



March 20, 2009

Mr. Jaspal Walia
Project Manager
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203

Re: Supplemental Groundwater Investigation Report – MW-04 Area
Former Buffalo Service Center and Related Sites
Buffalo, New York

Dear Mr. Walia,

On behalf of QLT Buffalo LLC, WSP Engineering of New York, P.C. prepared this report to present the findings of the supplemental groundwater investigation in the vicinity of MW-04. The scope of work was outlined in the Supplemental Groundwater Investigation Work Plan – MW-04 Area submitted to the New York State Department of Environmental Conservation (NYSDEC) on October 21, 2008. Field work was conducted during the week of December 15, 2008. The objectives outlined in the work plan were to determine if contamination just east of the sheet pile wall is groundwater contained to that specific location and to confirm the extent of the contamination in the vicinity of MW-04.

The scope of work outlined in the supplemental investigation work plan included the installation of three soil boreholes, the collection of three grab groundwater samples from the temporary boreholes, and, if no measurable thickness of non-aqueous phase liquid (NAPL) were present in the monitoring well casing, the collection of a sample from MW-04 for laboratory analysis.

Background Information for the MW-04 Area

During execution of the first quarterly groundwater monitoring event in 2006, a NAPL was identified at MW-04 (Figure 1). As this was not expected during the first event, the thickness of the NAPL is unknown. Since the first sampling event, an oil-water interface probe has been used to measure the thickness of NAPL in the well. The NAPL thickness was not measureable and only a sheen was observed during the all subsequent events.

During implementation of the field work related to consent order B9-0577-00-05(A), fill material (in the former Wilkeson Slip, east of the sheet pile wall installed along Fourth Street) and affected soil from beneath the Waterfront School was excavated. The sheet pile wall was installed to provide protection for the utility corridor located just to the west of the sheet pile wall. Post-excavation confirmation soil samples were collected in accordance with the NYSDEC-approved work plan. The excavation was conducted to ensure soils on the east side of the sheet pile wall met the site-specific action levels defined for this project as presented in the Interim Remedial Measures Work Plan dated March 25, 2005 (Work Plan). All soils east of the sheet pile wall exceeding the defined regulatory standard were removed as necessary to satisfy

project objectives. Addressing conditions on the western side of the sheet pile wall was not within the scope of this remediation work plan or consent order. QLT Buffalo is not responsible for environmental conditions west of the sheet pile wall or contamination caused by conditions west of the sheet pile wall.

Dewatering activities to allow excavation lowered the groundwater table, and groundwater was induced to flow into the dewatered area. As the western limits of the excavation were reached, two dark colored seeps were identified flowing along the sheet pile wall from the west. In correspondence addressed to National Fuel Gas Distribution Corp. (NFG), dated August 9, 2005, the NYSDEC expressed concern with the quality of groundwater flowing from the western side of the sheet pile wall. NYSDEC and NFG both acknowledged that the soil and groundwater conditions west of the wall were not within the scope of the project as presented in the approved Work Plan. In response to the NYSDEC's concern, however, QLT Buffalo volunteered to provide groundwater collection and treatment in this area during field activities to address this temporary situation, caused by the dewatering of the site. A temporary sump was installed adjacent to the sheet pile wall (western end of OU-2A [School]). The sump consisted of an 18-inch HDPE vertical stand pipe surrounded with an envelope of coarse stone. To create a barrier against groundwater flow toward the east, a combination of flowable fill and clay was incorporated (Figure 2) into the backfill of OU-2A (School). The flowable fill and clay created a barrier to reduce future migration of groundwater from the west to the clean fill placed for the interim remedial measure (IRM). The flowable fill and clay barrier remain between MW-4 and the site to this day.

At the request of NYSDEC, and over the technical objections of QLT Buffalo, MW-04 was placed immediately east of the sheet pile wall to evaluate groundwater conditions within the remediated area. Based on conditions observed during the excavation program, QLT Buffalo identified the concern that this specific location is more likely groundwater historically impacted by conditions west of the sheet pile wall than by current groundwater conditions at the remediated site. The location of the well is just east of the offsite impacted fill within the flowable fill and clay plug. The well location is in fact isolated from the remediated site by the flowable fill and clay plug. Groundwater elevations measured as part of the quarterly sampling events indicate a depression in the vicinity of MW-04 as compared to historical groundwater elevations measured from this location; the most recent comprehensive round of groundwater elevations (November 2008) are presented on Figure 1.

Drilling Activities

In accordance with the work plan, McIntosh & McIntosh, P.C. , a New York State-licensed surveyor, identified the location of the proposed sample locations, the former Wilkeson Slip, and the sheet pile wall. Underground utilities in the vicinity of the sample locations were identified by High Voltage Maintenance & Technical Services of Cicero, New York.

Three borings (DP-08-01, DP-08-02, and DP-08-03) were advanced with a direct-push drill rig. Continuous soil samples were collected from all borings with a Macro-Core® sampler (or similar) equipped with a disposable acetate line. The soils were screened with a portable flame ionization detector for organic vapors and logged using the USCS classification system; boring logs are presented in Attachment A.

Organic vapors were detected in the soils collected from DP-08-01 from 10 feet below ground surface (ft-bgs) to refusal at 30 ft-bgs. The organic vapor concentrations ranged from 5 parts per

million (ppm) to 104 ppm; the highest organic vapor concentration was detected in the soil sample collected from 14 ft-bgs to 16 ft-bgs. No organic vapors were detected in the soils collected from DP-08-02 and DP-08-03.

The boreholes were backfilled with bentonite chips and capped with asphalt, concrete, or topsoil. All downhole equipment was decontaminated before commencing site activities and between boreholes with a non-phosphate soap wash, followed by a potable water rinse. Investigation derived waste (IDW) was containerized in labeled drums for disposal off site.

Groundwater Purging and Sampling

Grab groundwater samples were collected from the borehole locations via 1-inch temporary wells instead of the screen point sampler described in the work plan. This alteration occurred because of the low yield encountered when the first screen point sampler was installed at DP-08-01. The 1-inch temporary wells were constructed of polyvinyl chloride material with 5-foot screened intervals.

A minimum of one well volume was purged from each boring location before sample collection; DP-08-01 was purged dry in the initial sample collection attempt using the screen point sampler. The temporary well was installed in this sample location and groundwater was allowed to recharge before sample collection. The temporary wells were purged and sampled with a peristaltic pump and dedicated tubing. A sheen of NAPL was observed in the soil cuttings from DP-08-01; however, NAPL was not observed in the purge water.

In accordance with the work plan, an electric oil/water probe was used to determine if a measurable thickness of NAPL was present in MW-04. As the thickness of NAPL was not measurable, MW-04 was sampled. A minimum of three well volumes were removed using a peristaltic pump and dedicated tubing. NAPL globules coalesced in the purge bucket. Water quality parameters were measured before, during, and after purging; the final measurements are presented in Table 1.

After collection, the samples were placed in iced coolers and delivered to TestAmerica Analytical, Inc. of Buffalo, New York on December 19, 2008. The analytical results are discussed in the following section.

Laboratory Analytical Results

In accordance with the work plan, analyses for benzene, toluene, ethylbenzene, and total xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), and turbidity were performed using Environmental Protection Agency (EPA) Methods 8260, 8270, and 180.1 Total dissolved solids analysis by EPA Method 2540C was inadvertently performed instead of total suspended solids by EPA method 160.2 as stated in the work plan and requested on the chain of custody.

The laboratory analytical data package is included as Attachment B. Table 2 presents the summary of the results from the supplemental investigation as well as MW-04 sampling results from August 2007. Ambient Water Quality Standards and Guidance Values (<http://www.dec.ny.gov/chemical/23853.html>; June 1998) are included on Table 2 for reference purposes; the data from DP-08-01 and MW-04 are not compared to the values because of the blended nature (NAPL and water) of these samples.

The data was validated by ECT.CON, Inc of Imperial Pennsylvania. No data were rejected based on the data validation. Data presented in Table 2 and on Figure 3 include data validation changes; a summary of the data validation is also included in Attachment B.

BTEX and several PAHs were detected in all groundwater samples and blended samples collected during the supplemental investigation (Figure 3). Concentrations of most BTEX and PAHs in the samples from DP-08-01 and MW-04 are one to two orders of magnitude greater than the samples collected from DP-08-02 and DP-08-03.

Findings

Based on the results of this supplemental investigation, elevated BTEX and PAH concentrations are present along the western boundary of the former Wilkeson Slip excavation project. Low permeability flowable fill and clay were used as backfill along the sheet pile wall to prevent or minimize the movement of contaminants toward the east. Given the relatively low concentrations of BTEX and PAHs detected in samples DP-08-02 and DP-08-03 and the absence of NAPL, the water quality in samples from MW-04 are interpreted to be localized and isolated by the flowable fill and clay preventing migration toward the east. Based on this supplemental data, the remediation activities on the site and along the former Wilkeson Slip have been effective and met the goals of the approved Work Plan.

Removal of BTEX and PAH-containing compounds took place east of the sheet pile wall in accordance with the consent order and NYSDEC-approved work plan. As soil and groundwater was completely removed on the east side of the sheet pile wall during remedial activities, the detection of elevated concentrations of BTEX and PAHs in samples from DP-08-01 and MW-04 indicates that fill west of the sheet pile wall likely contains BTEX and PAHs. Based on historical investigations conducted by others, elevated BTEX and PAHs are known to exist west of the sheet pile wall. Knowing that the confirmation samples were clean at the completion of the excavation, evaluation of the limited extent of groundwater sample impacts, and the understanding of the influence of the dewatering on the local groundwater flow regime all indicate that the impacts at MW-04 are simply a manifestation of the compounds known to exist west of the sheet pile wall.

Based on this information, it is clear that there is no need for evaluation or implementation of a remedy for the impacts detected just east of the sheet pile wall as future migration toward the MW-04 area will be limited by the reestablishment of the site groundwater levels and the sources of these compounds west of the sheet pile wall will remain. No available technology will improve the localized conditions:

- Dewatering or other extraction technologies at the MW-04 area would induce groundwater flow from the west to the east thereby promoting contaminant migration from west to east.
- The performance of in-situ technologies via injection is expected to be extremely limited due to the low permeability of the flowable fill and clay that surrounds MW-04.
- A re-excavation program would result in similar conditions to those that exist today and the soil had been sampled and was clean.
- Active or passive skimming systems are also expected to be limited at this location due to the low permeability material that will significantly inhibit product flow into the MW-04.

As previously stated and acknowledged by NFG and the NYSDEC, addressing the contamination west of the sheet pile wall was not within the scope of the remediation activities

or required by the consent order. The impacts detected in samples from MW-4 pose no risk to human health or the environment. There is no direct contact or ingestion pathway to this water and this location is not acting as a source because of the isolation afforded by the flowable fill and clay. As conditions at the MW-04 specific location is the result of groundwater conditions west of the sheet pile wall, rather than by current groundwater conditions at the remediated site, addressing the limited groundwater affected area just east of the sheet pile wall will provide only a temporary effect. It is our interpretation that this condition directly adjacent to the sheet pile wall is exactly what we all expected at the time we agreed to the placement of the sheet pile wall limitation to the remedial program.

If you have any questions, please do not hesitate to contact me at (412) 604-1040.

Sincerely,



Glen E. Rieger
Senior Project Director

GER:CEI:eal

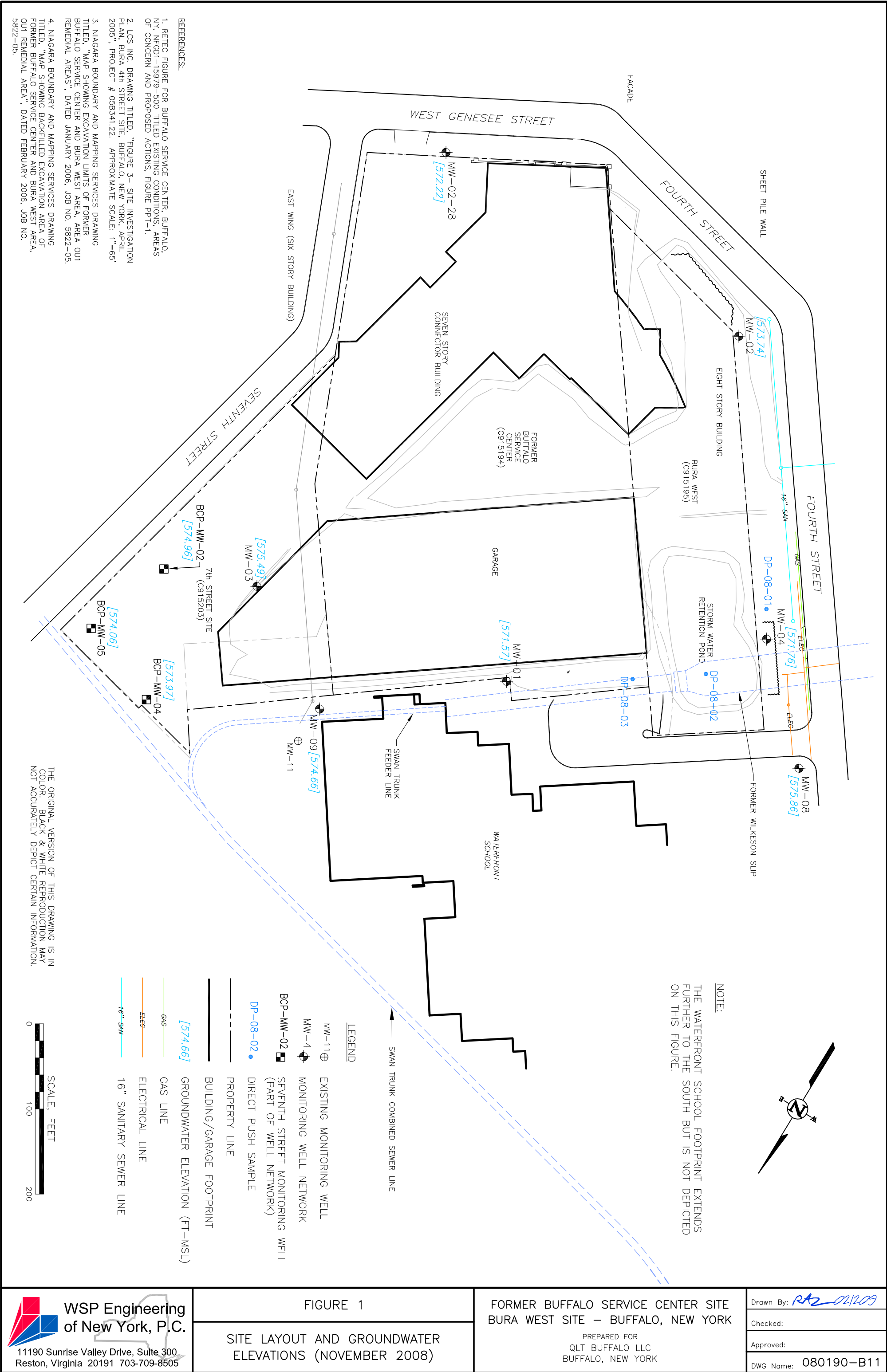
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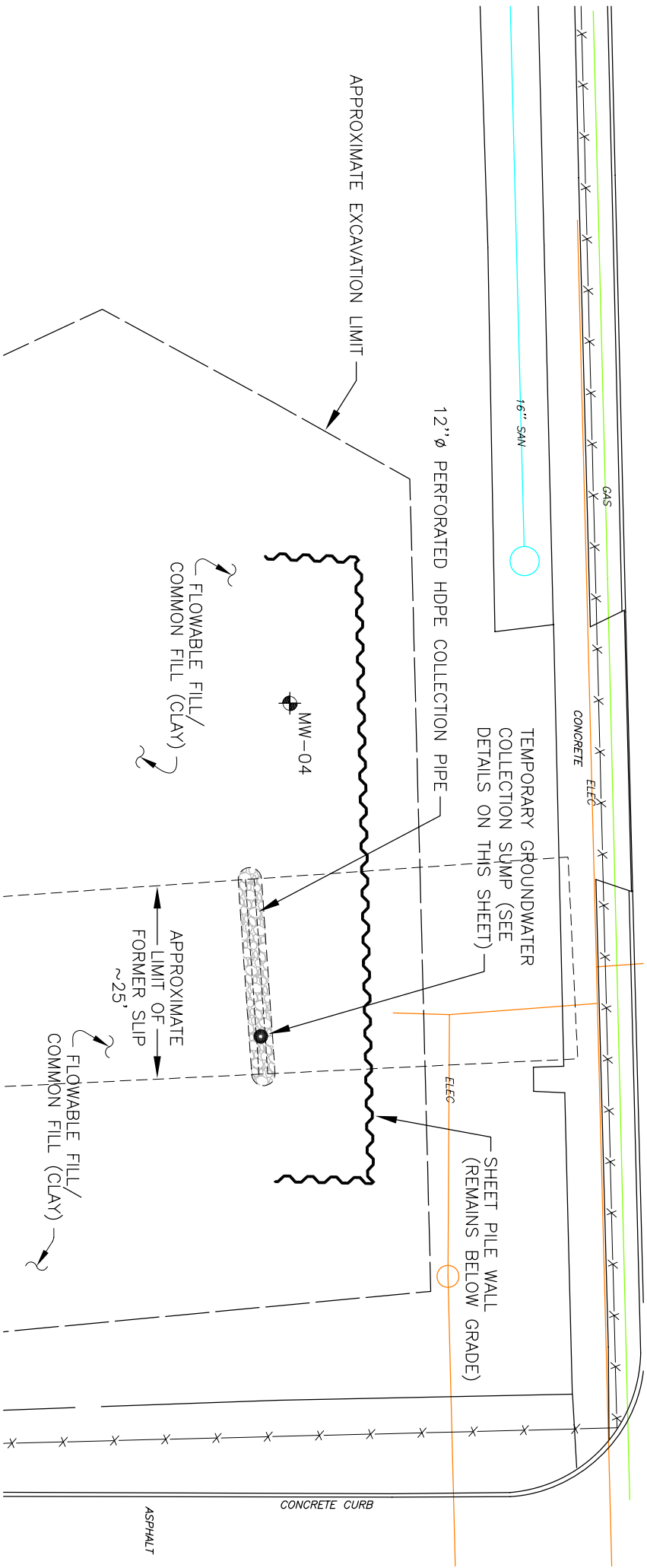
Enclosures

cc: Gordon Adkison, Duke Realty
Tanya Alexander, National Fuel Gas Distribution Corp.
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Martin Doster, New York State Department of Environmental Conservation
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Robert Rua, Buffalo Board of Education
Dennis Sutton, City of Buffalo
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John Hannon, City of Buffalo
Kelly Eisenried, City of Buffalo School District
John Heffron, City of Buffalo
Brian Reilley, City of Buffalo
Reynolds Renshaw, Renshaw Consulting Group, LLC

Enclosures

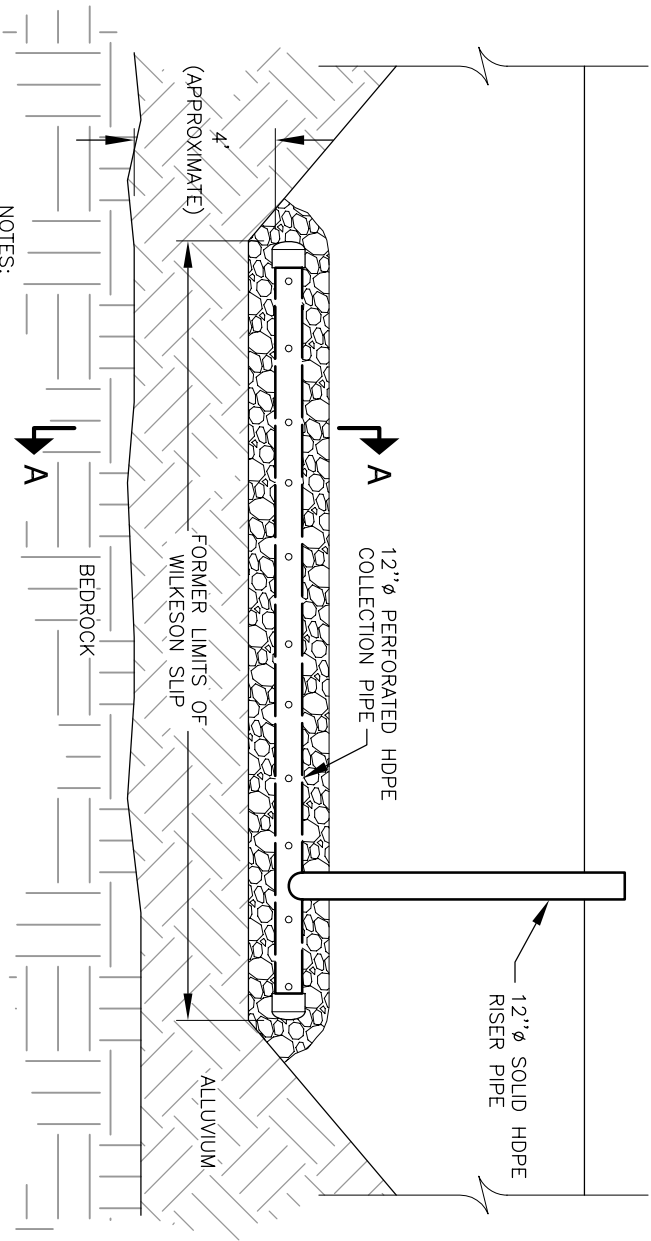
Figures





TEMPORARY SUMP - PLAN VIEW

NOT TO SCALE



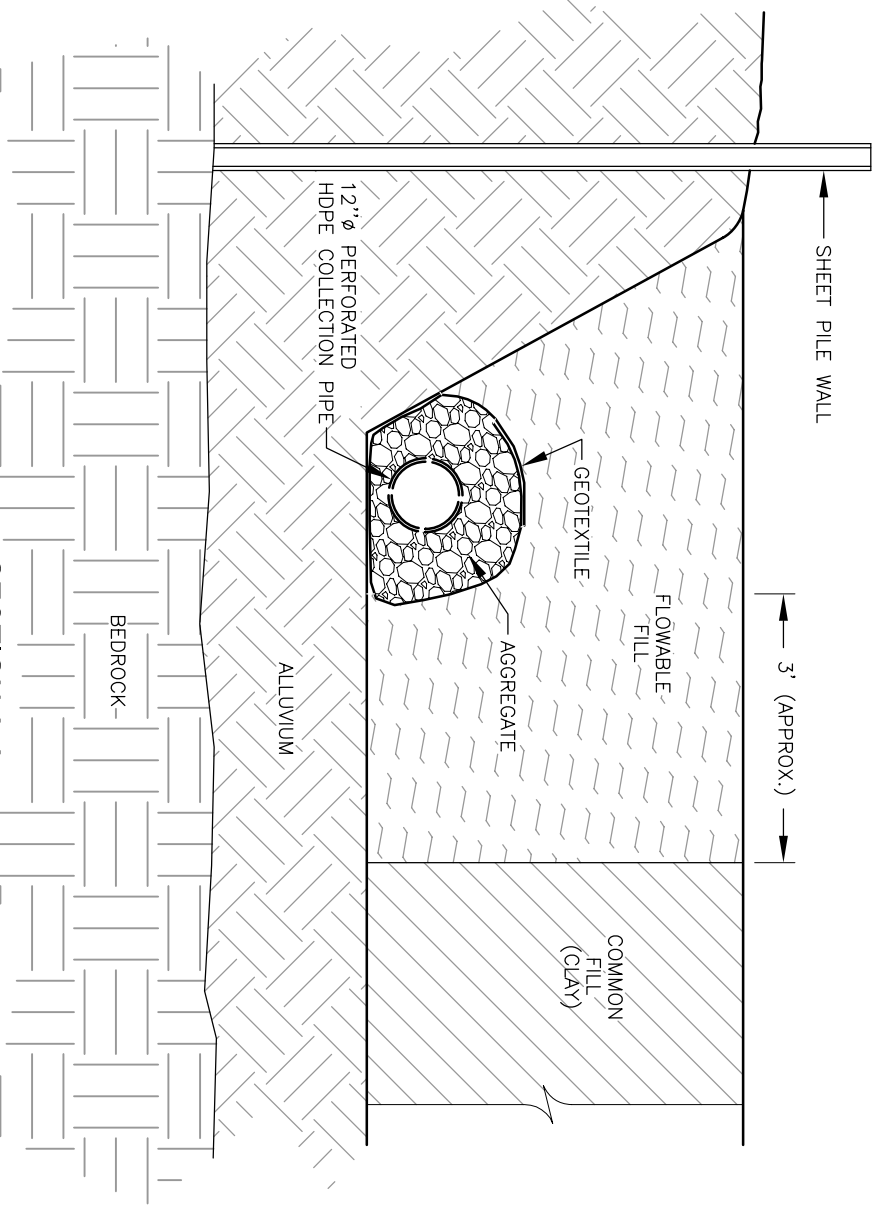
NOTES:

1. WATER WAS PUMPED FROM THE RISER PIPE TO THE GWTP DURING REMEDIATION.
2. TWO PNEUMATIC PUMPS WERE USED TO REMOVE WATER.
3. SUMP WAS ABANDONED DURING DEMOBILIZATION. THE SUMP WAS FILLED WITH FLOWABLE FILL. THE HDPE RISER PIPE WAS CUT APPROXIMATELY 2' BELOW THE GROUND SURFACE. OXYGEN RELEASING COMPOUNDS WERE INTRODUCED AND REMAIN IN THE SUMP.

TEMPORARY GROUNDWATER COLLECTION

SUMP OU-2A (SCHOOL) PROFILE

NOT TO SCALE



SECTION A-A

NOT TO SCALE

FIGURE 2

TEMPORARY SUMP APPLICATION

NATIONAL FUEL GAS/FORMER
BUFFALO SERVICE CENTER OU-2A
(SCHOOL PROPERTY)

PREPARED FOR
QLT BUFFALO LLC - RESTON, VIRGINIA

Drawn By: *RAZ* 051908

Checked:

Approved:

DWG Name: 080190-B07

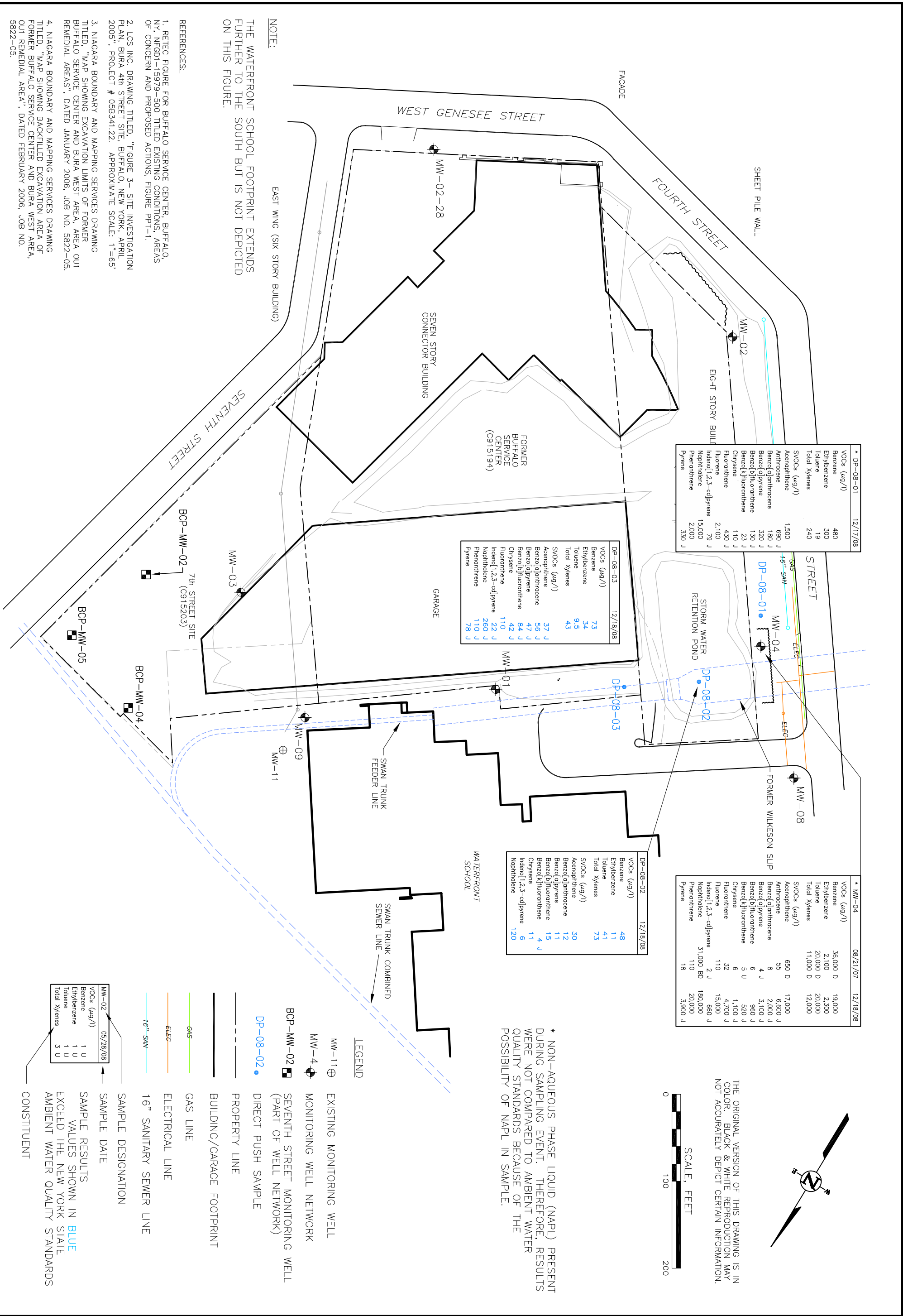


FIGURE 3

MW-04 AREA SAMPLE RESULTS

FORMER BUFFALO SERVICE CENTER SITE
BURA WEST SITE – BUFFALO, NEW YORK

PREPARED FOR
QLT BUFFALO LLC
BUFFALO, NEW YORK

Drawn By: RA 02/209

Checked:

Approved:

DWG Name: 080190-B12

Tables

Table 1
Summary of Field Parameters
QLT Buffalo
Buffalo, New York (a)

<u>Well</u>	<u>Temperature</u> <u>(°C)</u>	<u>Specific</u> <u>Conductance</u> <u>(mS/cm)</u>	<u>Dissolved</u> <u>Oxygen</u> <u>(mg/l)</u>	<u>pH</u> <u>(s.u.)</u>	<u>ORP</u> <u>(mV)</u>	<u>Turbidity</u> <u>(NTUs)</u>	<u>Purge</u> <u>Volume (gal)</u>
MW-04	12.06	0.23	0.16	5.06	-155.70	22	6.69

a/ °C = degrees Celsius; mS/cm = milliSiemens per centimeter; mg/l = milligrams per liter; s.u. standard units; mV = milliVolts
 NTUs = nephelometric turbidity units; gal = gallon.

Table 2

Summary of MW-04 Area Sample Results
QLT Buffalo
Buffalo, New York (a)

<u>Parameters</u>	<u>Sample I.D.:</u> <u>Sample Date:</u>	<u>DP-08-01</u> <u>12/17/08</u>	<u>DP-08-02</u> <u>12/17/08</u>	<u>DP-08-03</u> <u>12/18/08</u>	<u>MW-04</u> <u>12/18/08</u>
	NYSDEC				
Volatile Organic Compounds (µg/l)	Values (c)				
Benzene	1	480 (d)	48	73	19,000
Ethylbenzene	5	300	11	34	2,300
Toluene	5	19	41	9.5	20,000
Total Xylenes	5	240	73	43	12,000
Polycyclic Aromatic Hydrocarbons (µg/l)					
Acenaphthene	20 (e)	1,500	30	37 J	17,000
Acenaphthylene	-	59 J	5	8 J	760 J
Anthracene	50 (e)	690 J	13	38 J	6,600 J
Benzo(a)anthracene	0.002 (e)	180 J	12	56 J	2,000 J
Benzo(a)pyrene	0.002 (e,f)	320 J	11	47 J	3,100 J
Benzo(b)fluoranthene	0.002 (e)	130 J	15	84 J	960 J
Benzo(ghi)perylene	-	90 J	7	22 J	730 J
Benzo(k)fluoranthene	0.002 (e)	23 J	4 J	5 UJ	520 J
Chrysene	0.002 (e)	110 J	11	42 J	1,100 J
Dibenzo(a,h)anthracene	-	320 J	2 J	4 J	3,200 J
Fluoranthene	50 (e)	430 J	28	110 J	4,700 J
Fluorene	50 (e)	2,100	21	38 J	15,000
Indeno(1,2,3-cd)pyrene	0.002 (e)	79 J	6	22 J	660 J
2-Methylnaphthalene	-	3,700	32	52 J	68,000
Naphthalene	10 (e)	15,000	120	260 J	180,000
Phenanthrene	50 (e)	2,000	34	110 J	20,000
Pyrene	50 (e)	330 J	21	78 J	3,900 J
Total Dissolved Solids (mg/l)	-	1,840	1,810	3,200	2,530
Turbidity (NTUs)	-	286 J	694 J	681	226

Boxed value indicates concentration greater than NYSDEC Ambient Water Quality values

a/ I.D. = identification; NYSDEC = New York State Department of Environmental Conservation; µg/l = micrograms per liter; mg/l = milligrams per liter; '-' indicates no criterion developed; NTUs = nephelometric turbidity units.

b/ Sample and duplicate.

c/ NYSDEC Ambient Water Quality Standards and Guidance Values. Technical and Operational Guidance Series (1.1.1). June 1998 and as updated.

d/ Data Qualifiers:

U = constituent not detected at reported detection limit

J = estimated concentration

e/ Comparison criterion is a guidance value.

f/ Guidance value protective of drinking water source from surface water.

Attachment A

Boring Logs

Boring Log: DP-08-01**Project:** QLT Buffalo**Project No.:** 080190-05**Location:** Buffalo, New York**Completion Date:** December 16, 2008**Surface Elevation (feet AMSL*):** ND**Total Depth (feet):** 30**Borehole Diameter (inches):** 2

*AMSL = Above mean sea level

Sample Data					Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description
						Ground Surface
1		0		60		Lean Clay (CL) Brown lean clay, soft; moist; topsoil; fill.
5						Sandy Lean Clay with Gravel (CL) Brown lean clay, sand, gravel, soft; moist; fill.
2		0		95		Lean Clay with Gravel (CL) Gray/brown lean clay, gravel, wood fragments, soft; moist; fill.
						Lean Clay with Gravel (CL) Gray/brown lean clay, gravel, soft; moist; fill.
10		6		90		Lean Clay (CL) Gray/brown lean clay, black staining from 11 feet to 12 feet and 14 feet to 16 feet, soft; moist; fill.
4		104		100		
15						
5		7.1		70		Lean Clay (CL) Gray lean clay, black staining from 16 feet to 18 feet, soft; moist; fill.
20						
6		47		100		Lean Clay (CL) Gray lean clay, soft; moist to saturated at 22 feet with a sheen.
25						
7		5		100		Lean Clay (CL) Gray lean clay, soft; saturated with a sheen.
8		7.8		100		Lean Clay (CL) Gray lean clay, soft; saturated with a sheen.
30						

Geologist(s): Michael J. Gelles
Subcontractor: SJB Services, Inc.
Driller/Operator: Steve Veright
Method: Direct Push

WSP Environment & Energy
 750 Holiday Drive, Suite 410
 Pittsburgh, PA 15220
 412-604-1040

Boring Log: DP-08-01**Project:** QLT Buffalo**Project No.:** 080190-05**Location:** Buffalo, New York**Completion Date:** December 16, 2008**Surface Elevation (feet AMSL*):** ND**Total Depth (feet):** 30**Borehole Diameter (inches):** 2*AMSL = Above mean sea level

Sample Data					Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description
35						Bottom of Boring at 30 feet Refusal at 30 feet
40						
45						
50						
55						
60						

Geologist(s): Michael J. Gelles
Subcontractor: SJB Services, Inc.
Driller/Operator: Steve Veright
Method: Direct Push

WSP Environment & Energy
750 Holiday Drive, Suite 410
Pittsburgh, PA 15220
412-604-1040

Boring Log: DP-08-02**Project:** QLT Buffalo**Project No.:** 080190-05**Location:** Buffalo, New York**Completion Date:** December 16, 2008**Surface Elevation (feet AMSL*):** ND**Total Depth (feet):** 21**Borehole Diameter (inches):** 2

*AMSL = Above mean sea level

Sample Data					Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description
						Ground Surface
1	1	0	...	60		Lean Clay (CL) Brown lean clay, soft; moist; topsoil; fill.
						Sandy Lean Clay with Gravel (CL) Brown lean clay, sand, gravel, soft; moist; fill.
5	2	0	...	95		Lean Clay with Gravel (CL) Brown lean clay, gravel, soft; moist; fill.
10	3	0	...	100		
15	4	0	...	100		Lean Clay with Gravel (CL) Gray lean clay, gravel, trace brick fragments, black staining, soft; moist to saturated at 12 feet; fill.
20	5	0	...	100		Lean Clay (CL) Gray lean clay, stiff, slightly plastic; saturated; native [till].
	6	0	...	100		
						Bottom of Boring at 21 feet Refusal at 21 feet
25						
30						

Geologist(s): Michael J. Gelles
Subcontractor: SJB Services, Inc.
Driller/Operator: Steve Veright
Method: Direct Push

WSP Environment & Energy
 750 Holiday Drive, Suite 410
 Pittsburgh, PA 15220
 412-604-1040

Boring Log: DP-08-03**Project:** QLT Buffalo**Project No.:** 080190-05**Location:** Buffalo, New York**Completion Date:** December 17, 2008**Surface Elevation (feet AMSL*):** ND**Total Depth (feet):** 20**Borehole Diameter (inches):** 2

*AMSL = Above mean sea level

Sample Data					Subsurface Profile	
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description
						Ground Surface
1		0	...	60		Lean Clay (CL) Brown lean clay, soft; moist; topsoil; fill.
						Lean Clay with Gravel (CL) Brown lean clay, gravel, soft; moist; fill.
5	2	0	...	100		Lean Clay with Gravel (CL) Brown lean clay, some gravel, soft; moist; fill.
10	3	0	...	100		Lean Clay with Gravel (CL) Gray lean clay, some gravel, black staining, soft; moist; fill.
15	4	0	...	100		Lean Clay with Gravel (CL) Gray lean clay, some gravel, some ash, some brick fragments, black staining, soft; saturated; fill.
20	5	0	...	100		
						Bottom of Boring at 20 feet Refusal at 20 feet
25						
30						

Geologist(s): Michael J. Gelles
Subcontractor: SJB Services, Inc.
Driller/Operator: Steve Veright
Method: Direct Push

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Attachment B
Laboratory Data Package