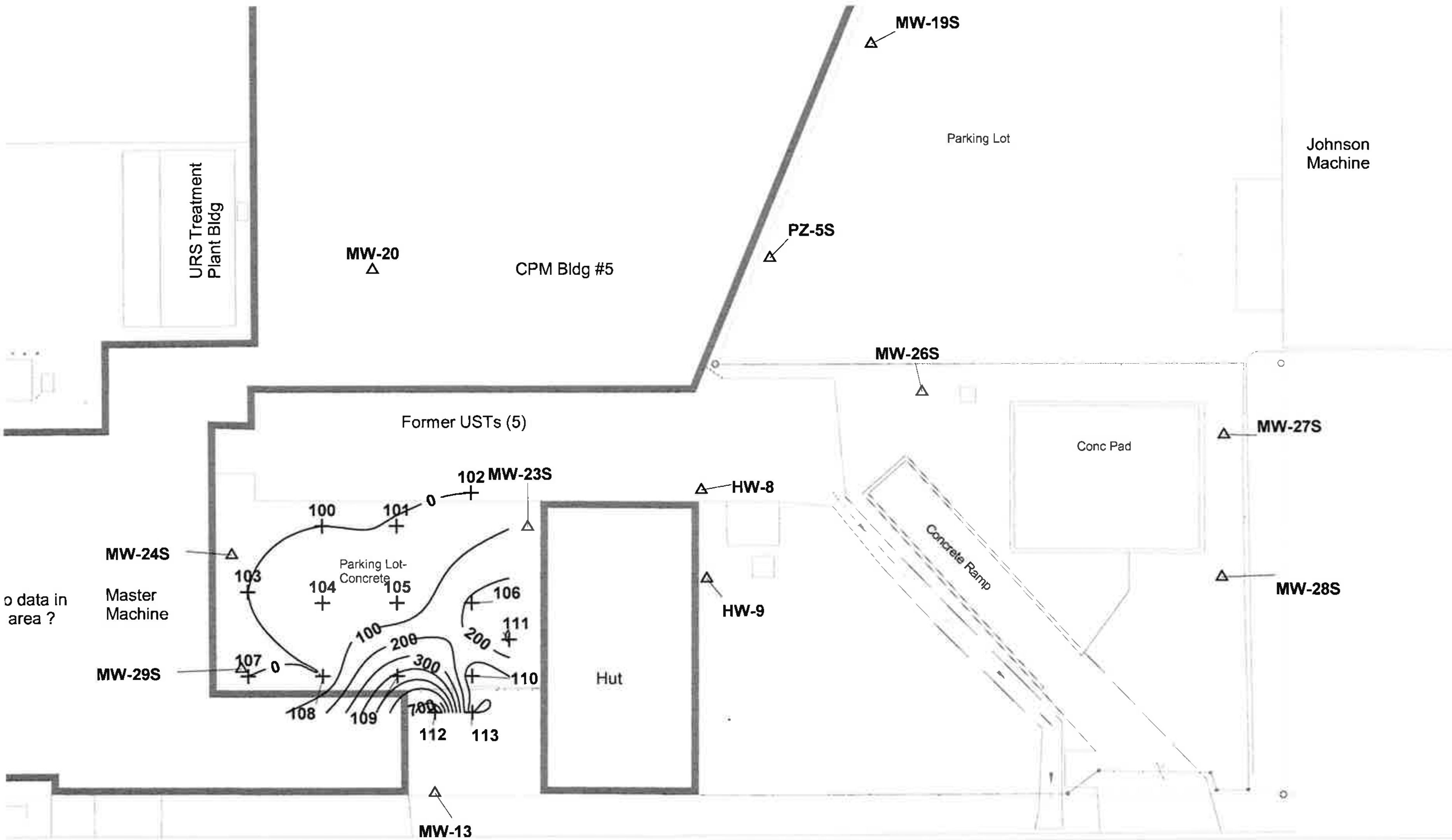


Note: NYDEC Remedial Action Objectives (RAOs) for VOCs in soils are 10 ppm total and 1 ppm individual. VOC > 1.0 ppm shown as colored area.

sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
ꞦS 41569123

UST Area- Shallow Soils
Ethylbenzene, ug/kg
Post-Treatment, August, 2012

Figure 3-26



Note: NYDEC Remedial Action Objectives (RAOs) for VOCs in soils are 10 ppm total and 1 ppm individual. VOC > 1.0 ppm shown as colored area.

sex Specialty Products, Inc.
sex/Hope Site, Jamestown, NY
emical Oxidation Remedial Action Report
RS 41569123

UST Area- Shallow Soils
Total Xylenes, ug/kg
Post-Treatment, August, 2012

Figure 3-27

Note: VOC values above 1.0 mg/l shown as colored area for reference purposes only. NYDEC RAOs for individual VOCs are 5 ug/l.

Essex Specialty Products, Inc.
Essex/Hope Site, Jamestown, NY
Chemical Oxidation Remedial Action Report
URS 41569123

RW-6D Area-Deep Groundwater
Acetone, ug/l
Round 3, 6/13/12

Figure 3-28

APPENDIX A

Technology Discussion and Field Report

to

URS Corporation

for

The Application of "Zero Valent Iron Catalyzed Hydroxyl & Sulfate Free Radical Oxidation"

at

Essex Jamestown Site
Jamestown, New York
URS Project # 41568097

November 2011

Innovative Environmental Technologies, Inc.
6130 Kit Road
Pipersville, PA 18947
(888) 721-8283
IET-INC.NET

EXECUTIVE SUMMARY

On behalf of URS, Innovative Environmental Technologies, Inc (IET) has prepared the following injection report. This report has been prepared to document remediation activities conducted at the site.

The injection program was implemented between November 8th and November 18th, 2011. The remedial approach employed the integration of both Fenton's chemistry and persulfate chemistry, utilizing zero valent iron as the catalyst for both reactions. The integration of these two chemistries shall allow for synergistic catalyzed reactions and long lasting (via persulfate) oxidation.

66,575 pounds of Klozur® mixed with approximately 15,815 gallons of water, 4,424 pounds of ZVI suspended in 8,015 gallons of water and 1,221 gallons of 50% hydrogen peroxide solution were injected into the subsurface of the site.

The number of injection locations was reduced and the mass/volumes were increased based on site conditions prior to implementing the remedial design. Slight surfacing was observed in several of the injection locations, especially in the areas of former excavations. By observation, most all injectants remained in the subsurface. All of the injections were completed in locations consistent with those that were proposed.

INTRODUCTION

The Essex Jamestown Site site located in Jamestown, NY, was identified by URS, their consulting engineer, as having soils and groundwater impacted by the historical release of petroleum hydrocarbons. The primary class of compounds of concern at the site was CTEX which is cumene (isopropyl benzene), toluene, ethylbenzene, and xylenes. An injection program was proposed by IET for the remediation of residual levels of VOC impacts at the site utilizing advanced oxidation technologies.

REMEDIATION IMPLEMENTATION

1.1 INJECTION PROCEDURES

Innovative Environmental Technologies, Inc (IET) completed a total of 383 injections at 123 injection locations at the Essex Jamestown Facility. Injection logs are provided in the Appendix.

Direct-Push-Driven Perforated Rod Placement

A Geoprobe 6610 unit comparable to the one pictured below, was utilized to drive the perforated injection rod (similar to Figure 2) to depths ranging from 8 to 40 feet below ground surface (bgs). It is at these depths, that the likelihood exists of being in close

Figure 1: Geoprobe 6610DT

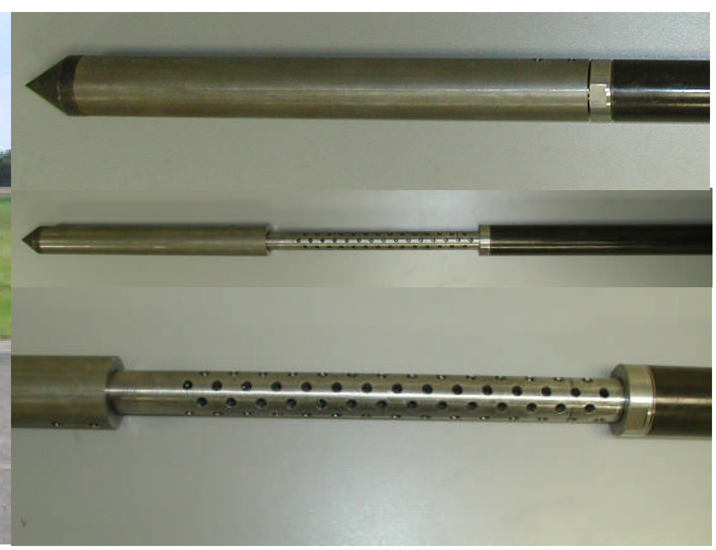


Figure 2: IET Retractable Injection Point

proximity to the targeted waters in the more permeable layers that were identified during characterization of the site. These more permeable layers are those believed to have historically provided the preferential pathways taken by the chemicals of concern.

Subsurface Fracture

Compressed air was used to propel all injectants into the subsurface. Compressed air was first injected into the subsurface at approximately 150 pounds per square inch (psi) until a significant pressure drop was observed at the injection pressure vessel. This process is referred to as pathway development. The intent of this step is to open pathways in the subsurface for the injectants to follow. Liquid and liquid-entrained injectants are then delivered with pressurized gas to the pathways that were produced during the development step.

ZVI, Klozur® and Hydrogen Peroxide Injection

A colloidal suspension of micron scale zero valent iron (ZVI) was immediately injected into the subsurface fractures and voids that were developed during the compressed air injection step. A predetermined volume of an either 2.5% or 5% solution of H2O2 followed this step. Immediately following, under constant pressure a sodium persulfate solution was then introduced.

Liquid Rinse

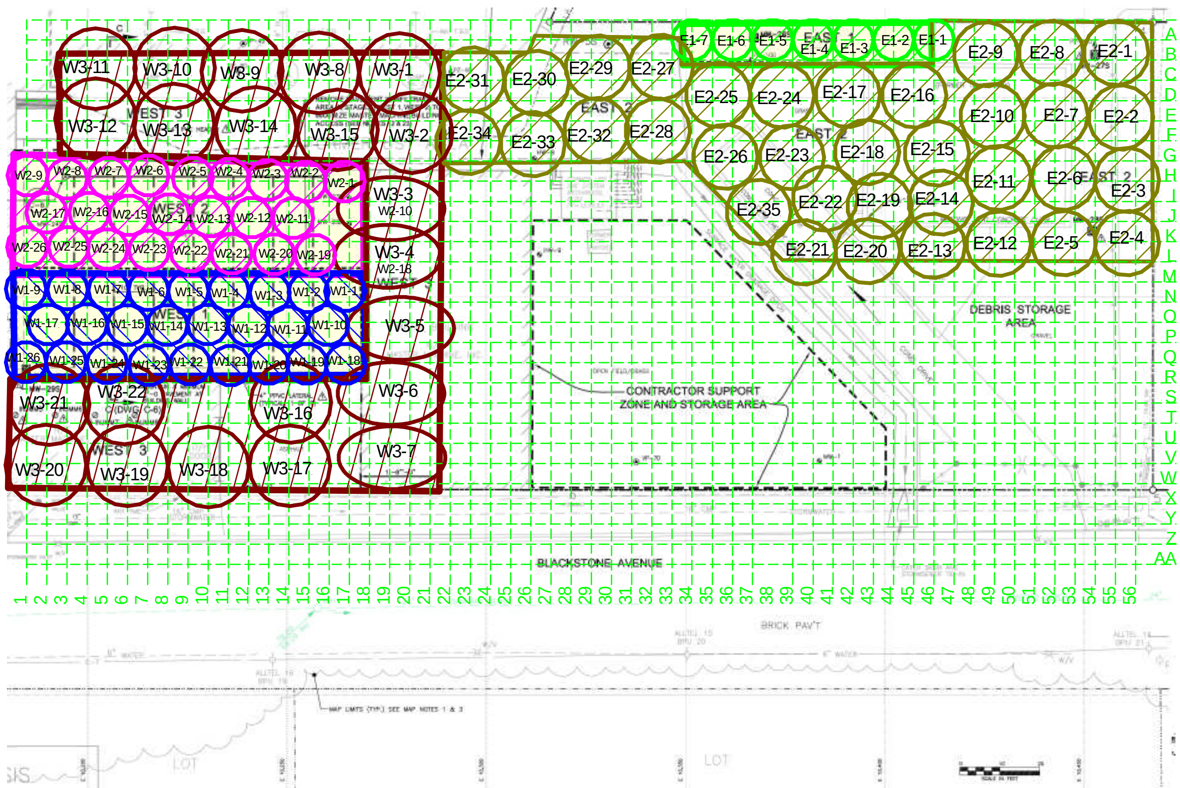
A small amount of water was injected to clear the injection lines of the chemical oxidants and ZVI and promotes mounding of groundwater into the vadose zone.

Post Injection Line Purge

Compressed air was injected to clear the lines of all material and to force the remedial components further into the formation before moving to the next injection location.

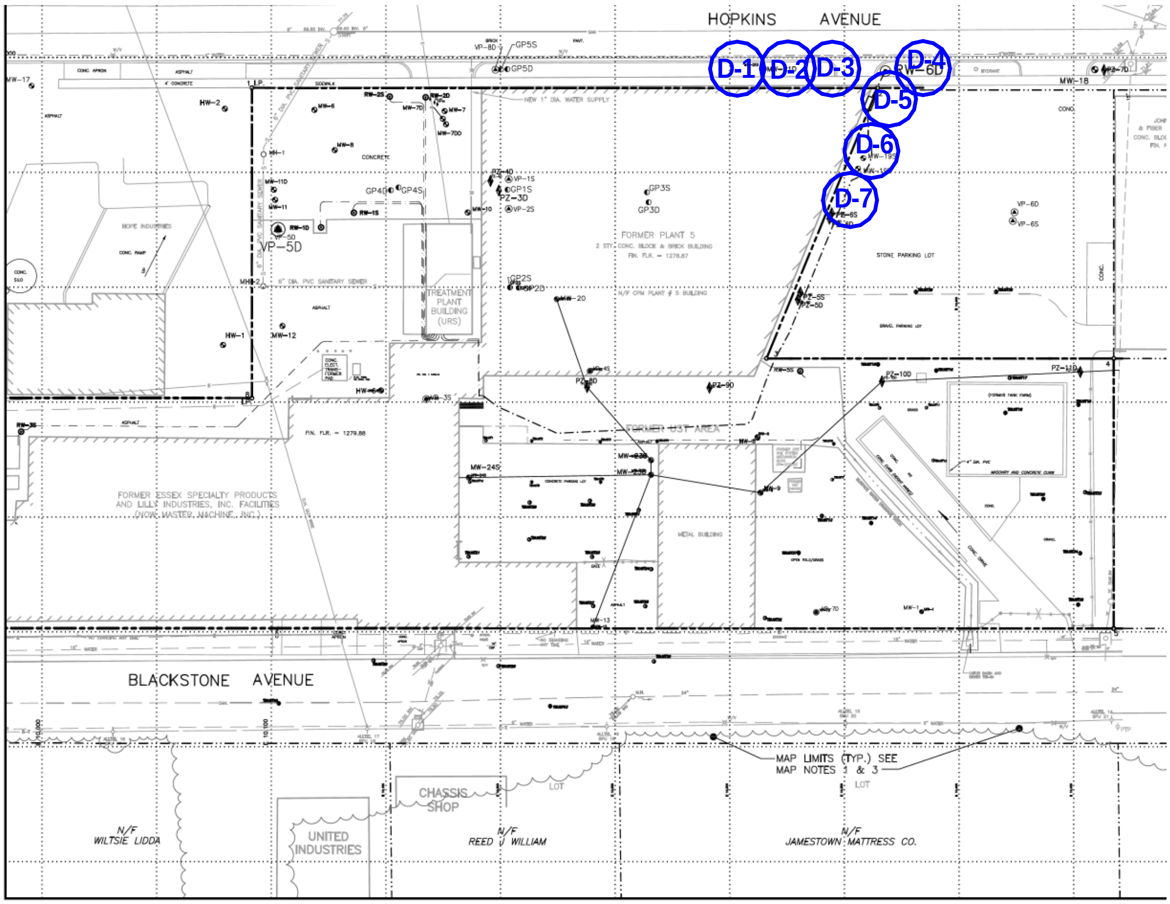
General Injection Implementation – East West Area

The injection locations of are identified in the appendix by alphanumeric labels beginning with E1-1 through W3-22, as seen in the map below.



Acetone Area

The injection locations of are identified in the appendix by alphanumeric labels beginning with D-1 through D-7, as seen in the map below.



Conclusion

The injection program at the Essex Jamestown Site was implemented and all proposed materials were introduced to the targeted subsurface planes. Modifications to the original design were made based upon the sites limitations. One extra injection point was added to the East 2 Area, W3-3 through W3-7 were directionally injected using tooling which would focus the majority of the remedial compounds under the building (which was otherwise inaccessible,) and a couple of injection points were combined in order to address short circuiting issues. All other aspects of the injection program were implemented successfully.

Odors, varying in degree, were observed throughout the sites soils. Detailed descriptions of odors, volumes and masses are included in the attached injection logs.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/09/11 **Time of Injection :** 9:22 AM

Grid Point: E1-1 **Grid Point Location:** A-46

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	11.4	11.4	11.4	11.4	11.4	11.4	34.2	34.2
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	118	118	118	118	118	118	354	354
Gallons of 50% H_2O_2	3.2	3.2	3.2	3.2	3.2	3.2	9.6	9.6
Gallons of Dilution Water	50	50	50	50	50	50	150	150
Gallons of Klozur/H_2O_2	53.2	53.2	53.2	53.2	53.2	53.2	159.6	159.6
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/09/11 **Time of Injection :** 9:57 AM

Grid Point: E1-2 **Grid Point Location:** A-44

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	11.4	11.4	11.4	11.4	11.4	11.4	34.2	34.2
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	118	118	118	118	118	118	354	354
Gallons of 50% H_2O_2	3.2	3.2	3.2	3.2	3.2	3.2	9.6	9.6
Gallons of Dilution Water	50	50	50	50	50	50	150	150
Gallons of Klozur/H_2O_2	53.2	53.2	53.2	53.2	53.2	53.2	159.6	159.6
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/09/11 **Time of Injection :** 10:25 AM

Grid Point: E1-3 **Grid Point Location:** A-42

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	11.4	11.4	11.4	11.4	11.4	11.4	34.2	34.2
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	118	118	118	118	118	118	354	354
Gallons of 50% H_2O_2	3.2	3.2	3.2	3.2	3.2	3.2	9.6	9.6
Gallons of Dilution Water	50	50	50	50	50	50	150	150
Gallons of Klozur/H_2O_2	53.2	53.2	53.2	53.2	53.2	53.2	159.6	159.6
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | **Phase I** | **East Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/09/11 **Time of Injection :** 11:09 AM

Grid Point: E1-4 **Grid Point Location:** A-40

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	11.4	11.4	11.4	11.4	11.4	11.4	34.2	34.2
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	118	118	118	118	118	118	354	354
Gallons of 50% H_2O_2	3.2	3.2	3.2	3.2	3.2	3.2	9.6	9.6
Gallons of Dilution Water	50	50	50	50	50	50	150	150
Gallons of Klozur/H_2O_2	53.2	53.2	53.2	53.2	53.2	53.2	159.6	159.6
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | East Area 1

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/09/11 **Time of Injection :** 11:50 AM

Grid Point: E1-5 **Grid Point Location:** A-38

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	11.4	11.4	11.4	11.4	11.4	11.4	34.2	34.2
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	118	118	118	118	118	118	354	354
Gallons of 50% H_2O_2	3.2	3.2	3.2	3.2	3.2	3.2	9.6	9.6
Gallons of Dilution Water	50	50	50	50	50	50	150	150
Gallons of Klozur/H_2O_2	53.2	53.2	53.2	53.2	53.2	53.2	159.6	159.6
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | **Phase I** | **East Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/09/11 **Time of Injection :** 12:52 PM

Grid Point: E1-6 **Grid Point Location:** A-36

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	11.4	11.4	11.4	11.4	11.4	11.4	34.2	34.2
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	118	118	118	118	118	118	354	354
Gallons of 50% H_2O_2	3.2	3.2	3.2	3.2	3.2	3.2	9.6	9.6
Gallons of Dilution Water	50	50	50	50	50	50	150	150
Gallons of Klozur/H_2O_2	53.2	53.2	53.2	53.2	53.2	53.2	159.6	159.6
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/09/11 **Time of Injection :** 1:28 PM

Grid Point: E1-7 **Grid Point Location:** A-34

Injection Zone	Actual 6-8' bgs	Proposed 6-8' bgs	Actual 10-12' bgs	Proposed 10-12' bgs	Actual 14-16' bgs	Proposed 14-16' bgs	Summary Actual	Summary Proposed
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	0	4.7	4.7	4.7		
Pounds of ZVI	11.4	11.4	0	11.4	22.8	11.4	34.2	34.2
Gallons of ZVI Solution	20	20	0	20	40	20	60	60
Pounds of Klozur	118	118	0	118	236	118	354	354
Gallons of 50% H_2O_2	3.2	3.2	0	3.2	6.4	3.2	9.6	9.6
Gallons of Dilution Water	50	50	0	50	100	50	150	150
Gallons of Klozur/H_2O_2	53.2	53.2	0	53.2	106.4	53.2	159.6	159.6
Duration of Post-Injection Fracture (seconds):	5	5	0	5	5	5		
Pressure of Post-injection pathway development	100	100	0	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

Slight surface escape noted at completion of 6-8' interval.

Short circuit observed during pathway development stage of 10-12' injection interval. Doubled remedial compounds introduced into deep interval.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Summary

	Actual	Proposed
Pounds of ZVI	239.4	239.4
Gallons of ZVI Solution	420	420
Pounds of Klozur	2478	2478
Gallons of 50% H_2O_2	67.2	67.2
Gallons of Dilution Water	1050	1050
Gallons of Klozur/H_2O_2	1117.2	1117.2

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/8/11 **Time of Injection :** 2:00 PM

Grid Point: E2-1 **Grid Point Location:** B-55

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs	Actual	Proposed
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/8/11 **Time of Injection :** 3:12 AM

Grid Point: E2-2 **Grid Point Location:** E-55

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/8/11 **Time of Injection :** 3:49 PM

Grid Point: E2-3 **Grid Point Location:** H-55

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/8/11 **Time of Injection :** 4:18 PM

Grid Point: E2-4 **Grid Point Location:** K-55

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site　　**Phase I**　　**East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11　　**Time of Injection :** 8:25 AM

Grid Point: E2-5　　**Grid Point Location:** K-52

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______　Slight ______　Moderate _______　Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/9/11 **Time of Injection :** 2:50 PM

Grid Point: E2-6 **Grid Point Location:** H-52

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/9/11 **Time of Injection :** 2:16 PM

Grid Point: E2-7 **Grid Point Location:** E-52

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site   Phase I   East Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/8/11   Time of Injection : 4:50 PM

Grid Point: E2-8   Grid Point Location: B-52

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/9/11 **Time of Injection :** 8:45 AM

Grid Point: E2-9 **Grid Point Location:** B-49

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/9/11 **Time of Injection :** 3:26 PM

Grid Point: E2-10 **Grid Point Location:** E-49

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/9/11 **Time of Injection :** 3:52 PM

Grid Point: E2-11 **Grid Point Location:** H-49

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11 **Time of Injection :** 8:58 AM

Grid Point: E2-12 **Grid Point Location:** K-49

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11 **Time of Injection :** 9:24 AM

Grid Point: E2-13 **Grid Point Location:** K-46

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/9/11 **Time of Injection :** 4:53 PM

Grid Point: E2-14 **Grid Point Location:** I-46

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site　　Phase I　　East Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11　　Time of Injection : 7:53 AM

Grid Point: E2-15　　Grid Point Location: G-46

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site — **Phase I** — **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/9/11 **Time of Injection :** 4:23 PM

Grid Point: E2-16 **Grid Point Location:** D-45

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary Actual	Summary Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: ____________________

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11 **Time of Injection :** 10:30 AM

Grid Point: E2-17 **Grid Point Location:** D-42

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary Actual	Summary Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11 **Time of Injection :** 11:00 AM

Grid Point: E2-18 **Grid Point Location:** F-43

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs	Actual	Proposed
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

IET

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11 **Time of Injection :** 11:33 AM

Grid Point: E2-19 **Grid Point Location:** I-43

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site Phase I East Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11 Time of Injection : 9:55 AM

Grid Point: E2-20 Grid Point Location: K-43

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11 **Time of Injection :** 3:21 PM

Grid Point: E2-21 **Grid Point Location:** L-40

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site   Phase I   East Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11   Time of Injection : 2:53 PM

Grid Point: E2-22   Grid Point Location: I-41

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site   Phase I   East Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11   Time of Injection : 12:36 PM

Grid Point: E2-23   Grid Point Location: G-39

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11 **Time of Injection :** 12:00 PM

Grid Point: E2-24 **Grid Point Location:** D-38

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs	Actual	Proposed
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong __X___

Other Field Observations: Strong odors detected

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11 **Time of Injection :** 1:50 PM

Grid Point: E2-25 **Grid Point Location:** D-35

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | East Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11 | Time of Injection : 2:22 PM

Grid Point: E2-26 | Grid Point Location: G-36

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 **Time of Injection :** 8:30 AM

Grid Point: E2-27 **Grid Point Location:** C-29

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site   Phase I   East Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11   Time of Injection : 4:31 PM

Grid Point: E2-28   Grid Point Location: F-32

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 **Time of Injection :** 9:12 AM

Grid Point: E2-29 **Grid Point Location:** C-30

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | East Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 | Time of Injection : 9:45 AM

Grid Point: E2-30 | Grid Point Location: C-26

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 **Time of Injection : 10:14 AM**

Grid Point: E2-31 **Grid Point Location: D-26**

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS **None______ Slight ______ Moderate _______ Strong _____**

Other Field Observations: Refusal encountered at 8' bgs. Offset 2' South and 1' East.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 **Time of Injection :** 11:58 AM

Grid Point: E2-32 **Grid Point Location:** F-29

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 **Time of Injection :** 11:20 AM

Grid Point: E2-33 **Grid Point Location:** F-26

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 **Time of Injection :** 10:56 AM

Grid Point: E2-34 **Grid Point Location:** F-23

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/10/11 **Time of Injection :** 3:59 PM

Grid Point: E2-35 **Grid Point Location:** I-37

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	8-10' bgs	8-10' bgs	11-13' bgs	11-13' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	8	8	8	8	8	8		
Pounds of ZVI	11.5	11.5	11.5	11.5	11.5	11.5	34.5	34.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	63	63	63	63	63	63	189	189
Gallons of 50% H_2O_2	1.15	1.15	1.15	1.15	1.15	1.15	3.45	3.45
Gallons of Dilution Water	30	30	30	30	30	30	90	90
Gallons of Klozur/H_2O_2	40	40	40	40	40	40	120	120
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Additional point added

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **East Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Summary

	Actual	Proposed
Pounds of ZVI	1207.5	1207.5
Gallons of ZVI Solution	2100	2100
Pounds of Klozur	6615	6615
Gallons of 50% H_2O_2	120.75	120.75
Gallons of Dilution Water	3150	3150
Gallons of Klozur/H_2O_2	4200	4200

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11 **Time of Injection :** 8:18 AM

Grid Point: W1-1 **Grid Point Location:** M-18

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	0	6-8' bgs	0	10-12' bgs	0	14-16' bgs		
Duration of Fracture (seconds):	0	4	0	4	0	4		
Pressure of Pre-injection pathway development	0	150	0	150	0	150		
Estimated Radius of Influence	0	5	0	5	0	5		
Pounds of ZVI	0	12.7	0	12.7	0	12.7	0	38.1
Gallons of ZVI Solution	0	20	0	20	0	20	0	60
Pounds of Klozur	0	280	0	280	0	280	0	840
Gallons of 50% H_2O_2	0	5.34	0	5.34	0	5.34	0	16.02
Gallons of Dilution Water	0	55	0	55	0	55	0	165
Gallons of Klozur/H_2O_2	0	60	0	60	0	60	0	180
Duration of Post-Injection Fracture (seconds):	0	5	0	5	0	5		
Pressure of Post-injection pathway development	0	100	0	100	0	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Refusal on footing under concrete slab. Added material to W1-2.

IET

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11 **Time of Injection :** 8:21 AM

Grid Point: W1-2 **Grid Point Location:** M-16

Injection Zone	Actual 6-8' bgs	Proposed 6-8' bgs	Actual 10-12' bgs	Proposed 10-12' bgs	Actual 14-16' bgs	Proposed 14-16' bgs	Summary Actual	Summary Proposed
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	25.4	12.7	25.4	12.7	25.4	12.7	76.2	38.1
Gallons of ZVI Solution	40	20	40	20	40	20	120	60
Pounds of Klozur	560	280	560	280	560	280	1680	840
Gallons of 50% H_2O_2	10.68	5.34	10.68	5.34	10.68	5.34	32.04	16.02
Gallons of Dilution Water	110	55	110	55	110	55	330	165
Gallons of Klozur/H_2O_2	120	60	120	60	120	60	360	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Added material from W1-1. Slight surface escapes noted along cracks in concrete. Also observed in W2-19 and W2-20 concrete cores.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/17/11 **Time of Injection :** 7:46 AM

Grid Point: W1-3 **Grid Point Location:** M-14

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary Actual	Summary Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11 **Time of Injection :** 2:00 PM

Grid Point: W1-4 **Grid Point Location:** M-12

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

Stopped injection at deep interval due to short circuit at building foundation.

Completed injection at 4:00 pm

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11 **Time of Injection :** 4:11 PM

Grid Point: W1-5 **Grid Point Location:** M-10

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate ___X____ Strong _____

Other Field Observations: Moderate odors observed

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | West Area 1

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11 | Time of Injection : 3:43 PM

Grid Point: W1-6 | Grid Point Location: M-7

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ___X___ Moderate _______ Strong _____

Other Field Observations: Slight odors observed

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11 **Time of Injection :** 3:14 PM

Grid Point: W1-7 **Grid Point Location:** M-5

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong __X___

Other Field Observations: Strong odors oberved

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11 **Time of Injection :** 2:42 PM

Grid Point: W1-8 **Grid Point Location:** M-3

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/13/11 **Time of Injection :** 12:30 PM

Grid Point: W1-9 **Grid Point Location:** M-1

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | **Phase I** | **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11 **Time of Injection :** 7:48 AM

Grid Point: W1-10 **Grid Point Location:** O-16

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11 **Time of Injection :** 9:01 AM

Grid Point: W1-11 **Grid Point Location:** O-14

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate ___X____ Strong _____

Other Field Observations: Moderate odors observed

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | **Phase I** | **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11 **Time of Injection :** 8:37 AM

Grid Point: W1-12 **Grid Point Location:** O-12

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong __X___

Other Field Observations: Strong odors observed

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11 **Time of Injection :** 1:46 PM

Grid Point: W1-13 **Grid Point Location:** O-10

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11 **Time of Injection :** 1:16 PM

Grid Point: W1-14 **Grid Point Location:** O-8

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11 **Time of Injection :** 12:50 PM

Grid Point: W1-15 **Grid Point Location:** O-6

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs	Actual	Proposed
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong __X___

Other Field Observations: Strong odors detected

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site   **Phase I**   **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11   **Time of Injection :** 12:22 PM

Grid Point: W1-16   **Grid Point Location:** O-4

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong __X___

Other Field Observations: Strong odors detected

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site   **Phase I**   **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/13/11   **Time of Injection :** 2:30 PM

Grid Point: W1-17   **Grid Point Location:** O-2

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ___X___ Moderate _______ Strong _____

Other Field Observations: Slight odors observed. Non petroleum/non chlorinated.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | West Area 1

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11 | Time of Injection : 8:07 AM

Grid Point: W1-18 | Grid Point Location: Q-17

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site   **Phase I**   **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11   **Time of Injection :** 7:38 AM

Grid Point: W1-19   **Grid Point Location:** Q-15

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ___X___ Moderate _______ Strong _____

Other Field Observations: Slight odors observed

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11 **Time of Injection :** 10:13 AM

Grid Point: W1-20 **Grid Point Location:** Q-13

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong __X__

Other Field Observations: Strong odors observed

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site — **Phase I** — **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11 **Time of Injection :** 9:43 AM

Grid Point: W1-21 **Grid Point Location:** Q-9

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11 **Time of Injection :** 9:17 AM

Grid Point: W1-22 **Grid Point Location:** Q-7

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/14/11 **Time of Injection :** 8:45 AM

Grid Point: W1-23 **Grid Point Location:** Q-6

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | West Area 1

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/13/11 | Time of Injection : 4:00 PM

Grid Point: W1-24 | Grid Point Location: Q-5

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/13/11 **Time of Injection :** 3:17 PM

Grid Point: W1-25 **Grid Point Location:** Q-3

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/13/11 **Time of Injection :** 1:42 PM

Grid Point: W1-26 **Grid Point Location:** Q-1

							Summary	
Injection Zone	Actual 6-8' bgs	Proposed 6-8' bgs	Actual 10-12' bgs	Proposed 10-12' bgs	Actual 14-16' bgs	Proposed 14-16' bgs	Actual	Proposed
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	12.7	12.7	12.7	12.7	12.7	12.7	38.1	38.1
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	280	280	280	280	280	280	840	840
Gallons of 50% H_2O_2	5.34	5.34	5.34	5.34	5.34	5.34	16.02	16.02
Gallons of Dilution Water	55	55	55	55	55	55	165	165
Gallons of Klozur/H_2O_2	60	60	60	60	60	60	180	180
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate ___X____ Strong _____

Other Field Observations: Moderate odors observed.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 1**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Summary

	Actual	Proposed
Pounds of ZVI	990.6	990.6
Gallons of ZVI Solution	1560	1560
Pounds of Klozur	21840	21840
Gallons of 50% H_2O_2	416.52	416.52
Gallons of Dilution Water	4290	4290
Gallons of Klozur/H_2O_2	4680	4680

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: ______________________________

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INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/17/11 **Time of Injection :** 9:12 AM

Grid Point: W2-1 **Grid Point Location:** H-17

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong __X__

Other Field Observations: Strong petroleum odors observed

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11 **Time of Injection :** 3:04 PM

Grid Point: W2-2 **Grid Point Location:** H-15

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site   Phase I   West Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11   Time of Injection : 2:22 PM

Grid Point: W2-3   Grid Point Location: H-3

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site   Phase I   West Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11   Time of Injection : 12:10 PM

Grid Point: W2-4   Grid Point Location: H-11

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11 **Time of Injection :** 11:45 AM

Grid Point: W2-5 **Grid Point Location:** H-9

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11 **Time of Injection :** 11:21 AM

Grid Point: W2-6 **Grid Point Location:** H-7

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Slight surface escapes noted in fill material.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11 **Time of Injection :** 10:52 AM

Grid Point: W2-7 **Grid Point Location:** H-5

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Slight surface escapes noted in fill material.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11 **Time of Injection :** 9:20 AM

Grid Point: W2-8 **Grid Point Location:** H-3

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/13/11 **Time of Injection :** 10:45 AM

Grid Point: W2-9 **Grid Point Location:** H-1

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: ___________ **Time of Injection :** __________

Grid Point: W2-10 **Grid Point Location:** __________

Injection Zone	Actual 6-8' bgs	Proposed 6-8' bgs	Actual 10-12' bgs	Proposed 10-12' bgs	Actual 14-16' bgs	Proposed 14-16' bgs	Summary Actual	Summary Proposed
Duration of Fracture (seconds):	0	4	0	4	0	4		
Pressure of Pre-injection pathway development	0	150	0	150	0	150		
Estimated Radius of Influence	0	5	0	5	0	5		
Pounds of ZVI	0	19.05	0	9.53	0	9.53	0	38.11
Gallons of ZVI Solution	0	20	0	20	0	20	0	60
Pounds of Klozur	0	315	0	158	0	158	0	631
Gallons of 50% H_2O_2	0	5.57	0	2.79	0	2.79	0	11.15
Gallons of Dilution Water	0	60	0	40	0	40	0	140
Gallons of Klozur/H_2O_2	0	65	0	43	0	43	0	151
Duration of Post-Injection Fracture (seconds):	0	5	0	5	0	5		
Pressure of Post-injection pathway development	0	100	0	100	0	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Added material to W3-3 due to surfacing.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | West Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/17/11 | Time of Injection : 12:51 PM

Grid Point: W2-11 | Grid Point Location: J-14

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11 **Time of Injection :** 3:30 PM

Grid Point: W2-12 **Grid Point Location:** J-12

Injection Zone	Actual 6-8' bgs	Proposed 6-8' bgs	Actual 10-12' bgs	Proposed 10-12' bgs	Actual 14-16' bgs	Proposed 14-16' bgs	Summary Actual	Summary Proposed
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Injection point clogged after 6-8' interval. Completed injection 11-16-11 at 7:22am

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | West Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/17/11 | Time of Injection : 8:38 AM

Grid Point: W2-13 | Grid Point Location: J-10

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	0	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	0	4	0	4	0	4		
Pressure of Pre-injection pathway development	0	150	0	150	0	150		
Estimated Radius of Influence	0	5	0	5	0	5		
Pounds of ZVI	0	19.05	19.06	9.53	19.06	9.53	38.12	38.11
Gallons of ZVI Solution	0	20	40	20	40	20	80	60
Pounds of Klozur	0	315	316	158	316	158	632	631
Gallons of 50% H_2O_2	0	5.57	5.58	2.79	5.58	2.79	11.16	11.15
Gallons of Dilution Water	0	60	80	40	80	40	160	140
Gallons of Klozur/H_2O_2	0	65	86	43	86	43	172	151
Duration of Post-Injection Fracture (seconds):	0	5	0	5	0	5		
Pressure of Post-injection pathway development	0	100	0	100	0	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Skipped shallow interval due to surfacing in unconsolidated fill. 6-8' interval added to middle and deep injection intervals. Slight surfacing still noted.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | West Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11 | Time of Injection : 2:58 PM

Grid Point: W2-14 | Grid Point Location: J-8

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | West Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11 | Time of Injection : 2:36 PM

Grid Point: W2-15 | Grid Point Location: J-6

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

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INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11 **Time of Injection :** 2:00 PM

Grid Point: W2-16 **Grid Point Location:** J-4

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site — Phase I — West Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/13/11 — Time of Injection : 11:17 AM

Grid Point: W2-17 — Grid Point Location: J-2

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | **Phase I** | **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: ________ **Time of Injection :** ________

Grid Point: W2-18 **Grid Point Location:** ________

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	0	4	0	4	0	4		
Pressure of Pre-injection pathway development	0	150	0	150	0	150		
Estimated Radius of Influence	0	5	0	5	0	5		
Pounds of ZVI	0	19.05	0	9.53	0	9.53	0	38.11
Gallons of ZVI Solution	0	20	0	20	0	20	0	60
Pounds of Klozur	0	315	0	158	0	158	0	631
Gallons of 50% H_2O_2	0	5.57	0	2.79	0	2.79	0	11.15
Gallons of Dilution Water	0	60	0	40	0	40	0	140
Gallons of Klozur/H_2O_2	0	65	0	43	0	43	0	151
Duration of Post-Injection Fracture (seconds):	0	5	0	5	0	5		
Pressure of Post-injection pathway development	0	100	0	100	0	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Added material to W3-4 due to surfacing.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/16/11 **Time of Injection :** 3:41 PM

Grid Point: W2-19 **Grid Point Location:** L-15

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site   Phase I   West Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/17/11   Time of Injection : 8:16 AM

Grid Point: W2-20   Grid Point Location: L-13

Injection Zone	Actual 6-8' bgs	Proposed 6-8' bgs	Actual 10-12' bgs	Proposed 10-12' bgs	Actual 14-16' bgs	Proposed 14-16' bgs	Summary Actual	Summary Proposed
Duration of Fracture (seconds):	0	4	0	4	0	4		
Pressure of Pre-injection pathway development	0	150	0	150	0	150		
Estimated Radius of Influence	0	5	0	5	0	5		
Pounds of ZVI	0	19.05	19.06	9.53	19.06	9.53	38.12	38.11
Gallons of ZVI Solution	0	20	40	20	40	20	80	60
Pounds of Klozur	0	315	316	158	316	158	632	631
Gallons of 50% H_2O_2	0	5.57	5.58	2.79	5.58	2.79	11.16	11.15
Gallons of Dilution Water	0	60	80	40	80	40	160	140
Gallons of Klozur/H_2O_2	0	65	86	43	86	43	172	151
Duration of Post-Injection Fracture (seconds):	0	5	10	5	10	5		
Pressure of Post-injection pathway development	0	100	200	100	200	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Skipped shallow interval due to elevated groundwater table and surface escapes. Added material to bottom two intervals.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/17/11 **Time of Injection :** 10:32 AM

Grid Point: W2-21 **Grid Point Location:** L-11

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site　　**Phase I**　　**West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11　　**Time of Injection :** 12:20 PM

Grid Point: W2-22　　**Grid Point Location:** L-9

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______　Slight ______　Moderate _______　Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11 **Time of Injection :** 11:51 AM

Grid Point: W2-23 **Grid Point Location:** L-7

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11 **Time of Injection :** 11:24 AM

Grid Point: W2-24 **Grid Point Location:** L-5

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site Phase I West Area 2

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/15/11 Time of Injection : 10:53 AM

Grid Point: W2-25 Grid Point Location: L-3

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/13/11 **Time of Injection :** 11:48 AM

Grid Point: W2-26 **Grid Point Location:** L-1

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	5	5	5	5	5	5		
Pounds of ZVI	19.05	19.05	9.53	9.53	9.53	9.53	38.11	38.11
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	315	315	158	158	158	158	631	631
Gallons of 50% H_2O_2	5.57	5.57	2.79	2.79	2.79	2.79	11.15	11.15
Gallons of Dilution Water	60	60	40	40	40	40	140	140
Gallons of Klozur/H_2O_2	65	65	43	43	43	43	151	151
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 2**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Summary

	Actual	Proposed
Pounds of ZVI	914.66	990.86
Gallons of ZVI Solution	1480	1560
Pounds of Klozur	15146	16406
Gallons of 50% H_2O_2	267.62	289.9
Gallons of Dilution Water	3400	3640
Gallons of Klozur/H_2O_2	3666	3926

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 **Time of Injection :** 1:35 PM

Grid Point: W3-1 **Grid Point Location:** C-19

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	8-10' bgs	6-8' bgs	11-13' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Began injections 2' deeper due to change in surface elevation.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/13/11 **Time of Injection :** 9:52 AM

Grid Point: W3-2 **Grid Point Location:** F-20

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong __X___

Other Field Observations: Very strong odors observed

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site — **Phase I** — **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/17/11 — **Time of Injection :** 11:11 AM

Grid Point: W3-3 — **Grid Point Location:** J-19

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	26.55	7.5	17.03	7.5	17.03	7.5	60.61	22.5
Gallons of ZVI Solution	40	20	40	20	40	20	120	60
Pounds of Klozur	439	124	282	124	282	124	1003	372
Gallons of 50% H_2O_2	7.57	2	4.79	2	4.79	2	17.15	6
Gallons of Dilution Water	85	25	65	25	65	25	215	75
Gallons of Klozur/H_2O_2	95	30	73	30	73	30	241	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Added material from W2-10 to directional injection point due to surfacing.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/17/11 **Time of Injection :** 11:56 AM

Grid Point: W3-4 **Grid Point Location:** L-17

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	26.55	7.5	17.03	7.5	17.03	7.5	60.61	22.5
Gallons of ZVI Solution	40	20	40	20	40	20	120	60
Pounds of Klozur	439	124	282	124	282	124	1003	372
Gallons of 50% H_2O_2	7.57	2	4.79	2	4.79	2	17.15	6
Gallons of Dilution Water	85	25	65	25	65	25	215	75
Gallons of Klozur/H_2O_2	95	30	73	30	73	30	241	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Added material from W2-18 to directional injection point due to surfacing.

IET

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/13/11 **Time of Injection :** 4:30 PM

Grid Point: W3-5 **Grid Point Location:** O-17

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Directional injection point

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/12/11 **Time of Injection :** 4:08 PM

Grid Point: W3-6 **Grid Point Location:** S-17

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/12/11 **Time of Injection :** 3:40 PM

Grid Point: W3-7 **Grid Point Location:** V-17

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Directional injection point

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 **Time of Injection :** 2:12 PM

Grid Point: W3-8 **Grid Point Location:** C-15

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary Actual	Summary Proposed
Injection Zone	8-10' bgs	6-8' bgs	11-13' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Began injections 2' deeper due to change in surface elevation.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 **Time of Injection :** 2:40 PM

Grid Point: W3-9 **Grid Point Location:** C-16

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary Actual	Summary Proposed
Injection Zone	8-10' bgs	6-8' bgs	11-13' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Began injections 2' deeper due to change in surface elevation.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 **Time of Injection :** 3:20 PM

Grid Point: W3-10 **Grid Point Location:** C-8

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
Injection Zone	8-10' bgs	6-8' bgs	11-13' bgs	10-12' bgs	14-16' bgs	14-16' bgs	Actual	Proposed
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Began injections 2' deeper due to change in surface elevation.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | West Area 3

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 | Time of Injection : 3:52 PM

Grid Point: W3-11 | Grid Point Location: C-4

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary Actual	Summary Proposed
Injection Zone	8-10' bgs	6-8' bgs	11-13' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong __X___

Other Field Observations:

Began injections 2' deeper due to change in surface elevation.

Very strong odors observed

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/11/11 **Time of Injection :** 4:20 PM

Grid Point: W3-12 **Grid Point Location:** E-4

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong __X___

Other Field Observations: Very strong odors observed

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/12/11 **Time of Injection :** 8:55 AM

Grid Point: W3-13 **Grid Point Location:** F-8

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs	Actual	Proposed
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS **None**______ **Slight** ______ **Moderate** _______ **Strong** __X___

Other Field Observations: Very strong odors observed

IET

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/12/11 **Time of Injection :** 9:37 AM

Grid Point: W3-14 **Grid Point Location:** F-13

							Summary	
Injection Zone	Actual 6-8' bgs	Proposed 6-8' bgs	Actual 10-12' bgs	Proposed 10-12' bgs	Actual 14-16' bgs	Proposed 14-16' bgs	Actual	Proposed
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/13/11 **Time of Injection :** 8:59 AM

Grid Point: W3-15 **Grid Point Location:** F-16

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/12/11 **Time of Injection :** 3:18 PM

Grid Point: W3-16 **Grid Point Location:** S-14

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | West Area 3

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/12/11 Time of Injection : 4:38 PM

Grid Point: W3-17 Grid Point Location: V-14

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site — Phase I — West Area 3

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/12/11 — Time of Injection : 2:38 PM

Grid Point: W3-18 — Grid Point Location: U-11

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: Refusal encountered in two location inside building. Moved injection location outside of overhead door.

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/12/11 **Time of Injection :** 10:30 AM

Grid Point: W3-19 **Grid Point Location:** V-6

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site   Phase I   West Area 3

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/12/11   Time of Injection : 11:25 AM

Grid Point: W3-20   Grid Point Location: V-2

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/12/11 **Time of Injection :** 12:08 PM

Grid Point: W3-21 **Grid Point Location:** S-2

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
							Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/12/11 **Time of Injection :** 1:19 PM

Grid Point: W3-22 **Grid Point Location:** S-6

							Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	6-8' bgs	6-8' bgs	10-12' bgs	10-12' bgs	14-16' bgs	14-16' bgs		
Duration of Fracture (seconds):	3	4	3	4	3	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150		
Estimated Radius of Influence	4.7	4.7	4.7	4.7	4.7	4.7		
Pounds of ZVI	7.5	7.5	7.5	7.5	7.5	7.5	22.5	22.5
Gallons of ZVI Solution	20	20	20	20	20	20	60	60
Pounds of Klozur	124	124	124	124	124	124	372	372
Gallons of 50% H_2O_2	2	2	2	2	2	2	6	6
Gallons of Dilution Water	25	25	25	25	25	25	75	75
Gallons of Klozur/H_2O_2	30	30	30	30	30	30	90	90
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **West Area 3**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Summary

	Actual	Proposed
Pounds of ZVI	571.22	495
Gallons of ZVI Solution	1440	1320
Pounds of Klozur	9446	8184
Gallons of 50% H_2O_2	154.3	132
Gallons of Dilution Water	1930	1650
Gallons of Klozur/H_2O_2	2282	1980

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **Deep Injections**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/18/11 **Time of Injection :** 3:50 PM

Grid Point: D-1 **Grid Point Location:** ______

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary Actual	Summary Proposed
Injection Zone	16-18' bgs	16-18' bgs	22-24' bgs	22-24' bgs	28-30' bgs	28-30' bgs	34-36' bgs	34-36' bgs	38-40' bgs	38-40' bgs		
Duration of Fracture (seconds):	4	4	4	4	4	4	4	4	4	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150	150	150	150	150		
Estimated Radius of Influence	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5		
Pounds of ZVI	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	71.5	71.5
Gallons of ZVI Solution	29	29	29	29	29	29	29	29	29	29	145	145
Pounds of Klozur	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	1578.5	1578.5
Gallons of 50% H_2O_2	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	27.8	27.8
Gallons of Dilution Water	57	57	57	57	57	57	57	57	57	57	285	285
Gallons of Klozur/H_2O_2	70	70	70	70	70	70	70	70	70	70	350	350
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **Deep Injections**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/18/11 **Time of Injection :** 2:20 PM

Grid Point: D-2 **Grid Point Location:** ________

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary Actual	Summary Proposed
Injection Zone	16-18' bgs	16-18' bgs	22-24' bgs	22-24' bgs	28-30' bgs	28-30' bgs	34-36' bgs	34-36' bgs	38-40' bgs	38-40' bgs		
Duration of Fracture (seconds):	4	4	4	4	4	4	4	4	4	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150	150	150	150	150		
Estimated Radius of Influence	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5		
Pounds of ZVI	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	71.5	71.5
Gallons of ZVI Solution	29	29	29	29	29	29	29	29	29	29	145	145
Pounds of Klozur	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	1578.5	1578.5
Gallons of 50% H_2O_2	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	27.8	27.8
Gallons of Dilution Water	57	57	57	57	57	57	57	57	57	57	285	285
Gallons of Klozur/H_2O_2	70	70	70	70	70	70	70	70	70	70	350	350
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100	100	100	100	100		

ODORS **None**______ **Slight** ______ **Moderate** _______ **Strong** _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **Deep Injections**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/18/11 **Time of Injection :** 1:10 PM

Grid Point: D-3 **Grid Point Location:** ________

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary Actual	Summary Proposed
Injection Zone	16-18' bgs	16-18' bgs	22-24' bgs	22-24' bgs	28-30' bgs	28-30' bgs	34-36' bgs	34-36' bgs	38-40' bgs	38-40' bgs		
Duration of Fracture (seconds):	4	4	4	4	4	4	4	4	4	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150	150	150	150	150		
Estimated Radius of Influence	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5		
Pounds of ZVI	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	71.5	71.5
Gallons of ZVI Solution	29	29	29	29	29	29	29	29	29	29	145	145
Pounds of Klozur	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	1578.5	1578.5
Gallons of 50% H_2O_2	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	27.8	27.8
Gallons of Dilution Water	57	57	57	57	57	57	57	57	57	57	285	285
Gallons of Klozur/H_2O_2	70	70	70	70	70	70	70	70	70	70	350	350
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **Deep Injections**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/18/11 **Time of Injection :** 11:15 AM

Grid Point: D-4 **Grid Point Location:** ________

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary Actual	Summary Proposed
Injection Zone	16-18' bgs	16-18' bgs	22-24' bgs	22-24' bgs	28-30' bgs	28-30' bgs	34-36' bgs	34-36' bgs	38-40' bgs	38-40' bgs		
Duration of Fracture (seconds):	4	4	4	4	4	4	4	4	4	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150	150	150	150	150		
Estimated Radius of Influence	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5		
Pounds of ZVI	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	71.5	71.5
Gallons of ZVI Solution	29	29	29	29	29	29	29	29	29	29	145	145
Pounds of Klozur	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	1578.5	1578.5
Gallons of 50% H_2O_2	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	27.8	27.8
Gallons of Dilution Water	57	57	57	57	57	57	57	57	57	57	285	285
Gallons of Klozur/H_2O_2	70	70	70	70	70	70	70	70	70	70	350	350
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site | Phase I | Deep Injections

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/18/11 | Time of Injection : 9:48 AM

Grid Point: D-5 | Grid Point Location: ________

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary	
Injection Zone	16-18' bgs	16-18' bgs	22-24' bgs	22-24' bgs	28-30' bgs	28-30' bgs	34-36' bgs	34-36' bgs	38-40' bgs	38-40' bgs	Actual	Proposed
Duration of Fracture (seconds):	4	4	4	4	4	4	4	4	4	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150	150	150	150	150		
Estimated Radius of Influence	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5		
Pounds of ZVI	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	71.5	71.5
Gallons of ZVI Solution	29	29	29	29	29	29	29	29	29	29	145	145
Pounds of Klozur	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	1578.5	1578.5
Gallons of 50% H_2O_2	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	27.8	27.8
Gallons of Dilution Water	57	57	57	57	57	57	57	57	57	57	285	285
Gallons of Klozur/H_2O_2	70	70	70	70	70	70	70	70	70	70	350	350
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **Deep Injections**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/18/11 **Time of Injection :** 8:07 AM

Grid Point: D-6 **Grid Point Location:** ________

	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Summary Actual	Summary Proposed
Injection Zone	16-18' bgs	16-18' bgs	22-24' bgs	22-24' bgs	28-30' bgs	28-30' bgs	34-36' bgs	34-36' bgs	38-40' bgs	38-40' bgs		
Duration of Fracture (seconds):	4	4	4	4	4	4	4	4	4	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150	150	150	150	150		
Estimated Radius of Influence	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5		
Pounds of ZVI	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	71.5	71.5
Gallons of ZVI Solution	29	29	29	29	29	29	29	29	29	29	145	145
Pounds of Klozur	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	1578.5	1578.5
Gallons of 50% H_2O_2	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	27.8	27.8
Gallons of Dilution Water	57	57	57	57	57	57	57	57	57	57	285	285
Gallons of Klozur/H_2O_2	70	70	70	70	70	70	70	70	70	70	350	350
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100	100	100	100	100		

ODORS **None______** **Slight ______** **Moderate _______** **Strong _____**

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **Deep Injections**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Date of Injection: 11/17/11 **Time of Injection :** 4:00 PM

Grid Point: D-7 **Grid Point Location:** ________

											Summary	
	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed
Injection Zone	16-18' bgs	16-18' bgs	22-24' bgs	22-24' bgs	28-30' bgs	28-30' bgs	34-36' bgs	34-36' bgs	38-40' bgs	38-40' bgs		
Duration of Fracture (seconds):	4	4	4	4	4	4	4	4	4	4		
Pressure of Pre-injection pathway development	150	150	150	150	150	150	150	150	150	150		
Estimated Radius of Influence	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5		
Pounds of ZVI	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	71.5	71.5
Gallons of ZVI Solution	29	29	29	29	29	29	29	29	29	29	145	145
Pounds of Klozur	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	315.7	1578.5	1578.5
Gallons of 50% H_2O_2	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	5.56	27.8	27.8
Gallons of Dilution Water	57	57	57	57	57	57	57	57	57	57	285	285
Gallons of Klozur/H_2O_2	70	70	70	70	70	70	70	70	70	70	350	350
Duration of Post-Injection Fracture (seconds):	5	5	5	5	5	5	5	5	5	5		
Pressure of Post-injection pathway development	100	100	100	100	100	100	100	100	100	100		

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I** **Acetone Hot Spot**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Summary

	Actual	Proposed
Pounds of ZVI	500.5	500.5
Gallons of ZVI Solution	1015	1015
Pounds of Klozur	11049.5	11049.5
Gallons of 50% H_2O_2	194.6	194.6
Gallons of Dilution Water	1995	1995
Gallons of Klozur/H_2O_2	2450	2450

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations: ______________________________

INNOVATIVE ENVIRONMENTAL TECHNOLOGIES, INC.

Job Name: Essex Jamestown Site **Phase I**

Zero Valent Iron Catalyzed Hydoxyl and Sulfate Free Radical Oxidation

Summary

	Actual	Proposed
Pounds of ZVI	4423.88	4423.86
Gallons of ZVI Solution	8015	7975
Pounds of Klozur	66574.5	66572.5
Gallons of 50% H_2O_2	1220.99	1220.97
Gallons of Dilution Water	15815	15775
Gallons of Klozur/H_2O_2	18395.2	18353.2

ODORS None______ Slight ______ Moderate _______ Strong _____

Other Field Observations:

APPENDIX B

120-Day Data Evaluation and Technology Discussion

to

URS

For

Former Dow Facility
Jamestown, New York

June 2012

Innovative Environmental Technologies, Inc.
6151 Kellers Church Road
Pipersville, PA 18947
(888) 721-8283

Executive Summary:

A two phased approach, consisting of an initial chemical oxidation process followed by a biologically mediated mineralization phase, was used to degrade cumene (isopropyl benzene), toluene, ethylbenzene and xylene (CTEX) compounds present in soil and groundwater at a site in Jamestown, NY. The injection event was implemented from November 8th to 18th, 2011. Utilization of free radical chemistry and chemical oxidation was implemented in such a way as to extend the oxidant and free radical residuals while enhancing the in-situ environment so that it is suitable for biologically based attenuation. The two phase program effectively introduces the remedial chemicals, sodium persulfate, hydrogen peroxide and zero-valent iron (ZVI) directly into the soil and groundwater using direct push technologies using top down injection tooling through which the remedial materials were pumped into the targeted zones. Phase one of the degradation program targeted CTEX compounds and their intermediary byproducts via hydroxyl and sulfate free radicals while the second will utilize the decomposition products of the phase one reactions to enhance facultative biological activity. A modified Fenton's chemistry and persulfate chemistry was integrated at the site, utilizing zero-valent iron as a catalyst for both reactions. Four months post injection, the remedial program has transitioned from the persulfate based oxidative process to the facultative biological processes in two of the three targeted areas, while the West area remains highly oxidative in the 120 day sampling event.

The 123 injection events were distributed to the subsurface via alphanumeric points. The program was designed to influence an approximate area of 22,800 sq. ft. over depths varying from six to forty feet bgs depending on the area. A site map of the treatment areas is included below in Figure 1.

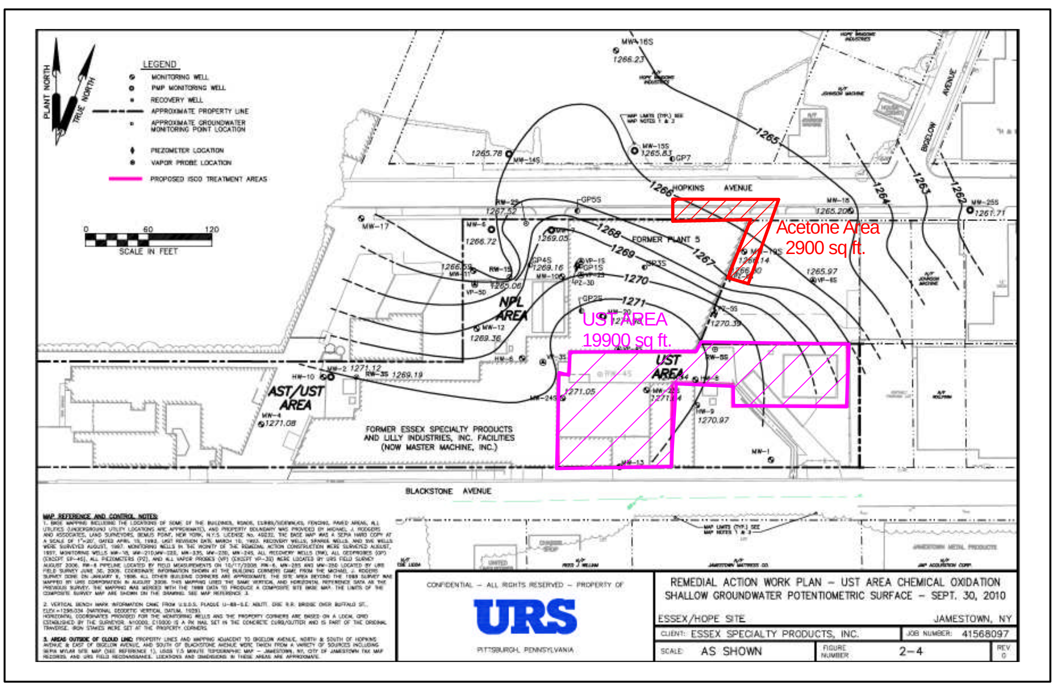

Figure 1: Areas targeted during the November 2011 injection event.

The mechanisms employed by IET in the injection process utilized compressed air followed by the remedial liquid introduction. The liquid injection was accomplished via a double diaphragm pump. As a result of the injection process, the preexisting pore volume is displaced both laterally and vertically. The transient elevation in groundwater and the rapid radial movement of those waters often results in an initial increase in the concentration of the targeted compounds, such as CTEX and other aromatic hydrocarbon concentrations. The overall effect is an in-situ mixing and homogenization of the subsurface conditions.

An evaluation of the analytical data and field parameters from the 120 day sampling event following the injection event indicates that the remedial program was successful in altering the geochemistry at the site, oxidizing dissolved CTEX compounds, and stimulating biological activity. The results from the direct oxidation phase of the remedial program indicate that there was some in-situ mixing and homogenization and in the areas with the highest CTEX concentrations, chemical oxidation appears to have decreased the concentrations significantly. Based on the concentrations seen at the site, sulfate and iron concentrations, and reducing conditions, concentrations should continue to decrease with ongoing biological mineralization.

After dissolved oxygen has been depleted in the treatment area, sulfate (the by-product of the persulfate oxidation) may be used as an electron acceptor for facultative biodegradation. This process is termed sulfanogenesis and results in the production of sulfide. Fluctuation in concentrations of sulfate may be used as an indicator of degradation of CTEX compounds. Stoichiometrically, each 1.0 mg/L of sulfate consumed by microbe's results in the destruction of approximately 0.21 mg/L of CTEX. Sulfate can play an important role in bioremediation of CTEX compounds, acting as an electron acceptor in co-metabolic processes. As an example of benzene mineralization under sulfate reduction:

$$\mathbf{C_6H6 + 3.754\ SO_4^{2-} + 3\ H_2O \rightarrow 2.25\ H^+ + 6HCO_{3-} + 3.75HS^-}$$

Sulfate concentrations are important in the monitoring program at the Dow site due to this sufanogenesis process. The presence of large concentrations of sulfate ensures that long-lasting bioremediation and natural attenuation can occur at the site.

Ferric iron is also used as an electron acceptor during biodegradation of CTEX after sulfate depletion, or sometimes in conjunction with sulfate. During this process, ferric iron is reduced to ferrous iron which is soluble in water. Ferrous iron may then be used as an indicator of anaerobic activity. Stoichiometrically, the degradation of 1 mg/L of CTEX results in the production of approximately 21.8 mg/L of ferrous iron.

An evaluation of the VOC analytical data and field parameters is discussed below. All percentage reductions are based on the November 2011 and March 2012 data.

Data Analysis:

The remedial liquids were injected into 383 injection intervals via direct push technologies. In the six UST areas, three intervals were utilized between six and sixteen feet bgs to introduce the remedial solutions. In the Acetone area, five intervals between sixteen and forty feet below ground surface (bgs) were used to inject the liquids and colloidal ZVI suspension into the targeted media affecting a radius of 4.5-11.5 feet for each point. The targeted UST area included 19,900 sq ft. over a 10 ft. vertical zone, while the acetone area targeted a 2,900 sq. ft. over a 24 ft. vertical zone. The November 2011 injections were successful in influencing the geochemistry within the targeted area. Total VOC data has not recorded any notable decreases as of the March 2012 sampling event due to the formation of acetone and 2-butanone across the site. These compounds are known intermediary compounds during a zero-valent iron activated persulfate remedial approach to aromatic hydrocarbon contamination (Fowler et al, 2011). Acetone is a transient compound with a short half live, approximately 19 to 197 days depending on geochemical conditions (Aaronson and Howard, 1997). These by products are also mediated by sulfate reducing heterotrophic bacteria and conditions exist for these facultative processes to occur in most wells sampled during the 120 day event. All treatment areas are discussed in detail within the following pages, including recommendations and analysis for the areas of concern.

UST AREAS

East UST area:
Wells sampled within this area are indicated in Figure 2 below.

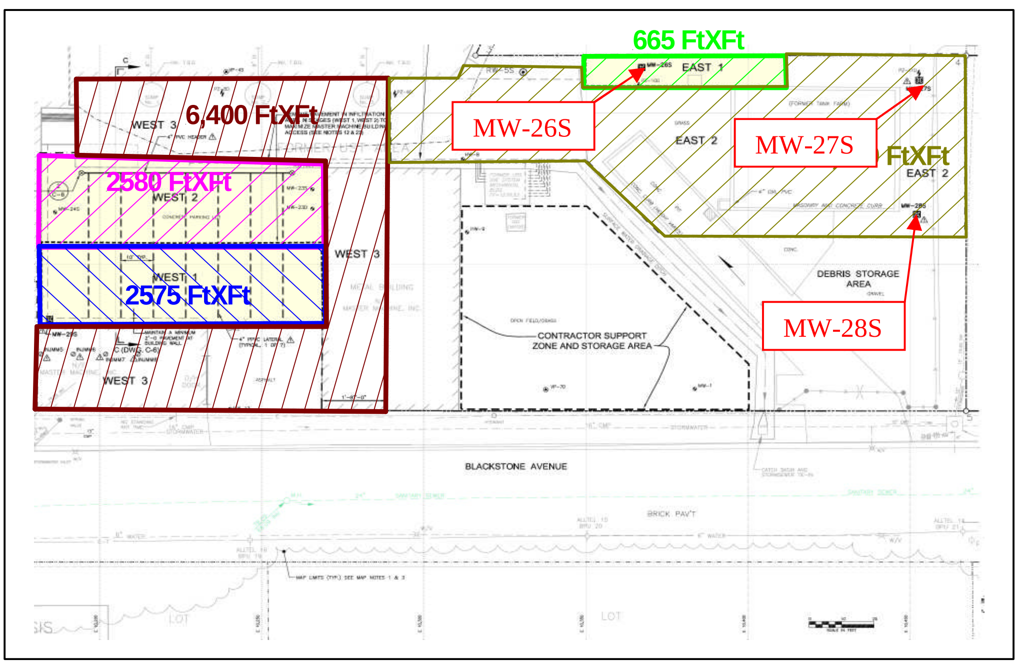

Figure 2: Wells sampled in March 2012 located in the East UST areas.

East 1:
Monitoring wells sampled in March 2012 within this area include MW-26S.

MW-26S (Strong biological activity, – via sulfate reduction/iron reduction; intermediate formation followed by biomineralization)

MW-26S is located within the UST East Area 1 treatment area and has been positively affected by the injection program. A proliferation of sulfate and iron ions as well as increases in conductivity and from 0.340 ms/cm in the November baseline sampling event to 5.314 ms/cm in the December post sampling event indicate that the injection program has had an influence within this area. The March 13, 2012 pH value of 6.23 is sustainable for facultative biological processes to continue occurring within this well. The decrease in ORP from +74 mV in December to -100 mV in March indicates that the in-situ environment has returned reducing. The accumulation of ferrous iron (Fe^{+2}) from 2,100 µg/L in December 2011 to 86,300 µg/L, is a result of the reducing conditions having returned to MW-26S. This indicates that biologic mineralization of VOC's via facultative bacteria may be accelerating in this area, utilizing the ferric iron species (Fe^{3+}) as an electron acceptor during cell respiration. The decrease in total iron and sulfate, which dropped from 4,140 mg/L in December to 1,090 mg/L in March, indicates that the mineral ferrous sulfide (pyrite) could also be accumulating. This accumulation will aid in the biologic processes by binding the toxic sulfide concentrations up, sulfide has decreased from 1,000 µg/L in the November 2011 (pre-injection) sampling event to non-detect in the most recent, March 2012, sampling event. The rebound in alkalinity will help preserve the neutral pH value within this monitoring well. Other geochemical parameters sampled indicate that conditions are ideal for biological attenuation.

MW-26S	11/2/2011	12/5/2011	3/13/2012
Total Iron (ppb)	18,200	282,000	133,000
Dissolved Iron (ppb)	9,000	2,100	86,300
Alkalinity (ug/L)	208,000	26,000	88,000
Sulfide (ug/L)	1,000	nd	nd
Sulfate (ug/L)	nd	4,140,000	1,090,000
pH	6.41	5.27	6.23
Conductivity (mS/cm)	0.34	5.31	1.32
ORP(mV)	-59	74.1	-100.1

Table 1: Groundwater geochemical data from MW-26S

VOC concentrations have responded to the injection program within this monitoring point. An initial spike in the intermediary by product, Acetone, has occurred from the baseline concentration of non-detect to the December measured value of 441 µg/L. In the most recent sampling event, taken March 13, 2012, acetone was measured at 10.8 µg/L; 98% lower than the December concentration. CTEX concentrations have also decreased by 65% since the November baseline sampling event in the 120 day sampling event. Table 1 shows VOC concentrations in MW-26S.

MW-26S (ppb)	11/2/2011	12/1/2011	3/14/2012	% change
Acetone	nd	441	10.8	Increase
Bromomethane	nd	11	nd	N/A
2-Butanone	nd	55	nd	N/A
chloromethane	nd	28	nd	N/A
Ethylbenzene	398	340	221	-44%
Isopropylbenzene	225	129	107	-52%
xylenes	1,410	1,250	385	-73%
CTEX	2,033	1,719	713	-65%
TVOC's	**2,033**	**2,254**	**723.8**	-64%

Table 2: Groundwater VOC data from MW-26S

East 2:
Monitoring wells sampled within in March 2012 within this area include MW-27S and MW-28S.

MW-27S (Strong biological activity, – via sulfate reduction/iron reduction; intermediate formation followed by biomineralization)

MW-27S is located within the UST East Area 2 treatment area and appears to have been affected by the injection program. A proliferation of sulfate and iron ions as well as increases in conductivity and from 0.235 ms/cm in the November baseline sampling event to 3.815 ms/cm in the December post-injection sampling event indicate that the injection program has had an influence within this area. Similar to MW-26S, a fluctuation in ORP value has been observed in MW-27S since the November 2011 injection event, while ferrous iron concentrations have increased. Ferric iron reducing to ferrous iron will release hydroxides back into dissolved phase, which is the cause of the pH value having rebounded to the more neutral 6.1 value, measured during the March 2012 sampling event. Sulfate, along with total iron concentrations have decreased from December 2011 to March 2012, indicating the formation of pyrite in MW-27S.

MW-27S	11/2/2011	12/5/2011	3/13/2012
Total Iron (ppb)	20,300	404,000	116,000
Dissolved Iron (ppb)	6,400	2,500	9,300
Alkalinity (ug/L)	122,000	38,000	110,000
Sulfide (ug/L)	nd	1,000	nd
Sulfate (ug/L)	nd	2,800,000	1,060,000
pH	6.22	5.51	6.1
Conductivity(mS/cm)	0.3	0.32	1.08
ORP(mV)	-163.5	-21.5	-106.9

Table 3: Groundwater geochemical data from MW-27S

VOC concentrations increased from the pre-injection sampling event to the December 2011 (post injection) sampling event. This is due, in part, to sorbed soil concentrations having been liberated by the injection event. Ethylbenzene preferentially sorbs to the soil mass and the increase in this particular compound indicates desorption of the CTEX compounds into dissolved phase. MW-27S is also located in the down-gradient corner of the treatment area East 2 and migration from upgradient treatment areas could also be contributing to the initial CTEX and acetone increases observed within this well. An initial spike in acetone concentrations occurred from the baseline concentration of non-detect to the December measured value of 392 µg/L. In the most recent sampling event, taken in March 2012 acetone was non-detect. The depletion of Acetone and 2-butanone, which are preferable to facultative bacteria, will require the bacterial populations present to mediate the longer carbon chained aromatic compounds, such as CTEX. Therefore, biological attenuation of the remaining CTEX compounds is expected to occur within this monitoring point in the following sampling events. Table 4 shows the VOC concentrations from the three most recent sampling events in MW-27S.

MW-27S (ppb)	11/2/2011	12/1/2011	3/14/2012	% change
Acetone	nd	392	nd	N/A
2-Butanone	nd	48.8	nd	N/A
ethylbenzene	nd	201	358	Increase
Isopropylbenzene	24.7	133	134	Increase
xylenes	nd	496	425	Increase
CTEX	24.7	830	917	Increase
TVOC's	**24.7**	**1270.8**	**917**	Increase

Table 4: Groundwater VOC data from MW-27S

MW-28S

This well is located within the UST East Area 2 treatment area. An increase of sulfate and iron ions, as well as increases in conductivity and from 0.36 ms/cm in the November baseline sampling event to 2.08 ms/cm in the December post sampling event indicate that the injection program has successfully altered the geochemical conditions in MW-28S. The March 2012 pH value of 6.29 is acceptable for facultative biological processes to continue occurring within this well. The decrease in ORP from -9.6 mV in December to -88.4 mV in March indicates that the environment has returned reducing and a decrease in sulfate from 1,260 mg/L in December to 454 mg/L in March indicates that sulfate reduction has occurred as well. Other geochemical parameters sampled indicate that, following initial oxidation, conditions are ideal for biological attenuation. The concentration of ferrous iron has increased to 63.2 mg/L and ferric iron is present at 34.8 mg/L.

MW-28S	11/3/2011	12/1/2011	3/14/2012
Total Iron (ppb)	33,000	184,000	98,000
Dissolved Iron (ppb)	11,900	2,900	63,200
Alkalinity (ug/L)	208,000	110,000	178,000
Sulfide (ug/L)	nd	nd	nd
Sulfate (ug/L)	nd	1,260,000	454,000
pH	6.28	6.01	6.29
Conductivity(mS/cm)	0.36	2.08	0.86
ORP(mV)	-31.5	-9.6	-88.4

Table 5: Geochemical data from MW-28S

VOC concentrations have been affected by the injection program within this monitoring point. An initial increase in acetone concentrations occurred from the baseline concentration of non-detect to the December measured value of 69.5 µg/L. It appears that the acetone and 2-butanone intermediary compounds have been depleted and as a result the remaining CTEX compounds have begun their stepwise decline. CTEX concentrations have decreased from the baseline sampling event to the March 2012 sampling event by 96%. Table 3 displays the VOC concentrations from the three most recent sampling events in MW-28S.

MW-28S (ppb)	11/2/2011	12/1/2011	3/14/2012	% change
Acetone	nd	69.5	nd	N/A
2-Butanone	nd	12.3	nd	N/A
Ethylbenzene	1490	296	93.8	-93.7%
Isopropylbenzene	316	190	103	-67.4%
toluene	nd	8	nd	N/A
xylenes	5480	609	73.7	-98.7%
CTEX	7286	1103	270.5	-96.3%
TVOC's	**7286**	**1184.8**	**270.5**	-96.3%

Table 6: Groundwater VOC data from MW-28S

West UST area:

Wells sampled within this area are indicated on Figure 3 below.

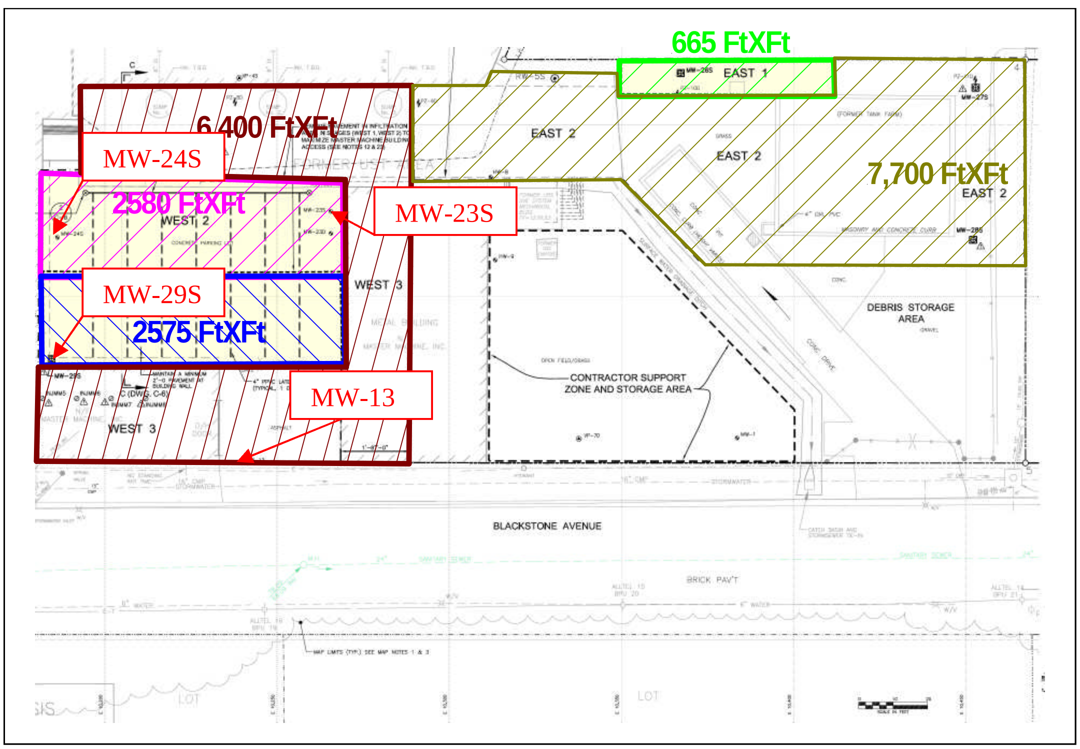

Figure 3: Wells sampled in March 2012 located in the West UST areas.

West 1:
Monitoring wells sampled in March 2012 within this area include MW-29S.

MW-29S (Continued low pH as a result of the oxidation, no biological activity demonstrated, intermediates accumulating)

MW-29S is located within the UST West Area 1 treatment area in the up gradient corner and appears to have been influenced geochemically by the injection program. An increase in sulfate and iron concentrations as well as increases in conductivity from 0.945 ms/cm in the November baseline sampling event to 27.98 ms/cm in the December, post injection sampling event, also indicate the success of the injections targeting this area. The more oxidative ORP, increasing from -8 mV in the November baseline sampling event to +475 mV in December and +219 in March 2012 indicates that continued chemical oxidation is occurring in the vicinity of MW-29S. The extended oxidation period within this well is likely due to the increased amount of persulfate having been injected in this area. Elevated iron concentrations exist in MW-29S, mostly remaining in the ferric oxidation state (Fe^{+3}). This also indicates the geochemistry of the subsurface remains in an oxidizing state. If the ferric iron begins reducing to ferrous iron species, the pH will begin to neutralize due to the release of hydroxides that occur during iron reduction. The concentration of ferric iron is currently measured at 708 mg/L and ferrous iron is present at 1.7 mg/L. Table 7 tabulates the data from the above discussion. With a stabilized pH above 6.0 (expected in the upcoming sampling events) biological mineralization of the targeted compounds and the intermediates is expected.

MW-29S	11/2/2011	12/1/2011	3/13/2012
Total Iron (ppb)	8,260	643,000	710,000
Dissolved Iron (ppb)	2,900	2,300	1,700
Alkalinity (ug/L)	358,000	nd	nd
Sulfide (ug/L)	nd	1,200	nd
Sulfate (ug/L)	nd	18,100,000	12,200,000
pH	6.31	2.50	4.13
Conductivity (mS/cm)	0.95	28.0	10.0
ORP(mV)	(8.0)	475.9	219.3

Table 7: Groundwater geochemical data from MW-29S

VOC discussion in MW-29S is pre-mature due to the remaining oxidative conditions in MW-29S. Increases in the VOCs can be attributed to the groundwater mounding step of the injection process having liberated the sorbed compounds off of the soil mass and into the groundwater. Acetone is an oxidative byproduct of isopropyl benzene and is expected to accumulate, before decreasing in the following sampling events. Acetone has decreased by 74% from the December 2011 (post injection) sampling event to the most recent, March 2012, sampling event. Other VOC compounds appeared for the first time historically in the post injection sampling event and most of these shorter carbon chain compounds (i.e. chloromethane) have decreased as a result of the oxidation. However, xylene and ethylbenzene concentrations have remained elevated. Table 8 tabulates the

VOC data from the 120 day sampling event in MW-29S, showing percent decreases in each compound from pre-injection to March 2012 and from post injection to March 2012, because some increases have been by levels of magnitude no percent increases were provided for this table.

MW-29S (ppb)	11/2/2011	12/1/2011	3/13/2012	% decrease(baseline)	% decrease(post inj.)
Acetone	27	5,360	1,360	Increase	74.6%
Benzene	135	7.5	85.5	36.7%	Increase
Bromomethane	-	334	16.5	Increase	95.1%
2-Butanone	-	191	109	Increase	42.9%
Carbon disulfide	-	136	46.8	Increase	65.6%
chloroethane	-	45.5	16.8	Increase	63.1%
chloromethane	-	2,730	665	Increase	75.6%
1,1 DCA	-	6.0	-	N/A	100.0%
ethylbenzene	8,700	3,660	12,500	Increase	Increase
2-Hexanone	-	10.5	21.3	Increase	Increase
Isopropylbenzene	325	113	218	32.9%	Increase
methyene chloride	-	8.3	-	N/A	100.0%
4-Methyl-2-Pentanone	45.2	-	45.8	Increase	Increase
styrene	-	101	-	N/A	100.0%
toluene	-	-	3,350	N/A	Increase
xylenes	52,900	22,950	71,000	Increase	Increase
CTEX	62,060	26,731	87,154	Increase	Increase
TVOC's	**62,132**	**35,653**	**89,435**	Increase	Increase

Table 8: Groundwater VOC data from MW-29S

West 2:
Monitoring wells sampled in March 2012 within this area include MW-23S and MW-24S.

MW-23S (Continued low pH as a result of the oxidation, no biological activity demonstrated, intermediates accumulating)

MW-23S is located within the UST West 2 treatment area in the down gradient corner and is screened from seven to seventeen feet bgs. This well appears to have been positively affected by the injection program. An increase in sulfate and iron concentrations as well as increases in conductivity from 0.694 ms/cm in the November baseline sampling event to 20.56 ms/cm in the December post sampling event indicate that the injection program has had an influence within this area. The increase in ORP from -60 mV in the November baseline sampling event to +444 mV in the March 2012 indicates that continued chemical oxidation may be occurring in the vicinity of MW-23S. The reason for the elongated oxidation timetable within this well can be directly related to the amount of persulfate that was injected into this area as opposed to the East area. Ferrous iron concentrations have appeared in MW-23S indicating that some iron reduction may be occurring in area west 2 in areas up-gradient and have migrated into the vicinity of MW-23S. The concentration of ferric iron is currently measured at 16.3 mg/L and ferrous iron is present at 51.4 mg/L. As groundwater returns to equilibrium within MW-23S, IET expects to see the pH continue to neutralize as the remaining ferric iron concentrations reduce to ferrous iron and release hydroxides thus providing buffering the groundwater. The ORP values are also expected to begin to decrease, preparing this area to return reducing. Table 9 tabulates the geochemical data from the above discussion.

MW-23S	11/2/2011	12/1/2011	3/13/2012
Total Iron (ppb)	15,800	1,360,000	67,700
Dissolved Iron (ppb)	1,500	2,000	51,400
Alkalinity (ug/L)	304,000	nd	nd
Sulfide (ug/L)	nd	1,000	nd
Sulfate (ug/L)	14,800	12,900,000	6,040,000
pH	6.64	2.59	3.29
Conductivity (mS/cm)	0.649	20.56	5.673
ORP(mV)	-60.4	442.3	466.3

Table 9: Groundwater geochemical data from MW-23S

VOC concentrations have been influenced by the modified Fenton's reagent and sulfate free radical oxidation in the initial step of remediation and decreases in VOC concentrations can most likely be attributed to the oxidation phase of the remediation. The initial increase in acetone concentrations occurred from the baseline non-detect measurement to the December measured value of 1,200 µg/L. Acetone is a product of hydroxyl oxidation of isopropyl benzene which may account for the increase in MW-23S. Other VOC contamination appeared in the post injection sampling event and most of the shorter carbon chain compounds, e.g. chloromethane and acetone, have decreased as a result of the oxidation. An 84% decrease in total VOC's has been observed since the post injection sampling event conducted in December 2011. Table 7 tabulates the data from the above discussion.

MW-23S (ppb)	11/2/2011	12/1/2011	3/14/2012	% decrease (baseline)	% decrease(post inj.)
Acetone	nd	1200	216	Increase	82.0%
Benzene	nd	3.1	nd	N/A	100.0%
Bromomethane	nd	31	5.9	Increase	81.0%
2-Butanone	nd	94.9	19	Increase	80.0%
Carbon disulfide	nd	136	14.9	Increase	89.0%
chloroethane	nd	12.6	nd	N/A	100.0%
chloromethane	nd	394	82.3	Increase	79.1%
ethylbenzene	15.9	38.7	7.8	50.9%	79.8%
Isopropylbenzene	57.5	12.2	1.8	96.9%	85.2%
xylenes	32.7	198.9	nd	100.0%	100.0%
TVOC's	**106.1**	**2121.4**	**347.7**	Increase	83.6%

Table 10: Groundwater VOC data from MW-23S

MW-24S (A rebounding pH following the oxidation event has led to biological activity and the mineralization of both the targeted compounds and the intermediates formed as a result of the oxidation process)

MW-24S is located within the UST West Area 2 treatment area in and is screened from seven to seventeen feet bgs. This well appears to have been affected by the injection program. An increase in sulfate and iron concentrations in combination with increases in conductivity from 0.414 ms/cm in the November baseline sampling event to 17.61 ms/cm in the December post sampling event, indicate that the injection program has had an influence within this area. The decrease in ORP from +412 mV in December 2011 to -6 mV in the March sampling event indicates that the groundwater has become reducing. The more negative redox potential will enhance iron reduction and allow for continued buffering of the pH. Sulfate reduction also appears to be occurring in the area surrounding MW-23S as concentrations have decreased by 9,910 mg/L in the past three months. Decreasing sulfate concentrations, along with the decrease in total iron, and the depletion of sulfide indicates that the formation of the mineral pyrite may also be occurring in MW-24S. Table 11 tabulates the data from the above discussion.

MW-24S	11/2/2011	12/1/2011	3/13/2012
Total Iron (ppb)	12,700	844,000	221,000
Dissolved Iron (ppb)	500	1,600	nd
Alkalinity (ug/L)	236,000	nd	632,000
Sulfide (ug/L)	1,000	nd	nd
Sulfate (ug/L)	nd	13,300,000	3,390,000
pH	6.58	2.72	5.24
Conductivity(mS/cm)	0.414	18.51	3.301
ORP(mV)	-51.5	412.7	-6.0

Table 11: Groundwater geochemical data from MW-24S

Concentrations of VOCs in MW-24S have decreased most likely due to modified Fenton's and sulfate free radical oxidation implemented by the initial step of the remediation. An initial spike in acetone concentrations occurred from the baseline non-detect measurement to the December measured value of 1,300 µg/L. The concentration of acetone has decreased 91% during the March sampling event. Acetone is a product of hydroxyl oxidation of isopropyl benzene which may account for the increase measured in MW-24S. Other VOC contamination such as Ethylbenzene and Xylenes have increased in the first two sampling events taken in December 2011 and March 2012. This is likely due to sorbed concentrations of the compounds such as Ethylbenzene and xylenes having been liberated into dissolved phase, by the November 2011 injection event. Most of the shorter carbon chain compounds, e.g. (chloromethane, Acetone), have decreased as a result of the extended, sulfate free radical, oxidation. Table 12 tabulates the data from the above discussion.

MW-24S (ppb)	11/2/2011	12/1/2011	3/14/2012	% decrease (baseline)	% decrease(post inj.)
Acetone	nd	1,300	116	Increase	91.1%
Benzene	nd	3.9	1.1	Increase	71.8%
Bromomethane	nd	77.5	nd	N/A	100.0%
2-Butanone	nd	115	nd	N/A	100.0%
Carbon disulfide	nd	294	5.1	Increase	98.3%
chloroethane	6.9	6.9	nd	100.0%	100.0%
chloromethane	nd	377	nd	N/A	100.0%
ethylbenzene	94.1	450	2,040	Increase	Increase
Isopropylbenzene	229	51.3	164	28.4%	Increase
4-Methyl-2-Pentanone	nd	10.1	nd	Increase	100.0%
toluene	nd	11.0	10.1	Increase	8.2%
xylenes	1,465	3,008	6,595	Increase	Increase
TVOC's	**1,795**	**5,705**	**8,931**	Increase	Increase

Table 12: Groundwater VOC data from MW-24S

West 3:
Monitoring wells sampled in March 2012 within this area includes MW-13.

MW-13 (A rebounding pH, decreasing ORP has resulted in biomineralization of the targeted and intermediate compounds)

MW-13 is located within the UST West Area 3 treatment area in and is screened from nine to nineteen feet bgs. This well appears to have been affected by the injection program. Increases in sulfate and iron concentrations, as well as increases in conductivity from 0.717 ms/cm in the November baseline sampling event to 9.448 ms/cm in the December post injection sampling event, indicate that the injection program has had an influence within this area. The March pH measurement of 5.73 is slightly acidic, but with an elevated alkalinity value of 178,000 ug/L, IET expects the pH to become more neutral in subsequent sampling events. The decrease in ORP from +37.5 mV to -49.6 mV in the most recent sampling event indicates that the environment has returned to reducing conditions. Decreases in sulfate and iron from the December 2011 to the March 2012 sampling events may indicate the chemical production of the mineral pyrite which binds up toxic sulfide concentrations enabling facultative bacteria to thrive during the biological attenuation phase of the remedial design. Table 13, shown below, tabulates data from the above discussion.

MW-13	11/2/2011	12/1/2011	3/13/2012
Total Iron (ppb)	9,930	2,890,000	105,000
Dissolved Iron (ppb)	3,800	260	101,000
Alkalinity (ug/L)	110,000	200,000	178,000
Sulfide (ug/L)	nd	nd	nd
Sulfate (ug/L)	65,500	6,450,000	1,100,000
pH	6.14	5.58	5.73
Conductivity (mS/cm)	0.717	9.448	1.445
ORP(mV)	11.5	37.5	-49.6

Table 13: Geochemical data from MW-13

VOC concentrations initially increased from baseline sampling results to the post injection, (December 2011), sampling event but have returned to non-detect. The initial increase was likely due to the groundwater mounding phase of the remedial program. MW-13 is screened across a 10 interval and is located at the most up-gradient location of all the treatment areas. These parameters coupled with the seasonally high water table commonly observed in the late winter in this area of the country could have caused the plume to expand towards MW-13 prior to returning to its pre-injection concentrations. IET does not expect VOC concentrations to rebound within this monitoring well based on geochemical conditions. This fluctuation in VOC concentrations can be viewed below in Table 14.

MW-13 (ppb)	11/2/2011	12/1/2011	3/14/2012	% decrease (baseline)	% decrease(post inj.)
Acetone	nd	381	nd	Increase	100.0%
benzene	nd	3.3	nd	Increase	100.0%
2-butanone	nd	30	nd	Increase	100.0%
carbon disulfide	nd	11.1	nd	Increase	100.0%
chloromethane	nd	64.8	nd	Increase	100.0%
ethylbenzene	nd	15.7	nd	Increase	100.0%
xylenes	nd	88.9	nd	Increase	100.0%
TVOC's	**0**	**594.8**	**0**	Increase	100.0%

Table 14: Groundwater VOC data from MW-13

Acetone area:
Wells sampled within this area are indicated on Figure 5 below.

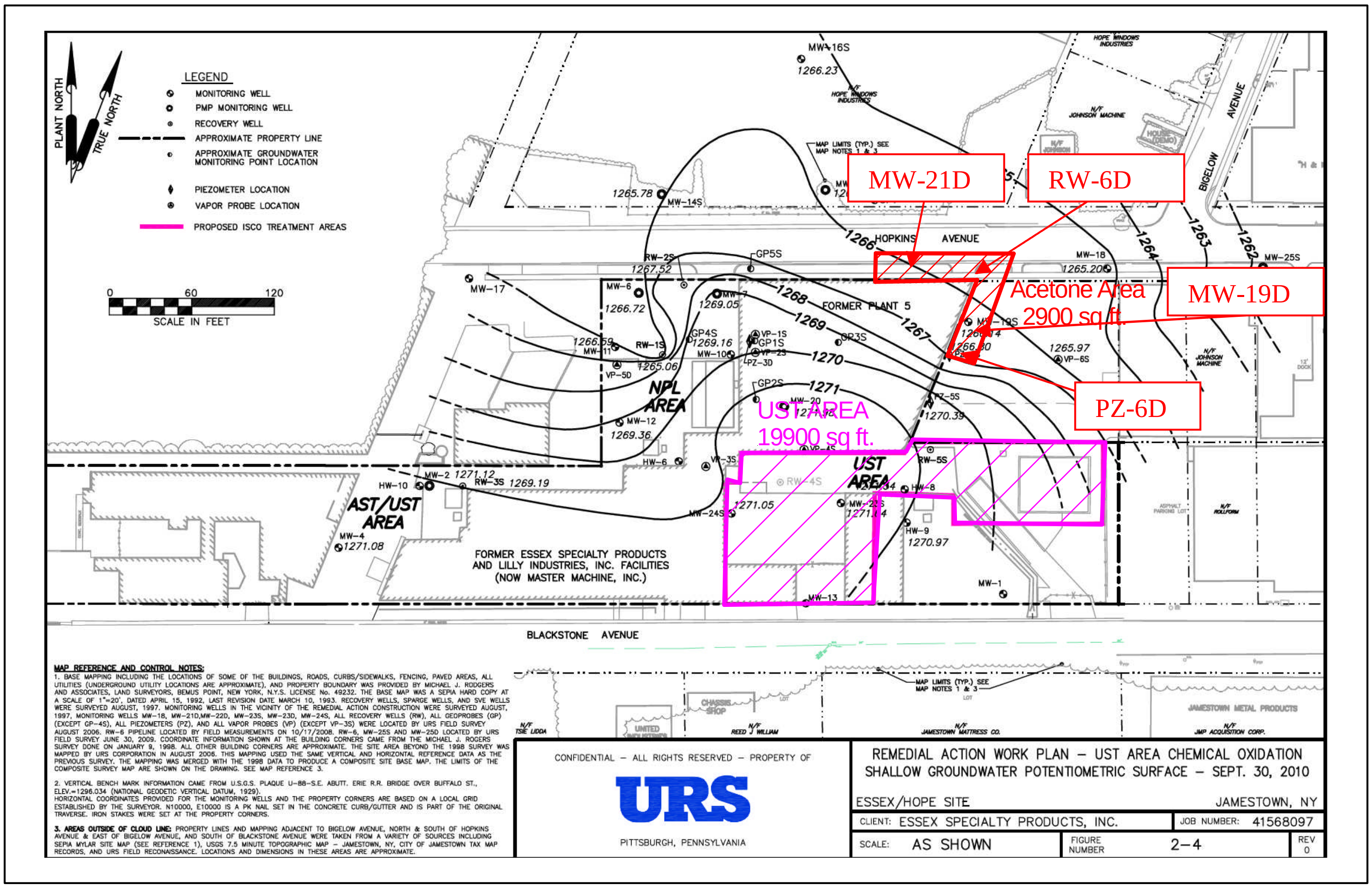

Figure 4: Wells sampled in March 2012 located in the Acetone area.

Acetone Area:
Monitoring wells sampled in March 2012 within this area includes MW-19D, MW-21D, RW-6D and PZ-6D.

MW-19D (Sulfate reducing conditions have allowed for biological mineralization of the acetone present at the on-set of the project as well as other targeted compounds)

MW-19D is located on the up-gradient edge of the acetone treatment area, and no screen information was available for this well. The geochemical data indicates that this well was not directly influenced by the injection event as no increases in conductivity, iron concentrations or sulfate concentrations were observed the first two sampling events.

MW-19D	11/2/2011	12/1/2011	3/14/2012
Total Iron (ppb)	455000	417000	1030000
Dissolved Iron (ppb)	8800	6200	6300
Alkalinity	630000	620000	586000
sulfide	nd	nd	nd
sulfate	nd	nd	nd
pH	6.94	6.53	6.53
conductivity(mS/cm)	0.605	0.8	0.768
ORP(mV)	-87	-53.8	-162

Table 15: Geochemical data from MW-19D

Acetone concentrations initially increased in the first post injection (December 2011) sampling event, but have decreased in the most recent sampling event. A 59% decrease in acetone has occurred from the baseline sampling event of 2,870 µg/L to the March 2012 measured value of 1,190 µg/L. It is expected that as an indirect effect of the injection event, groundwater mounded into the screened interval of MW-19D. However, since the December 2011 sampling event, the groundwater has returned to equilibrium, thus lowering the concentrations back to below their pre-injection values. Table 16 charts VOC data for MW-19D.

MW-19D ppb	11/2/2011	12/1/2011	3/14/2012	% decrease(baseline)	% decrease(post inj.)
Acetone	2,870	16,400	1,190	Increase	92.7%
Benzene	nd	2.9	nd	Increase	N/A
2-Butanone	17.5	64.4	nd	Increase	100.0%
Vinyl Chloride	130	48.3	19.6	84.9%	59.4%
TVOC's	**3,018**	**16,516**	**1,210**	59.9%	92.7%

Table 16: Groundwater VOC data from MW-19D

MW-21D (Appears not to have been affected by the in-situ injection event -need screen interval)

MW-21D is located within the acetone treatment area and it’s screened interval is unknown. This well does not appear to have been affected by the injection program. The ORP has remained reductive since the injection event and sulfate concentrations have remained non-detect.

MW-21D	11/3/2011	12/1/2011	3/14/2012
Total Iron (ppb)	27800	25200	22200
Dissolved Iron (ppb)	5300	19200	10900
Alkalinity	562000	652000	176000
sulfide	nd	nd	nd
sulfate	nd	nd	nd
pH	6.49	6.68	6.5
conductivity(mS/cm)	1.151	1.337	1.239
ORP(mV)	-33.1	-64.3	-75.9

Table 17: Geochemical data from MW-21D

VOC data is fluctuating within this monitoring point; however, these fluctuations are more likely a result of the water table rising and falling within the soil column due to either adjacent injection events or seasonal water table fluctuations, and the oxidation event. Table 18 tabulates these VOC concentrations within MW-21D.

MW-21D (ppb)	11/2/2011	12/1/2011	3/14/2012
Acetone	65,100	232,000	338,000
Benzene	73.8	55.7	67.7
2-Butanone	582	151	1,390
1,1 DCE	593	202	158
Carbon disulfide	nd	68	nd
cis-1,2 DCE	185,000	76,200	120,000
trans-1,2 DCE	3,600	1,080	nd
toluene	26.6	nd	5.5
Trichloroethene	30,000	2,050	2,390
vinyl chloride	36,200	30,700	39,200
xylenes	nd	12	nd
TVOC's	**321,175**	**342,519**	**501,211**

Table 18: Groundwater VOC data from MW-21D

RW-6D (Sulfate reducing conditions have allowed for biological mineralization of the acetone present at the on-set of the project as well as other targeted compounds)

RW-6D is located on the downgradient edge of the Acetone treatment area. This well appears to have been indirectly influenced by the injection event in November 2011. Increases in total iron and sulfate were observed in the December post injection sampling event. Reducing conditions remain within this the area around RW-6D with ORP values measured at -104 mV and a ferrous iron concentrations increasing from 720 µg/L in December to 1,200 µg/L in March.

RW-6D	11/2/2011	12/1/2011	3/20/2012
Total Iron (ppb)	7,350	13,000	5,320
Dissolved Iron (ppb)	100	720	1,200
Alkalinity (ug/L)	354,000	370,000	358,000
Sulfide (ug/L)	nd	nd	nd
Sulfate (ug/L)	nd	21,600	nd
pH	6.76	6.70	6.76
Conductivity (mS/cm)	0.57	0.64	0.53
ORP(mV)	-69.9	-118.7	-104.0

Table 19: Geochemical data from RW-6D

Acetone concentrations have decreased within RW-6D by 93%, but other VOC data including chlorinated aliphatic compounds such as TCE, cis-1,2-DCE and vinyl chloride remain elevated within the location. A reductive dechlorination approach may be necessary in order to remedy such constituents, as the ORP values within this well are naturally reducing. The remedial design would provide the subsurface within this area with sources of organic carbon and hydrogen, while abiotically reducing parent compounds such as TCE with zero valent iron. Thereby enhancing long term reductive dechlorination via anaerobic processes. Table 20 shows these chlorinated compounds along with acetone and other targeted compounds.

RW-6D (ppb)	11/2/2011	12/1/2011	3/14/2012
Acetone	36,000	29,500	2,390
Benzene	36.7	21.7	25.2
2-Butanone	192	147	40.2
1,1 DCE	53.0	120	42.4
cis-1,2 DCE	24,200	15,000	19,800
trans-1,2 DCE	297	137	317
Trichloroethene	3,510	6,570	3,560
vinyl chloride	2,990	2,470	2,650
TVOC's	**67,279**	**53,966**	**28,825**

Table 20: Groundwater VOC data from RW-6D

PZ-6D (Area has transitioned to biologically mediated remedial processes following the oxidation event and the formation of acetone. Most recet data supports the premise of attenuation by-way of the sulfate and iron reducing processes.)

PZ-6D is located within the acetone treatment area. PZ-6D sulfate concentrations increased from the pre-injection sampling event in November 2011 to the post injection sampling event, from non-detect to 11,700 mg/L, and have decreased to 1,770 mg/L in the most recent sampling event. Sulfide has decreased from 1000 ppb to non-detect in the March 2012 sampling event. Excessive sulfide concentration can inhibit bacterial growth, therefore the precipitation of pyrite in groundwater is paramount in the enhanced development of heterotrophic populations. In-situ iron is transitioning to ferrous species as the ORP levels have decreased to -240.3 mV in the most recent sampling event. The geochemical parameters of interest can be viewed below in Table 21.

PZ-6D	11/3/2011	12/5/2011	3/14/2012
Total Iron (ppb)	594,000	231,000	862,000
Dissolved Iron (ppb)	5,100	550	10,000
Alkalinity	84,000	1,600,000	796,000
Sulfide	nd	1,000	nd
Sulfate	nd	11,700,000	1,770,000
pH	6.6	na	6.62
Conductivity (mS/cm)	0.383	na	1.287
ORP(mV)	-50.7	na	-240.3

Table 21: Geochemical parameters for PZ-6D

Acetone concentrations have increased within PZ-6D from non-detect to 843 mg/L in December 2012. This indicates that contamination may have been liberated during the November injection event. Such a drastic increase in concentration is a likely a result of sorbed concentrations having been mobilized during the injection event. Due to sulfate free radical oxidation, the acetone concentration has decreased since December to 407 mg/L and biologic processes should yield further decreases within this monitoring well in subsequent sampling events. Table 22 charts the past three sampling events VOC data from PZ-6D.

PZ-6D (ppb)	11/2/2011	12/1/2011	3/14/2012
Acetone	nd	843,000	407,000
2-Butanone	2,031	nd	1,851
Carbon disulfide	nd	68.4	nd
chloromethane	nd	8.7	nd
cis-1,2 DCE	nd	nd	25.0
4-methyl-2-pentanone	32.8	50.7	18.2
vinyl chloride	13.3	7.6	38.4
TVOC's	**2,077**	**843,135**	**408,933**

Table 22: Groundwater VOC data from PZ-6D

Outside of Treatment Area:

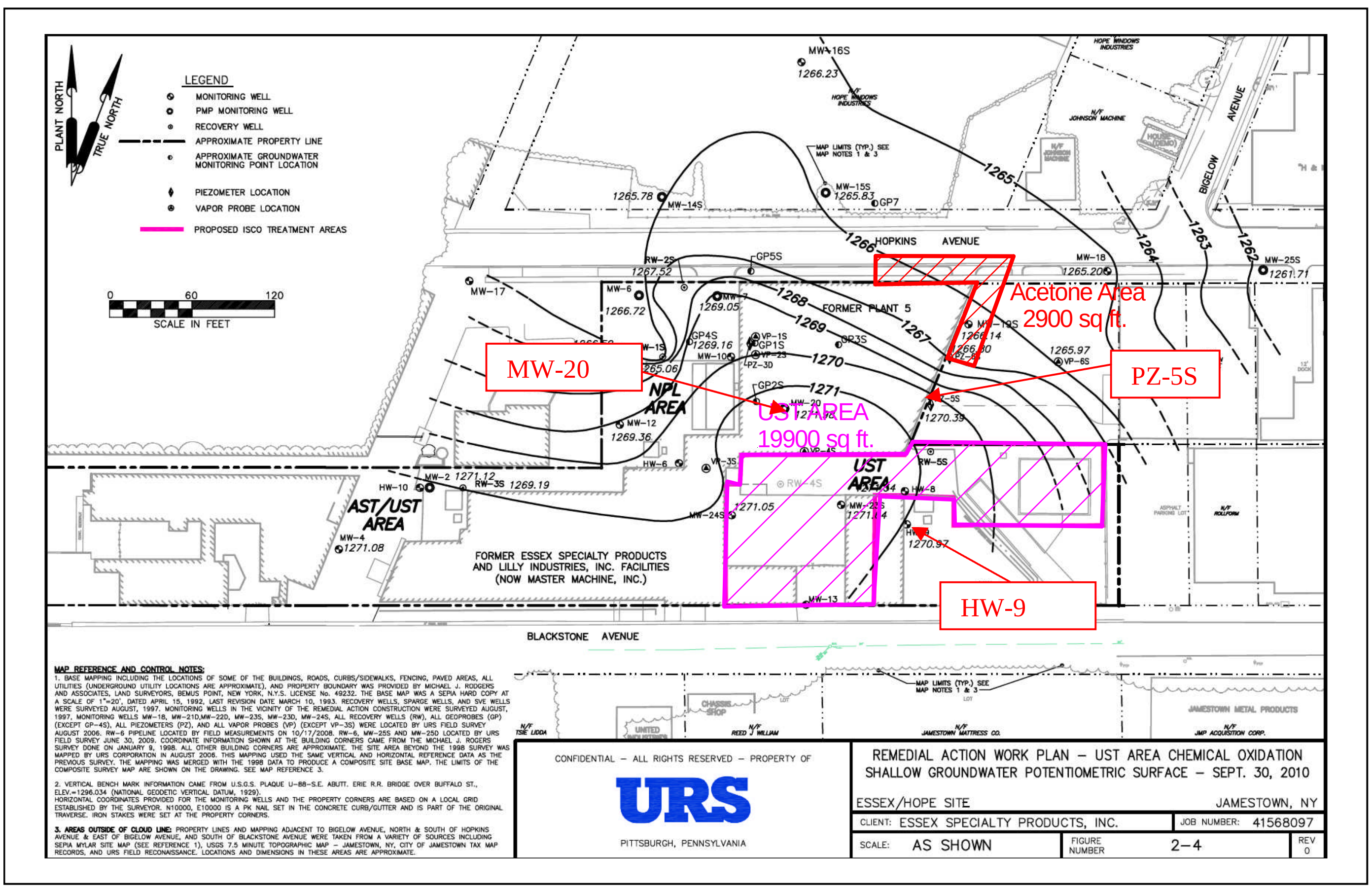

Figure 5. Wells sampled outside of treatment area (MW-20, PZ-5S, and HW-9).

Outside the treatment areas:
Wells sampled in March that lay outside of the treatment areas include; MW-20, PZ-5S and HW-9.

MW-20 (Sulfate reducing conditions have allowed for biological mineralization of the acetone present at the on-set of the project as well as other targeted compounds)

MW-20 is located approximately fifty feet side-gradient of Area West 2 and is screened from 7-12 feet bgs. This well appears to have been slightly influenced by the injection event in November 2011. Increases in total iron and sulfate were observed in the December post injection sampling event. Conductivity has increased from 0.245 ms/cm in the November baseline sampling event to 1.036 ms/cm in the most recent March 2012 sampling event. Both the pH and alkalinity remain in the range for facultative biologic processes to occur, 6.26 and 114,000 ug/L, respectively. Iron reduction appears to be occurring as concentrations of iron are mostly in the ferrous Fe^{2+} reduced state with a concentration of 46.9 mg/L in the March sampling event. Redox potential has decreased from the pre-injection sampled event in November 2011 value of -42.5 mV to the most recent value of -95 mV. Table 23 shows measured geochemical parameters for the first three sampling events within MW-23.

MW-20	11/3/2011	12/1/2011	3/14/2012
Total Iron (ppb)	16,300	88,700	63,800
Dissolved Iron (ppb)	6,300	63,000	46,900
Alkalinity (ug/L)	82,000	20,000	114,000
Sulfide (ug/L)	nd	nd	nd
Sulfate (ug/L)	14,100	620,000	680,000
pH	6.42	6.29	6.26
Conductivity (mS/cm)	0.245	1.036	1.057
ORP(mV)	-42.5	-40.4	-95

Table 23: Groundwater geochemical data from MW-20

Concentrations of VOC's have appeared in the most recent sampling event mainly in the form of CTEX compounds including first time measured concentration of isopropyl benzene, toluene, ethylbenzene and xylenes. This indicates that the injection event, having occurred slightly up-gradient, may have liberated these compounds off of the soil mass. These compounds also having light non-aqueous phase characteristics will migrate to the shallower zones, where MW-20 is screened. The concentrations of the VOC's for MW-20 can be viewed below in Table 24.

MW-20 (ppb)	11/3/2011	12/5/2011	3/14/2012
cis-1,2 DCE	403.0	17.5	5.5
Ethylbenzene	nd	nd	990.0
Isopropylbenzene	nd	nd	83.5
toluene	nd	nd	607.0
Trichloroethene	79.0	6.2	nd
vinyl chloride	5.1	nd	nd
xylenes	nd	12.1	6,290.0
TVOC's	**487.1**	**35.8**	**7,976.0**

Table 24: Groundwater VOC data from MW-20

PZ-5S

PZ-5S is located approximately forty feet down-gradient of area East 2. This well appears to have been indirectly influenced by the injection event in November 2011. Increases in total iron and sulfate were observed in the December post injection sampling event. Conductivity has increased from 0.145 ms/cm in the November baseline sampling event to 3.76 ms/cm in the post injection sampling event. Ferrous iron (Fe^{2+}) concentrations are elevated at 95.8 mg/L in the March sampling event and ferric iron concentrations measure non-detect. Redox potential has decreased from the pre-injection sampling event in November 2011 value of -10.4 mV to the most recent value of -79.9 mV. The combination of decreasing ORP and increasing ferrous iron concentrations indicate a return of the area around PZ-5S to pre-injection reducing conditions. As a result IET expects to see biological attenuation of these compounds over the next few sampling events, so long as sulfate concentrations remain available to serve as terminal electron acceptors for these processes, and geochemical conditions remain ideal for sulfate reduction to excel. Table 25 shows measured geochemical parameters for the first three sampling events within PZ-5S.

PZ-5S	11/2/2011	12/5/2011	3/14/2012
Total Iron (ppb)	3,170	105,000	94,900
Dissolved Iron (ppb)	2,400	51,200	95,800
Alkalinity (ug/L)	68,000	nd	82,000
Sulfide (ug/L)	nd	nd	nd
Sulfate (ug/L)	24,100	2,710,000	52,800
pH	6.65	5.3	5.91
Conductivity(mS/cm)	0.145	3.76	1.983
ORP(mV)	-10.4	82.8	-79.9

Table 25: Groundwater geochemical data from PZ-5S

Concentrations of VOC's have remained at low concentrations in PZ-5S. VOC's are mainly in the form of CTEX compounds, including the first time measured concentration of isopropyl benzene, ethylbenzene and xylenes. This indicates that the injection event, having occurred slightly up-gradient, may have liberated these compounds from the soil mass. These compounds have light, non-aqueous phase characteristics, so when displaced they will tend to migrate to the shallower zones. IET expects to see biological attenuation of these compounds continue over the next few sampling events. A 31% reduction in total VOCs was observed between the December post-injection sampling event and the March 2012 sampling event. Acetone has decrease from 162 µg/L in December 2011 to below detection in March 2012. Sulfate concentrations decreased from 2,710 mg/L in December to 52.8 mg/L in March which is likely due to plume contraction coupled with sulfate reduction of VOC concentrations. The VOC concentrations for PZ-5S can be viewed below in Table 26.

PZ-5S (ppb)	11/2/2011	12/1/2011	3/14/2012
Acetone	nd	162	nd
Carbon disulfide	nd	8.8	nd
chloromethane	nd	13	nd
ethylbenzene	20.4	11.8	54.2
Isopropylbenzene	4.4	5.7	18.9
xylenes	125	7.6	71.1
TVOC's	**149.8**	**208.9**	**144.2**

Table 26: Groundwater VOC data from PZ-5S

HW-9

HW-9 is located approximately twenty-five feet up-gradient of area East 2 and twenty-five feet down-gradient of area West 3. This monitoring location appears to have been indirectly influenced by the injection event in November 2011. Increases in total iron, sulfate and alkalinity have been observed in both sampling event since the pre-injection sampling event. This likely indicates downgradient migration of injected constituents from Area East 2. The redox potential has decreased from the pre-injection sampled event in November 2011 value of +30 mV in November 2011 to the most recent value of -63 mV. This indicates that oxidation is not occurring, but with elevated sulfate concentrations, biological processes are expected to excel within HW-9. Table 27 shows measured geochemical parameters for the first three sampling events within MW-27.

HW-9	11/2/2011	12/5/2011	3/13/2012
Total Iron (ppb)	11,300	29,600	177,000
Dissolved Iron (ppb)	4,100	22,300	147,000
Alkalinity (ug/L)	166,000	110,000	138,000
Sulfide (ug/L)	nd	nd	nd
Sulfate (ug/L)	nd	298,000	2,190,000
pH	6.21	6.06	5.98
Conductivity(mS/cm)	0.277	0.678	2.385
ORP(mV)	29.7	31.5	-62.9

Table 27: Groundwater geochemical data from HW-9

Concentrations of VOC's have increased in HW-9, mainly in the form of ethylbenzene and xylenes. This indicates that the injection event, having occurred slightly up-gradient, may have liberated these compounds from the soil mass. These compounds have light non-aqueous phase characteristics, so when displaced they will tend to migrate to the, downgradient, shallower zones. The increased concentrations of these compounds can be viewed below in Table 28. IET expects to see biological attenuation of these compounds over the next few sampling events.

HW-9 (ppb)	11/2/2011	12/1/2011	3/14/2012
Acetone	nd	10.3	nd
ethylbenzene	nd	nd	48.9
Isopropylbenzene	18.7	13.6	26.5
xylenes	nd	nd	58.1
TVOC's	**18.7**	**23.9**	**133.5**

Table 28: Groundwater VOC data from HW-9

Two areas of concern are discussed below.

The Acetone area

This area was addressed as both an inhibitor of plume migration and a remedial address of acetone that had migrated down gradient of the source area, below the restrictive silty clay pan at 13-20 feet bgs. A notable increase in acetone concentrations resulted in the post-injection sampling event and although facultative degradation appears to be occurring within the sampling points in this area, the amount of electron acceptor sulfate may not be sufficient for complete attenuation of the acetone concentrations. Chlorinated compounds, which also are used by sulfate reducing bacteria, exist in the area at elevated concentrations. The oxidation event decreased concentrations of these constituents; however, the increase in acetone may have increased the chemical oxygen demand to beyond the originally designed values. IET's recommendation is to evaluate data from the subsequent sampling events in order to assess the biological attenuation rates occurring in this area. Also, monitoring down-gradient monitoring wells will provide valuable information to the possible movement of the acetone and/or chlorinated species. Figure 6 below charts the concentrations of VOCs across this area over the first two post injection sampling events.

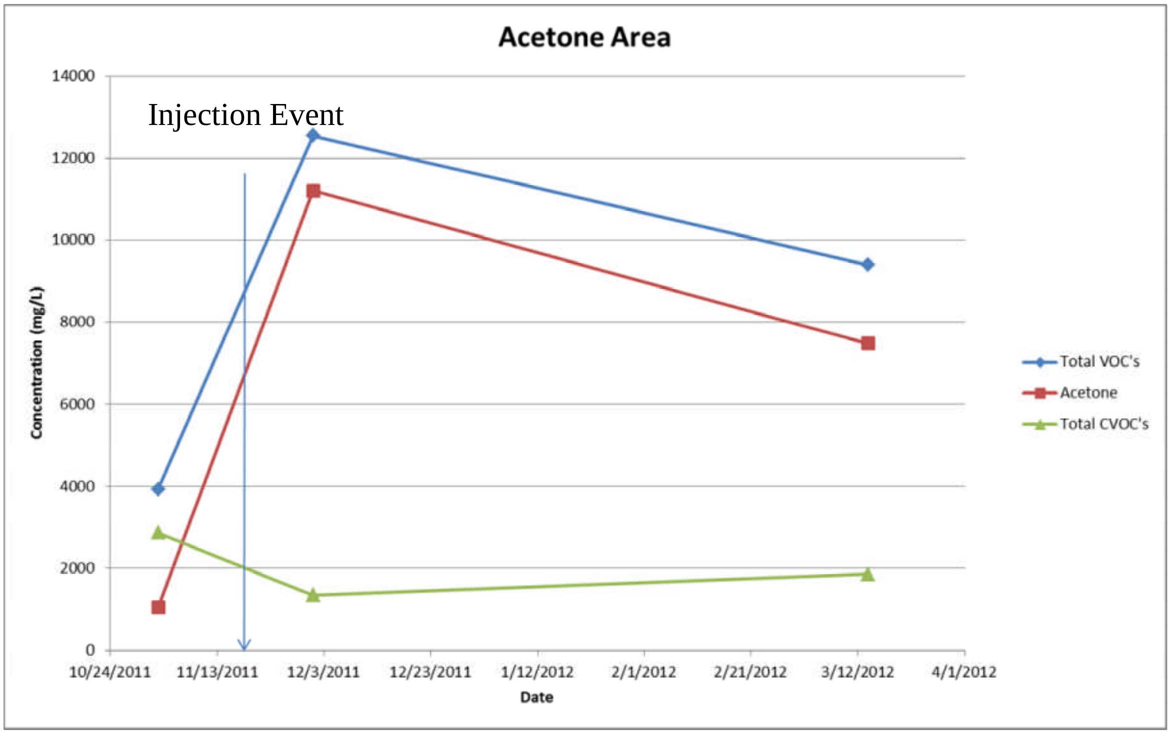

Figure 6: Total concentrations across all wells sampled in the Acetone Area.

Areas West 1 and West 2

This area was addressed as a source area treatment zone; therefore, increased amounts of oxidant were injected into areas West 1 and West 2. The pH value has become acidic in all three monitoring points within this area, which include MW-29S, MW-23S and MW-24S. The fluctuations in pH can be viewed below in Table 20. The decrease in pH is expected initially as the activated persulfate reacts with source area contamination. However, these pHs may be low enough to inhibit facultative biological processes. In MW-29S and MW-24S the pH values have increased as ORP values have decreased. Due to their location as the two most up-gradient wells, IET expects this trend to continue throughout the area eventually affecting MW-23S. There has not been a decrease in ORP within MW-23S as of the March 2012 sampling event; however, ferrous iron concentrations have increased while total iron has decreased. This trend indicates the transition of non-dissolved iron into ferrous iron (Fe^{2+}), which is the goal of the process. The ferrous iron then reacts with the sulfide ion (S^{2-}) to form iron sulfide. As a result of the oxidation event, CTEX concentrations have responded positively within these two areas. Although no notable percentage decreases in total VOCs have occurred in the first two sampling events, acetone has decreased in all three wells sampled since the post injection December 2011 sampling event. Acetone is byproduct of cumene oxidation using a Fenton's reagent, which accounts for the initial increase recorded in the December 2011 sampling event. The effect of the injection event on total isopropylbenzene and total acetone concentrations can be viewed in the Figures 7 and 8, respectively.

pH	11/2/2011	12/1/2011	3/13/2012
MW-29S	6.31	2.5	4.13
MW-23S	6.64	2.59	3.29
MW-24S	6.58	2.72	5.24

Table 29: pH values for monitoring locations in areas West 1 and West 2

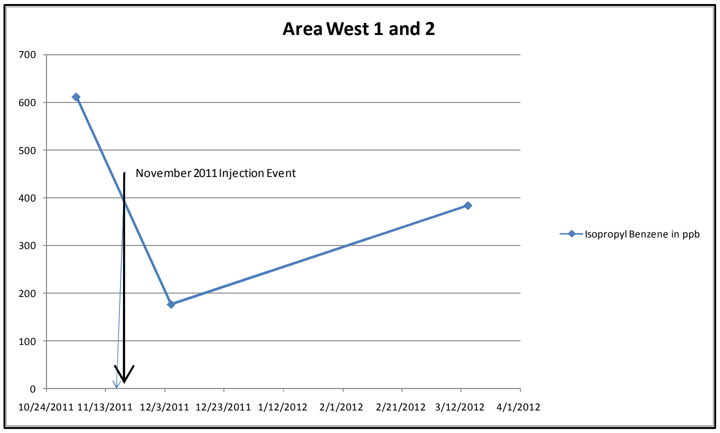

Figure 7: Total Isopropyl benzene concentrations for all wells sampled in Area west 1 and area west 2

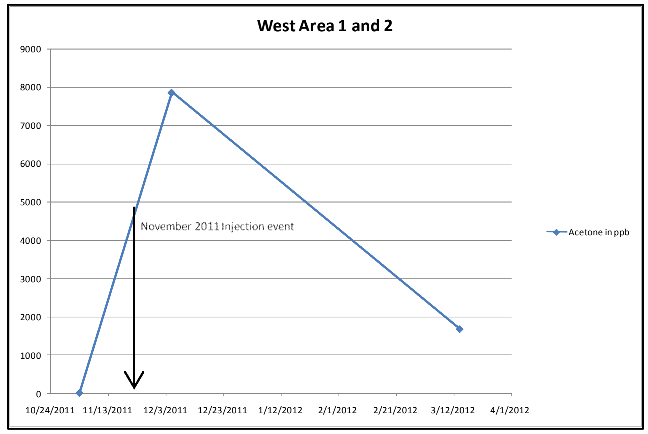

Figure 8: Total Acetone concentrations for all wells sampled in Area west 1 and area west 2

Conclusions and Recommendations:

The efficacy of the remedial injection event that occurred in November has been successful in altering geochemical parameters in all three treatment areas. Drastic increases in sulfate, total iron and fluctuations in ORP have been observed across the site, which allude to the effectiveness of the remedial effort to emplace material throughout the targeted zones. On a broad scale, VOC concentrations have responded to the oxidation event and have started declining after the initial increase in most monitoring points from the December 2011 sampling event. This spike is common when oxidation technologies are implemented to address aromatic hydrocarbons. These types of contaminants will preferentially sorb to soil particles rather than dissolve into groundwater, so during the injection process they are typically liberated. The injection event in November 2011 effectively desorbed these compounds by mounding the groundwater into the unsaturated zone through the increased temperatures resulting from the persulfate activation process. IET recommends continued quarterly groundwater monitoring in all areas in order to evaluate the efficacy of the biological portion of the remediation process.

Appendix C

Field Sampling Logs

Groundwater

Baseline

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE JAMESTOWN Sample ID HW-9
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	11.2.11 / 1415	VS/BC
~~Sample Depth~~ DTW/Well Depth: 9.08/18.78	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: SUNNY / 50's

Sample Description:
LT BRN/RUST COLOR, CLEAR/COLORLESS INITIALLY

Additional Comments/Observations:
PRE-OPS/BASELINE SAMPLING FOR UST AREA ISCO

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1347	1352	INT'L	~1.0	6.19	13.40	0.209	0.96	24.4
	1357	9.08'	~2.5	6.01	13.35	0.214	3.62	50.3
	1402			6.08	13.35	0.216	2.64	52.7
	1407		~5.5	6.17	13.36	0.256	1.86	41.2
	1412		~6.5	6.21	13.35	0.277	1.61	29.7

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE UST
Project Number 41560097
Sample ID MW-13
Sample Type GW (SHALLOW)

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
LOW FLOW / PERISTALTIC	6·30·11 / 1125	BC
Sample Depth/Well Depth: TD ~ 18' DTW ~ 10.16	**PID (ppm) Headspace:** NA	**Laboratory:** PACE

Weather/Temperature:

Sample Description:

CLEAR, COLORLESS

Additional Comments/Observations:

SAMPLING CONDUCTED AS PART OF UST AREA REMEDIAL ACTION INVESTIGATION OF SHALLOW PLUME.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1055	1059			6.19	13.90	0.729	0.83	34.9
	1100		~0.5	6.03	13.54	0.692	0.61	39.4
	1103		~1.0	5.93	13.21	0.699	0.88	36.4
1104	1111	Recharge						
	1116		~1.5	6.14	14.45	0.717	0.98	11.5
		RECHARGE						

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE JAMESTOWN
Project Number 41569123
Sample ID MW-26S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC	11.2.11 / 1335	VS/BC
DTW ~~Sample Depth~~/Well Depth: 6.34' / ~15'	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: SUNNY, 50's

Sample Description:
- H2O INITIALLY, LT BRNISH, GRAY, CLOUDY, SLIGHT ODOR PRESENT.
- CLEAR/COLORLESS

Additional Comments/Observations:
PRE-OPS/BASELINE SAMPLING FOR USTAKEA USCO

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1313	1318	Init'l DTW = 6.34'		6.23	14.40	0.359	0.34	-0.7
	1323		~2.5	6.28	14.29	0.350	0.26	-62.1
	1328		~4.0	6.30	14.29	0.343	0.25	-65.0
	1331		~5.5	6.44	14.28	0.339	0.20	-60.0
	1334		~6.5	6.41	14.31	0.340	0.24	-59.0

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE ~~JAMESTOWN~~

Project Number 41569123

Sample ID MW-27S

Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	11-2-11 / 1305	VS | BC
~~Sample Depth~~ DTW/Well Depth: 9.88' / 20'	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: SUNNY, 50s°

Sample Description:

- H2O Initially, V.LT GREY, CLOUDY
- CLEAR, COLORLESS

Additional Comments/Observations:

PREOPS/BASELINE SAMPLING FOR UST AREA ISCO.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1237	1242	INT'L DTW	~1.25	6.23	15.85	0.227	1.33	-166.3
	1247	=9.88'	~2.5	6.20	15.75	0.217	0.88	-174.9
	1252		~3.75	6.21	15.70	0.225	0.47	-158.3
	1257		~5.0	6.21	15.68	0.232	0.33	-141.0
	1302		~6.25	6.22	15.70	0.235	0.30	-163.5

URS

SAMPLE LOG SHEET

Project Name: ESSEX/HOPE JAMESTOWN
Project Number: 41569123
Sample ID: MW-28S
Sample Type: GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	11.2.11 / 1450	VS / BC
DTW ~~Sample Depth~~/Well Depth:	PID (ppm) Headspace:	Laboratory:
9.79' / 17'	NA	PACE

Weather/Temperature: SUNNY / 80's

Sample Description:

- H2O initially v. lt gray and cloudy, slight odor

Additional Comments/Observations:

PRE-OPS / BASELINE SAMPLING FOR UST AREA ESCO

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1424	1429	Init'l	~1.25	6.24	15.34	0.365	0.33	-14.5
	1432	9.79'	~2.0	6.24	15.57	0.360	0.18	-23.2
	1436		~3.0	6.27	15.39	0.361	0.17	-29.8
	1440		~4.0	6.27	15.43	0.360	0.18	-29.3
	1444		~5.0	6.28	15.35	0.359	0.21	-31.9
	1448		~6.0	6.28	15.38	0.360	0.19	-31.5

URS

SAMPLE LOG SHEET

Project Name: ESSEX / HOPE JAMESTOWN
Project Number: 41569123
Sample ID: MW-29S
Sample Type: GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	11.2.11 / 1620	VS/BC
~~Sample Depth~~/Well Depth: (DTW)	PID (ppm) Headspace:	Laboratory:
8.04 / ~13'	N/A	PACE

Weather/Temperature: SUNNY / 50°s

Sample Description:

- H_2O INITIALLY DK. GRAY, CLOUDY, STRONG ODOR PRESENT.
- H_2O

Additional Comments/Observations:

PRE-OPS / BASELINE SAMPLING FOR UST AREA ISCO.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1546	1551	INTL	~1.0	6.32	15.55	0.964	0.56	70.1
	1555	8.04'	~2.0	6.33	15.54	1.006	0.45	59.5
	1600		~3.0	6.33	15.54	0.955	0.30	34.6
	1605		~4.0	6.33	15.54	0.948	0.27	9.2
	1610		~5.0	6.32	15.53	0.946	0.16	-4.5
	1615		~6.0	6.31	15.53	0.945	0.24	-8.0

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE UST
Project Number 41568097

Sample ID MW-23S
Sample Type GW (SHALLOW)

Sample and/or Purge Method: LOW FLOW/ PERISTALTIC	Sample Date & Time: 6.30.11 / 0825	Sampled By: BC
Sample Depth/Well Depth: TD ~15 DTW 6.15'	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature:

Sample Description:

CLEAR, COLORLESS

Additional Comments/Observations:

SAMPLING CONDUCTED AS PART OF UST AREA REMEDIAL ACTION INVESTIGATION OF SHALLOW PLUME.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
0807	0808			6.76	12.19	1.148	4.03	1.3
	0809			6.61	11.81	1.122	2.30	-13.7
	0811		~1.0	6.50	12.46	1.031	0.63	-18.9
	0813		~1.5	6.37	13.06	0.997	0.77	-20.5
	0815		~2.0	6.53	13.10	0.688	0.75	-39.9
	0817		~2.5	6.59	13.02	0.661	0.62	-50.9
	0819		~3.0	6.64	12.94	0.649	0.56	-60.4

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE UST
Project Number 41568097
Sample ID MW-24S
Sample Type GW (SHALLOW)

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
LOW FLOW/PERISTALTIC	6.30.11/0935	BC
Sample Depth/Well Depth: TD~15' DTW~7.95	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature:

Sample Description:

CLEAR, COLORLESS, MILD ODOR.

Additional Comments/Observations:

SAMPLING CONDUCTED AS PART OF UST AREA REMEDIAL ACTION SHALLOW PLUME INVESTIGATION

Well Purging Data:

Time		DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
From	To							
0914	0916			6.53	13.02	0.468	1.13	-25.7
	0919		~1.0	6.51	12.91	0.445	0.62	-35.6
	0924		~2.0	6.52	13.02	0.426	0.42	-42.1
	0927		~2.5	6.54	12.96	0.417	0.39	-46.2
	0929		~3.0	6.56	12.94	0.414	0.35	-49.5
	0932		~3.5	6.58	12.94	0.414	0.37	-51.5

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE UST
Project Number 41568097
Sample ID PZ-5S
Sample Type GW(SHALLOW)

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
LOWFLOW/ PERISTALTIC	6.30.11/1205	BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
TD ~12' DTW ~6.45'	NA	PACE

Weather/Temperature:

Sample Description:

CLEAR, COLORLESS

Additional Comments/Observations:

SAMPLING CONDUCTED AS PART OF UST AREA REMEDIAL ACTION INVESTIGATION OF SHALLOW PLUME

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1146	1148			6.72	14.10	0.161	12.26	-3.1
	1151		~1.0	6.60	12.92	0.150	1.52	-3.3
	1153		~1.5	6.52	12.88	0.147	1.27	-2.0
	1155		~2.0	6.52	12.80	0.146	1.11	-2.9
	1157		~2.5	6.54	12.76	0.146	1.03	-5.0
	1200		~3.0	6.58	12.77	0.145	0.96	-7.5
	1202		~3.5	6.65	12.65	0.145	0.96	-10.4

Sheet ____ of ____

WELL PURGING/FIELD MEASUREMENT RECORD

Project: ESSEX/HOPE	Project No: 41568904	Well No: MW-20
Location: JAMESTOWN, NY		Date: 9.21.11 (W)
Purging Method: SUBMERSIBLE PUMP	Duration:	Personnel: VS/BC
Depth of Well (TOC): 11.73'	Depth to Water (TOC): 6.99'	Aquifer Yield (gpm):

Time From	Time To	Action	Vol (gal)	pH	Cond ~~(uS/cm)~~ mS/cm	Temp (°C)	Turb (NTU)	DO (mg/L)	ORP (mV)	
1057	1059	PURGE	~0.5	6.89	0.259	15.25	Lt. BRN/ Rust color.	0.81	-46.0	
	1101	↓	~1.0	6.61	0.251	15.18		0.56	-34.7	
	1103	↓	~1.5	6.52	0.250	15.19	clear colorless	0.86	-35.7	
	1105	↓	~2.0	6.48	0.249	15.18		0.57	-37.5	
	1107	↓	~2.5	6.45	0.246	15.19		0.63	-40.6	
	1109	↓	~3.0	6.42	0.245	15.19		0.58	-42.5	
	1110	SAMPLE								

Notes:

Well Casing Volume Calculation: $[3.14*(r)^2*(H)]*7.48$ = 1 Casing Volume (gal) ≈ 0.75 GAL

Where: r = Well Radius (ft) [2-in well = 0.083-ft; 4-in well = 0.166-ft; 6-in well = .025-ft]
H = Water Column Height (ft) = (Total Depth - Depth to Water)

Sheet ____ of ____

WELL PURGING/FIELD MEASUREMENT RECORD

Project: ESSEX/HOPE	**Project No:** 41568904	**Well No:** MW-22D
Location: JAMESTOWN, NY		**Date:** 9.21.11 (W)
Purging Method: SUBMERSIBLE PUMP	**Duration:**	**Personnel:** VS/BC
Depth of Well (TOC): 43.05'	**Depth to Water (TOC):** 10.30'	**Aquifer Yield (gpm):**

Time From	Time To	Action	Vol (gal)	pH	Cond (~~µS/cm~~) mS/cm	Temp (°C)	Turb (NTU)	DO (mg/L)	ORP (mV)	
1124	1127	PURGE	~2.0	6.44	0.378	11.04	Lt. Grey Cloudy	0.57	65.2	
	1131	↓	~5.0	6.00	0.385	10.96	Clear colorless	0.54	100.9	
	1133		~7.5	5.92	0.385	10.98		0.58	101.5	
	1136		~10.0	6.10	0.385	10.97		0.62	96.2	
	1139		~12.5	6.27	0.386	10.97		0.62	89.3	
	1142		~15.0	6.34	0.386	10.95		0.48	87.3	
	1145		~17.5	6.38	0.386	10.96		0.52	86.0	
	1148		~20.0	6.42	0.387	10.93		0.59	85.3	
	1150	SAMPLE								

Notes:

Well Casing Volume Calculation: $[3.14*(r)^2*(H)]*7.48$ = 1 Casing Volume (gal) ≈ 5.5 GAL

Where: r = Well Radius (ft) [2-in well = 0.083-ft; 4-in well = 0.166-ft; 6-in well = .025-ft]
H = Water Column Height (ft) = (Total Depth - Depth to Water)

WELL PURGING/FIELD MEASUREMENT RECORD

Project: ESSEX/HOPE	Project No: 41568904	Well No: MW-19D
Location: JAMESTOWN, NY		Date: 10.3.11
Purging Method: SUBMERSIBLE PUMP	Duration:	Personnel: VS
Depth of Well (TOC): ~44'	Depth to Water (TOC): ~10.24'	Aquifer Yield (gpm):

Time From	Time To	Action	Vol (gal)	pH	Cond (~~µS/cm~~) mS/cm	Temp (°C)	Turb (NTU)	DO (mg/L)	ORP (mV)	
1359	1400	Purge		7.44	0.616	12.78		7.31	26.6	
	1402			7.03	0.628	12.07		1.95	-61.6	
	1405			6.94	0.618	12.09		1.67	-76.2	
	1408			6.90	0.607	12.09		1.55	-80.6	
	1412			6.92	0.603	12.11		1.24	-84.1	
	1415			6.93	0.604	12.12		1.21	-85.7	
	1418			6.92	0.611	12.14		0.98	-85.8	
	1421			6.94	0.605	12.15		0.96	-87.0	
	1425	Sample								

Notes:

Well developed by Nothnagle 10.3.11
Silt removed to bottom of well
~18 gal silt,
~100 gal H_2O removed.

Well Casing Volume Calculation: $[3.14*(r)^2*(H)]*7.48$ = 1 Casing Volume (gal)

Where: r = Well Radius (ft) [2-in well = 0.083-ft; 4-in well = 0.166-ft; 6-in well = .025-ft]
H = Water Column Height (ft) = (Total Depth - Depth to Water)

Sheet ____ of ____

WELL PURGING/FIELD MEASUREMENT RECORD

Project: ESSEX/HOPE	Project No: 41568904	Well No: MW-21D
Location: JAMESTOWN, NY		Date: 9.21.11 (W)
Purging Method: SUBMERSIBLE PUMP	Duration:	Personnel: VS/BC
Depth of Well (TOC): 41.27'	Depth to Water (TOC): 9.95'	Aquifer Yield (gpm):

Time From	Time To	Action	Vol (gal)	pH	Cond ~~(µS/cm)~~ mS/cm	Temp (°C)	Turb (NTU)	DO (mg/L)	ORP (mV)	
1158	1203	PURGE	2.5	6.47	1.006	11.74	Lt. Brwsh Grn, cloudy	0.82	-23	
	1207	↓	5.0	6.46	1.108	11.71	clear colorless	0.63	-11.4	
	1211	↓	7.5	6.47	1.125	11.62		0.58	-15.6	
	1214	↓	10.0	6.46	1.137	11.62		0.57	-20.1	
	1218	↓	12.5	6.47	1.142	11.58		0.63	-25.1	
	1222	↓	15.0	6.48	1.142	11.57		0.54	-28.6	
	1226	↓	17.5	6.49	1.151	11.59		0.54	-33.1	
	1230	SAMPLE								

Notes:

Well Casing Volume Calculation: $[3.14*(r)^2*(H)]*7.48$ = 1 Casing Volume (gal) ≈ 5.0 GAL

Where: r = Well Radius (ft) [2-in well = 0.083-ft; 4-in well = 0.166-ft; 6-in well = .025-ft]
H = Water Column Height (ft) = (Total Depth - Depth to Water)

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE JAMESTOWN Sample ID RW-6D
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
RW PUMP/SAMPLE PORT	11.2.11/1800	VS/BC
Sample Depth/Well Depth:	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: 50s

Sample Description:

LT. GRAY, LITTLE CLOUDY, ODOR

Additional Comments/Observations:

PRE-OP/BASELINE. FOR UST AREA/ACETONE PLUME ISCO

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
	1735			6.90	12.75	0.500	1.10	21.1
	1740			6.78	12.72	0.505	0.35	-20.5
	1745			6.73	12.78	0.519	0.24	-37.3
	1748			6.72	12.79	0.530	0.24	-45.2
	1752			6.70	12.81	0.545	0.22	-52.4
	1755			6.76	12.82	0.556	0.17	-62.4
	1759			6.76	12.82	0.565	0.15	-69.9

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE JAMESTOWN Sample ID PZ-6D

Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	11.3.11 / 0910	VS/DC
DTW ~~Sample~~ Depth/Well Depth:	PID (ppm) Headspace:	Laboratory:
10.87'/33.20'	NA	PACE

Weather/Temperature: Cloudy, 50's

Sample Description:

GRAY CLAYEY SILT (FINE) HEAVY, DIFFICULT TO PURGE. FOLLOWING PURGE/SAMPLE OF WELL - TD ~39.75' PURGE DATA (WATER QUALITY DATA) MAY BE OFF DUE TO FLO THRU CELL HALF FULL OF SOLIDS

Additional Comments/Observations:

PRE-OPS/BASELINE SAMPLING FOR UST AREA #/ACETONE PLUME ISCO.
PZ DEVELOPED ON 10/13/11 TO TD OF ~45.5'. SILTED UP TO TD ~33' 11.3.11.
WELL SCREENED FROM 25.5-45.5'

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
0838	0843			6.56	12.10	0.550?	0.75	68.3
	0848			6.58	11.99	0.603?	0.41	17.0
	0853		~2.5	6.59	11.97	0.594?	0.35	-23.7
	0858			6.59	11.93	0.594?	0.23	-38.8
	0903		~4.0	6.60	11.92	0.406	0.28	-45.8
	0908		~5.0	6.60	11.90	0.383	0.23	-50.7

Groundwater

Round 1 – December 2011

URS

SAMPLE LOG SHEET

Project Name: E/H JAMESTOWN
Project Number: 41569123

Sample ID: HW-9
Sample Type: GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	12.5.11 / 1320	VS/BC
~~Sample Depth/Well~~ Depth:	PID (ppm) Headspace:	Laboratory:
DTW: 8.07'	NA	PACE

Weather/Temperature: RAIN, 40s

Sample Description:

CLEAR, COLORLESS

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 1 - APPROX 2-3 WKS POST COMPLETION

Well Purging Data:

Time		DTW	Volume	pH	Temp (°C)	Cond	DO (mg/L)	ORP (mV)
From	To	(ft-bgs)	(gal)			(ms/cm)		
1259	1302		~0.5	5.63	12.02	0.397	1.28	57.1
	1305		~1.0	5.73	12.00	0.400	0.86	60.8
	1307		~1.5	5.83	11.99	0.415	0.80	58.0
	1309		~2.0	5.90	12.00	0.466	0.79	53.0
	1311		~2.5	5.96	12.01	0.535	0.73	48.4
	1313		~3.0	6.02	12.04	0.626	0.70	38.5
	1315		~3.5	6.06	12.06	0.678	0.70	31.5

URS

SAMPLE LOG SHEET

Project Name: E/H JAMESTOWN
Project Number: 41569123

Sample ID: MW-13
Sample Type: GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	12.1.11/1010	VS
~~Sample Depth/Well Depth:~~	PID (ppm) Headspace:	Laboratory:
DTW: 10.62	NA	PACE

Weather/Temperature: Sunny, 30s

Sample Description:

- GRAY, CLOUDY, SILTY, MILD ODOR

Additional Comments/Observations:

- POST ISCO SAMPLING ROUND 1 - APPROX 2 WKS POST COMPLETION.

Well Purging Data:

Time		DTW	Volume	pH	Temp (°C)	Cond	DO (mg/L)	ORP (mV)
From	To	(ft-bgs)	(gal)			(ms/cm)		
0929	0932		~0.5	5.42	13.68	9.275	2.14	53.5
	0935		~1.0	5.58	14.46	9.448	0.67	37.5
0937	0948		well dry at 0934; allow to recharge					
0948	0949		Little Recovery and dry again @ 0949 - allow to recharge (?)					
	approx 1.25-1.5 gals purge removed total							

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123
Sample ID MW-26S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	12.5.11 / 1250	VS/BC
~~Sample Depth/Well Depth~~: DTW: 6.30'	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: RAIN, 40S

Sample Description:
- ORANGE/BRN - RUST COLOR, CLOUDY,
- THEN CLOUDY/LT. GRAY, ODORS PRESENT.

Additional Comments/Observations:
POST ISCO SAMPLING ROUND 1 - APPROX 2-3 WKS POST COMPLETION.

Well Purging Data:

Time		DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
From	To							
1230	1233		~0.5	4.47	13.36	5.199	0.95	193.5
	1236		~1.0	5.08	13.34	5.172	0.94	122.0
	1239		~1.5	5.32	13.35	5.195	0.64	92.0
	1242		~2.0	5.35	13.34	5.251	0.42	83.2
	1244		~2.5	5.32	13.36	5.289	0.37	78.9
	1246		~3.0	5.29	13.35	5.306	0.32	75.3
	1249		~3.5	5.27	13.35	5.314	0.33	74.1

URS

SAMPLE LOG SHEET

Project Name: E/H JAMESTOWN
Project Number: 41569123
Sample ID: MW-27S
Sample Type: GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	12.5.11/1225	VS/BC
~~Sample Depth/Well Depth~~: DTW: 8.49'	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: RAIN, Cloudy 40s

Sample Description:
~GRAY/BRN, CLOUDY INITIALLY, ~CLEAR, COLORLESS

Additional Comments/Observations:
POST LSCO SAMPLING ROUND 1 - APPROX 2-3 WKS POST COMPLETION.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1200	1203		~0.5	5.39	14.58	2.295	1.41	10.7
	1206		~1.0	5.46	14.66	3.372	1.14	-6.2
	1209		~1.5	5.49	14.66	3.669	0.56	-15.2
	1211		~2.0	5.50	14.66	3.762	0.40	-17.8
	1214		~2.5	5.50	14.69	3.806	0.39	-20.0
	1216		~3.0	5.51	14.72	3.816	0.36	-21.1
	1219		~3.5	5.51	14.71	3.815	0.32	-21.5

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN Sample ID MW-28S

Project Number 41569123 Sample Type GW

~~Sample and/or Purge~~ Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	12.5.11 / 1345	VS/BC
~~Sample Depth/Well Depth~~:	PID (ppm) Headspace:	Laboratory:
DTW: 8.70'	NA	PACE

Weather/Temperature: Rainy, 40s, Cloudy

Sample Description:

-RUST COLORED, CLOUDY, MILD ODORS

-LT. BRNISH GRAY, CLOUDY

Additional Comments/Observations:

POST-ISCO SAMPLING ROUND 1 - APPROX 2-3 WKS POST COMPLETION.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1328	1330		0.5	6.06	13.98	2.055	8.41	10.6
	1332		1.0	6.07	13.90	2.051	1.14	3.0
	1334		1.5	6.07	13.91	2.073	0.75	-2.4
	1336		2.0	6.07	13.97	2.129	0.61	-7.4
	1339		2.5	6.06	14.03	2.150	0.57	-9.5
	1342		3.0	6.03	14.08	2.111	0.54	-10.1
	1345		3.5	6.01	14.09	2.076	0.46	-9.6

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN

Project Number 41569123

Sample ID MW-29S

Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	12.1.11 / 0915	VS
~~Sample Depth/Well Depth:~~ DTW - 6.90'	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: Sunny, 30s

Sample Description:

GRAY, CLOUDY, SILTY, MOD ODORS
- WARM TEMP

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 1 - APPROX 2 WKS
POST COMPLETION.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
0850	0853		~0.5	2.43	17.88	25.83	0.59	537.9
	0856		~1.0	2.44	18.08	26.35	0.32	521.5
	0859		~1.5	2.44	18.29	27.18	0.24	521.6
	0902		~2.0	2.46	18.42	27.82	0.22	508.0
	0905		~2.5	2.48	18.43	27.99	0.23	484.1
	0908		~3.0	2.50	18.62	27.98	0.24	475.9

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123

Sample ID MW-23S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	12.1.11 / 0740	VS
~~Sample Depth/Well Depth~~: DTW ~~10.62~~ 4.73'	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: Sunny, 30s

Sample Description:

Gray, Cloudy, Silty, V.MILD ODOR

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 1 - APPROX 2 WKS. POST COMPLETION

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
0715	0716			2.23	16.63	24.82	2.18	562.6
	0719		2.5	2.43	16.23	19.26	2.19	528.6
	0722		4.0	2.50	16.64	20.80	1.87	476.5
	0724		6.0	2.56	16.72	20.88	1.69	451.0
	0726		8.0	2.59	16.71	20.56	1.62	442.3

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123
Sample ID MW-24S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	12.1.11 / 0825	VS
~~Sample Depth/Well Depth~~: DTW: 6.25'	PID (ppm) Headspace: N/A	Laboratory: PACE

Weather/Temperature: Sunny, 30s

Sample Description:

GRAY, CLOUDY, SILTY - MILD ODOR.
- WATER WARM TEMP

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 1 - APPROX 2 WKS POST COMPLETION

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
0803	0805			2.62	12.79	18.05	1.75	426.9
	0807		~1.0	2.64	17.15	17.97	0.92	426.0
	0809		~1.5	2.66	17.40	18.26	0.61	423.5
	0811		~2.0	2.66	17.42	18.41	0.51	421.7
	0814		~2.5	2.69	17.60	18.47	0.43	416.5
	0817		~3.0	2.72	17.61	18.51	0.38	412.7

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123
Sample ID PZ-5S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	12.5.11 / 1440	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
DTW: 5.17'	NA	PACE

Weather/Temperature: Rainy, 40s.

Sample Description:

-DK GRAY/BRN - CLOUDY, HEAVY AMTS OF FINE SILT IN WATER, TD ~ 10.6' BELOW TOC, TD OF WELL ~12';
-ODOR PRESENT
PROBS W/ FLOW THRU CELL CLOGGING DUE TO SILT.

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 1 - APPROX 2-3 WKS POST COMPLETION.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1408	1420	Ø (L)	~0.5	5.43	12.80	3.824	0.92	79.4
	1426		1.0	5.37	12.83	3.758	0.24	77.2
	1430		1.25	5.28	12.77	3.733	0.10	83.6
	1436		1.5	5.30	12.56	3.760	0.21	82.8

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123

Sample ID MW-20
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	12.5.11 / 1615	VS/BC
~~Sample Depth/Well~~ Depth: DTW: 6.03'	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: Rain, 40s

Sample Description:
- ODOR PRESENT, CLEAR, COLORLESS

Additional Comments/Observations:
POST ISCO SAMPLING ROUND 1 - APPROX 2-3 WKS POST COMPLETION.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1556	1559		~0.5	6.07	14.26	1.066	2.78	15.5
	1601		~1.0	6.15	14.32	1.050	1.61	0.7
	1603		~1.5	6.22	14.35	1.028	0.98	-16.5
	1605		~2.0	6.25	14.36	1.021	0.73	-27.2
	1607		2.5	6.27	14.37	1.021	0.64	-32.9
	1610		3.0	6.28	14.38	1.029	0.56	-37.8
	1612		3.5	6.29	14.38	1.036	0.51	-40.4

-40.4

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN Sample ID MW-22D
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	12.1.11 / 1130	VS
~~Sample Depth/Well Depth:~~	PID (ppm) Headspace:	Laboratory:
DTW - 9.55'	N/A	PACE

Weather/Temperature: SUNNY, 30s

Sample Description:
INT'L V. LT. GRAY, LITTLE, CLOUDY →
CLEAR, COLORLESS

Additional Comments/Observations:
POST ISCO SAMPLING ROUND 1- APPROX 2 WKS
POST COMPLETION -

Well Purging Data:

Time		DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
From	To							
1108	1110		~2.0	6.07	11.99	1.392	1.80	51.5
	1112		~3.0	6.04	12.08	1.864	2.02	63.4
	1114		~4.0	6.10	12.03	1.767	1.43	68.3
	1116		~5.0	6.12	12.00	1.773	1.36	72.4
	1118		~6.0	6.12	12.07	1.814	1.41	76.4
	1120		~7.0	6.11	12.01	1.842	1.37	79.4
	1122		~8.0	6.11	12.07	1.865	1.34	82.0

URS

SAMPLE LOG SHEET

Project Name: E/H JAMESTOWN
Project Number: 41569123

Sample ID: MW-19D
Sample Type: GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	12.1.11 / 1235	VS
~~Sample Depth/Well Depth~~: DTW - 11.15'	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: SUNNY, 30s

Sample Description:
GRAY, CLOUDY, HEAVY FINE SILT

Additional Comments/Observations:
POST ISCO SAMPLING ROUND #1 - APPROX 2WKS POST COMPLETION.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1201	1204		~1.0	6.51	12.77	0.861	1.44	-14.8
	1208		~2.0	6.53	12.72	0.847	0.42	-33.9
	1213		~3.0	6.53	12.77	0.840	0.28	-42.1
	1218		~4.0	6.53	12.83	0.838	0.21	-47.3
	1223		~5.0	6.54	12.73	0.822	1.45	-51.6
	1228		~6.0	6.53	12.75	0.800	0.22	-53.8

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN Sample ID MW-21D
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	12.1.11 / 1340	VS
~~Sample Depth/Well Depth:~~ DTW - 10.10'	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: Sunny, 30s

Sample Description:

-CLEAR, COLORLESS

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 1 - APPROX 2 WKS POST COMPLETION.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1313	1317		~1.0	6.66	12.40	1.316	1.48	-48.1
	1320		~2.0	6.70	12.57	1.237	0.49	-52.0
	1323		~3.0	6.70	12.56	1.264	0.33	-55.9
	1326		~4.0	6.70	12.57	1.291	0.27	-58.6
	1329		~5.0	6.69	12.54	1.316	0.21	-61.0
	1332		~6.0	6.68	12.52	1.333	0.19	-63.1
	1335		~7.0	6.68	12.55	1.337	0.56	-64.3

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123
Sample ID RW-6D
Sample Type GW

Sample and/or Purge Method: RW SUBMERSIBLE PUMP 6D - PORT	Sample Date & Time: 12.1.11 / 1515	Sampled By: VS
~~Sample Depth/Well Depth~~: DTW - 9.06' (NON-PUMPING)	PID (ppm) Headspace: NA	Laboratory: PACE

Weather/Temperature: 30s Sunny

Sample Description: ~~COLORLESS~~, LIGHT GRAY, INITIALLY DK GRAY, LITTLE, CLOUDY, ODOR, SOME SILT

AT START TIME (1501) APPROX ~60 gal removed from well, RW-6D PUMP ON @ 1417, Sampled from Port ~~OFF~~ @ 1517

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 1 - APPROX 2 WKS POST COMPLETION

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
	1501			6.89	11.74	0.605	4.15	-59.7
	1504			6.80	11.91	0.611	0.74	-100.3
	1508			6.72	11.93	0.622	0.40	-114.2
	1512			6.70	11.97	0.636	0.27	-118.7

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN Sample ID PZ-6D

Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	12.5.11 / 1530	VS/BC
Sample Depth/Well Depth: DTW: 10.131 WD: 45.5' SCREENED 25.5'-45.5'	**PID (ppm) Headspace:** NA	**Laboratory:** PACE

Weather/Temperature: RAIN, 40S

Sample Description:

- TD OF WELL ~28.10' - SILTED UP FROM 45.5' WELL DEPTH - GRAY SILT IN WATER. ATTEMPT TO DEVELOP VIA PUMP/SURGE W/ TUBING. BEGIN @ 1455. NO H2O QUALITY DATA COLLECTED DUE TO SILT BLOCKAGE IN FLOW THRU CELL TUBING. APPROX 1.5-2 GAL REMOVED IN 30 MIN SAMPLE @ 1530.

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 1 - APPROX ~~2~~-3 WKS POST COMPLETION.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)

Groundwater

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URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123

Sample ID HW-9
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	3.13.12/1315	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
DTW - 9.89'	N/A	PACE

Weather/Temperature: SUNNY / 50s

Sample Description:

INITIALLY LT. CLOUDY, CLEAR, COLORLESS

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 2 - APPROX 3-4 MONTHS

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1245	1251		1.0	5.56	8.47	0.571	5.83	12.1
	1254		1.5	5.74	8.50	0.941	4.84	-22.2
	1257		2.0	5.83	8.56	1.354	3.90	-32.6
	1300		2.5	5.87	8.55	1.698	3.30	-46.4
	1303		3.0	5.92	8.62	2.034	2.79	-54.0
	1306		3.5	5.94	8.62	2.170	2.62	-57.2
	1309		4.0	5.97	8.60	2.288	2.58	-61.3
	1312		4.5	5.98	8.68	2.385	2.43	-62.9

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN Sample ID MW-13
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	3.13.12/1610	VS/BC
Sample Depth/Well Depth:	PID (ppm) Headspace:	Laboratory:
DTW - 8.95'	N/A	PACE

Weather/Temperature: SUNNY, 50S.

Sample Description:

BRNISH GRAY, CLOUDY, MILD PETRO ODOR

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 2 - APPROX 3-4 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1534	1540		0.5	5.62	11.77	1.295	1.36	-20.1
	1545		1.0	5.65	11.06	1.273	0.81	-25.3
	1550		1.5	5.66	11.21	1.361	0.58	-29.8
	1555		2.0	5.71	11.31	1.472	0.57	-37.9
	1600		2.5	5.73	11.75	1.463	0.49	-38.8
	1605		3.0	5.73	12.18	1.445	0.36	-49.6

BEGIN TO COLLECT SAMPLE AND WELL DRY @
1610 ALLOW TO RECHARGE.
1625 SAMPLE RESUME, 1630 RECHARGE
SEVERAL ATTEMPTS AND RECHARGES REQUIRED TO
COLLECT VOLUME NEEDED

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123
Sample ID MW-26S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	3.13.12 / 1240	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
DTW - 9.43'	N/A	PACE

Weather/Temperature: SUNNY / 50s

Sample Description:

GW INITIALLY BRNISH GRAY, CLDY
- MOD. PETRO ODOR.

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 2 - APPROX 3-MOS. -4

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1216	1219		0.5	6.40	8.48	1.493	1.51	-80.8
	1221		1.0	6.31	8.00	1.367	1.70	-78.5
	1224		1.5	6.25	7.82	1.322	1.28	-83.7
	1227		2.0	6.23	7.84	1.319	0.95	-91.9
	1230		2.5	6.23	7.86	1.320	0.92	-96.3
	1233		3.0	6.23	7.84	1.322	0.87	-100.1

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN　　Sample ID MW-27S
Project Number 41569122　　Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	3.13.12 / 1210	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
DTW - 9.33'	N/A	PACE

Weather/Temperature: PTLY SUNNY / 50s

Sample Description:
GW INITIALLY, LT BRWNISH GRAY, CLOUDY. THEN CLEAR, COLORLESS, MILD ODOR

Additional Comments/Observations:
POST ISCO SAMPLING ROUND 2 APPROX ~~3~~ 4-MONTHS

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1135	1140		0.50	6.08	10.03	0.864	3.85	-55.1
	1142		1.0	6.11	10.04	1.086	3.44	-71.3
	1147		2.0	6.13	9.96	1.253	2.78	-95.2
	1152		3.0	6.12	10.05	1.298	1.38	-102.0
	1157		4.0	6.13	10.13	1.311	1.22	-104.6
	1200		4.5	6.13	9.98	1.313	1.15	-107.2
	1202		5.0	6.10	10.08	1.342	1.08	-106.9

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE TOWN Sample ID MW-28S
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	3.13.12 / 1130	VS/BC
Sample Depth/Well Depth: DTW - 9.68'	PID (ppm) Headspace: N/A	Laboratory: PACE

Weather/Temperature: PTLY SUNNY / 50s

Sample Description:
GW INITIALLY BROWNISH/RUST COLORED, CLOUDY THEN CLEAR, COLORLESS, MILD PETRO ODOR.

Additional Comments/Observations:
POST ISCO SAMPLING ROUND 2 APPROX 3-4 MONTHS

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1100	1103		0.5	6.26	10.46	0.793	8.79	-166.0
	1105		1.0	6.23	10.19	0.804	6.63	-97.1
	1108		1.5	6.29	9.97	0.824	4.44	-85.1
	1114		2.5	6.30	10.15	0.843	3.15	-97.0
	1117		3.0	6.31	10.11	0.849	2.61	-97.3
	1120		3.5	6.30	10.09	0.856	2.59	-84.0
	1122		4.0	6.29	10.14	0.857	2.70	-88.4

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN Sample ID MW-29S

Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	3.13.12/1525	VS/BC
Sample Depth/Well Depth:	PID (ppm) Headspace:	Laboratory:
DTW - 7.95'	N/A	PACE

Weather/Temperature: SUNNY 50s

Sample Description:

BRWNISH GRAY, CLOUDY, SHEEN PRESENT, STRONG ODOR

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 2 - APPROX 3-4 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1454	1458		0.5	3.21	11.84	9.844	2.70	351.5
	1501		1.0	3.25	11.40	9.611	1.28	358.0
	1504		1.5	3.53	11.41	9.702	1.10	339.7
	1508		2.0	3.81	11.38	9.820	0.95	295.2
	1511		2.5	3.98	11.30	9.892	0.81	260.0
	1515		3.0	4.07	11.33	9.967	0.73	235.6
	1518		3.5	4.13	11.36	10.031	0.71	219.3

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 4156 9123
Sample ID MW-23S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	3.13.12 / 1400	VS/BC
Sample Depth/Well Depth:	PID (ppm) Headspace:	Laboratory:
DTW - 6.02'	N/A	PACE

Weather/Temperature: SUNNY, 50s

Sample Description:
GW INITIALLY LT BRN/GRAY, CLOUDY.
LITTLE DISCOLOR, CLEAR.

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 2 - APPROX 3-4 MOS.

Well Purging Data:

Time		DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
From	To							
1329	1335	'	1.0	4.47	9.35	6.200	2.81	339.9
	1341		2.0	3.53	9.05	5.326	1.46	464.7
	1344		2.5	3.43	9.05	5.456	1.64	473.9
	1347		3.0	3.38	9.11	5.544	1.42	471.7
	1350		3.5	3.35	9.12	5.603	1.32	477.0
	1353		4.0	3.33	8.83	5.629	1.29	467.6
	1356		4.5	3.29	8.98	5.673	1.11	466.3

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123

Sample ID MW-24S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	3.13.12 / 1440	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
DTW - 7.55'	N/A	PACE

Weather/Temperature: SUNNY, 50s

Sample Description:
-GW INITIALLY BRWN/GRAY, V. CLOUDY, ODOR PRESENT,
THEN CLEAR, ODORLESS

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 2 - APPROX 3-4 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1411	1417		1.0	4.83	11.05	3.172	1.48	435
	1423		2.0	5.08	10.91	3.243	0.91	11.0
	1426		2.5	5.14	10.92	3.266	0.86	6.7
	1429		3.0	5.18	10.99	3.300	0.91	2.6
	1432		3.5	5.19	11.00	3.311	0.67	-0.6
	1435		4.0	5.22	11.04	3.308	0.61	-4.9
	1438		4.5	5.24	11.02	3.301	0.63	-6.0

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123
Sample ID PZ-5S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	3.19.12/0955	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
DTW - 7.69'	N/A	PACE

Weather/Temperature: Sunny, 40°

Sample Description:

GW CLEAR, COLORLESS, PETRO ODOR

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 2 – APPROX 3-4 MOS.

Well Purging Data:

Time		DTW	Volume	pH	Temp (°C)	Cond	DO (mg/L)	ORP (mV)
From	To	(ft-bgs)	(gal)			(ms/cm)		
0929	0935			5.98	9.62	1.984	2.09	-70.3
	0940		~1.0	5.94	9.56	1.979	1.54	-72.9
	0945		~1.5	5.91	9.56	1.979	1.47	-77.1
	0951		2.0	5.91	9.62	1.983	1.46	-79.9

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN   Sample ID MW-20

Project Number 41569123   Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	3.14.12/0910	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
DTW - 7.70'	N/A	PACE

Weather/Temperature: Sunny, 30s (Am)

Sample Description:

- CLOUDY, ODOR (PETRO) PRESENT

- THEN CLEAR, COLORLESS

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 2 — APPROX 3-4 months

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
0848	0852		0.5	6.22	12.24	1.187	1.20	-94.6
	0854		1.0	6.25	12.20	1.129	1.80	-97.5
	0857		1.5	6.26	12.19	1.091	1.74	-98.9
	0900		2.0	6.26	12.19	1.072	1.46	-101.4
	0903		2.5	6.26	12.19	1.061	1.34	-96.5
	0906		3.0	6.26	12.20	1.057	1.27	-95.0

URS

SAMPLE LOG SHEET

Project Name: E/H JAMESTOWN
Project Number: 41569123
Sample ID: MW-22D
Sample Type: GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	3.14.12/1200	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
DTW - 9.78'	N/A	PACE

Weather/Temperature: SUNNY, 50°

Sample Description:
INITIALLY, LT GRAY, CLOUDY, → CLEAR, COLORLESS

Additional Comments/Observations:
POST ISCO SAMPLING ROUND 2 - APPROX 3-4 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1141	1144		2.5	5.92	11.88	1.727	3.55	-57.8
	1146		5.0	5.73	11.91	2.437	2.49	-57.6
	1149		8.0	5.58	11.94	2.529	1.68	-57.1
	1152		12.0	5.66	11.97	2.556	1.42	-54.9
	1154		14.0	5.64	11.98	2.571	1.26	-54.0
	1156		16.0	5.64	11.98	2.576	1.15	-53.4
	1158		18.0	5.64	11.94	2.586	1.02	-59.9

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE JAMESTOWN Sample ID MW-19D
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	3.14.12/1130	VS/BC
Sample Depth/Well Depth: DTW - 10.60'	PID (ppm) Headspace: N/A	Laboratory: PACE

Weather/Temperature: SUNNY, 40s

Sample Description:
GRAY, CLOUDY, HEAVY SILT/CLAY IN WATER.

WELL SILTED TD ~ 39', SCREEN 34'-44'

Additional Comments/Observations:
POST ISCO SAMPLING ROUND 2 - APPROX. 3-4 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1102	1107		2.0	6.51	12.69	0.750	1.93	-162.2
	1112		5.0	6.52	12.97	0.790	1.40	-166.0
	1116		8.0	6.52	12.93	0.760	1.10	-169.3
	1121		12.0	6.53	12.99	0.769	0.86	-167.2
	1125		15.0	6.53	12.71	0.768	0.72	-162.0

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123

Sample ID MW-21D
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	3.14.12/ 1230	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
DTW - 10.47'	N/A	PACE

Weather/Temperature: SUNNY, 50°

Sample Description:
GRAY, CLOUDY, STRONG ODOR → CLEAR, COLORLESS

Additional Comments/Observations:
POST-ISCO SAMPLING ROUND 2, APPROX 3-4 MOS.

Well Purging Data:

Time		DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
From	To							
1209	1211		2.0	6.51	12.32	1.097	2.18	-76.0
	1214		5.0	6.52	12.26	1.180	1.75	-82.6
	1217		8.0	6.51	12.30	1.220	1.53	-81.3
	1219		10.0	6.51	1.229	1.229	1.31	-76.6
	1221		12.0	6.51	12.38	1.232	1.13	-76.5
	1223		14.0	6.51	12.39	1.236	1.02	-76.6
	1225		16.0	6.51	12.41	1.237	0.91	-76.4
	1227		18.0	6.50	12.42	1.239	0.86	-75.9

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123

Sample ID RW-6D
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
RW PUMP	3.20.12 / 1410	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
DTW - 9.32' TD ~ 39.42' (3.13.12)	N/A	PACE

Weather/Temperature:

Sample Description:

- H_2O GRAY, CLOUDY, SILT IN H_2O.
- AFTER INITIAL 10-15 gal H_2O lt gray, less silt, cloudiness.

@SAMPLE TIME, CLEAR, COLORLESS
- ODOR PRESENT

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 2 - APPROX 3-4 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
	1323		7.5	6.49	10.80	0.612	0.80	-68.8
	1329		15.0	6.83	9.11	0.503	0.53	-96.0
	1334		20.0	6.87	10.05	0.503	0.43	-99.0
	1344		30.0	6.86	10.42	0.491	0.45	-99.6
	1349		35.0	6.84	10.45	0.492	0.43	-100.2
	1356		40.0	6.91	10.58	0.508	0.40	-101.9
	1407		45.0	6.76	10.55	0.531	0.40	-104.0
	1410	SAMPLE						

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123

Sample ID PZ-6D
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	3.14.12 / 1040	VS / BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
DTW - 10.21'	N/A	PACE

Weather/Temperature: SUNNY, 40S

Sample Description:
H2O DK GRAY, SILTY, - HEAVY AMTS OF SILT IN H2O, CLOUDY
TOTAL DEPTH ~ 32' (WELL DEPTH ~ 41')

PUMPING LABORED DUE TO HEAVY SILT AND AIR IN LINE.

Additional Comments/Observations:
POST - ISCO SAMPLING ROUND 2 - APPROX 2-3 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1008	1013		0.5	6.62	12.18	2.882	1.60	-183.2
	1018		1.0	6.64	12.34	2.961	1.79	-202.8
	1023		1.5	6.60	12.39	1.837	1.70	-219.3
	1028		2.0	6.60	12.39	1.350	1.52	-228.4
	1033		2.5	6.62	12.39	1.308	1.59	-234.8
	1038		3.0	6.62	12.39	1.287	1.58	-240.3

Groundwater

Round 3 – June 2012

URS

SAMPLE LOG SHEET

Project Name ~~FH~~ JAMESTOWN
Project Number 41569127

Sample ID HW-9
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	6.13.12 / 1035	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
	N/A	PACE

Weather/Temperature: 60s, Blowing

Sample Description:

Additional Comments/Observations:

POST - ISCO SAMPLING ROUND 3 APPROX 7 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1005	1013		0.5	5.84	10.29	0.718	4.15	51.1
	1015		1.0	5.89	10.30	0.949	4.11	38.4
	1019		1.5	5.96	10.35	1.343	2.59	22.1
	1023		2.0	6.01	10.38	1.696	2.75	11.7
	1027		2.5	6.02	10.32	1.999	2.10	2.9
	1031		3.0	6.04	10.32	2.243	1.63	-4.0

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123

Sample ID MW-13
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	6.13.12/1315	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
	N/A	PACE

Weather/Temperature: 60s, Ptly Cloudy

Sample Description:

GRAY, CLOUDY

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 3 - APPROX 7 MOS

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1242	1247			5.82	14.30	0.183	0.86	114.6
	1252			5.91	14.54	0.127	0.61	119.2
	1257		1.0	5.90	14.48	0.194	0.50	85.4
	1302			5.87	14.35	0.346	0.39	7.5
	1307		1.5	5.90	14.29	0.407	1.24	-7.1
	1310		1.75	5.96	14.24	0.455	0.51	-22.1

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123

Sample ID MW-26S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	6.13.12/0955	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
	N/A	PACE

Weather/Temperature: 60s, Cloudy

Sample Description:

BRWN/GRAY, PETRO ODOR, SHEEN PRESENT

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 3 - APPROX 7 MO?

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
	0936		0.5	6.39	10.97	1.623	1.53	-72.4
	0939		1.0	6.26	10.99	1.541	1.22	-49.6
	0943		1.5	6.27	11.01	1.511	1.15	-46.9
	0946		2.0	6.28	11.00	1.504	0.97	-50.1
	0950		2.5	6.30	11.01	1.500	0.70	-53.4

URS

SAMPLE LOG SHEET

Project Name: E/H JAMESTOWN
Sample ID: MW-27S
Project Number: 41569123
Sample Type: GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	6.13.12/0850	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
	N/A	PACE

Weather/Temperature: 60°, Cloudy

Sample Description:

BRWN/GRAY, LITTLE CLOUDY

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 3 - APPROX 7 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
0819	0823			5.42	12.13	0.207	5.08	83.7
	0826		-0.5	5.09	11.89	0.428	4.98	82.6
	0829		-1.0	5.43	11.82	0.639	4.63	43.3
	0832		-1.5	5.75	11.81	0.754	3.54	14.0
	0835		-2.0	5.87	11.79	0.803	2.74	3.0
	0838		-2.5	5.94	11.77	0.827	2.22	-4.4
	0841		2.75	5.97	11.78	0.835	1.93	-7.9
	0944		3.0	5.99	11.78	0.843	1.68	-11.1

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123
Sample ID MW-28S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC	6.13.12/0920	VS/BC
Sample Depth/Well Depth:	PID (ppm) Headspace: N/A	Laboratory: PACE

Weather/Temperature: 60s, Cloudy

Sample Description:

CLEAR, COLORLESS

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 3 - APPROX 7 MOS

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
0854	0900		~0.5	5.72	11.48	0.298	0.69	57.2
	0903		1.25	5.83	11.47	0.311	0.58	47.6
	0905		1.5	5.91	11.46	0.335	0.63	38.2
	0909		2.0	6.00	11.43	0.435	0.63	21.0
	0913		2.5	6.04	11.40	0.547	0.62	8.8
	0917		3.0	6.06	11.40	0.614	0.70	0.6

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123
Sample ID MW-29S
Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	6.13.12 / 1235	VS/BC
Sample Depth/Well Depth:	PID (ppm) Headspace: N/A	Laboratory: PACE

Weather/Temperature: 60s, Ptly Cloudy

Sample Description:
GRAY, CLOUDY, STRONG ODOR PRESENT

Additional Comments/Observations:
POST ISCO SAMPLING ROUND 3 - APPROX 7 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1206	1211		0.5	4.10	13.67	8.074	0.90	262.1
	1215		1.0	4.18	13.74	8.040	0.52	269.8
	1219		1.5	4.44	13.73	8.058	0.39	231.3
	1223		2.0	4.57	13.75	8.089	0.35	209.0
	1227		2.5	4.69	13.72	8.065	0.25	194.1
	1231		3.0	4.75	13.74	8.057	0.24	175.8

URS

SAMPLE LOG SHEET

Project Name E/H JAMESTOWN
Project Number 41569123
Sample ID MW-23S
Sample Type GW

Sample and/or Purge Method: PERISTALTIC PUMP	Sample Date & Time: 6.13.12/1130	Sampled By: VS/BC
Sample Depth/Well Depth:	PID (ppm) Headspace: N/A	Laboratory: PACE

Weather/Temperature: 60s, Cloudy

Sample Description:
BRN/GRAY, CLOUDY, ODOR PRESENT

Additional Comments/Observations:
POST-ISCO SAMPLING ROUND 3 - APPROX 7 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1100	1105		0.5	5.11	13.01	7.620	1.09	86.4
	1109		1.0	5.03	13.17	6.[illegible]15	0.48	95.4
	1113		1.5	5.09	13.31	5.042	0.35	95.7
	1117		2.0	5.11	13.45	4.788	0.27	96.9
	1121		2.5	5.08	13.58	4.857	0.24	100.3
	1125		3.0	5.07	13.62	4.924	0.25	104.2

URS

SAMPLE LOG SHEET

Project Name: E/H JAMESTOWN
Project Number: 41569123
Sample ID: MW-24S
Sample Type: GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	6.13.12 / 1200	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
	N/A	PACE

Weather/Temperature: 60s, Ptly Cloudy

Sample Description:
BRWN/GRAY, CLOUDY, ODOR PRESENT - STRONG INITIALLY

Additional Comments/Observations:
POST ISCO SAMPLING ROUND 3 - APPROX 7 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1133	1138		0.5	5.28	13.75	2.936	0.57	43.2
	1142		1.0	5.33	13.76	2.805	0.36	31.4
	1146		1.5	5.44	13.71	2.677	0.22	21.3
	1150		2.0	5.48	13.78	2.588	0.18	15.1
	1154		2.5	5.54	13.59	2.492	0.67	9.0
	1158		3.0	5.56	13.66	2.404	0.17	4.9

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE JAMESTOWN Sample ID PZ-5S
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	6.12.12/1135	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
	N/A	PACE

Weather/Temperature: Cloudy, 70s

Sample Description:
INITIALLY DK GRAY/BLK, CLOUDY, STRONG PETRO ODOR, SILTY

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 3 - APPROX. 6-7 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1114	1118			5.71	13.74	1.465	3.05	-35.4
	1120		~0.75	5.64	13.34	1.452	2.14	-34.9
	1122		~1.0	5.65	13.26	1.449	1.65	-36.8
	1124		~1.25	5.67	13.07	1.444	1.56	-34.6
	1126		~1.5	5.68	13.03	1.442	1.43	-34.1
	1128		~1.75	5.72	12.94	1.440	1.42	-35.8
	1130		~2.0	5.74	12.95	1.439	1.33	-42.5

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE STOWN Sample ID MW-20
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	6.12.12 / 1305	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
	N/A	PACE

Weather/Temperature: 70s, Cloudy

Sample Description:

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 3 - APPROX. 6-7 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1244	1248			6.42	14.49	0.485	5.66	-13.0
	1251		~0.5	5.20	14.01	0.411	4.30	44.5
	1253		~0.75	5.08	13.94	0.422	4.04	43.5
	1255		~1.0	5.13	13.87	0.442	3.30	35.9
	1257		~1.5	5.25	13.83	0.466	2.86	22.1
	1259		~1.75	5.52	13.77	0.513	1.76	-3.3
	1301		~2.0	5.66	13.74	0.536	1.54	-16.1
	1303		~2.25	5.74	13.73	0.553	1.38	-24.8

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE JAMESTOWN Sample ID MW-22D
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	6.12.12/ 0915	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
	N/A	PACE

Weather/Temperature: Cloudy, 70s

Sample Description:

Additional Comments/Observations:

POST ISCO SAMPLING - APPROX 6-7 MOS.
ROUND 3

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
0858	0900		1.0	5.53	11.76	2.706	11.28	49.7
	0902		2.0	5.13	11.71	2.673	12.03	69.7
	0904		3.0	5.11	11.71	2.707	11.35	72.8
	0906		4.0	5.16	11.73	2.729	10.90	71.0
	0908		5.0	5.22	11.72	2.738	10.41	69.5
	0910		6.0	5.27	11.72	2.742	9.62	68.0
	0912		7.0	5.31	11.74	2.746	8.76	66.4

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE JAMESTOWN Sample ID MW-19D
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	12.12/0955	VS/BC
Sample Depth/Well Depth:	PID (ppm) Headspace:	Laboratory:
	N/A	PACE

Weather/Temperature: Cloudy, 70s.

Sample Description:

H2O GRAY, CLOUDY, SILTY

Additional Comments/Observations:

POST ISCO SAMPLING - APPROX 67 MOS, ROUND 3

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
0927	0932		1.0	6.06	13.01	0.841	8.41	-55.3
	0936		2.0	6.11	12.71	0.822	6.53	-68.3
	0940		3.0	6.18	12.66	0.833	4.53	-78.4
	0943		4.0	6.26	12.69	0.836	3.62	-87.0
	0947		5.0	6.33	12.67	0.838	3.01	-92.7
	0950		6.0	6.35	12.67	0.835	2.76	-93.2

URS

SAMPLE LOG SHEET

Project Name ~~ESSEX/HOPE~~ JAMESTOWN Sample ID MW-21D
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
SUBMERSIBLE PUMP	6/12/12 / 1040	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
	N/A	PACE

Weather/Temperature: Cloudy, 70s

Sample Description:

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 3 - APPROX 6-7 MO!

Well Purging Data:

Time		DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
From	To							
1009	1013		1.0	6.40	12.88	1.373	3.91	-48.9
	1017		2.0	6.34	12.71	1.327	2.25	-44.3
	1022		3.0	6.39	12.68	1.330	1.56	-57.7
	1026		4.0	6.42	12.68	1.341	1.38	-62.1
	1030		5.0	6.43	12.71	1.357	1.12	-63.3
	1034		6.0	6.44	12.71	1.360	0.97	-60.5

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE JAMESTOWN Sample ID RW-6D
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
WELL PUMP RW-6D	6.12.12 / 1330	VS/BC
Sample Depth/Well Depth:	PID (ppm) Headspace: N/A	Laboratory: PACE

Weather/Temperature: 70s, Cloudy

Sample Description:

RW PUMPING CONTINUOUS SINCE 6/11/12 WHEN PLACED BACK ONLINE

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 3 - APPROX 7 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
	1320			6.66	17.22	0.836	3.54	-95.4
	1322			6.69	17.10	0.843	0.88	-114.1
	1324			6.69	17.08	0.843	0.57	-121.4
	1326			6.70	17.07	0.843	0.52	-123.6
	1328			6.69	17.09	0.844	0.50	-130.4

URS

SAMPLE LOG SHEET

Project Name ESSEX/HOPE JAMESTOWN Sample ID PZ6D
Project Number 41569123 Sample Type GW

Sample and/or Purge Method:	Sample Date & Time:	Sampled By:
PERISTALTIC PUMP	6.12.12/1215	VS/BC
Sample Depth/Well Depth:	**PID (ppm) Headspace:**	**Laboratory:**
	N/A	PACE

Weather/Temperature: Cloudy, 70s.

Sample Description:

~~POST ISCO SAMPLING~~

DK GRAY, CLOUDY, V. SILTY; NOT PUMPING STEADY DUE TO HEAVY AMTS OF SILT IN H2O LINE

Additional Comments/Observations:

POST ISCO SAMPLING ROUND 3 - APPROX 6-7 MOS.

Well Purging Data:

Time From	Time To	DTW (ft-bgs)	Volume (gal)	pH	Temp (°C)	Cond (ms/cm)	DO (mg/L)	ORP (mV)
1147	1151			6.47	13.52	1.934	1.28	-85.5
	1155			6.44	13.36	1.782	0.79	-121.1
	1158		~0.75	6.47	13.37	1.716	1.10	-139.2
	1201		~1.0	6.54	13.43	1.584	0.79	-163.4
	1205		~1.25	6.64	13.47	1.490	0.49	-190.6
	1209		~1.75	6.60	13.25	1.433	0.30	-205.1
	1211		~2.0	6.60	13.25	1.424	0.33	-209.9

Appendix D

MW Construction, Test Boring, and Test Pit Logs

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	REPORT OF BORING HW-8
CLIENT: Essex Specialty Products	SAMPLER: 2" Split Spoon	PAGE 1 OF 1
PROJECT LOCATION: Jamestown, New York	HAMMER: 140 lbs.	LOCATION:
FILE NO.: 2576.011.220	FALL: 30"	START DATE:
		END DATE:

BORING COMPANY: Buffalo Drilling
FOREMAN: Larry Schroeder
OBG GEOLOGIST: OBG oversight by John Mason

LEGEND: Grout, Sand Pack, Pellets, Screen, Riser

DEPTH BELOW GRADE	NO.	DEPTH (FEET)	BLOWS /6"	PENETR/ RECOVERY	"N" VALUE	SAMPLE DESCRIPTION	STRATUM CHANGE GENERAL DESCRIPT	EQUIPMENT INSTALLED	FIELD TESTING PID	FIELD TESTING HEAD-SPACE
0	1	0-2	4-30-22-11	2'/1'	52	Dry, light brown, fine to medium SAND and GRAVEL, some silt				
1										
2	2	2-4	3-3-8-9	2'/1'	11	Dry to damp, light brown to gray, fine SAND, some silt and very fine sand, trace gravel				
3										
4	3	4-6	8-20-26-19	2'/1'	46	Same as above, little gravel, damp to wet				
5										
6	4	6-8	13-17-23-23	2'/1.5'	40	Same as above, wet, little to some gravel, petroleum odor				
7										
8	5	8-10	14-26-35-41	2'/1'	61	Wet, green to gray, medium SAND and fine to medium GRAVEL, little to some silt, sheen and petroleum odor noted				
9										
10	6	10-12	9-10-11-11	2'/0.5'	21	Same as above				
11										
12	7	12-14	9-6-4-6	2'/1'	10	Same as above to light gray clayey SILT at bottom of spoon				
13										
14	8	14-16	3-8-10-12	2'/1'	18	Wet, light gray, laminated clayey SILT, trace fine rounded gravel				
15										
16	9	16-18	7-10-11-14	2'/1.5'	21	Same as above, 1" thick lenses of medium to coarse sand				
17										
18						Bottom of boring 18.0 ft.				
19										
20										

- 10 slot, 2" PVC well screen
- Morie #NOO sand
- Stick up

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING HW-9
PAGE 1 OF 1
LOCATION:

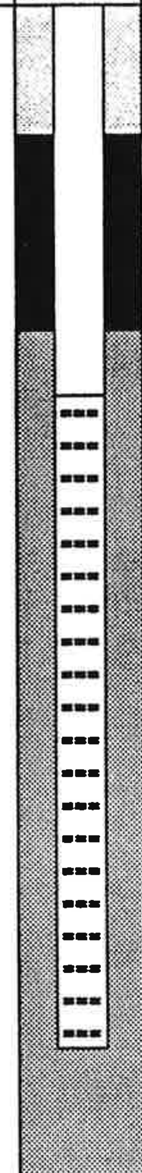
CLIENT: Essex Specialty Products
PROJECT LOCATION: Jamestown, New York
FILE NO.: 2576.011.220

SAMPLER 2" Split Spoon
HAMMER: 140 lbs.
FALL: 30"

START DATE: 4/1/92
END DATE: 4/1/92

BORING COMPANY: Buffalo Drilling
FOREMAN: Larry Schroeder
OBG GEOLOGIST: OBG oversight by John Mason

LEGEND: Grout; Sand Pack; Pellets; Screen; Riser

DEPTH BELOW GRADE	NO.	DEPTH (FEET)	BLOWS /6"	PENETR/ RECOVERY	"N" VALUE	SAMPLE DESCRIPTION	STRATUM CHANGE GENERAL DESCRIPT	EQUIPMENT INSTALLED	FIELD TESTING PID	FIELD TESTING HEAD-SPACE
0	1	0-2'	2-4-2-2	2'/1'	6	Dry to damp, brown to black, medium SAND, some fine to medium gravel, little silt to fine sand, trace cinders				
1										
2	2	2-4'	6-10-19-25	2'/1.5'	29	Dry, light brown, fine to medium SAND, some fine to medium gravel, little silt				
3										
4	3	4-6'	17-23-23-17	2'/1'	46	Same as above, dry to damp, augering through large gravel				
5										
6	4	6-8'	13-16-18-22	2'/1.5'	34	Same as above, wet				
7										
8	5	8-10'	12-16-15-19	2'/1.5'	31	Same as above, augering easier, light gray				
9										
10	6	10-12'	12-16-14-32	2'/1.5'	30	Same as above				
11										
12	7	12-14'	15-27-24-27	2'/1'	51	Same as above				
13										
14	8	14-16'	20-39-46-25	2'/1'	85	Same as above				
15										
16	9	16-18'	7-12-17-26	2'/1.5'	29	Light gray, laminated clayey SILT, trace fine to medium round gravel				
17										
18						Bottom of boring 18.0 ft.				
19										
20										

- 10 slot, 2" PVC well screen
- Morie #NOO sand
- Stick up

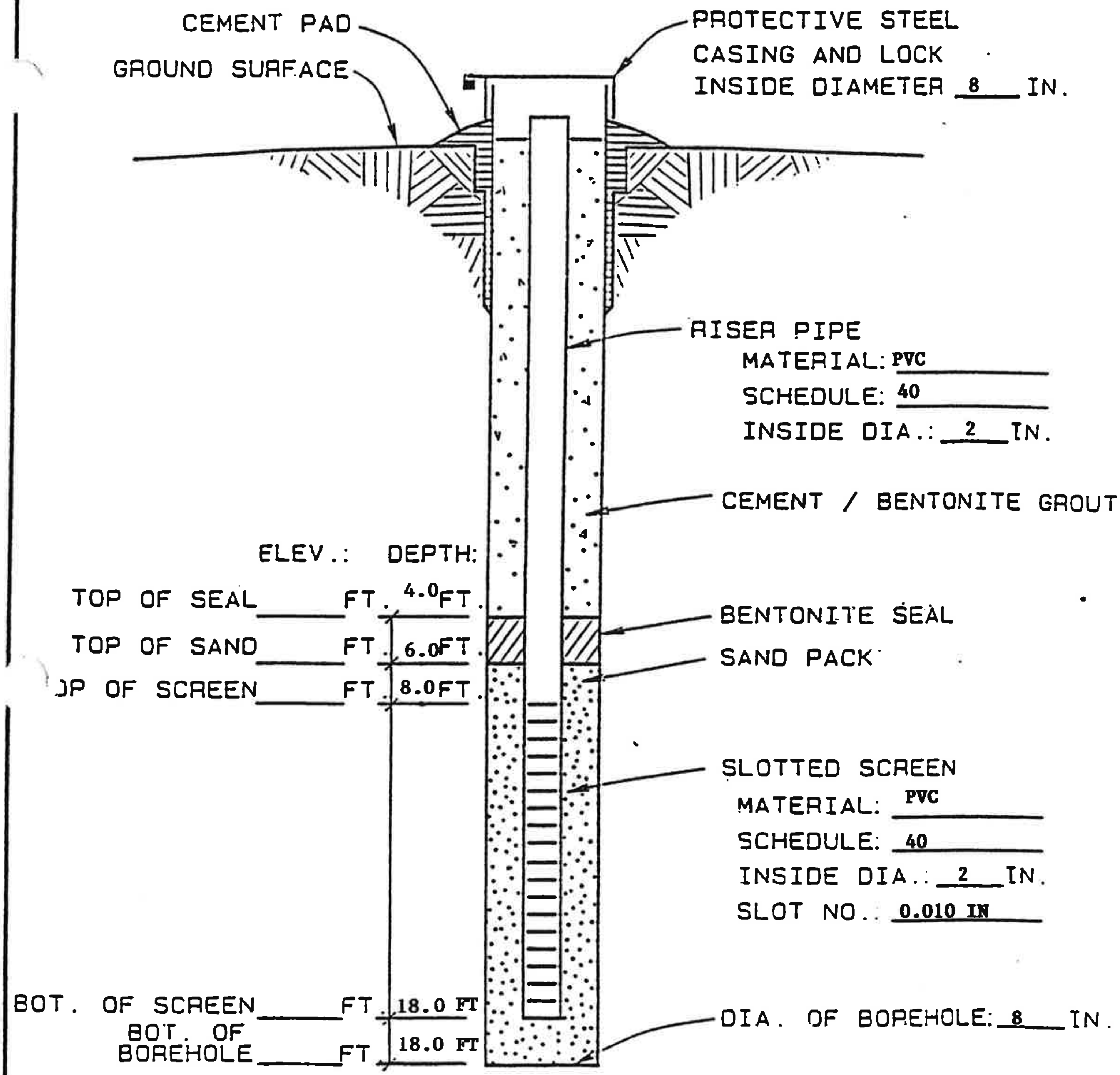
O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	REPORT OF BORING MW-13
CLIENT: Essex Specialty Products	SAMPLER: Split Spoon	PAGE 1 OF 1
PROJECT LOCATION: Jamestown, NY	HAMMER: 140 lbs.	LOCATION:
FILE NO.: 2576.010	FALL: 30"	START DATE: 1/23/92 END DATE: 1/23/92

BORING COMPANY: Parratt-Wolff, Inc.
FOREMAN: Barney Waters
OBG GEOLOGIST: John M. Mason

LEGEND: Grout, Sand Pack, Pellets, Screen, Riser

DEPTH BELOW GRADE	NO.	DEPTH (FEET)	BLOWS /6"	PENETR/ RECOVERY	"N" VALUE	SAMPLE DESCRIPTION	STRATUM CHANGE GENERAL DESCRIPT	EQUIPMENT INSTALLED	FIELD TESTING PID	FIELD TESTING HNU
0						CONCRETE to ~6"				
1										
2										
3	1	3-5	8-13-16-16	2'/1'	29	Dry to damp, light to medium brown to olive, very fine SAND, some silt, little clay, trace coarse gravel				0
4										
5										
6										
7										
8	2	8-10	4-7-10-10	2'/1'	17	Same as above, moist to wet, little to some clay, little fine, rounded gravel				0
9										
10	3	10-12	5-9-9-11	2'/0'	18	No recovery				—
11						1266.59				
12	4	12-14	9-14-13-16	2'/1'	27	Wet, light gray, clayey SILT, little very fine sand, laminated				0
13										
14	5	14-16	6-7-7-8	2'/1'	14	Same as above, trace gravel				0
15										
16	6	16-18	8-10-11-11	2'/0.5'	21	Same as above				0
17										
18						Bottom of boring 18.0'				
19										
20										

JMM:cmb/ESP010.4



TYPICAL OVERBURDEN MONITORING WELL

N.T.S.

MW-13

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING MW-19D

CLIENT: Essex Specialty Products	SAMPLER: 2" Split Spoon	LOCATION: East side of Building
PROJECT LOCATION: Jamestown, NY	HAMMER: 140 lbs.	START DATE: 3/03/93 END DATE: 3/06/93
FILE NO.: 2576.010	FALL: 30"	
BORING COMPANY: Parratt-Wolff, Inc. FOREMAN: Doug Richmond OBG GEOLOGIST: John M. Mason		LEGEND: Grout; Sand Pack; Pellets; Scre; Riser

DEPTH BELOW GRADE	NO.	DEPTH (FEET)	BLOWS /6"	PENETR/ RECOVERY	"N" VALUE	SAMPLE DESCRIPTION	STRATUM CHANGE GENERAL DESCRIPT	EQUIPMENT INSTALLED	FIELD TESTING PID
20	10	20-22	4-6-8-11	2'/1'	14	Wet, light gray, laminated, clayey SILT			0
21									
22	11	22-24	4-6-10-12	2'/1.5'	16	Same as above, little stringers of very fine sand			0
23									
24	12	24-26	10-9-9-13	2'/1'	18	Wet, light gray, very fine to fine SAND, trace lenses of laminated, clayey silt			0.2
25									
26	13	26-28	5-15-23-17	2'/1'	38	Wet, same as above, no clayey silt			0.1
27									
28	14	28-30	6-7-9-8	2'/1.5'	16	Wet, same as above			0.5
29									
30	15	30-32	4-7-7-8	2'/0.1'	14	Wet, same as above			0
31									
32	16	32-34	9-7-9-9	2'/1'	16	Same as above			0.5
33									
34	17	34-36	7-9-9-10	2'/1'	18	Same as above			0
35									
36	18	36-38	6-8-11-9	2'/1'	19	Same as above, trace laminated, clayey silt			0
37									
38	19	38-40	8-8-14-19	2'/1.5'	22	Same as above			0
39									
40	20	40-42	7-9-11-11	2'/1'	20	Same as above			0
41									
42	21	42-44	7-8-8-11		16	Same as above, changes to wet, light gray, laminated, clayey SILT			0
43									
44						Bottom of boring 44 ft			

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING MW-20
PAGE 1 OF 1

CLIENT: Essex Specialty Products
PROJECT LOCATION: Jamestown, NY
FILE NO.: 2576.010

SAMPLER: 2" Split Spoon
HAMMER: 140 lbs.
FALL: 30"

LOCATION: ~15 ft. East of Diptank
START DATE: 3/06/93
END DATE: 3/06/93

BORING COMPANY: Parratt-Wolff, Inc.
FOREMAN: Doug Richmond
OBG GEOLOGIST: John M. Mason

GRND 1278.92

LEGEND: Grout, Sand Pack, Pellets, Scre, Rise

DEPTH BELOW GRADE	NO.	DEPTH (FEET)	BLOWS /6"	PENETR/ RECOVERY	"N" VALUE	SAMPLE DESCRIPTION	STRATUM CHANGE GENERAL DESCRIPT	EQUIPMENT INSTALLED	FIELD TESTIN PID
0									
	1	0.5-2	- 7-9-2	2'/1'	16	Dry, light to medium brown, fine SAND			0
1						and GRAVEL, some silt to medium sand			
2	2	2-4	6-7-8-8	2'/2'	15	Dry to damp, tan brown SILT, mottled,			0
						trace very fine sand			
3									
4	3	4-6	41-43-	2'/1.5'	90	Same as above, changes to moist, light to			0
			47-36			medium brown, medium to coarse SAND,			
5						some gravel, little fine sand			
6	4	6-8	42-40-	2'/1.5'	71	Moist to wet, medium brown, medium to			8
			31-25			coarse SAND, some gravel			
7									
8	5	8-10	26-17-	2'/1'	43	Wet, medium gray, fine to medium SAND,			12
			26-25			little to some gravel, trace silt			
9									
10	6	10-12	11-11-	2'/1.5'	17	Wet, same as above, changes to wet, medium			20
			6-4			brown, laminated, clayey SILT			
11									
12	7	12-14	6-14-	2'/1'	33	Wet, medium brown to light gray, laminated,			1
			19-19			clayey SILT, trace fine gravel			
13									
14						Bottom of boring 14 ft.			
15									
16									
17									
18									
19									
20									

1267.92

21D.

WELL COMPLETION LOG

PAGE 1 OF 1

WELL NO. MW-21D

HOLE NO. ______

BY KD

DATE 11-11-03

CHK BY ______

DATE ______

PROJECT NAME ESSEX/HOPE

LOCATION JAMESTOWN, NY

DRILLING CONTRACTOR NOTHNAGLE

DRILLING METHOD 10¼ HSA/Driven Flush CASING

DRILLING FLUID WATER

DRILLING START DATE 11-10-03

PROJECT NO. 804041.21

GEOLOGIST KEITH DODRILL

DRILLER STEVE LORMAN

RIG TYPE CME-85

DRILLING COMPLETION DATE 11-11-03

INSTALLATIONS

ELEVATION / DEPTH DATA

GROUND SURFACE ELEV. ______

SURFACE PAD ELEV. ______

HOLE DEPTH ______

WELL DEPTH ______

WELL RISER (TOP) ______

PROTECTIVE CASING (TOP) ______

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
12-IN	0-17 FT
4-IN	17-41.5 FT

PROTECTIVE CASING

TYPE FLUSH MOUNT

MATERIAL STEEL

DIAMETER 8-IN

DEPTH INTERVAL 0-1 FT

SURFACE PAD DIMENSIONS 18-IN DIA x 6-IN

OUTER CASING

MATERIAL SCH 40 PVC

DIAMETER 6-IN

JOINT TYPE FLUSH THREAD

DEPTH INTERVAL 0-17 FT

WELL RISER

MATERIAL SCH 40 PVC

DIAMETER 2-IN

JOINT TYPE FLUSH THREAD

DEPTH INTERVAL 0.5-31.5 FT

SCREEN

MATERIAL SCH 40 PVC

DIAMETER 2-IN

JOINT TYPE FLUSH THREAD

OPENINGS 0.01-IN

DEPTH INTERVAL 31.5-41 FT

BLANK CASING N/A

MATERIAL ______

DIAMETER ______

JOINT TYPE ______

DEPTH INTERVAL ______

BOTTOM CAP

MATERIAL SCH 40 PVC

TYPE FLUSH THREAD

DEPTH INTERVAL 41-41.5 FT

ANNULAR GROUT

INSTALL. METHOD TREMIE

MATERIAL CEMENT/BENT

MIX PROPORTIONS ______

94 lb PORTLAND

5% BENTONITE

6 Gal H2O

QUANTITIES ______

DEPTH INTERVAL 0-17 FT

0.5-26.5 FT

ANNULAR SEAL

INSTALL. METHOD TREMIE

MATERIAL BENTONITE PELLETS

QUANTITY ______

DEPTH INTERVAL 26.5-29.5 FT

FILTER PACK

INSTALL. METHOD TREMIE

MATERIAL RICCI 00N

QUANTITY ______

DEPTH INTERVAL 29.5-41.5 FT

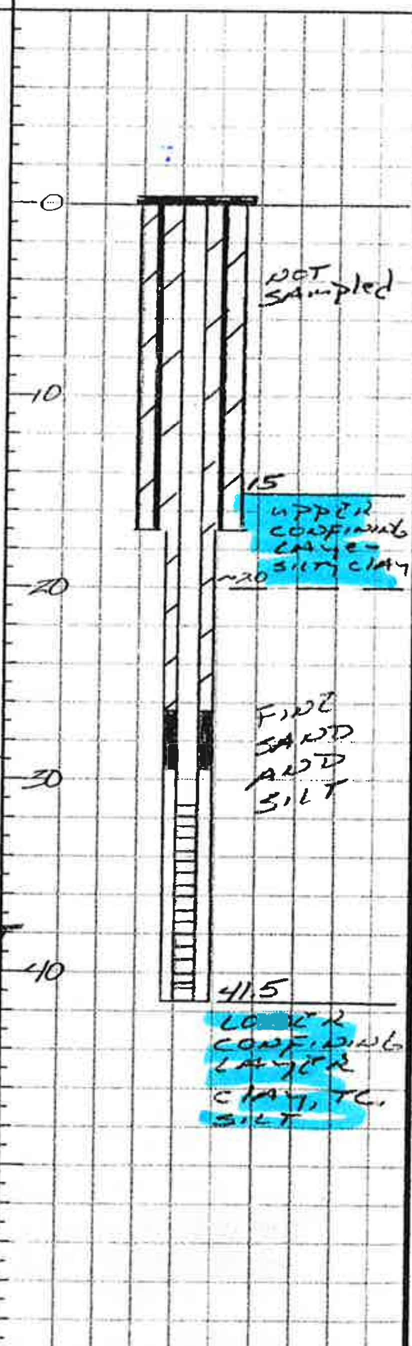
DEVELOPMENT

METHOD ______

TIME ______

PRODUCTION ______

WELL CONSTRUCTION SKETCH



21.1

ADDITIONAL INFORMATION:
CONFIRMATORY SAMPLES COLLECTED FROM 15-17 FT & 36-42 FT

FILE: \WELL-LOG

22D

WELL COMPLETION LOG

PAGE 1 OF 1

WELL NO. MW-22D

HOLE NO.

PROJECT NAME Essex/HOPC — PROJECT NO. 504041.21

BY KD — LOCATION Jamestown, NY — GEOLOGIST Keith Dodrill

DATE 11-6-03 — DRILLING CONTRACTOR Nothnagle — DRILLER Steve Lorenson

CHK BY — DRILLING METHOD 10¼ HSA/6" Driven Casing — RIG TYPE CME 85

DATE — DRILLING FLUID Water

DRILLING START DATE 11-5-03 — DRILLING COMPLETION DATE 11-6-03

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV.
SURFACE PAD ELEV.
HOLE DEPTH 42.5
WELL DEPTH 42.5
WELL RISER (TOP)
PROTECTIVE CASING (TOP)

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
12-in	0 - 26 FT
4-in	26 - 42.5 FT

PROTECTIVE CASING
TYPE Flush Mount
MATERIAL Steel
DIAMETER 8-in
DEPTH INTERVAL 0 - 1
SURFACE PAD DIMENSIONS 18-in Dia x 6-in

OUTER CASING
MATERIAL SCH 40 PVC
DIAMETER 6-in
JOINT TYPE Flush Thread
DEPTH INTERVAL 0.5 - 26 FT

WELL RISER
MATERIAL SCH 40 PVC
DIAMETER 2-in
JOINT TYPE Flush Thread
DEPTH INTERVAL 0.5 - 32.5 FT

SCREEN
MATERIAL SCH 40 PVC
DIAMETER 2-in
JOINT TYPE Flush Thread
OPENINGS 0.01-in
DEPTH INTERVAL 32.5 - 42 FT

BLANK CASING N/A
MATERIAL
DIAMETER
JOINT TYPE
DEPTH INTERVAL

BOTTOM CAP
MATERIAL SCH 40 PVC
TYPE Flush Thread
DEPTH INTERVAL 42 - 42.5 FT

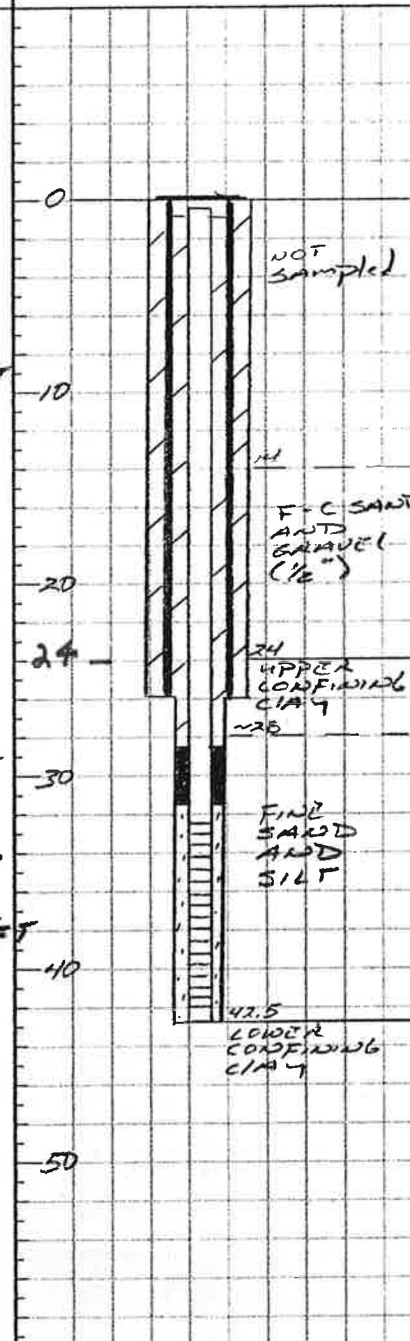
ANNULAR GROUT
INSTALL. METHOD Tremie
MATERIAL Cement/Bent.
MIX PROPORTIONS
94 lb Portland
5% Bent
~~6 Gal H_2O~~
QUANTITIES
DEPTH INTERVAL ~~0 - 26 FT~~ 0 - 28.5 FT

ANNULAR SEAL
INSTALL. METHOD Tremie
MATERIAL Bentonite Pellets
QUANTITY
DEPTH INTERVAL 28.5 - 31.5 FT

FILTER PACK
INSTALL. METHOD Tremie
MATERIAL Ricci 00N
QUANTITY
DEPTH INTERVAL 31.5 - 42.5

DEVELOPMENT
METHOD
TIME
PRODUCTION

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION: Confirmatory split spoon samples collected from 14 to 28 FT and 36 to 44 FT

FILE: \WELL-LOG

235

WELL COMPLETION LOG

PAGE 1 OF 1

WELL NO. MW-23 S

HOLE NO. ____

BY KD

DATE 11-7-03

CHK BY ____

DATE ____

PROJECT NAME ESSEX/HOPE

LOCATION JAMESTOWN, NY

DRILLING CONTRACTOR NOTHNAGLE

DRILLING METHOD 10¼ HSA / 4-in DRIVEN CASING

DRILLING FLUID WATER

DRILLING START DATE 11-7-03

PROJECT NO. 2041041.21

GEOLOGIST KEITH DODRILL

DRILLER STEVE LORENTY

RIG TYPE CME 85

DRILLING COMPLETION DATE 11-7-03

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV. ____
SURFACE PAD ELEV. ____
HOLE DEPTH 15 FT
WELL DEPTH 15 FT
WELL RISER (TOP) ____
PROTECTIVE CASING (TOP) ____

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
8-IN	0-15 FT

PROTECTIVE CASING
TYPE FLUSH MOUNT
MATERIAL STEEL
DIAMETER 8-IN
DEPTH INTERVAL 0-1
SURFACE PAD DIMENSIONS N/A (INSTALLED IN CONCRETE slab)

OUTER CASING N/A
MATERIAL ____
DIAMETER ____
JOINT TYPE ____
DEPTH INTERVAL ____

WELL RISER
MATERIAL SCH 40 PVC
DIAMETER 2-IN
JOINT TYPE FLUSH THREAD
DEPTH INTERVAL 0.5-5 FT

SCREEN
MATERIAL SCH 40 PVC
DIAMETER 2-IN
JOINT TYPE FLUSH THREAD
OPENINGS 0.01-IN
DEPTH INTERVAL 5-14.5 FT

BLANK CASING N/A
MATERIAL ____
DIAMETER ____
JOINT TYPE ____
DEPTH INTERVAL ____

BOTTOM CAP
MATERIAL SCH 40 PVC
TYPE FLUSH THREAD
DEPTH INTERVAL 14.5-15 FT

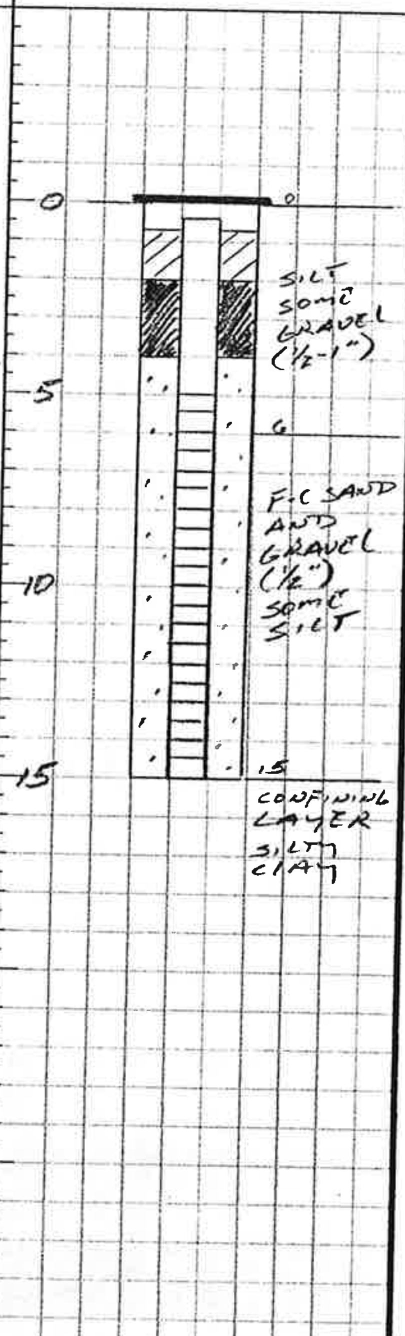
ANNULAR GROUT
INSTALL. METHOD BOREHOLE
MATERIAL CEMENT/BENT
MIX PROPORTIONS 94 lb PORTLAND 5% BENT 6 Gal H_2O
QUANTITIES ____
DEPTH INTERVAL 0-2 FT

ANNULAR SEAL
INSTALL. METHOD BOREHOLE
MATERIAL BENTONITE PELLETS
QUANTITY ____
DEPTH INTERVAL 2-4 FT

FILTER PACK
INSTALL. METHOD BOREHOLE
MATERIAL RICCI OON
QUANTITY ____
DEPTH INTERVAL 4 TO 15 FT

DEVELOPMENT
METHOD ____
TIME ____
PRODUCTION ____

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION:

FILE: \WELL-LOG

WELL COMPLETION LOG

PAGE 1 OF 1

WELL NO. MW-24S

HOLE NO. TBUST 10

BY KD
DATE 11-4-03
CHK BY ____
DATE ____

PROJECT NAME ESSEX/HOPE
LOCATION JAMESTOWN, NY
DRILLING CONTRACTOR NOTHNAGLE
DRILLING METHOD 4 1/4 HSA
DRILLING FLUID N/A
DRILLING START DATE 11-4-03

PROJECT NO. 504041.21
GEOLOGIST KEITH DOTRILL
DRILLER STEVE LORCNTY
RIG TYPE CME 85

DRILLING COMPLETION DATE 11-4-03

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV. ____
SURFACE PAD ELEV. ____
HOLE DEPTH ____
WELL DEPTH ____
WELL RISER (TOP) ____
PROTECTIVE CASING (TOP) ____

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
8-IN	0-15 FT

PROTECTIVE CASING
TYPE FLUSH MOUNT
MATERIAL STEEL
DIAMETER 8-IN
DEPTH INTERVAL 0-1 FT
SURFACE PAD DIMENSIONS N/A
IN CONCRETE SLAB

OUTER CASING N/A
MATERIAL ____
DIAMETER ____
JOINT TYPE ____
DEPTH INTERVAL ____

WELL RISER
MATERIAL SCH 40 PVC
DIAMETER 2-IN
JOINT TYPE FLUSH THREAD
DEPTH INTERVAL 0.5-5 FT

SCREEN
MATERIAL SCH 40 PVC
DIAMETER 2-IN
JOINT TYPE FLUSH THREAD
OPENINGS 0.01-IN
DEPTH INTERVAL 5-14.5 FT

BLANK CASING N/A
MATERIAL ____
DIAMETER ____
JOINT TYPE ____
DEPTH INTERVAL ____

BOTTOM CAP
MATERIAL SCH 40 PVC
TYPE FLUSH THREAD
DEPTH INTERVAL 14.5-15 FT

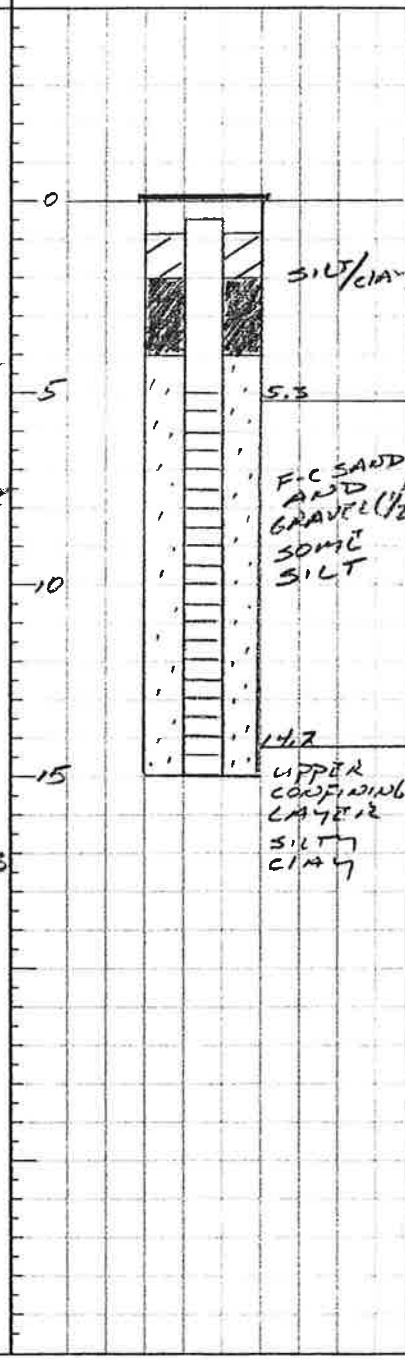
ANNULAR GROUT
INSTALL. METHOD BOREHOLE
MATERIAL CEMENT/BENTONITE
MIX PROPORTIONS
94 lbs PORTLAND
5% BENTONITE
6 Gal H_2O
QUANTITIES ____
DEPTH INTERVAL 0-2 FT

ANNULAR SEAL
INSTALL. METHOD BOREHOLE
MATERIAL BENTONITE PELLETS
QUANTITY ____
DEPTH INTERVAL 2-4 FT

FILTER PACK
INSTALL. METHOD BOREHOLE
MATERIAL RICCI OON
QUANTITY ____
DEPTH INTERVAL 4-15 FT

DEVELOPMENT
METHOD ____
TIME ____
PRODUCTION ____

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION:

FILE: \WELL-LOG

URS

WELL COMPLETION LOG
WELL NO. MW-26S

BY	BAC	*PROJECT NAME*	Essex-Hope Jamestown	*PROJECT NO.*	41568904
DATE	10/20/2011	*LOCATION*	Jamestown, NY	*GEOLOGIST/ENGINEER*	M. Dowiak
CHK BY	MJD	*INSTALL COMPANY*	Nothnagle	*DRILLER*	Steve Lorenti
DATE	10/21/11	*DRILLING METHOD*		*RIG TYPE*	CME 85
		DRILLING FLUID	N/A		
		DRILLING START DATE	10/18/2011	*DRILLING COMPLETION DATE*	10/18/2011

INSTALLATIONS

ELEVATION / DEPTH DATA

GROUND SURFACE ELEV.	NA
SURFACE PAD ELEV.	NA
HOLE DEPTH	16 ft
WELL DEPTH	15 ft
WELL RISER (TOP)	NA
PROTECTIVE CASING (TOP)	NA

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
4-inch	0 - 16 ft.

PROTECTIVE CASING

TYPE	Flush-mount manhole
MATERIAL	NA
DIAMETER	NA
DEPTH INTERVAL	NA
SURFACE PAD DIMENSIONS	NA

OUTER CASING

MATERIAL	NA
DIAMETER	NA
JOINT TYPE	NA
DEPTH INTERVAL	NA

WELL RISER

MATERIAL	PVC
DIAMETER	2-inch
JOINT TYPE	NA
DEPTH INTERVAL	0 - 15 ft

SCREEN

MATERIAL	PVC
DIAMETER	2-inch
JOINT TYPE	flush-threaded
OPENINGS	0.10 micron
DEPTH INTERVAL	5 - 15 ft

BLANK CASING

MATERIAL	NA
DIAMETER	NA
JOINT TYPE	NA
DEPTH INTERVAL	NA

BOTTOM CAP

MATERIAL	PVC
TYPE	Threaded
DEPTH INTERVAL	16 ft

ANNULAR GROUT

INSTALL. METHOD	NA
MATERIAL	NA
MIX PROPORTIONS	NA
QUANTITIES	NA
DEPTH INTERVAL	NA

ANNULAR SEAL

INSTALL. METHOD	Pour
MATERIAL	Bentonite
QUANTITY	1 bag x 50 lb
DEPTH INTERVAL	0 - 2 ft

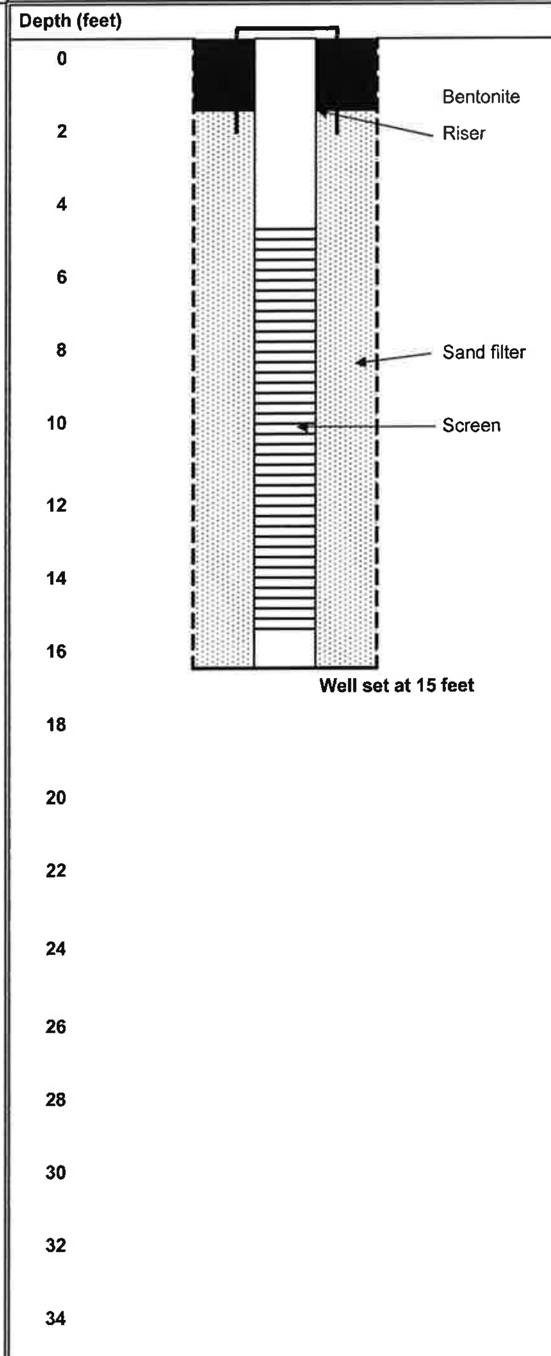
FILTER PACK

INSTALL. METHOD	Pour
MATERIAL	Sand - Silica Qtz
QUANTITY	4 bags x 50 lb
DEPTH INTERVAL	2 - 16 ft

DEVELOPMENT

METHOD	Pump
TIME	NA
Purge Volume	NA

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION

URS

TEST BORING ID	MW-26S
Project Name	Essex -Hope Jamestown
Drilling Contractor	Nothnagle
Drilling Method	
Start Date	10/18/2011

Page	1 1
Geologist/Engineer	MD
Driller	Steve Lorenti
Rig Type	CME 85
Completion Date	10/18/2011

DEPTH (feet)	Soil Core Recovery/ Penetration (inches)	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID (ppm$_v$)	DEPTH (feet)	REMARKS
0 - 2	18	0' to 6" - organic Silt (topsoil), dark brow. 6" to 1' 6" - fine to coarse Sand and fine Gravel, moist.			0 - 2	Blow counts - 2, 3, 4, 5
2 - 4	22	2' to 2' 6" - fine to coarse Sand with Gravel, brown. 2' 6" to 3' 6" - clayey Silt, brown, stiff, moist.			2 - 4	Blow counts - 5, 4, 3, 6
4 - 6	20	4' to 4' 6" - fine to coarse Sand, brown. 4' 6" to 5' - clayey Silt, brown, stiff. 5' to 6' - fine to coarse silty Sand and Gravel (.5"), moist.			4 - 6	Blow counts - 8, 6, 6, 10
6 - 8	20	6' to 7' 8" - fine to coarse silty Sand and Gravel (.25" - .5"), brown, wet, chemical odor.			6 - 8	Blow counts - 7, 10, 10, 10
8 - 10	14	8' to 9' 2" - SAA. Water at 8'.			8 - 10	Blow counts - 5, 6, 5, 9
10 - 12	12	10' to 11' - SAA.			10 - 12	Blow counts - 5, 7, 9, 9
12 - 14	10	12' to 12' 10" - SAA.			12 - 14	Blow counts - 4, 3, 6, 6
14 - 16	14	14' to 14' 4" - SAA. 14' 4" to 15' 2" - clayey Silt, gray , stiff, wet. Confining bed.			14 - 16	Blow counts - 7, 4, 5, 9
16 - 18		End boring at 16"			16 - 18	
18 - 20					18 - 20	
20 - 24					20 - 24	

Additional Remarks:

URS

WELL COMPLETION LOG

WELL NO. MW-27S

PROJECT NAME	Essex-Hope Jamestown	PROJECT NO.	41568904
LOCATION	Jamestown, NY	GEOLOGIST/ENGINEER	M. Dowiak
INSTALL COMPANY	Nothnagle	DRILLER	Steve Lorenti
DRILLING METHOD		RIG TYPE	CME 85
DRILLING FLUID	N/A		
DRILLING START DATE	10/17/2011	DRILLING COMPLETION DATE	10/17/2011

BY	BAC
DATE	10/20/2011
CHK BY	MJD
DATE	10/21/11

INSTALLATIONS

ELEVATION / DEPTH DATA

GROUND SURFACE ELEV.	NA
SURFACE PAD ELEV.	NA
HOLE DEPTH	20 ft
WELL DEPTH	20 ft
WELL RISER (TOP)	NA
PROTECTIVE CASING (TOP)	NA

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
4-inch	0 - 20 ft.

PROTECTIVE CASING

TYPE	Flush-mount manhole
MATERIAL	NA
DIAMETER	NA
DEPTH INTERVAL	NA
SURFACE PAD DIMENSIONS	NA

OUTER CASING

MATERIAL	NA
DIAMETER	NA
JOINT TYPE	NA
DEPTH INTERVAL	NA

WELL RISER

MATERIAL	PVC
DIAMETER	2-inch
JOINT TYPE	NA
DEPTH INTERVAL	0 - 10 ft

SCREEN

MATERIAL	PVC
DIAMETER	2-inch
JOINT TYPE	flush-threaded
OPENINGS	0.10 micron
DEPTH INTERVAL	10 - 20 ft

BLANK CASING

MATERIAL	NA
DIAMETER	NA
JOINT TYPE	NA
DEPTH INTERVAL	NA

BOTTOM CAP

MATERIAL	PVC
TYPE	Threaded
DEPTH INTERVAL	20 ft

ANNULAR GROUT

INSTALL. METHOD	NA
MATERIAL	NA
MIX PROPORTIONS	NA
QUANTITIES	NA
DEPTH INTERVAL	NA

ANNULAR SEAL

INSTALL. METHOD	Pour
MATERIAL	Bentonite
QUANTITY	1 bag x 50 lb
DEPTH INTERVAL	0 - 2 ft

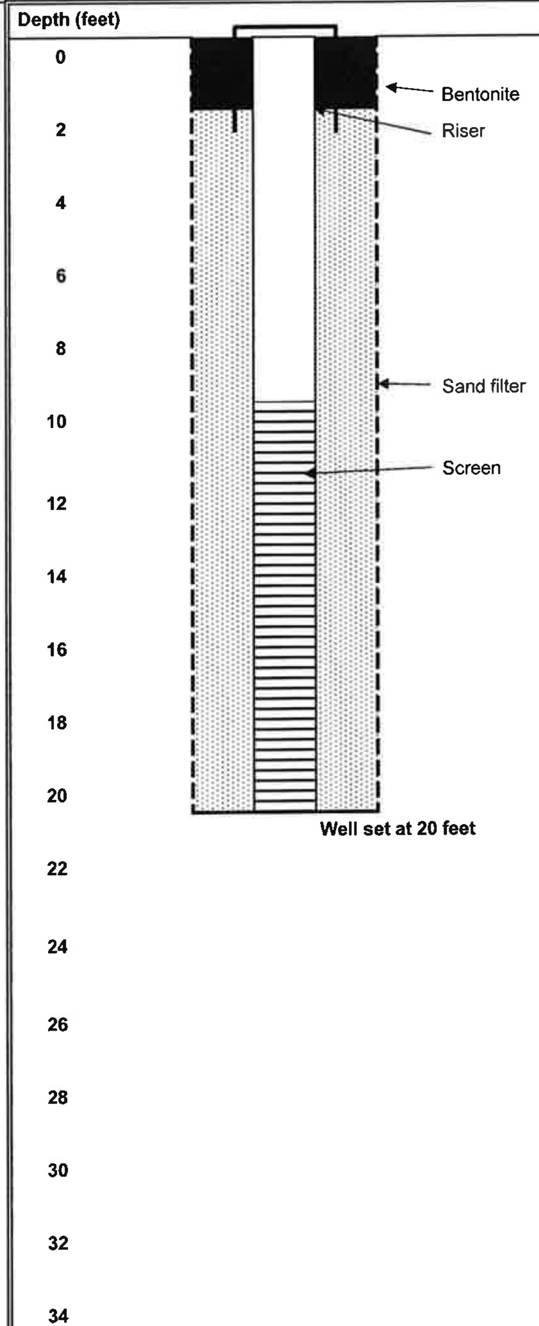
FILTER PACK

INSTALL. METHOD	Pour
MATERIAL	Sand -Silica Qtz
QUANTITY	4 bag x 50 lb
DEPTH INTERVAL	2 - 20 ft

DEVELOPMENT

METHOD	Pump
TIME	NA
Purge Volume	NA

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION

URS

TEST BORING ID MW-27S
Project Name Essex-Hope Jamestown
Drilling Contractor Nothnagle
Drilling Method
Start Date 10/17/2011

Page 1 1
Geologist/Engineer MD
Driller Steve Lorenti
Rig Type CME 85
Completion Date 10/17/2011

DEPTH (feet)	Soil Core Recovery/ Penetration (inches)	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID (ppm$_v$)	DEPTH (feet)	REMARKS
0 - 2	18	0" to 3" - Topsoil and vegetation. 3" to 18" - fine to medium Sand, some Gravel, Brown.			0 - 2	Blow counts - 1, 2, 1, 3
2 - 4	18	2' to 2' 6" - Organic Silt, dark brown. 2' 6" to 3' 4" - medium Sand, med dry, brown. 3' 4" to 3' 6" - clayey Silt, brown.			2 - 4	Blow counts - 2, 3, 4, 4
4 - 6	6	4' to 4' 6" - Silt and Sand with Gravel fragments (granite), brown, moist.			4 - 6	Blow counts - 3, 9, 10, 26
6 - 8	14	6' to 7' 2" - Sand and Silt with Gravel fragments, brown-orange.			6 - 8	Blow counts - 8, 10, 8, 9
8 - 10	16	8' to 9' 4" - sandy Silt with Gravel (.25" - 1"), wet, brown-gray, no odor. Water at 8"			8 - 10	Blow counts - 16, 9, 6, 6
10 - 12	15	10' to 11' 3" - SAA.			10 - 12	Blow counts - 4, 4, 4, 5
12 - 14	3	12' to 12' 3" - sandy Silt with Gravel (.25" - 1"), gray, wet.			12 - 14	Blow counts - 5, 4, 3, 4
14 - 16	0	Silt with gravel, gray, wet.			14 - 16	Blow counts - 3, 3, 3, 1
16 - 18	0	Rock fragment in spoon, wet.			16 - 18	Blow counts - 4, 3, 3, 3
18 - 20	4	18' to 18' 4" - Silt with Gravel gray and brown, organic silt with roots dark brown.			18 - 20	Blow counts - 4, 3, 2, 1
20 - 24		End boring at 20'			20 - 24	

Additional Remarks:

URS

WELL COMPLETION LOG
WELL NO. MW-28S

BY	BAC	*PROJECT NAME*	Essex-Hope Jamestown	*PROJECT NO.*	41568904
DATE	10/20/2011	*LOCATION*	Jamestown, NY	*GEOLOGIST/ENGINEER*	M. Dowiak
CHK BY	MJD	*INSTALL COMPANY*	Nothnagle	*DRILLER*	Steve Lorenti
DATE	10/21/11	*DRILLING METHOD*		*RIG TYPE*	CME 85
		DRILLING FLUID	N/A		
		DRILLING START DATE	10/17/2011	*DRILLING COMPLETION DATE*	10/17/2011

INSTALLATIONS

ELEVATION / DEPTH DATA

GROUND SURFACE ELEV.	NA
SURFACE PAD ELEV.	NA
HOLE DEPTH	20 ft
WELL DEPTH	17 ft
WELL RISER (TOP)	NA
PROTECTIVE CASING (TOP)	NA

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
4-inch	0 - 20 ft.

PROTECTIVE CASING

TYPE	Flush-mount manhole
MATERIAL	NA
DIAMETER	NA
DEPTH INTERVAL	NA
SURFACE PAD DIMENSIONS	NA

OUTER CASING

MATERIAL	NA
DIAMETER	NA
JOINT TYPE	NA
DEPTH INTERVAL	NA

WELL RISER

MATERIAL	PVC
DIAMETER	2-inch
JOINT TYPE	NA
DEPTH INTERVAL	0 - 7 ft

SCREEN

MATERIAL	PVC
DIAMETER	2-inch
JOINT TYPE	flush-threaded
OPENINGS	0.10 micron
DEPTH INTERVAL	7 - 17 ft

BLANK CASING

MATERIAL	NA
DIAMETER	NA
JOINT TYPE	NA
DEPTH INTERVAL	NA

BOTTOM CAP

MATERIAL	PVC
TYPE	Threaded
DEPTH INTERVAL	20 ft

ANNULAR GROUT

INSTALL. METHOD	NA
MATERIAL	NA
MIX PROPORTIONS	NA
QUANTITIES	NA
DEPTH INTERVAL	NA

ANNULAR SEAL

INSTALL. METHOD	Pour
MATERIAL	Bentonite
QUANTITY	1 bag x 50 lb
DEPTH INTERVAL	0 - 2, 17 - 20 ft

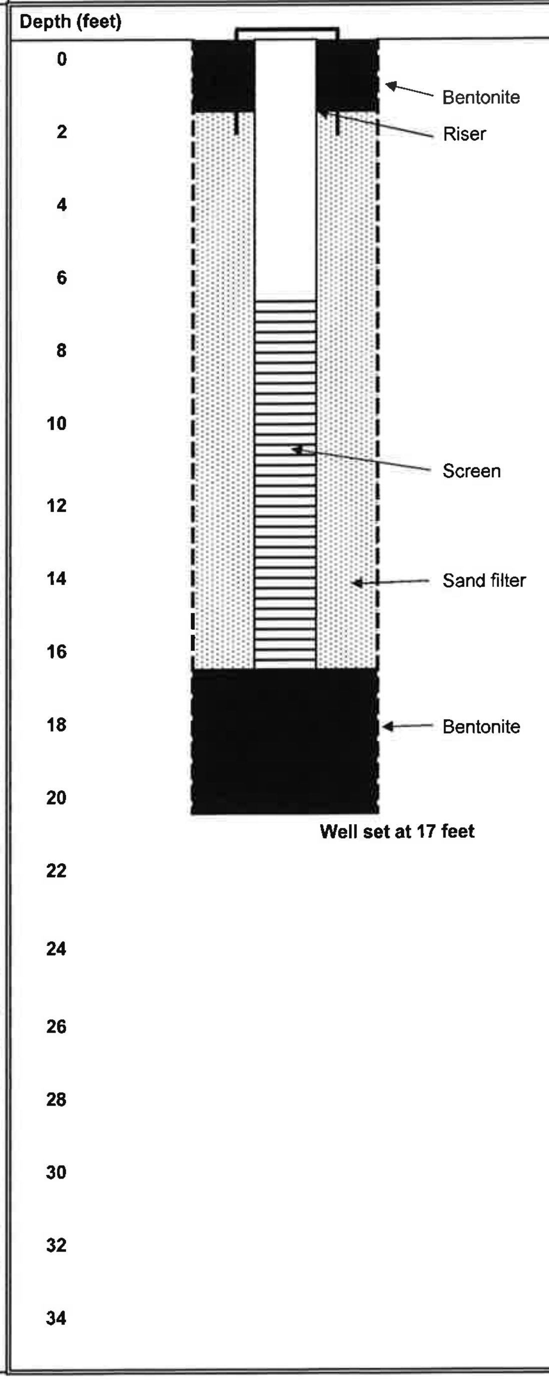
FILTER PACK

INSTALL. METHOD	Pour
MATERIAL	Sand -Silica Qtz
QUANTITY	4 bags x 50 lb
DEPTH INTERVAL	4 - 17 ft

DEVELOPMENT

METHOD	Pump
TIME	NA
Purge Volume	NA

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION

URS

TEST BORING ID MW-28S
Project Name Essex-Hope Jamestown
Drilling Contractor Nothnagle
Drilling Method
Start Date 10/17/2011

Page 1 1
Geologist/Engineer MD
Driller Steve Lorenti
Rig Type CME 85
Completion Date 10/17/2011

DEPTH (feet)	Soil Core Recovery/ Penetration (inches)	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID (ppm_v)	DEPTH (feet)	REMARKS
0 – 2	11	0" to 6" - organic Topsoil. 6" to 8" - Sand, brown to gray, moist.			0 – 2	Blow counts - 1, 2, 2, 4
2 – 4	16	2' to 2' 10" - organic Topsoil. 2' 10" to 2' 11" - rock fragments. 2' 11" to 3' 4" - med - coarse Sand, brown, moist.			2 – 4	Blow counts - 4, 4, 8, 4
4 – 6	14	4' to 5' 2" - fine Sand and Silt, brown, moist.			4 – 6	Blow counts - 3, 8, 10, 10
6 – 8	18	6' to 7' 6" - silty Sand and Gravel, brown-gray, wet, no odor.			6 – 8	Blow counts - 16, 15, 10, 11
8 – 10	12	8' to 8' 10" - SAA. 8' 10" to 9' - silty Sand and Gravel, gray, wet. Water at 8'.			8 – 10	Blow counts - 5, 7, 8, 10
10 – 12	10	10' to 10' 10" - SAA, slight chemical odor.			10 – 12	Blow counts - 3, 6, 5, 6
12 – 14	8	12' to 12' 8" - Silt and fine Sand with Gravel, gray, wet, slight chemical odor.			12 – 14	Blow counts - 4, 4, 5, 5
14 – 16	0	Silt, gray (SAA), mild chemical odor.			14 – 16	Blow counts - 5, 7, 7, 11
16 – 18	16	16' to 16' 3" - SAA. 16' 3" to 17' 4" - clayey Silt, gray, moist to wet, no odor. Confining bed.			16 – 18	Blow counts - 13, 6, 6, 11
18 – 20	4	18' to 18' 4" - Gravel with Sand, no odor.			18 – 20	Blow counts - 16, 15, 15, 12
20 – 24		End boring at 20'			20 – 24	

Additional Remarks:

URS

WELL COMPLETION LOG

WELL NO. MW-29S

BY	BAC	*PROJECT NAME*	Essex-Hope Jamestown	*PROJECT NO.*	41568904
DATE	10/20/2011	*LOCATION*	Jamestown, NY	*GEOLOGIST/ENGINEER*	M. Dowiak
CHK BY	MJD	*INSTALL COMPANY*	Nothnagle	*DRILLER*	Steve Lorenti
DATE	10/21/11	*DRILLING METHOD*		*RIG TYPE*	CME 85
		DRILLING FLUID	N/A		
		DRILLING START DATE	10/18/2011	*DRILLING COMPLETION DATE*	10/18/2011

INSTALLATIONS

ELEVATION / DEPTH DATA

GROUND SURFACE ELEV.	NA
SURFACE PAD ELEV.	NA
HOLE DEPTH	14 ft
WELL DEPTH	14 ft
WELL RISER (TOP)	NA
PROTECTIVE CASING (TOP)	NA

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
4-inch	0 - 14 ft.

PROTECTIVE CASING

TYPE	Flush-mount manhole
MATERIAL	NA
DIAMETER	NA
DEPTH INTERVAL	NA
SURFACE PAD DIMENSIONS	NA

OUTER CASING

MATERIAL	NA
DIAMETER	NA
JOINT TYPE	NA
DEPTH INTERVAL	NA

WELL RISER

MATERIAL	PVC
DIAMETER	2-inch
JOINT TYPE	NA
DEPTH INTERVAL	0 - 4 ft

SCREEN

MATERIAL	PVC
DIAMETER	2-inch
JOINT TYPE	flush-threaded
OPENINGS	0.10 micron
DEPTH INTERVAL	4 - 14 ft

BLANK CASING

MATERIAL	NA
DIAMETER	NA
JOINT TYPE	NA
DEPTH INTERVAL	NA

BOTTOM CAP

MATERIAL	PVC
TYPE	Threaded
DEPTH INTERVAL	14 ft

ANNULAR GROUT

INSTALL. METHOD	NA
MATERIAL	NA
MIX PROPORTIONS	NA
QUANTITIES	NA
DEPTH INTERVAL	NA

ANNULAR SEAL

INSTALL. METHOD	Pour
MATERIAL	Bentonite
QUANTITY	1 bag x 50 lb
DEPTH INTERVAL	0 - 2 ft

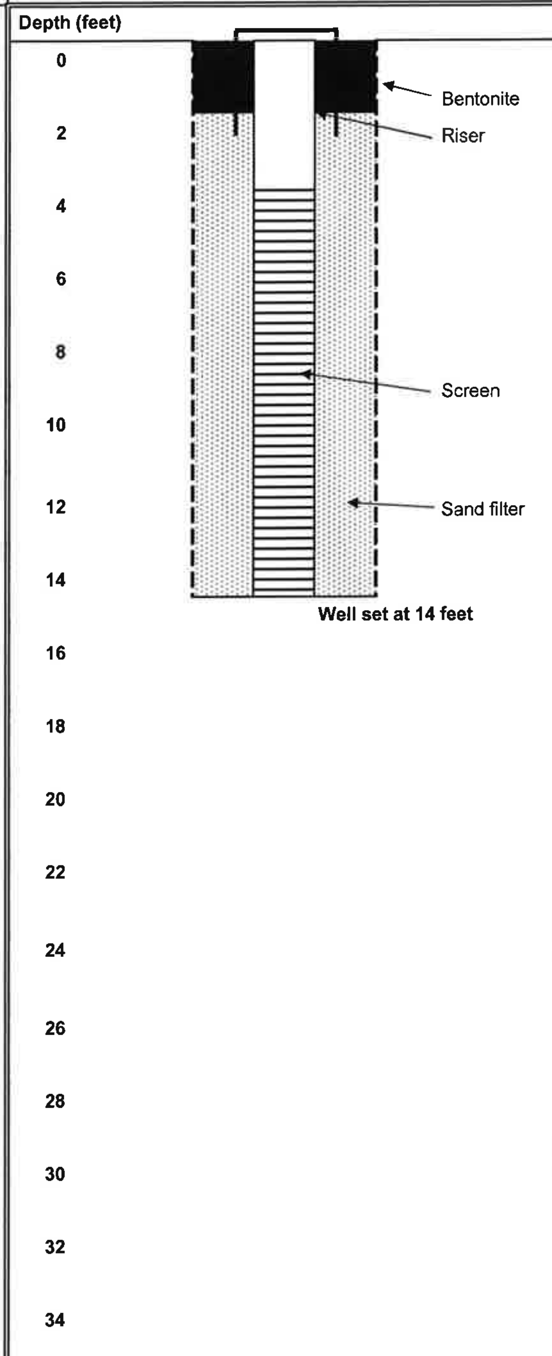
FILTER PACK

INSTALL. METHOD	Pour
MATERIAL	Sand -Silica Qtz
QUANTITY	2 bags x 50 lb
DEPTH INTERVAL	2 - 14 ft

DEVELOPMENT

METHOD	Pump
TIME	NA
Purge Volume	NA

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION

URS

TEST BORING ID	MW-29S
Project Name	Essex-Hope Jamestown
Drilling Contractor	Nothnagle
Drilling Method	
Start Date	10/18/2011

Page	1 1
Geologist/Engineer	MD
Driller	Steve Lorenti
Rig Type	CME 85
Completion Date	10/18/2011

DEPTH (feet)	Soil Core Recovery/ Penetration (Inches)	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID (ppm_v)	DEPTH (feet)	REMARKS
0 - 2	16	0" to 6" - Concrete. 6" to 1' 4" - fine to coarse Sand and Gravel, brown and gray, dry.			0 - 2	Blow counts - 5, 17, 15
2 - 4	2	Gravel in spoon.			2 - 4	Blow counts - 3, 5, 4, 10
4 - 6	14	4' to 5' 2" - Sand and Gravel, light brown, dry, no odor.			4 - 6	Blow counts - 9, 10, 12, 13
6 - 8	16	6' to 7' 4" - Sand and Gravel (.25" - 1"), lightbrown, some orange spotting, wet, chemical odor.			6 - 8	Blow counts - 7, 15, 15, 16
8 - 10	15	8' to 9' - SAA. 9' to 9' 3" - Sand, gray, wet, chemical odor. Water at 8'.			8 - 10	Blow counts - 6, 12, 7, 8
10 - 12	10	10' to 10' 10" - Sand and Gravel, gray, wet, chemical odor.			10 - 12	Blow counts - 5, 6, 5, 7
12 - 14	10	12' - 12' 8" - SAA. 12' 8" to 12' 10" - clayey Silt, gray stiff, wet. Confining bed.			12 - 14	Blow counts - 6, 9, 9, 11
14 - 16		End boring at 14"			14 - 16	
16 - 18					16 - 18	
18 - 20					18 - 20	
20 - 24					20 - 24	

Additional Remarks:

TEST BORING PZ-5D

RADIAN INTERNATIONAL

PROJECT NAME ESSEX / HOPE | PROJECT NO. 804041.21

BY KD | LOCATION JAMESTOWN NY | GEOLOGIST K. DODRILL

DATE 07-19-00 | DRILLING CONTRACTOR URS SDS | DRILLER BEN BUTLER

CHK BY | DRILLING METHOD GEOPROBE | RIG TYPE POWER PROBE 9600 EC VIPER 3

DATE | DRILLING START DATE 07-19-00 | DRILLING COMPLETION DATE 07-19-00

SURFACE ELEVATION | STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
	SS-1	48 IN		LT BROWN CLAYEY SILT (SOFT) - MOIST 3.2' LT BROWN CLAYEY SILT LITTLE M-C SAND & GRAVEL (1/4-1 IN) MOIST			209	4	
5	SS-2	2.5 FT		4' BROWN F-C SAND & GRAVEL SOME SILT - MOIST WET AT 6 FT			815	8	
10	SS-3	48 IN		8' TO 11.3' AS ABOVE GRADES TO OLIVE BROWN SATURATED 11.3'-12 OLIVE BROWN SILTY CLAY, WET, LITTLE GRAVEL IN UPPER 0.2'			617	12	CL
15	SS-4	1.8 FT		12-16' AS ABOVE, NO GRAVEL			781	16	
				16-20' AS ABOVE, MOIST			854		
20				TD = 20 FT				20	

ADDITIONAL REMARKS - INSTALL 3 IN. CASING TO 16 FT DEPTH

FILE: \FORMA

TEST BORING PZ-5D

RADIAN INTERNATIONAL

PROJECT NAME ESSEX / HOPE   PROJECT NO. 804041.21
LOCATION JAMESTOWN NY   GEOLOGIST R. RUPIPER
BY RR   DRILLING CONTRACTOR URS SDS   DRILLER BEN BUTLER
DATE 08-04-00   DRILLING METHOD GEOPROBE   RIG TYPE VIPER 3
CHK BY   DRILLING START DATE 08-04-00   DRILLING COMPLETION DATE 08-04-00
DATE   SURFACE ELEVATION   STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
		46"		20-24' GRAY SILTY CLAY, DAMP					CL
24		42"		24-28' GRAY FINE TO V. FINE SAND, LITTLE SILT, SATURATED			215.3	24	SAMPLE 24-28 FT
28		46"		28-32' AS ABOVE			276	28	
32		30"		32-36' AS ABOVE			33.4	32	
36		44"		36-38' AS ABOVE, WET			2.6	36	SAMPLE 36-38 FT
				38-39.5' GRAY SILTY CLAY TRACE FINE SAND, V. STIFF				38	
				39.5-40' GRAY V. FINE SAND, DAMP			1.3	39.5	
40		39"		40-41.25' AS ABOVE				41.5	
				41.25-44' GRAY SILTY CLAY					
44				44-48' AS ABOVE					

ADDITIONAL REMARKS
TOTAL DEPTH = 48 FT

FILE: \FORMAT

WELL COMPLETION LOG

RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

PAGE 1 OF 1

WELL NO. PZ-5S
HOLE NO. ____

BY RR
DATE ____
CHK BY ____
DATE ____

PROJECT NAME ESSEX / HOPE
LOCATION JAMESTOWN NY
DRILLING CONTRACTOR URS SDS
DRILLING METHOD GEOPROBE
DRILLING FLUID ____
DRILLING START DATE ____

PROJECT NO. 804041.21
GEOLOGIST R. RUPIPER
DRILLER B. BUTLER
RIG TYPE VIPER
DRILLING COMPLETION DATE ____

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV. ~1276.90
SURFACE PAD ELEV. ____
HOLE DEPTH 12 FT
WELL DEPTH 12 FT
WELL RISER (TOP) 1276.56
PROTECTIVE CASING (TOP) ____

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
2 1/4"	0-12 FT

PROTECTIVE CASING
TYPE FLUSH MOUNT
MATERIAL STEEL
DIAMETER 8 IN
DEPTH INTERVAL 12 IN
SURFACE PAD DIMENSIONS 2'x2'x6"

OUTER CASING N/A
MATERIAL ____
DIAMETER ____
JOINT TYPE ____
DEPTH INTERVAL ____

WELL RISER
MATERIAL SCH 40 PVC
DIAMETER 1 IN
JOINT TYPE FLUSH THREAD
DEPTH INTERVAL 0-5.5 FT

SCREEN
MATERIAL SCH 40 PVC
DIAMETER 1 IN
JOINT TYPE FLUSH THREAD
OPENINGS 0.01 IN
DEPTH INTERVAL 12-5.5 FT

BLANK CASING N/A
MATERIAL ____
DIAMETER ____
JOINT TYPE ____
DEPTH INTERVAL ____

BOTTOM CAP
MATERIAL SCH 40 PVC
TYPE FLUSH THREAD
DEPTH INTERVAL ____

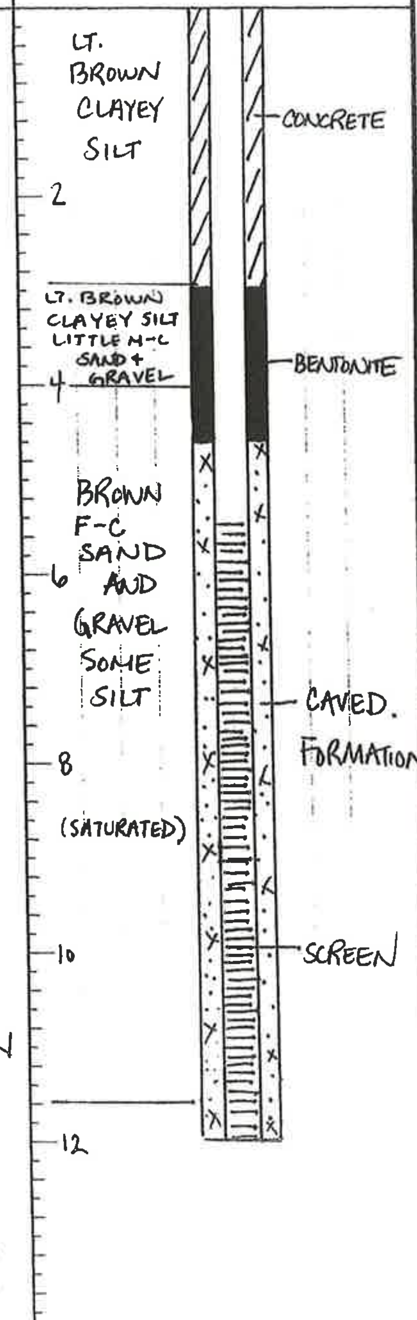
ANNULAR GROUT
INSTALL. METHOD BOREHOLE
MATERIAL CEMENT
MIX PROPORTIONS ____
QUANTITIES ____
DEPTH INTERVAL 0-3 FT

ANNULAR SEAL
INSTALL. METHOD BOREHOLE
MATERIAL GRANULAR BENT.
QUANTITY ____
DEPTH INTERVAL 3-4.5 FT

FILTER PACK
INSTALL. METHOD —
MATERIAL CAVED FORMATION
QUANTITY ____
DEPTH INTERVAL 4.5-12 FT

DEVELOPMENT
METHOD SURGE & BAIL
TIME ____
PRODUCTION ____

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION:

FILE: \WELL-LOG

RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

WELL COMPLETION LOG

WELL NO. PZ-5D
HOLE NO.

PROJECT NAME ESSEX / HOPE
PROJECT NO. 804041.21

BY RR
LOCATION JAMESTOWN NY
GEOLOGIST R. RUPIPER

DATE 08-04-00
DRILLING CONTRACTOR URS SDS
DRILLER B. BUTLER

CHK BY
DRILLING METHOD GEO PROBE
RIG TYPE POWER PROBE 9600 EC VIPER 3

DATE
DRILLING FLUID

DRILLING START DATE 08-04-00
DRILLING COMPLETION DATE 08-04-00

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV. 1276.90
SURFACE PAD ELEV.
HOLE DEPTH 48'
WELL DEPTH 41.5'
WELL RISER (TOP) 1276.52
PROTECTIVE CASING (TOP)

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
2 1/4-IN	0 - 48 FT
	0-16 FT

PROTECTIVE CASING
TYPE FLUSH MOUNT
MATERIAL STEEL
DIAMETER 8 IN.
DEPTH INTERVAL 12 IN.
SURFACE PAD DIMENSIONS 2" x 2" x 6"

OUTER CASING
MATERIAL SCH 40 PVC
DIAMETER 3 IN.
JOINT TYPE
DEPTH INTERVAL 0 - 16 FT

WELL RISER
MATERIAL SCH 40 PVC
DIAMETER 1-IN.
JOINT TYPE FLUSH THREAD
DEPTH INTERVAL 0-21.5 FT

SCREEN
MATERIAL SCH 40 PVC
DIAMETER 1"
JOINT TYPE FLUSH THREAD
OPENINGS 0.01-IN
DEPTH INTERVAL 41.5'-21.5'

BLANK CASING N/A
MATERIAL
DIAMETER
JOINT TYPE
DEPTH INTERVAL

BOTTOM CAP
MATERIAL SCH 40 PVC
TYPE FLUSH THREAD
DEPTH INTERVAL

ANNULAR GROUT
INSTALL. METHOD BOREHOLE
MATERIAL CEMENT
MIX PROPORTIONS

QUANTITIES

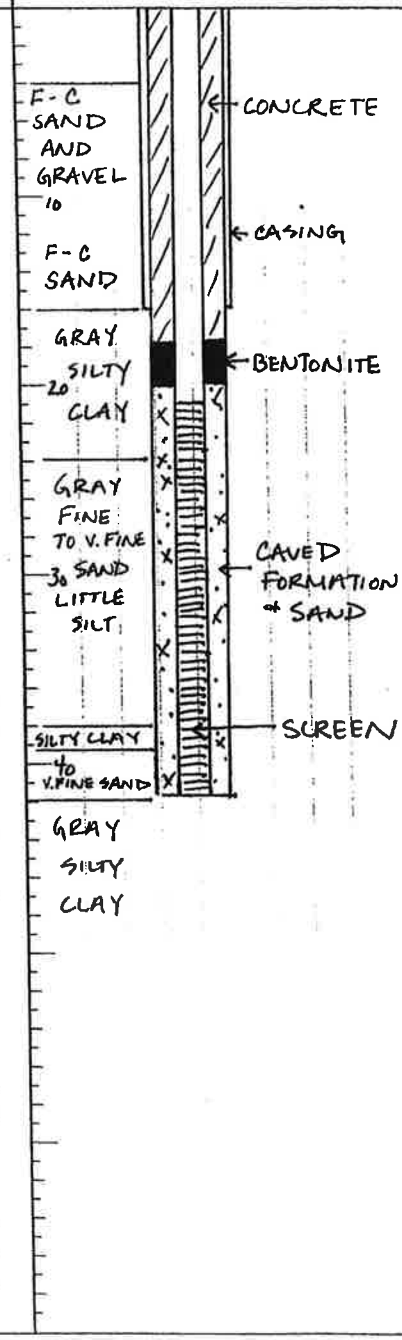
DEPTH INTERVAL 0-18 FT

ANNULAR SEAL
INSTALL. METHOD BOREHOLE
MATERIAL GRANULAR BENT.
QUANTITY
DEPTH INTERVAL 18-20 FT

FILTER PACK
INSTALL. METHOD BOREHOLE
MATERIAL FORMATION / SAND
QUANTITY
DEPTH INTERVAL 20-41.5 FT

DEVELOPMENT
METHOD SURGE & BAIL
TIME
PRODUCTION

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION:

FILE: \WELL-LOG

TEST BORING PZ-6D

PAGE 1 OF 3

RADIAN INTERNATIONAL

BY KD	PROJECT NAME ESSEX / HOPE		PROJECT NO. 804041.21
	LOCATION JAMESTOWN NY	GEOLOGIST K. DODRILL	
	DRILLING CONTRACTOR URS SDS	DRILLER B. BUTLER	
DATE 07-31-00	DRILLING METHOD GEOPROBE	RIG TYPE VIPER 2	
CHK BY	DRILLING START DATE 07-31-00	DRILLING COMPLETION DATE	
DATE	SURFACE ELEVATION	STICK-UP ELEVATION	

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
				0-10" GRASS, DK BROWN ORGANIC RICH SILT, DAMP					?
				10-20" LT BROWN CLAYEY SILT, MOIST					0
2		38"		20-48" AS ABOVE, SOME M-C SAND AND GRAVEL 1 TO >2" diAMETER MOIST					
4				48-96" LT BROWN TO OLIVE BROWN SILTY M-C SAND & GRAVEL (1/4->2 IN) DAMP					
6		36"							
8				96-118" AS ABOVE DAMP -WET AT 9'2"					
10		43"		118-144 IN OLIVE BROWN M-C SAND & GRAVEL (1/4-1 IN) SOME SILT, SATURATED					
12				12-13 FT 5 IN AS ABOVE, SATURATED					
				13'5" TO 16' OLIVE BROWN SILTY CLAY - WET					

ADDITIONAL REMARKS: INSTALL CASING (3") TO 16.5 FT

FILE: \FORMAT

TEST BORING PZ-6D

RADIAN INTERNATIONAL

BY RR	PROJECT NAME ESSEX / HOPE		PROJECT NO. 804041.21
DATE 08-07-00	LOCATION JAMESTOWN NY	GEOLOGIST R. RUPIPER	
CHK BY.	DRILLING CONTRACTOR URS SDS	DRILLER B. BUTLER	
DATE	DRILLING METHOD GEOPROBE	RIG TYPE POWER PROBE 9600 EC	
	DRILLING START DATE 08-07-00	DRILLING COMPLETION DATE 08-07-00	
	SURFACE ELEVATION	STICK-UP ELEVATION	

V3

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
16–20		46"		16-20' GRAY SILTY CLAY, V. SOFT 17-18.5'			0		
20–24		42"		20-24' AS ABOVE, MEDIUM STIFF			0	20	
24–28		46"		24-28' GRAY FINE TO V. FINE SAND SILTY CLAY FROM 26.1-26.3'			2.6	24	
28–32		39"		28-32' AS ABOVE SILTY CLAY 30.5-30.75'			1.3	28	
32–36		40"		32-36' AS ABOVE SILTY CLAY 35.5-35.75'			1.3	32	
36–40		43"		36-40' AS ABOVE SILTY CLAY (SOFT) AT 36.25-37' AND 38.75-39'			0	36	
40–44		0		40-44' NO RECOVERY (All LIQUID)				40	
44								44	

ADDITIONAL REMARKS

FILE: \FORMAT

RADIAN INTERNATIONAL

TEST BORING PZ-6D

BY RR	PROJECT NAME ESSEX/HOPE	PROJECT NO. 804041.21
DATE 08-07-00	LOCATION JAMESTOWN NY	GEOLOGIST R. RUPIPER
CHK BY.	DRILLING CONTRACTOR URS SDS	DRILLER B. BUTLER
DATE	DRILLING METHOD GEOPROBE	RIG TYPE POWER PROBE 9600 EC
	DRILLING START DATE 08-07-00	DRILLING COMPLETION DATE 08-07-00
	SURFACE ELEVATION	STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
				44-45' GRAY SILTY CLAY, STIFF			0	45	
				45-45½' GRAY V. FINE SAND, WET			1.3	45½	
				45½-48' GRAY SILTY CLAY, STIFF			1.3		
48				TOTAL DEPTH = 48FT				48	

ADDITIONAL REMARKS

FILE: \FORMAT

WELL COMPLETION LOG

RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

WELL NO. PZ-6S
HOLE NO. ____

BY RR
DATE ____
CHK BY ____
DATE ____

PROJECT NAME ESSEX/HOPE
LOCATION JAMESTOWN NY
DRILLING CONTRACTOR URS SDS
DRILLING METHOD GEOPROBE
DRILLING FLUID ____
DRILLING START DATE ____

PROJECT NO. 804041.21
GEOLOGIST R. RUPIPER
DRILLER B. BUTLER
RIG TYPE VIPER
DRILLING COMPLETION DATE ____

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV. ~1276.96
SURFACE PAD ELEV. ____
HOLE DEPTH 13.5 FT
WELL DEPTH 13.5 FT
WELL RISER (TOP) 1276.77
PROTECTIVE CASING (TOP) ____

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
2 1/4"	0 - 13.5 FT

PROTECTIVE CASING
TYPE FLUSH MOUNT
MATERIAL STEEL
DIAMETER 8 IN.
DEPTH INTERVAL 12 IN
SURFACE PAD DIMENSIONS 2' × 2' × 6"

OUTER CASING N/A
MATERIAL ____
DIAMETER ____
JOINT TYPE ____
DEPTH INTERVAL ____

WELL RISER
MATERIAL SCH 40 PVC
DIAMETER 1-IN.
JOINT TYPE FLUSH THREAD
DEPTH INTERVAL 0 - 8.5 FT

SCREEN
MATERIAL SCH 40 PVC
DIAMETER 1-IN
JOINT TYPE FLUSH THREAD
OPENINGS 0.01 IN
DEPTH INTERVAL 8.5 - 13.5 FT

BLANK CASING N/A
MATERIAL ____
DIAMETER ____
JOINT TYPE ____
DEPTH INTERVAL ____

BOTTOM CAP
MATERIAL SCH 40 PVC
TYPE FLUSH THREAD
DEPTH INTERVAL ____

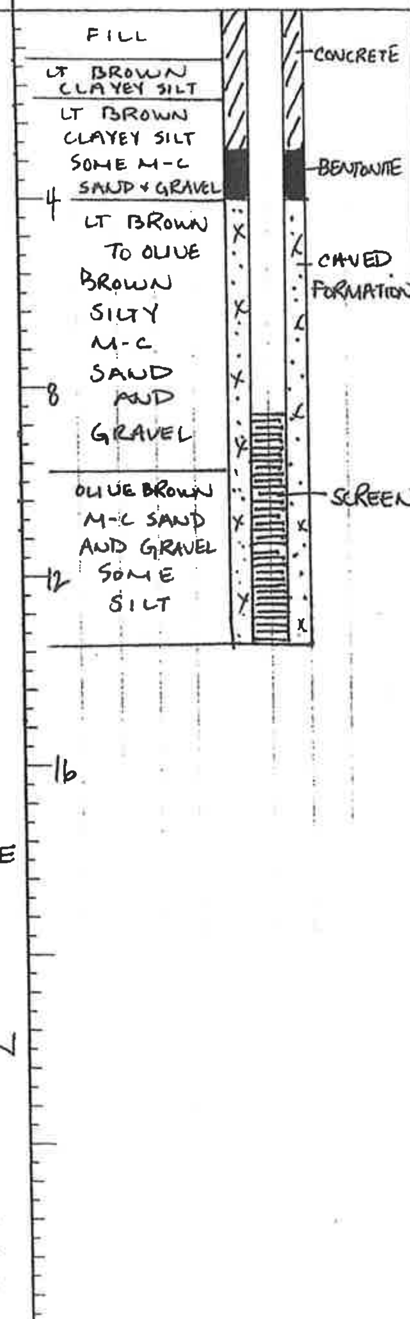
ANNULAR GROUT
INSTALL. METHOD BOREHOLE
MATERIAL CEMENT
MIX PROPORTIONS ____
QUANTITIES ____
DEPTH INTERVAL 0 - 3 FT

ANNULAR SEAL
INSTALL. METHOD BOREHOLE
MATERIAL GRANULAR BENTONITE
QUANTITY ____
DEPTH INTERVAL 3 - 4 FT

FILTER PACK
INSTALL. METHOD —
MATERIAL CAVED FORMATION
QUANTITY ____
DEPTH INTERVAL 4 - 13.5 FT

DEVELOPMENT
METHOD SURGE & BAIL
TIME ____
PRODUCTION ____

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION:

FILE: \WELL-LOG

RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

WELL COMPLETION LOG

WELL NO. PZ-6D
HOLE NO.

BY RR
DATE 08-07-00
CHK BY
DATE

PROJECT NAME ESSEX / HOPE
LOCATION JAMESTOWN, NY
DRILLING CONTRACTOR URS SDS
DRILLING METHOD GEOPROBE
DRILLING FLUID
DRILLING START DATE 08-07-00

PROJECT NO. 804041.21
GEOLOGIST R. RUPIPER
DRILLER B. BUTLER
RIG TYPE POWER PROBE 9600 EC V3
DRILLING COMPLETION DATE 08-07-00

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV. 1276.96
SURFACE PAD ELEV.
HOLE DEPTH 48'
WELL DEPTH 45.5'
WELL RISER (TOP) 1276.57
PROTECTIVE CASING (TOP)

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
2¼"	0-48'
	0-16.5'

PROTECTIVE CASING
TYPE FLUSH MOUNT
MATERIAL STEEL
DIAMETER 8 in
DEPTH INTERVAL 12 in
SURFACE PAD DIMENSIONS 2"×2"×6"

OUTER CASING
MATERIAL SCH 40 PVC
DIAMETER 3 in
JOINT TYPE 1
DEPTH INTERVAL 0-16.5 FT

WELL RISER
MATERIAL SCH 40 PVC
DIAMETER 1 in
JOINT TYPE FLUSH THREAD
DEPTH INTERVAL 0-25.5 FT

SCREEN
MATERIAL SCH 40 PVC
DIAMETER 1"
JOINT TYPE FLUSH THREAD
OPENINGS 0.01-in
DEPTH INTERVAL 45.5'-25.5'

BLANK CASING N/A
MATERIAL
DIAMETER
JOINT TYPE
DEPTH INTERVAL

BOTTOM CAP
MATERIAL SCH 40 PVC
TYPE FLUSH THREAD
DEPTH INTERVAL

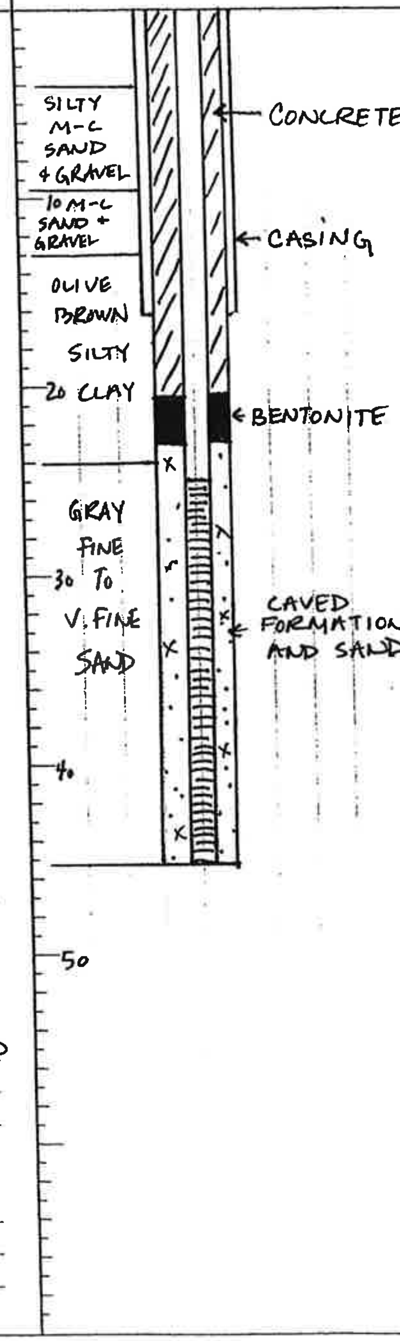
ANNULAR GROUT
INSTALL. METHOD BOREHOLE
MATERIAL CEMENT
MIX PROPORTIONS
QUANTITIES
DEPTH INTERVAL SURFACE TO 21'

ANNULAR SEAL
INSTALL. METHOD BOREHOLE
MATERIAL GRANULAR BENT.
QUANTITY
DEPTH INTERVAL 21-23 FT

FILTER PACK
INSTALL. METHOD BOREHOLE
MATERIAL FORMATION / SAND
QUANTITY
DEPTH INTERVAL 23-45.5 FT

DEVELOPMENT
METHOD SURGE & BAIL
TIME
PRODUCTION

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION:

FILE: \WELL-LOG

RADIAN INTERNATIONAL

TEST BORING PZ-7

PROJECT NAME ESSEX/HOPE | PROJECT NO. 804041.21

LOCATION JAMESTOWN NY | GEOLOGIST R. RUPIPER

BY RR | DRILLING CONTRACTOR URS SDS | DRILLER B. BUTLER

DATE 08-01-00 | DRILLING METHOD GEOPROBE | RIG TYPE POWER PROBE 9600EC V3

CHK BY | DRILLING START DATE 08-01-00 | DRILLING COMPLETION DATE 08-01-00

DATE | SURFACE ELEVATION | STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./ 6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
				0-8" DK BROWN ORGANIC RICH SILT SOME SAND + GRAVEL (<1/4-1/4 in) DAMP					
				8-19 1/2" BROWN CLAYEY SILT SOME SAND, LITTLE GRAVEL (1/4 IN)					
2				19 1/2" - 4' LT BROWN SILTY SAND AND GRAVEL (1/4-1 in), DAMP					
4				4-4.7' AS ABOVE					
				4.7-5' AS ABOVE, LESS GRAVEL DAMP					
				5-5.3' GRAVEL (1/2-1"), LITTLE DK. BROWN SAND, DAMP					
6				5.3-8' DK BROWN CLAYEY SILT SOME SAND AND GRAVEL (<1/4->1") MOIST					
				WET AT 8 FT					
8				8-12' AS ABOVE, SATURATED AT 8FT 11in					
10									
12				12-14' AS ABOVE					
				14-14.7' LT BROWN SILTY CLAY NO GRAVEL					
				14.7-16' GRAY SILTY CLAY					

ADDITIONAL REMARKS: INSTALL CASING TO 18 FT

FILE: \FORMAT\

TEST BORING PZ-7

PAGE 2 OF 2

RADIAN INTERNATIONAL

BY. RR	PROJECT NAME ESSEX / HOPE		PROJECT NO. 804041.21
DATE 08-03-00	LOCATION JAMESTOWN NY	GEOLOGIST R. RUPIPER	
CHK BY.	DRILLING CONTRACTOR URS SDS	DRILLER B. BUTLER	
DATE	DRILLING METHOD GEOPROBE	RIG TYPE VIPER 2	
	DRILLING START DATE 08-03-00	DRILLING COMPLETION DATE 08-03-00	
	SURFACE ELEVATION	STICK-UP ELEVATION	

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
				16-17.5' AS ABOVE					
		46"		17.5-20' GRAY V. FINE SAND, LITTLE SILT, DENSE, WET			24.4	17.5	SAMPLE 17.5-20'
20		46"		20-23.5' GRAY V. FINE SAND, TRACE SILT, SATURATED			10.7	20	
				23.5-24' AS ABOVE, BROWN			76	23.5	
24		46"		24-28' AS ABOVE, GRAY AT 24.25' GRADES TO LITTLE SILT			8.2	24	
28		46"		28-32' AS ABOVE			0	28	
32		2"		32-36' AS ABOVE ?				32	
36		46"		36-40' AS ABOVE			0	36	
40				40-42' AS ABOVE			0	40	SAMPLE 40-42'
				42-44' GRAY V. STIFF CLAY, LITTLE SILT			0	42	
44									

ADDITIONAL REMARKS: TOTAL DEPTH = 44 FT

FILE: \FORMAT

WELL COMPLETION LOG

DCM GROUP RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

WELL NO. PZ-7D
HOLE NO. ______

PROJECT NAME: ESSEX / HOPE
PROJECT NO. 804041.21

BY: RR	LOCATION: JAMESTOWN NY	GEOLOGIST: R. RUPIPER
DATE: 08-01-00	DRILLING CONTRACTOR: URS SDS	DRILLER: B. BUTLER
CHK BY:	DRILLING METHOD: GEOPROBE	RIG TYPE: POWER PROBE 9600EC V3
DATE:	DRILLING FLUID:	
	DRILLING START DATE: 08-01-00	DRILLING COMPLETION DATE: 08-01-00

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV. ~1276.13
SURFACE PAD ELEV.
HOLE DEPTH 44FT
WELL DEPTH 42FT
WELL RISER (TOP) 1275.83
PROTECTIVE CASING (TOP)

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
2¼"	0-44'

PROTECTIVE CASING
TYPE: FLUSH MOUNT
MATERIAL: STEEL
DIAMETER: 8 IN
DEPTH INTERVAL: 12 IN
SURFACE PAD DIMENSIONS: 2"×2"×6"

OUTER CASING
MATERIAL: SCH 40 PVC
DIAMETER: 3 IN.
JOINT TYPE:
DEPTH INTERVAL: 0-18 FT

WELL RISER
MATERIAL: SCH 40 PVC
DIAMETER: 1-IN
JOINT TYPE: FLUSH THREAD
DEPTH INTERVAL: 0-22 FT

SCREEN
MATERIAL: SCH 40 PVC
DIAMETER: 1"
JOINT TYPE: FLUSH THREAD
OPENINGS: 0.01-IN
DEPTH INTERVAL: 42'-22'

BLANK CASING N/A
MATERIAL:
DIAMETER:
JOINT TYPE:
DEPTH INTERVAL:

BOTTOM CAP
MATERIAL: SCH 40 PVC
TYPE: FLUSH THREAD
DEPTH INTERVAL:

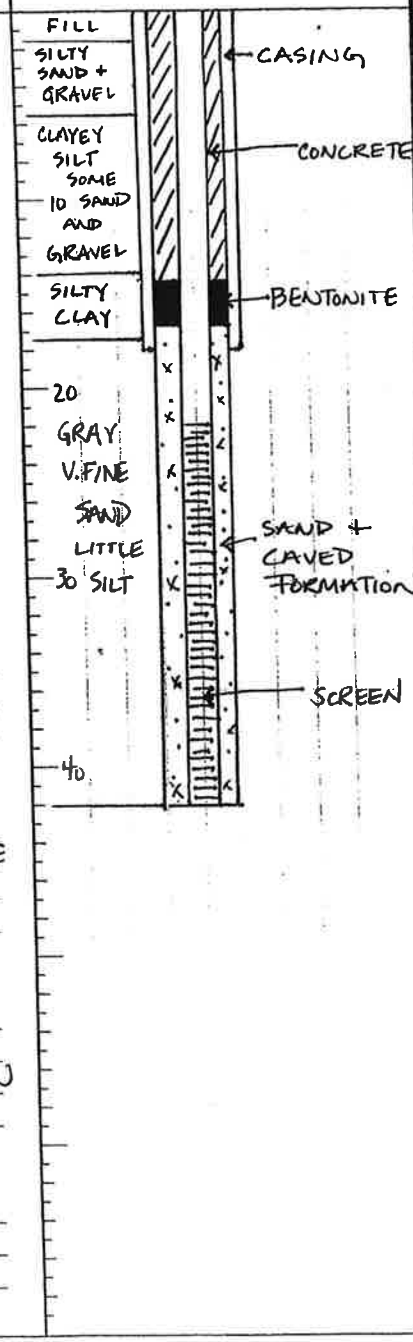
ANNULAR GROUT
INSTALL. METHOD: BOREHOLE
MATERIAL: CEMENT
MIX PROPORTIONS:
QUANTITIES:
DEPTH INTERVAL: SURFACE - 14.5'

ANNULAR SEAL
INSTALL. METHOD: BOREHOLE
MATERIAL: GRANULAR BENTONITE
QUANTITY:
DEPTH INTERVAL: 14.5'-16.75'

FILTER PACK
INSTALL. METHOD: BOREHOLE
MATERIAL: SAND/CAVED FORMATION
QUANTITY:
DEPTH INTERVAL: 16.75'-42'

DEVELOPMENT
METHOD: SURGE & BAIL
TIME:
PRODUCTION:

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION:

FILE: \WELL-LOG

TEST BORING PZ-8

RADIAN INTERNATIONAL

BY RR	PROJECT NAME ESSEX / HOPE	PROJECT NO. 804041.21	
DATE 08-01-00	LOCATION JAMESTOWN NY	GEOLOGIST R. RUPIPER	
CHK BY.	DRILLING CONTRACTOR URS SDS	DRILLER R. MILLER	
DATE	DRILLING METHOD GEOPROBE	RIG TYPE VIPER 2	
	DRILLING START DATE 08-01-00	DRILLING COMPLETION DATE 08-01-00	
	SURFACE ELEVATION	STICK-UP ELEVATION	

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
		44"		0-20" DK BROWN SAND & GRAVEL, DAMP 20"-2' DK BROWN TO BLACK SOFT CLAY, SOME SILT, MOIST 2-3' LT BROWN SILTY CLAY, STIFF 3-4' LT BROWN SILTY SAND AND GRAVEL (1/4-1 in)			66.8	20" 3'	
4		21"		4-4.5' AS ABOVE 4.5-8' AS ABOVE GRADING TO GRAY SATURATED			61.5 5565	4.5' 8'	
8		32"		8-11'1" AS ABOVE, STRONG ODOR BLACK SHINY COATING ON GRAVEL (1/16-1/8 in) 11'1"-12' GRAY CLAY, LITTLE SILT			9554	11'1"	CL?
12				TOTAL DEPTH = 12 FT					

ADDITIONAL REMARKS: INSTALL CASING TO 15 FT (3")

FILE: \FORMAT

TEST BORING PZ-8

RADIAN INTERNATIONAL

	PROJECT NAME ESSEX / HOPE		PROJECT NO. 804041.21
	LOCATION JAMESTOWN NY		GEOLOGIST R. RUPIPER
BY RR	DRILLING CONTRACTOR URS SDS		DRILLER B. BUTLER
DATE 08-05-00	DRILLING METHOD GEOPROBE		RIG TYPE VIPER 2
CHK BY	DRILLING START DATE 08-05-00		DRILLING COMPLETION DATE 08-05-00
DATE	SURFACE ELEVATION		STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
16–20		0		16-20' NO RECOVERY ?					CLAY?
20		34"		21-23' GRAY FINE TO V. FINE SAND, SATURATED			68.6	20–23	SAMPLE 20-23 FT
				23-24' GRAY SILTY CLAY, V. STIFF			116.3	23–24	
24		40"		24-28' GRAY FINE TO V. FINE SAND, SATURATED			29.4	24–28	
28		41 1/2"		28-32' AS ABOVE, LITTLE SILT			4	28–32	
32		43"		32-35.5' AS ABOVE			6.6	32–35.5	
				35.5-36' GRAY SILTY CLAY			17.3	35.5–36	
36		44"		36-40' GRAY FINE TO V. FINE SAND, LITTLE SILT			2.6	36–40	
40		42"		40-40.75' MED TO COARSE SAND, SOME SILT TRACE GRAVEL (1/4-1/2 in)			4.3	40–40.75	SAMPLE 40-40.75 FT
				40.75-44' GRAY CLAYEY SILT V. STIFF			0	40.75–44	
44								44	

ADDITIONAL REMARKS: 12-16 FT NO RECOVERY

TOTAL DEPTH = 44 FT

RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

WELL COMPLETION LOG

WELL NO. PZ-8D
HOLE NO.

PROJECT NAME: ESSEX / HOPE — PROJECT NO.: B04041.21

BY: RR — LOCATION: JAMESTOWN NY — GEOLOGIST: R. RUPIPER
DATE: 08-05-00 — DRILLING CONTRACTOR: URS SDS — DRILLER: B. BUTLER
CHK BY: — DRILLING METHOD: GEOPROBE — RIG TYPE: VIPER 2
DATE: — DRILLING FLUID:
DRILLING START DATE: 08-05-00 — DRILLING COMPLETION DATE: 08-05-00

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV. ~1278.93
SURFACE PAD ELEV.
HOLE DEPTH 44 FT
WELL DEPTH 41 FT
WELL RISER (TOP) 1278.63
PROTECTIVE CASING (TOP)

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
2¼"	0-44'

PROTECTIVE CASING
TYPE FLUSH MOUNT
MATERIAL STEEL
DIAMETER 8 iN
DEPTH INTERVAL 12 iN
SURFACE PAD DIMENSIONS —

OUTER CASING
MATERIAL SCH 40 PVC
DIAMETER 3 iN.
JOINT TYPE
DEPTH INTERVAL 0-15 FT

WELL RISER
MATERIAL SCH 40 PVC
DIAMETER 1-iN
JOINT TYPE FLUSH THREAD
DEPTH INTERVAL 0-21 FT

SCREEN
MATERIAL SCH 40 PVC
DIAMETER 1"
JOINT TYPE FLUSH THREAD
OPENINGS 0.01-iN
DEPTH INTERVAL 41'-21'

BLANK CASING N/A
MATERIAL
DIAMETER
JOINT TYPE
DEPTH INTERVAL

BOTTOM CAP
MATERIAL SCH 40 PVC
TYPE FLUSH THREAD
DEPTH INTERVAL

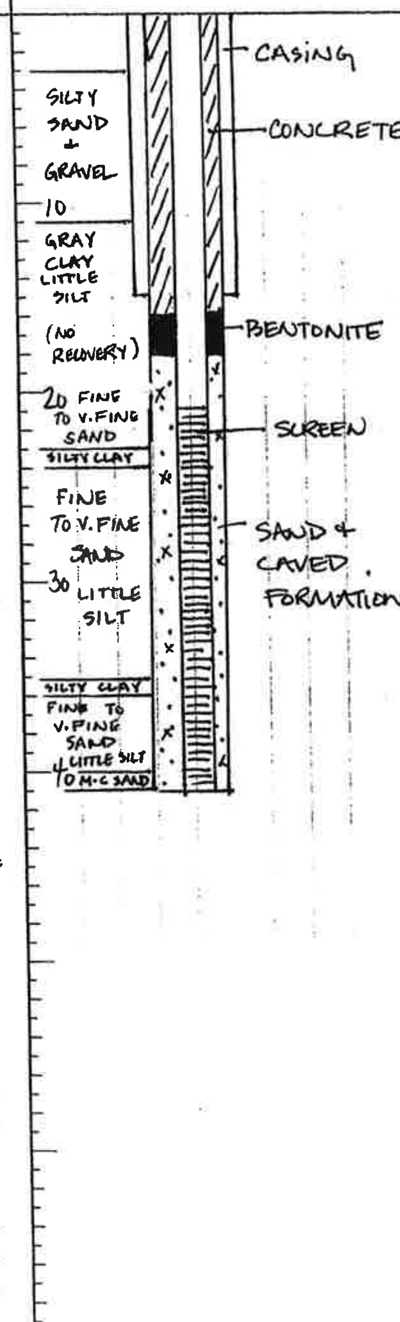
ANNULAR GROUT
INSTALL. METHOD BOREHOLE
MATERIAL CEMENT
MIX PROPORTIONS
QUANTITIES
DEPTH INTERVAL 0-16 FT

ANNULAR SEAL
INSTALL. METHOD BOREHOLE
MATERIAL GRANULAR BENTONITE
QUANTITY
DEPTH INTERVAL 16-18 FT

FILTER PACK
INSTALL. METHOD BOREHOLE
MATERIAL SAND/CAVED FORMATION
QUANTITY
DEPTH INTERVAL 18-41 FT

DEVELOPMENT
METHOD SURGE + BAIL
TIME
PRODUCTION

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION:

FILE: \WELL-LOG

RADIAN INTERNATIONAL

TEST BORING PZ-9

	PROJECT NAME ESSEX / HOPE		PROJECT NO. 804041.21
	LOCATION JAMESTOWN NY	GEOLOGIST R. RUPIPER	
BY RR	DRILLING CONTRACTOR URS SDS	DRILLER R. MILLER	
DATE 08-02-00	DRILLING METHOD GEOPROBE	RIG TYPE POWER PROBE 9600 EC	V3
CHK BY.	DRILLING START DATE 08-02-00	DRILLING COMPLETION DATE 08-02-00	
DATE	SURFACE ELEVATION	STICK-UP ELEVATION	

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
0-2				DID NOT SAMPLE (CONCRETE)					
2		16"		2-3' BROWN FINE TO COARSE SAND AND GRAVEL, SOME SILT, WET (1/4-1")			0	2	
4				3-6' YELLOW BRICK PIECES NO SEDIMENT				3	
6		30"		6-9 1/4' AS ABOVE			0	6	
8				9 1/4-10' LT BROWN V. STIFF CLAY, TRACE GRAVEL (1/2-1") TRACE SILT, MOIST			0	9.25	
10		44"		10-10.25' AS ABOVE				10.25	
12				10.25-14' GRAY SILTY CLAY, V. STIFF			0		
14								14	

ADDITIONAL REMARKS

TOTAL DEPTH = 14 FT

INSTALL 3" CASING TO 12 FT

FILE: \FORMAT

TEST BORING PZ-9

RADIAN INTERNATIONAL

	PROJECT NAME ESSEX / HOPE		PROJECT NO. 804041.21
	LOCATION JAMESTOWN NY	GEOLOGIST	R. RUPIPER
BY RR	DRILLING CONTRACTOR URS SDS	DRILLER	R. MILLER
DATE 08-05-00	DRILLING METHOD GEOPROBE	RIG TYPE	POWER PROBE 9600EC V3
CHK BY	DRILLING START DATE 08-05-00	DRILLING COMPLETION DATE	08-05-00
DATE	SURFACE ELEVATION	STICK-UP ELEVATION	

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
		46"		12-12.8' AS ABOVE 12.8-16' GRAY CLAYEY SILT V. STIFF					
16		42"		16-20' AS ABOVE GRADING TO LITTLE SAND AT 19 FT			2.6	16	
20		39"		20-21.5' AS ABOVE 21.5-24' GRAY SILTY SAND SATURATED			268	21.5	
24		36"		24-28' GRAY V. FINE SAND LITTLE SILT, SATURATED SLIGHT ODOR			200.6	24	
28		44"		28-31.75' AS ABOVE STRONG ODOR 31.75-32.25' GRAY V. STIFF SILTY CLAY			1394 579	28 31.75	SAMPLE 28-31.75'
32		44"		32.25-36' GRAY FINE TO V. FINE SILTY SAND, TRACE CLAY			123.2	32.25	
36		42"		36-38.75' AS ABOVE 38.75-40' GRAY SILTY CLAY, MED. STIFF			9.3	36	SAMPLE 36-40'
40								40	

ADDITIONAL REMARKS

FILE: \FORMA

TEST BORING PZ-9

RADIAN INTERNATIONAL

BY RR	PROJECT NAME ESSEX/HOPE		PROJECT NO. 804041.21
DATE 08-05-00	LOCATION JAMESTOWN NY	GEOLOGIST R. RUPIPER	
CHK BY	DRILLING CONTRACTOR URS SDS	DRILLER R. MILLER	
DATE	DRILLING METHOD GEOPROBE	RIG TYPE	
	DRILLING START DATE 08-05-00	DRILLING COMPLETION DATE 08-05-00	
	SURFACE ELEVATION	STICK-UP ELEVATION	

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
		46"		40-44' GRAY SILTY CLAY, STIFF					
44				TOTAL DEPTH = 44 FT					

ADDITIONAL REMARKS

FILE: \FORMAT\

WELL COMPLETION LOG

RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

WELL NO. PZ-9D
HOLE NO.

BY RR	PROJECT NAME ESSEX/HOPE	PROJECT NO. 804041.21
DATE 08-05-00	LOCATION JAMESTOWN NY	GEOLOGIST R. RUPIPER
CHK BY	DRILLING CONTRACTOR URS SDS	DRILLER R. MILLER
DATE	DRILLING METHOD GEOPROBE	RIG TYPE POWER PROBE 9600 EC V3
	DRILLING FLUID	
	DRILLING START DATE 08-05-00	DRILLING COMPLETION DATE 08-05-00

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV. ~1278.34
SURFACE PAD ELEV.
HOLE DEPTH 44 FT
WELL DEPTH 39 FT
WELL RISER (TOP) 1278.04
PROTECTIVE CASING (TOP)

BOREHOLE DIMENSIONS
DIAMETER	DEPTH INTERVAL
2¼"	0-44"

PROTECTIVE CASING
TYPE FLUSH MOUNT
MATERIAL STEEL
DIAMETER 8 in
DEPTH INTERVAL 12 in
SURFACE PAD DIMENSIONS —

OUTER CASING
MATERIAL SCH 40 PVC
DIAMETER 3 in
JOINT TYPE
DEPTH INTERVAL 0-12 FT

WELL RISER
MATERIAL SCH 40 PVC
DIAMETER 1"
JOINT TYPE FLUSH THREAD
DEPTH INTERVAL 0-19 FT

SCREEN
MATERIAL SCH 40 PVC
DIAMETER 1"
JOINT TYPE FLUSH THREAD
OPENINGS 0.01 in.
DEPTH INTERVAL 39'-19'

BLANK CASING N/A
MATERIAL
DIAMETER
JOINT TYPE
DEPTH INTERVAL

BOTTOM CAP
MATERIAL SCH 40 PVC
TYPE FLUSH THREAD
DEPTH INTERVAL

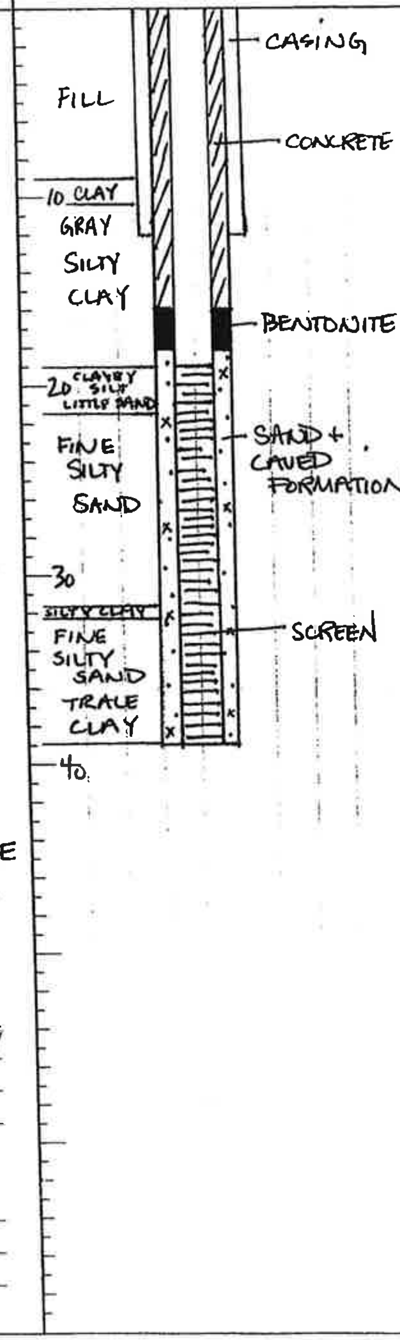
ANNULAR GROUT
INSTALL. METHOD BOREHOLE
MATERIAL CEMENT
MIX PROPORTIONS
QUANTITIES
DEPTH INTERVAL 0-18 FT

ANNULAR SEAL
INSTALL. METHOD BOREHOLE
MATERIAL GRANULAR BENTONITE
QUANTITY
DEPTH INTERVAL 16-18 FT

FILTER PACK
INSTALL. METHOD BOREHOLE
MATERIAL CAVED FORMATION/SAND
QUANTITY
DEPTH INTERVAL 18-39 Ft

DEVELOPMENT
METHOD SURGE & BAIL
TIME
PRODUCTION

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION:

TEST BORING PZ-10

RADIAN INTERNATIONAL

BY RR	PROJECT NAME ESSEX/HOPE	PROJECT NO. 804041.21	
DATE 08-02-00	LOCATION JAMESTOWN NY	GEOLOGIST R. RUPIPER	
CHK BY	DRILLING CONTRACTOR URS SDS	DRILLER B. BUTLER	
DATE	DRILLING METHOD GEOPROBE	RIG TYPE VIPER	
	DRILLING START DATE 08-02-00	DRILLING COMPLETION DATE 08-02-00	
	SURFACE ELEVATION	STICK-UP ELEVATION	

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN)	BL / 6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
				0-0.5' GRASS, SOIL				.5	
				0.5-2.5' BROWN FINE TO COARSE SAND AND GRAVEL (1/4-1")			1.3		
2		42"							
				2 1/2-4' BROWN SILT, LITTLE CLAY GRAVEL (1-2") AT 3.5'				2.5	
4				4-7.25' BROWN MED TO COARSE SAND AND GRAVEL (1/4-2") WET			0	4	
6		41"							
				7.25-8' AS ABOVE, GRAY ODOR, SATURATED			278	7.5	
8				8-11' AS ABOVE LESS SAND				8	SAMPLE 11-12 FT
10		44"					1178		
				11-12' AS ABOVE, BLACK					
12				12-13' AS ABOVE GRADING TO SOME CLAY, GRAY			224	12	
		48"		13-16' GRAY CLAY, LITTLE SILT, STIFF			82.9	13	
16								16	

TOTAL DEPTH = 16 FT

ADDITIONAL REMARKS

INSTALL CASING (3") TO 16'

FILE: \FORMA...

TEST BORING PZ-10

RADIAN INTERNATIONAL

PROJECT NAME ESSEX / HOPE — PROJECT NO. 804041.21

LOCATION JAMESTOWN NY — GEOLOGIST R. RUPIPER

BY RR — DRILLING CONTRACTOR URS SDS — DRILLER R. MILLER

DATE 08-05-00 — DRILLING METHOD GEOPROBE — RIG TYPE POWER PROBE 9600EC

V3

CHK BY — DRILLING START DATE 08-05-00 — DRILLING COMPLETION DATE 08-05-00

DATE — SURFACE ELEVATION — STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
		42"		16-20' GRAY SILTY CLAY					
20				20 - 20.9' AS ABOVE				20.9	
		38"		20.9 - 24 GRAY V. FINE SAND, SATURATED			0		
24		39½"		24-28' AS ABOVE			103.2	24	
28		43"		28 -32' AS ABOVE			208.6	28	SAMPLE 28-32'
32		40"		32-33' AS ABOVE 33-33.5' GRAY SILTY CLAY 33.5-36' GRAY V. FINE SAND, LITTLE SILT			1.3	32	
36		46"		36 - 39.5' AS ABOVE			2.6	36	
				39.5-40' GRAY SILTY CLAY			1.3	39.5	
40		42"		40-44' GRAY V. FINE SILTY SAND			1.3	40	SAMPLE 40-44'
44								44	

ADDITIONAL REMARKS

FILE: \FORMA...

TEST BORING PZ-10

RADIAN INTERNATIONAL

PROJECT NAME ESSEX / HOPE
PROJECT NO. 804041.21
LOCATION JAMESTOWN NY
GEOLOGIST R. RUPIPER
BY. RR
DRILLING CONTRACTOR URS SDS
DRILLER R. MILLER
DATE 08-05-00
DRILLING METHOD GEOPROBE
RIG TYPE POWERPROBE 9600 EC
CHK BY.
DRILLING START DATE 08-05-00
DRILLING COMPLETION DATE 08-05-00
DATE
SURFACE ELEVATION
STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
		44"		44-45' GRAY SILTY CLAY			1.3		
				45-46.5' GRAY V. FINE SILTY SAND			1.3	45	
				46.5-48' GRAY SILTY CLAY			1.3	46.5	
48		46"		48-52' AS ABOVE				48	
52				TOTAL DEPTH = 52 FT					

ADDITIONAL REMARKS

FILE: \FORMAT\

RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

WELL COMPLETION LOG

WELL NO. PZ-10D
HOLE NO. ______

PROJECT NAME ESSEX/HOPE
PROJECT NO. 804041.21

BY RR
LOCATION JAMESTOWN NY
GEOLOGIST R. RUPIPER

DATE 08-05-00
DRILLING CONTRACTOR URS SDS
DRILLER R. MILLER

CHK BY ______
DRILLING METHOD GEOPROBE
RIG TYPE POWER PROBE 9600 EC

DATE ______
DRILLING FLUID ______

DRILLING START DATE 08-05-00
DRILLING COMPLETION DATE 08-05-00

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV. ~1277.88
SURFACE PAD ELEV. ______
HOLE DEPTH 52 FT
WELL DEPTH 46.5 FT
WELL RISER (TOP) 1277.58
PROTECTIVE CASING (TOP) ______

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
2¼"	0-52 FT

PROTECTIVE CASING
TYPE FLUSH MOUNT
MATERIAL STEEL
DIAMETER 8 in
DEPTH INTERVAL 12 in
SURFACE PAD DIMENSIONS 2'x2'x6"

OUTER CASING
MATERIAL SCH 40 PVC
DIAMETER 3 in
JOINT TYPE ______
DEPTH INTERVAL 0-16 FT

WELL RISER
MATERIAL SCH 40 PVC
DIAMETER 1 in
JOINT TYPE FLUSH THREAD
DEPTH INTERVAL 0-26.5 FT

SCREEN
MATERIAL SCH 40 PVC
DIAMETER 1"
JOINT TYPE FLUSH THREAD
OPENINGS 0.01 in
DEPTH INTERVAL 46.5'-26.5'

BLANK CASING N/A
MATERIAL ______
DIAMETER ______
JOINT TYPE ______
DEPTH INTERVAL ______

BOTTOM CAP
MATERIAL SCH 40 PVC
TYPE FLUSH THREAD
DEPTH INTERVAL ______

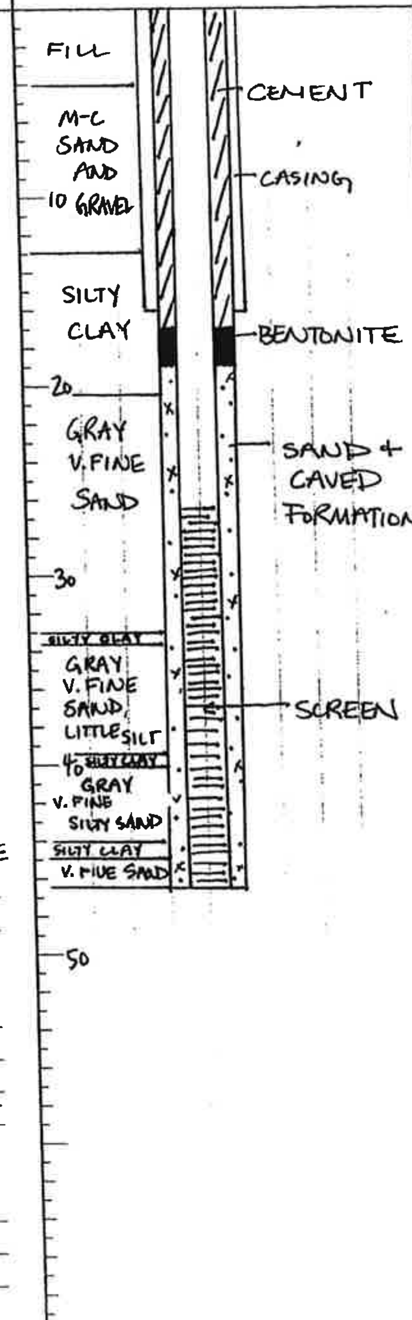
ANNULAR GROUT
INSTALL. METHOD BOREHOLE
MATERIAL CEMENT
MIX PROPORTIONS ______
QUANTITIES ______
DEPTH INTERVAL 0-17 FT

ANNULAR SEAL
INSTALL. METHOD BOREHOLE
MATERIAL GRANULAR BENTONITE
QUANTITY ______
DEPTH INTERVAL 17-19 FT

FILTER PACK
INSTALL. METHOD BOREHOLE
MATERIAL SAND/CAVED
QUANTITY FORMATION
DEPTH INTERVAL 19-46.5 FT

DEVELOPMENT
METHOD SURGE & BAIL
TIME ______
PRODUCTION ______

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION:

FILE: \WELL-LOG

TEST BORING PZ-11 — PAGE ___ OF ___

RADIAN INTERNATIONAL

BY: RR	PROJECT NAME: ESSEX / HOPE		PROJECT NO. 804041.21
DATE: 08-02-00	LOCATION: JAMESTOWN NY	GEOLOGIST: R. RUPIPER	
CHK BY:	DRILLING CONTRACTOR: URS SDS	DRILLER: B. BUTLER	
DATE:	DRILLING METHOD: GEOPROBE	RIG TYPE: VIPER	
	DRILLING START DATE: 08-02-00	DRILLING COMPLETION DATE: 08-02-00	
	SURFACE ELEVATION:	STICK-UP ELEVATION:	

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
0–4		44"		0-0.5' GRASS, SOIL				.5	
				0.5-1.5' MED TO COARSE SAND AND GRAVEL (1/4") WET			0	1.5	
				1.5-4' BROWN SILT, LITTLE CLAY			0	4	
4–8		39"		4-4.5' AS ABOVE				4.5	
				4.5-6.5' FINE TO COARSE SAND AND GRAVEL (1/4-1/2"), BROWN			0	6.5	
				6.5-8' AS ABOVE, GRAY, SATURATED			2.6	8	
8–12		44"		8-10.5' AS ABOVE				10.5	
				10.5-11.5' MED TO COARSE SAND, LITTLE GRAVEL (1/4") WET			12.5	11.5	SAMPLE
							88.9	12	SAMPLE
12–16		40"		11.5-15' MED TO COARSE SAND AND GRAVEL (1/4-1") SATURATED, SHEEN (NO ODOR)			5.3	15	
				15-16' AS ABOVE, MORE GRAVEL (1/2-1/2")			4	16	
16–20		36"		16-20.75 AS ABOVE LESS GRAVEL (1/4-1")				17	
							13.3	18	
							0		
20–24				20.75-21' OLIVE GRAY CLAY TRACE SILT, SOFT WET					
				21-24' GRAY V. FINE SAND			1.3		

ADDITIONAL REMARKS: INSTALL 3" CASING TO 24 FT

FILE: \FORMATS\

TEST BORING PZ-11

RADIAN INTERNATIONAL

BY RR	PROJECT NAME ESSEX / HOPE		PROJECT NO. 804041.21
DATE 08-05-00	LOCATION JAMESTOWN NY	GEOLOGIST R. RUPIPER	
CHK BY	DRILLING CONTRACTOR URS SDS	DRILLER B. BUTLER	
DATE	DRILLING METHOD GEOPROBE	RIG TYPE VIPER	
	DRILLING START DATE 08-05-00	DRILLING COMPLETION DATE 08-05-00	
	SURFACE ELEVATION	STICK-UP ELEVATION	

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
20-24		36"		20-24' GRAY V. FINE SAND			0		
24-28		39"		24-28' AS ABOVE, LITTLE GRAVEL			1.3	24	
28-32		42"		28-32' AS ABOVE, NO GRAVEL CLAY ~1/2" thick at 28.5', 30.25', 31.5'			0	28	
32-36		40"		32-32.5' AS ABOVE 32.5-33.25' SILTY CLAY - GRAY 33.25-36' GRAY V. FINE SAND			26 1.3	32.5 33.25	
36-40		44"		36-37.25' AS ABOVE 37.25-39.5' GRAY SILTY CLAY 39.5-40' GRAY V. FINE SAND				36 39.5	
40-44		46"		40-41.25' AS ABOVE 41.25-44' GRAY SILTY CLAY			2.6	41.25	SAMPLE 39.5-41.25'
44-48		46"		44-48' AS ABOVE					

ADDITIONAL REMARKS: TOTAL DEPTH = 48'

FILE:\FORMA...

WELL COMPLETION LOG

RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

WELL NO. PZ-11D
HOLE NO.

PROJECT NAME ESSEX / HOPE
PROJECT NO. 804041.21
BY RR
LOCATION JAMESTOWN NY
GEOLOGIST R. RUPIPER
DATE 08-05-00
DRILLING CONTRACTOR URS SDS
DRILLER B. BUTLER
CHK BY
DRILLING METHOD GEOPROBE
RIG TYPE VIPER
DATE
DRILLING FLUID
DRILLING START DATE 08-05-00
DRILLING COMPLETION DATE 08-05-00

INSTALLATIONS

ELEVATION / DEPTH DATA
GROUND SURFACE ELEV. ~1277.00
SURFACE PAD ELEV.
HOLE DEPTH 48 FT
WELL DEPTH 41.25 FT
WELL RISER (TOP) 1276.70
PROTECTIVE CASING (TOP)

BOREHOLE DIMENSIONS

DIAMETER	DEPTH INTERVAL
2¼"	0 - 48 FT

PROTECTIVE CASING
TYPE FLUSH MOUNT
MATERIAL STEEL
DIAMETER 8 IN
DEPTH INTERVAL 12 IN
SURFACE PAD DIMENSIONS 2" x 2" x 6"

OUTER CASING
MATERIAL SCH 40 PVC
DIAMETER 3 IN
JOINT TYPE
DEPTH INTERVAL 0 - 24 FT

WELL RISER
MATERIAL SCH 40 PVC
DIAMETER 1 IN
JOINT TYPE FLUSH THREAD
DEPTH INTERVAL 0 - 21.25 FT

SCREEN
MATERIAL SCH 40 PVC
DIAMETER 1"
JOINT TYPE FLUSH THREAD
OPENINGS 0.01 IN
DEPTH INTERVAL 41.25' - 21.25'

BLANK CASING N/A
MATERIAL
DIAMETER
JOINT TYPE
DEPTH INTERVAL

BOTTOM CAP
MATERIAL SCH 40 PVC
TYPE FLUSH THREAD
DEPTH INTERVAL

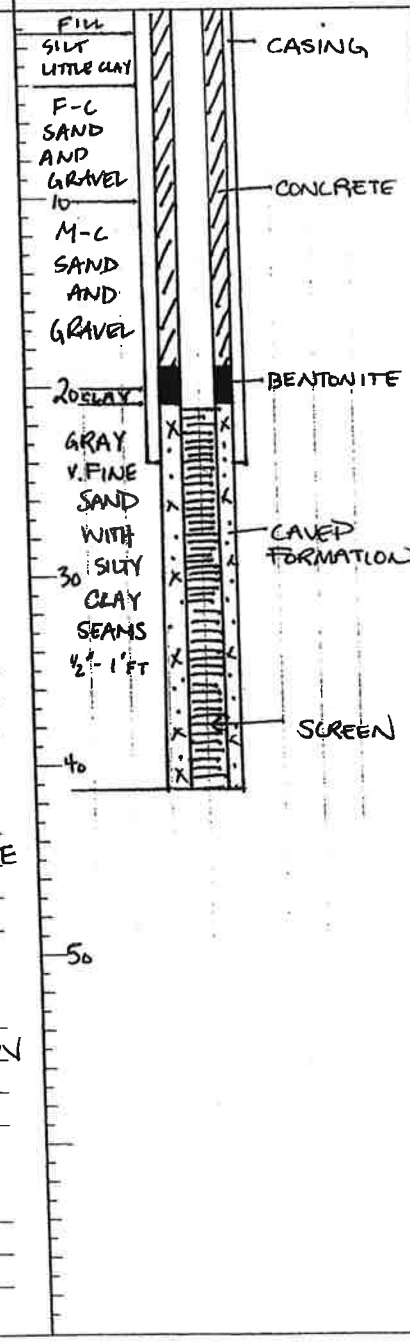
ANNULAR GROUT
INSTALL. METHOD BOREHOLE
MATERIAL CEMENT
MIX PROPORTIONS
QUANTITIES
DEPTH INTERVAL 0-19 FT

ANNULAR SEAL
INSTALL. METHOD BOREHOLE
MATERIAL GRANULAR BENTONITE
QUANTITY
DEPTH INTERVAL 19 - 21 FT

FILTER PACK
INSTALL. METHOD —
MATERIAL CAVED FORMATION
QUANTITY
DEPTH INTERVAL 21 - 41.25'

DEVELOPMENT
METHOD SURGE & BAIL
TIME
PRODUCTION

WELL CONSTRUCTION SKETCH



ADDITIONAL INFORMATION:

FILE: \WELL-LOG

URS

TEST BORING ID	TBUST-100
Project Name	Dow Essex Jamestown
Drilling Contractor	URS
Drilling Method	DP- 2-in x 4 ft lined sampler
Start Date	8/16/2012
Page	1 of 1
Geologist/Engineer	M Dowiak
Driller	B Carosone
Rig Type	AMS
Completion Date	8/16/2012

DEPTH (ft)	Soil Sample No.	Rec. (in)	Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
4' 0	NA	44"		0-6 '- Concrete pavement 6"-16 "- Brown silt with gravel (fill?) 16-44"- Gray/brown clayey silt with gravel, dense , moist				
8' 0	100	46"		4 -6'-4" - Brown clayey silt, little gravel, very dense, moist 6'-4" - 8'-0 - Gray/brown clayey silt and gravel, dense, moist				Mild chemical odor Mild chemical odor

Additional Remarks:

URS

TEST BORING ID	TBUST-101	*Page*	1 of 1
Project Name	Dow Essex Jamestown	*Geologist/Engineer*	M Dowiak
Drilling Contractor	URS	*Driller*	B Carosone
Drilling Method	DP- 2-in x 4 ft lined sampler	*Rig Type*	AMS
Start Date	8/16/2012	*Completion Date*	8/16/2012

DEPTH (ft)	Soil Sample No.	Soil Sample Rec. (in)	Soil Sample Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
-				0-6 '- Concrete pavement			-	
-				6"-12 "- Brown silt with gravel (fill?)			-	
-				12"- 2'-6"- Gray/brown clayey silt with gravel, dense , moist			-	
4' 0	NA	40"		2'-6"- 3'-4' - Gray/brown clayey silt, very dense , moist			-	
-							-	
-				4 -6' - Gray/brown clayey silt, very dense , moist			-	
-							-	
8' 0	101	48"		6'- 8'-0 - Gray/brown clayey silt and gravel, dense, moist to wet			-	Slight chemical odor
-							-	
-							-	

Additional Remarks:

URS

TEST BORING ID	TBUST-102
Project Name	Dow Essex Jamestown
Drilling Contractor	URS
Drilling Method	DP- 2-in x 4 ft lined sampler
Start Date	8/16/2012

Page	1 of 1
Geologist/Engineer	M Dowiak
Driller	B Carosone
Rig Type	AMS
Completion Date	8/16/2012

DEPTH (ft)	Soil Sample No.	Soil Sample Rec. (in)	Soil Sample Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
4' 0	NA	12"		0"-12 "- Brown silt with gravel (fill?)				
8' 0	102	12"		4 -5' - Gray/brown clayey silt with gravel				

Additional Remarks:

URS

TEST BORING ID	TBUST-103	*Page*	1 of 1
Project Name	Dow Essex Jamestown	*Geologist/Engineer*	M Dowiak
Drilling Contractor	URS	*Driller*	B Carosone
Drilling Method	DP- 2-in x 4 ft lined sampler	*Rig Type*	AMS
Start Date	8/16/2012	*Completion Date*	8/16/2012

DEPTH (ft)	Soil Sample No.	Soil Sample Rec. (in)	Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
-				0-6 '- Concrete pavement			-	
-				6"-16 "- Brown silt with gravel (fill?)			-	
-				16"- 2'-8"- Gray/brown clayey silt, v.dense , moist			-	Slight chemical odor
4' 0	NA	32"					-	
-							-	
-				4 -4'6" - Gray/brown clayey silt, v.dense , moist			-	
-							-	
8' 0	103	34"		4'-6"- 7'-4" - Gray/brown clayey silt and gravel, v. dense, moist			-	Slight chemical odor
-							-	
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Additional Remarks:

URS

TEST BORING ID	TBUST-104	**Page**	1 of 1
Project Name	Dow Essex Jamestown	*Geologist/Engineer*	M Dowiak
Drilling Contractor	URS	*Driller*	B Carosone
Drilling Method	DP- 2-in x 4 ft lined sampler	*Rig Type*	AMS
Start Date	8/16/2012	*Completion Date*	8/16/2012

DEPTH (ft)	Soil Sample No.	Soil Sample Rec. (in)	Soil Sample Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
4' 0	NA	20"		0-6 '- Concrete pavement 6"-15 "- Brown sily clay with sand (fill?)				
8' 0	104	31"		4'- 6'-7" - Brown clayey silt and gravel, v. dense, moist				Slight chemical odor

Additional Remarks:

URS

TEST BORING ID	TBUST-105	*Page*	1 of 1
Project Name	Dow Essex Jamestown	*Geologist/Engineer*	M Dowiak
Drilling Contractor	URS	*Driller*	B Carosone
Drilling Method	DP- 2-in x 4 ft lined sampler	*Rig Type*	AMS
Start Date	8/16/2012	*Completion Date*	8/16/2012

DEPTH (ft)	Soil Sample No.	Soil Sample Rec. (in)	Soil Sample Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
4' 0	NA	32"		0-6 '- Concrete pavement 6"-15 "- Brown silt with gravel (fill?) 15"- 2'-8"- Gray/brown clayey silt, v.dense , moist				
8' 0	105	40"		4 -5'4" - Gray/brown clayey silt, with gravel, v.dense , moist 5'4"-7'-4" - Gray/brown clayey silt and gravel, v. dense, moist				Slight chemical odor, oily Slight chemical odor

Additional Remarks:

URS

TEST BORING ID	TBUST-106	*Page*	1 of 1
Project Name	Dow Essex Jamestown	*Geologist/Engineer*	M Dowiak
Drilling Contractor	URS	*Driller*	B Carosone
Drilling Method	DP- 2-in x 4 ft lined sampler	*Rig Type*	AMS
Start Date	8/16/2012	*Completion Date*	8/16/2012

DEPTH (ft)	Soil Sample No.	Rec. (in)	Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
4' 0	NA	26"		0-6 '- Concrete pavement 6"-12 "- Brown silty clay with gravel (fill?) 12"- 2'-2"- Gray/brown clayey silt, dense , moist				
8' 0	106	36"		4 -4'10" - Black/brown clayey silt, dense , moist 4'10"- 6'-6"- Gray/brown clayey silt and gravel, dense, moist 6'6"-7'-0" - Gray/brown clayey silt and gravel, dense, wet				Slight chemical odor

Additional Remarks:

URS

TEST BORING ID	TBUST-107
Project Name	Dow Essex Jamestown
Drilling Contractor	URS
Drilling Method	DP- 2-in x 4 ft lined sampler
Start Date	8/16/2012

Page	1 of 1
Geologist/Engineer	M Dowiak
Driller	B Carosone
Rig Type	AMS
Completion Date	8/16/2012

DEPTH (ft)	Soil Sample No.	Rec. (in)	Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
4' 0	NA	31"		0-6 '- Concrete pavement 6"-17 "- Brown silty clay with gravel (fill?) 17"- 2'-9"- Brown clayey silt, v. dense , moist				
8' 0	107	40"		4 -7'-4" - Black/brown clayey silt, dense , moist (sample at 5-7 ft)				Slight chemical odor

Additional Remarks:

URS

TEST BORING ID	TBUST-108
Project Name	Dow Essex Jamestown
Drilling Contractor	URS
Drilling Method	DP- 2-in x 4 ft lined sampler
Start Date	8/16/2012

Page	1 of 1
Geologist/Engineer	M Dowiak
Driller	B Carosone
Rig Type	AMS
Completion Date	8/16/2012

DEPTH (ft)	Soil Sample No.	Rec. (in)	Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
4' 0	NA	18"		0-6 '- Concrete pavement 6"-12 "- Brown silty clay with gravel (fill?) 12"- 1'-6"- Brown clayey silt, v. dense , moist				
8' 0	108	34"		4 -6'-10" - Gray/brown silty sand and gravel, v. dense , moist (sample at 4'10"-6'10")				Slight chemical odor

Additional Remarks:

URS

TEST BORING ID	TBUST-109	*Page*	1 *of* 1
Project Name	Dow Essex Jamestown	*Geologist/Engineer*	M Dowiak
Drilling Contractor	URS	*Driller*	B Carosone
Drilling Method	DP- 2-in x 4 ft lined sampler	*Rig Type*	AMS
Start Date	8/16/2012	*Completion Date*	8/16/2012

DEPTH (ft)	Soil Sample No.	Rec. (in)	Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
-				0-6 '- Concrete pavement			-	
-				6"-19 "- Brown silty clay with gravel (fill?)			-	
-				1'7"- 2'-8"- Brown clayey silt, v. dense , moist			-	
4' 0	NA	32"					-	
-				4 -4'8" - Brown clayey silt with gravel, v. dense , moist			-	
-	109			4'8"- 5"11"- Brown clayey silt, v. dense , moist			-	
-	109			5'11"-6'10" - Brown clayey silt and gravel, dense, wet			-	Slight chemical odor, black oily staining
8' 0	109	46"		6'10"- 7'10"- Gray silty sand and gravel, dense, wet			-	Slight chemical odor
-							-	
-							-	

Additional Remarks:

URS

TEST BORING ID	TBUST-110	*Page*	1 *of* 1
Project Name	Dow Essex Jamestown	*Geologist/Engineer*	M Dowiak
Drilling Contractor	URS	*Driller*	B Carosone
Drilling Method	DP- 2-in x 4 ft lined sampler	*Rig Type*	AMS
Start Date	8/16/2012	*Completion Date*	8/16/2012

DEPTH (ft)	Soil Sample No.	Soil Sample Rec. (in)	Soil Sample Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
4' 0	NA	30"		0-6 '- Concrete pavement 6"-9 "- Brown silty sand and gravel (fill?) 9"- 2'-6"- Brown-black clayey silt, m. dense , moist				Slight chemical odor, black oily staining
				4 -6' - Brown-black clayey silt, m. dense , moist				Slight chemical odor
8' 0	110	36"		6'0"-7'0" - Brown -gray clayey silt, m.dense, wet				Slight chemical odor

Additional Remarks:

URS

TEST BORING ID	TBUST-111	*Page*	1 of 1
Project Name	Dow Essex Jamestown	*Geologist/Engineer*	M Dowiak
Drilling Contractor	URS	*Driller*	B Carosone
Drilling Method	DP- 2-in x 4 ft lined sampler	*Rig Type*	AMS
Start Date	8/16/2012	*Completion Date*	8/16/2012

DEPTH (ft)	Soil Sample No.	Soil Sample Rec. (in)	Soil Sample Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
-				0-6 '- Concrete pavement			-	
-				6"-12 "- Brown silty sand and gravel (fill?)			-	
-				1'- 2'-8"- Dark brown clayey silt, dense , moist			-	
4' 0	NA	32"					-	
-				4' -4'4" - Dark brown clayey silt, dense , moist			-	
-	111			4'4"- 6'4"- Brown silty sand and gravel, dense, moist			-	
-				6'4"-6'8" - Brown -gray clayey silt, m.dense, wet			-	
8' 0		32"					-	
-							-	
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Additional Remarks:

URS

TEST BORING ID TBUST-112
Project Name Dow Essex Jamestown
Drilling Contractor URS
Drilling Method DP- 2-in x 4 ft lined sampler
Start Date 8/16/2012

Geologist/Engineer M Dowiak
Driller B Carosone
Rig Type AMS
Completion Date 8/16/2012

DEPTH (ft)	Soil Sample No.	Soil Sample Rec. (in)	Soil Sample Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
-				0-6 '- Concrete pavement			-	
-				6"-15 "- Brown silty sand and gravel, dense, moist			-	
-				1'3"- 2'-9"- Brown-black silty sand and gravel, dense , moist			-	Slight chemical odor, black oily staining
4' 0	NA	48"		2'9"- 4'- Brown-gray clayey silt, moist			-	
-	112			4'- 7'10"- Brown-gray-black silty sand and gravel interbedded with clayeysily layers 2-4 in thick. Wet at 7'. Sample at 5-7 ft.			-	Slight chemical odor
-							-	
-							-	
8' 0		46"					-	

Additional Remarks:

URS

TEST BORING ID	TBUST-113	*Page*	1 *of* 1
Project Name	Dow Essex Jamestown	*Geologist/Engineer*	M Dowiak
Drilling Contractor	URS	*Driller*	B Carosone
Drilling Method	DP- 2-in x 4 ft lined sampler	*Rig Type*	AMS
Start Date	8/16/2012	*Completion Date*	8/16/2012

DEPTH (ft)	Soil Sample No.	Rec. (in)	Blows	VISUAL CLASSIFICATION AND DESCRIPTION	USCS Profile	PID Reading (ppm)	DEPTH (ft)	REMARKS
-				0-6 '- Concrete pavement			-	
-				6"-15 "- Brown silty sand and gravel, dense, moist (fill)			-	
-				1'3"- 3'- Brown clayey silt, dense , moist			-	
4' 0	NA	36"		2'9"- 4'- Brown-gray clayey silt, moist			-	
-				4'- 4'6"- Brown-gray clayey silt, moist			-	
-	113			4'6"- 6'4"- Brown silty sand and gravel, dense, moist 6'4"- 7'4"- Brown silty sand and gravel, with gray laminations, dense, wet			-	Slight chemical odor
-							-	
8' 0		40"					-	

Additional Remarks: