November 22, 2016

Eugene W. Melnyk, P.E.
Remediation Engineer
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

Re: 275 Franklin Street Site, Buffalo, New York
BCP Site No. C915208
Remedial Action Work Plan – Revision 1

Dear Mr. Melnyk:

On behalf of our client Buffalo Development Corporation (BDC), Benchmark Environmental Engineering & Science, PLLC (Benchmark) has prepared this Remedial Action Work Plan (RAWP) to convey our planned scope of work to remediate the subsurface soil impacts by excavating the apparent source area at the 275 Franklin Street Brownfield Cleanup Program (BCP) Site.

ENVIRONMENTAL CONDITIONS

The PersulfOx™ (chemical oxidation) injection was performed in March 2016 in accordance with the January 14, 2016 New York State Department of Environmental Conservation (NYSDEC)-approved Additional Remedial Measures Work Plan.

Description of Injection Program

On March 9, 2016, pre-injection borings were advanced in three locations surrounding the suspected source area monitoring well MW-5 (see Figure 1 and Attachment 1 for boring logs) to obtain photoionization detector (PID) readings and confirm the proposed injection interval:

- Boring B-1 (approx. 7 feet west of MW-5): 2" to 6" clay lens between 9.5 and 10 feet below ground surface (fbgs) with PID >10,000 parts per million (ppm) directly above and within the clay. A chemical like odor was detected within and one foot above the clay lens.
- Boring B-2 (approx. 15 feet SW of MW-5): same clay lens as B-1; however, PID readings range from 2.3 ppm at 9.5 fbgs to maximum of 48.6 ppm at 10 fbgs, and no chemical-like odor was detected.
- Boring B-3 (approx. 12 feet SE of MW-5): same clay lens as B-1 with PID readings ranging from 249 ppm at 9.5 fbgs to 6,666 ppm at 10 fbgs and dropping back down to 234 ppm at 10.5 fbgs; chemical-like odor was detected within and one foot above the clay lens.

The first PersulfOx injection was performed March 9-11, 2016 as follows:

- The injection interval of 9 to 12 fbgs was confirmed to be appropriate from the pre-injection borings.
- A total of 30 injection points were spaced at approximate 8 feet apart over the 1,800 square foot area.
- 20% PersulfOx solution was prepared with approximately 53 lb of PersulfOx plus 25 gallons of water per point; a total of 1,600 lb of PersulfOx was injected.
- Injections were performed from the outside of the area toward the source.
- Powder graphite was used to seal around the injection rod during injection. The injection points were sealed with bentonite upon completion.
- Issues encountered:
    - Bottom up injection method caused injection tip to clog due to fine sand; therefore, switched to top down method where necessary.
    - Refusal due to concrete and/or rocks; moved injection location slightly.
    - Reduced pumping speed when up surging occurred.

The second injection was performed April 14-18, 2016 as follows:

- The injection points were generally off-set by 4 feet from the first injection. The injection area was reduced around MW-5 to approximately 1,200 square feet.
- Same injection interval, number of injection points, quantity of PersulfOx injected per point, and outside-in approach as the first injection.
- Same issues were encountered and resolved as during the first injection.

Monitoring Results

Persulfate concentrations in PZ-4 and MW-5 were measured using a field kit as presented on Table 1 and summarized below:

- One week after the first injection, significant persulfate remained in both wells. The concentrations dropped off after two weeks; however, persulfate remained in both wells. The drop off indicates that the oxidant was used up fairly quickly but not completely before the second injection.
- Two and three weeks following the second injection, substantially more persulfate remained in both wells as compared to the first injection indicating the oxidant was being used up more slowly the second time. Two months following the second injection, significant persulfate remained in PZ-4 and some remained in MW-5.
- Persulfate field measurements were taken in groundwater samples collected from MW-5 and PZ-4 on August 11, 2016. A persulfate concentration of >70 ppm in PZ-4 indicates that

significant PersulfOx remained in the groundwater at that location. A persulfate concentration of 5.6-7 ppm in MW-5 groundwater indicates that PersulfOx was still present but the majority has been depleted. Comparing the August 11, 2016 and September 21, 2016 readings, persulfate measurements indicate a reduction in available PersulfOx at PZ-4 by approximately 50% with no change in MW-5.

On June 13, 2016, groundwater was sampled from well MW-5 and piezometer PZ-4 for analysis of target compound list (TCL) volatile organic compounds (VOCs). Total chlorinated VOCs (cVOCs) in well MW-5 decreased from 191 ppm in December 2015 to 180 ppm following the injections. On September 21, 2016, Benchmark collected groundwater samples from MW-5 and PZ-4 for analysis of TCL VOCs to determine if concentrations decreased due to further chemical oxidation since the last groundwater sampling and analysis on June 13, 2016. As shown on Table 2, total cVOCs in well MW-5 further decreased from 180 ppm in June 2015 to 110 ppm following the second injections; PCE concentrations in groundwater decreased by 39% in MW-5 and by 43% in PZ-4, the two on-site groundwater locations exhibiting the highest cVOC impacts since June 13, 2016.

Soil Boring Investigation

Geo-probe cores (designated B-4 through B-8) were advanced on September 21, 2016 at the five approximate locations shown on Figure 1. Benchmark scanned the soil from each core in approximate 2-foot intervals using a hand-held PID to qualitatively determine the concentration of volatile organics. Benchmark collected four soil samples representative of the highest PID readings from geo-probe cores B-4, B-5, and B-6 for quantitative analysis of VOCs via USEPA Method 8260C. As indicated on Table 3, the highest concentration (i.e. 92,000 mg/kg) of tetrachloroethene (PCE) is present in soil sample B-5 collected nearest to MW-5 (approximately 8 feet away) at a depth of 10 fbgs, with a corresponding PID reading of 6,313 ppm. The soil sample collected from B-6 (approximately 18 feet southeast of MW-5) at a depth of 10.5 fbgs had a PCE concentration an order of magnitude lower (1,100 mg/kg) along with a lower PID reading (3,309 ppm). The VOC concentrations in soil samples from B-4 (10') and B-6 (9') were below NYSDEC Part 375 protection of groundwater soil cleanup objectives (PGW SCOs). Soil samples were not analyzed from geo-probes cores B-7 and B-8 due to low PID readings (i.e., <21 ppm).

Summary of Findings

Based on the results of the monitoring and soil boring investigation following the PersulfOx injection program, Benchmark concludes that:

- PersulfOx has significantly reduced shallow groundwater cVOC concentrations in the most impacted on-site groundwater monitoring locations (i.e., MW-5 and PZ-4) but relatively high concentrations of PCE remain, particularly in MW-5.
- Significant concentrations of cVOCs remain in a very narrow band of unsaturated and/or saturated soil near the water table interface (i.e., 9.5-11.8 fbgs) referred to as the "smear zone" in the vicinity of MW-5 and is considered a cVOC contaminant "source area." No significant concentrations of cVOCs remain in unsaturated and/or saturated soil near the water table

interface in the vicinity of PZ-4; hence, PZ-4 is considered outside the contaminant source area.

- Due to the significant PCE concentration in soil in the vicinity of MW-5, BDC has elected to excavate the source area soils.

AREA OF IMPACT

Based on this new data along with the PID data from pre-injection borings B-1 through B-3 completed March 9, 2016, Benchmark revised the approximate boundary of the contaminant source area and corresponding proposed excavation area as shown in red on Figure 1. The boundaries of the source area are well defined based on soil boring data on the northern perimeter near MW-5 as well as on the east boundary and a portion of the south boundary near MW-5. However, at locations devoid of soil data particularly further from MW-5 along the western and southern boundary are not well defined and could be extended further out or brought in during excavation as lateral (and vertical) post-excavation verification soil samples will be collected.

Figure 1 conservatively presents the source area excavation boundaries, with corresponding soil impacts covering an estimated 1,000 square foot area over the 9- to 12-fbgs interval. Assuming the soil weighs 1.7 tons per cubic yard, approximately 200 tons of PCE-impacted soil would be generated through excavation. Benchmark will work with the disposal facilities to obtain waste profiles prior to excavation.

PLANNED REMEDIAL APPROACH

Well Decommissioning

Deep monitoring well MW-4 will be grouted in-place from the bottom to the top by means of a "tremie" pipe in accordance with NYSDEC Policy CP-43. Once the excavation has reached depth, the top approximately 12 feet of well casing will be cut off and removed along with the associated well materials. Overburden well MW-5 will be pulled during the excavation.

Excavation

Benchmark's proposed remedial approach will involve excavation of impacted soil/fill from the approximate area shown on Figure 1 based on field evidence of impact. Soil/fill removal activities will be conducted by a contractor experienced in select excavation and backfilling. Asphalt will be removed and set aside for off-site recycling. The excavation sidewalls will be sloped to avoid the need for shoring.

Clean soil/fill material (i.e., characterized by no evident odors, staining, and PID readings at or below background) overlying the impacts (9-12 fbgs) will be excavated and staged for reuse as backfill. Excavation of underlying and adjacent impacted soil/fill will proceed until PID scans of the excavation sidewall and floor measure 100 ppm or less, and there is no olfactory or visual evidence of impact. PID scans will be performed at a minimum every 5 lineal feet of sidewall and 25 square feet of excavation bottom. Careful excavation of the narrow band of highly impacted soil will be performed in order to reduce the quantity of soil requiring incineration. Separate roll-offs

will be staged to hold the soils proposed for each disposal location. The soils will be sampled and analyzed for VOCs with a 48-hour turnaround time to confirm disposal location.

Groundwater has been observed at depths below 11.5 fbgs; therefore, excavation dewatering should not be necessary. However, the subcontractor will be prepared to dewater the excavation if necessary. Standing water within or entering the excavation would be pumped to portable steel tank (Baker closed top tank or equivalent), processed through a bag or cartridge filter prior to treatment using granular activated carbon (GAC), and discharged to the sanitary sewer system under a temporary discharge permit from the City of Buffalo. Following dewatering activities, the Baker tank would be decontaminated via pressure washing and spent filter bags would be disposed. Spent GAC would be regenerated off-site or disposed with the impacted soil.

Post-Excavation Sampling

Upon completion of soil excavation activities as determined by the above criteria, Benchmark personnel will collect soil samples from the excavation sidewalls (one per 30 linear feet of sidewall) and bottom (one per 900 square feet of floor area). Sidewall samples will be collected by scraping the bucket of the excavator across the impacted face of the excavation wall to obtain a representative sample. The bottom sample(s) will be collected from the base of the excavation also using the excavator bucket; sampling personnel will not enter the excavation. All confirmatory soil samples will be collected with dedicated stainless steel sampling tools. The confirmatory samples will be analyzed for NYSDEC TCL VOCs by USEPA Method 8260C. Expedited (48-hour) turnaround will be required. Results will be compared to NYSDEC Part 375 PGW SCOs. Additional soil will be removed from excavation sidewalls and bottom if post-excavation sample locations exceed PGW SCOs, or as otherwise agreed to by NYSDEC. The newly excavation area will be re-sampled.

Oxidant Addition

Following receipt of acceptable post-excavation verification results, the subcontractor will apply 661 pounds of PersulfOx™ to the excavation bottom in order to address any residual smear zone impacts. Benchmark notified the United States Environmental Protection Agency (USEPA) of its intent to add PersulfOx™ to the excavation bottom. Benchmark has notified the USEPA of the pending addition and requested an extension to the March 2016 Underground Injection Control (UIC) Permit. The USEPA will likely require a letter from NYSDEC indicating its approval of this Work Plan.

Transportation, Treatment, and Disposal

The asphalt removed from the parking area will be hauled to a local recycling facility. Once impacted soil analytical results from each roll-off have confirmed disposal location, Tonawanda Tank Transport Service Inc., a licensed hauler, will transport the roll-offs to a permitted off-site disposal facility. Soil containing total VOCs up to 20,000 ppm will be transported to the US Ecology Michigan Disposal Waste Treatment Plant (MDWTP) in Belleville, MI for stabilization followed by landfilling at the co-located Wayne Disposal Inc. (WDI), formerly known as EQ. Soil containing >20,000 ppm total VOCs will be transported to and incinerated at the Heritage WTI facility in East Liverpool, OH.

Backfilling

Backfill of the excavation will be completed following receipt of satisfactory post-excavation sample results/ acceptance of the data by the NYSDEC. The excavation will be secured with plastic fencing at the conclusion of each day of work and while awaiting backfill. Backfill material will be comprised of clean overburden supplemented by soil, stone, or recycled materials such as steel slag or crushed concrete obtained from an off-site source (recycled materials, if employed, will be permitted for use as backfill under an NYSDEC-issued beneficial use determination). Backfill will be placed in 12- to 18-inch lifts and compacted with a tamper plate attachment on the excavator. Once the excavation is brought up to within 12 inches of the desired grade, 2" crusher run will be placed and compacted. Once the asphalt plants open in the spring, 3 inches of the crusher run will be removed and a 2-inch binder and 1-inch top coat will be placed and rolled.

Reporting

In lieu of preparing a Construction Closeout Report, Benchmark will include details of the remedial action in the revised Final Engineering Report (FER). The FER will summarize the approach to the work; field and laboratory findings; data interpretation; and conclusions. Copies of all pertinent records, including PID readings, scale receipts, manifests, certificates of destruction, maps, field logs, photographs, and laboratory reports will be appended to the FER.

GROUNDWATER MONITORING

Since monitoring well MW-5 will most likely be destroyed during excavation, Benchmark will install one 2-inch diameter replacement shallow (20-foot well depth) overburden monitoring well downgradient of MW-5 at a location approved by the NYSDEC. Benchmark will perform two rounds of groundwater monitoring to evaluate the effectiveness of the source area excavation and overall Site remediation. The shallow overburden groundwater monitoring program will consist of collecting samples from replacement monitoring well MW-5R; on-site piezometers PZ-4, PZ-5, PZ-6, PZ-11, PZ-12, PZ-13, and PZ-14; and off-site wells MW-23S, MW-24S, and MW-24D for analysis of TCL VOCs and field parameters (oxidation-reduction potential, dissolved oxygen, pH, temperature, and conductivity). The results of the sampling will be summarized and included in the revised FER.

REMEDIAL OBJECTIVES

We understand that in order to achieve a COC for both the 275 Franklin Street and 432 Pearl Street Sites, BDC will need to:

- Demonstrate that the Sites are no longer contributing to degradation of off-site groundwater quality.
- Demonstrate that groundwater remedial action objectives (RAOs) will be achieved in five years.

- Commit in the Site Management Plan to additional remedial measures should significant rebound be observed during future groundwater monitoring events.

PROPOSED SCHEDULE

The project schedule is dependent on weather conditions and impacted soil/fill disposal facility approval. Benchmark will notify the NYSDEC of the planned schedule for remediation as soon as possible but a minimum of one week ahead of performing the work. In order to obtain COCs in 2017, BDC proposes the following schedule:

- November 22, 2016: Submit final RAWP to NYSDEC
- November 23, 2016: Award subcontract to excavation firm
- December 1-12, 2016: Complete remedial activities
- January 16-17, 2017: Collect first round of post-excavation groundwater samples
- April 17-18, 2017: Collect second round of post-excavation groundwater samples
- May 8, 2017: Submit revised FER and SMP to NYSDEC and NYSDOH
- June 2017: Address NYSDEC comments on revised FER and SMP
- July 2017: Submit final FER and SMP to NYSDEC, NYSDOH, and document repository
- August 2017: Receive COCs

Please contact us if you have any questions or require additional information.

Sincerely,
Benchmark Environmental Engineering & Science, PLLC

Michael A. Lesakowski
Sr. Project Manager

Lori E. Riker, P.E.
Project Manager

Att.
ec: Chad Staniszewski (NYSDEC Region 9)
Robert Knoer (The Knoer Group)
Sandy Nasca (The Knoer Group)

File: 0156-016-002

TABLES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

FIELD DATA AND OBSERVATIONS FOLLOWING PERSULFOX INJECTIONS

275 Franklin Street & 432 Pearl Street Sites
BCP Sites No. C915208 & C915237
Buffalo, New York

Date	PZ-4						MW-5					
	Persulfate Conc (ppm)	pH (S.U.)	D.O.	ORP (mV)	Temp (°C)	Observations	Persulfate Conc (ppm)	pH (S.U.)	D.O.	ORP (mV)	Temp (°C)	Observations
1st PersulfOx Injection: March 9-11, 2016												
3/18/2016	35	--	--	--	--	--	70	--	--	--	--	--
3/25/2016	7-14	--	--	--	--	No odor or sheen	5.6-7	--	--	--	--	Sheen
3/31/2016	5.6-7	--	--	--	--	--	5.6-7	--	--	--	--	--
4/14/2016	4.2-5.6	--	--	--	--	--	5.6-7	--	--	--	--	--
2nd PersulfOx Injection: April 14-18, 2016												
5/2/2016	>>70	7.24	--	231	13.4	--	>>70	7.62	--	246	12.2	--
5/13/2016	>70	--	--	--	--	--	>70	7.02	--	84	18.7	--
6/13/2016	70	7.07	5.45	197	16.5	Sweet odor, slight sheen	7-14	7.18	1.02	17	17.3	Sweet odor, sheen
8/11/2016	>>70	6.67	--	245	20.1	No odor or sheen	5.6-7	6.87	--	-61	18.8	Mild sweet odor, slight sheen
9/21/2016	42-49	7.75	5.27	321	25.3	No odor or sheen	4.2-7	7.17	1.38	-130	21.6	chemical/sweet odor

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2

SUMMARY OF PRE- AND POST-REMEDIAL GROUNDWATER ANALYTICAL RESULTS

275 Franklin Street & 432 Pearl Street Sites
BCP Sites No. C915208 & C915237
Buffalo, New York

Monitoring Location & Sample Date		Parameter [1]																											
		TCL Volatile Organic Compounds (ug/L)										Microbial Parameters (cells/mL)				Water Quality Parameters (mg/L)								Field Measurements (units as indicated)					
		2-Butanone (MEK)	Carbon disulfide	Chloroform	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Methylene chloride	Tetrachloroethene	Trichloroethene	Vinyl chloride	*Total TCL cVOCs*	Dehalococcoides	TCE R-Dase	BAV1 VC R-Dase	Vinyl Chloride Reductase (VC R-Dase)	Total Organic Carbon (TOC)	Iron- Soluble	Manganese- Soluble	Nitrate, mg/L-N	Sulfate	Ethane	Ethene	Methane	pH (units)	Temperature (°C)	Specific Conductance (uS)	Turbidity	ORP (mV)	DO (ppm)
GWQS [2]		**50**	**--**	**7**	**5**	**5**	**5**	**5**	**5**	**2**	**--**	**--**	**--**	**--**	**--**		**300**	**300**	**10**	**250**	**--**	**--**	**250**	**6.5 - 8.5**	**--**	**--**	**--**	**--**	**--**
Shallow Overburden Wells																													
PZ-4	11/16/06	< 10	< 10	< 10	< 10	< 10	< 10	530	3 J	< 10	**533**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.54	16.3	3782	< 1000	49	5.92
	04/24/08	< 25	< 5	< 5	46	< 5	< 5	1,900 D	19	< 5	**1,965**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.29	13.4	6293	< 1000	158	7.63
	08/18/08	**HRC INJECTION**																											
	10/02/08	< 5	< 1	< 1	56	0.82 J	< 1	2,800 D	30	< 1	**2,888**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.40	15.7	5898	< 1000	85	7.33
	12/18/08	< 200	< 40	< 40	99	< 40	< 40	2,800	42	< 40	**2,941**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.38	9.3	10502	< 1000	147	8.97
	02/11/09	< 5	< 1	< 1	16	< 1	< 1	540 D,H	9.4	< 1	**565**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.61	10.7	7079	17	48	9.22
	04/21/09	< 5	< 1	< 1	6	< 1	< 1	520 D	6.3	< 1	**532**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.37	11.7	18510	206	99	9.58
	07/17/09	< 5	< 1	< 1	0.93 J	< 1	< 1	180 D	1.6	< 1	**183**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.61	16.7	12	6.5	-46	6.69
	03/29/10	< 50	< 1.9	< 3.4	< 10	< 10	< 4.4	46 D	< 10	< 2.4	**46**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.61	9.0	6934	13	0	9.37
	06/02/11	< 10	< 0.19	< 0.34	9.1	< 1	< 0.44	390 D	8.1	< 1	**407**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.49	13.5	9095	9.0	36	8.02
	06/05/12	< 50	< 0.95	< 1.7	15	< 1	< 2.2	950 D	24	< 4.5	**989**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.63	14.0	8812	16	289	7.71
	04/16/14	**IET INJECTION**																											
	06/18/14	< 26	< 3.8	< 6.8	39	< 18	< 8.8	1,200	35	< 18	**1,274**	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.5	< 1.5	< 1	7.46	14.9	11710	30	71	4.95
	09/03/14	< 26	< 3.8	< 6.8	190	< 18	11 J	1,200	60	< 18	**1,450**	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.5	< 1.5	< 1.3 J	7.44	18.9	9106	3.2	-77	3.20
	04/16/15	< 26	< 3.8	< 6.8	110	< 18	< 8.8	940	59	< 18	**1,109**	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.5	< 1.5	< 1	7.40	11.9	7306	9.9	-37	7.73
	08/13/15	< 26	< 3.8	< 6.8	160	< 18	11 J	480	61	< 18	**701**	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.5	< 1.5	13	*7.47*	*22.0*	*12.82*	*> 1000*	*-143*	*2.79*
	12/18/15	< 19	< 10	< 7	29	< 7	< 7	780	30	< 0.7	**839**	NA	NA	NA	NA	COD=64	0.04 J	NA	NA	94.6	NA	NA	NA	7.67	11.4	5925	63	22	5.96
	Mar & Apr 2016	**PERSULFOX INJECTIONS**																											
	06/13/16	< 39	< 20	< 14	64	< 14	< 14	1,100	46	< 1.4	**1,210**	NA	NA	NA	NA	COD=240	0.026 J	NA	NA	572	NA	NA	NA	7.07	16.5	10	217	197	5.45
	09/21/16	< 39	< 20	< 14	34 J	< 14	< 14	630	34	< 1.4	**698**	NA	NA	NA	NA	COD=170	< 0.191	NA	NA	273	NA	NA	NA	7.75	26.3	5784	510	321	5.27
MW-5	04/25/08	< 5	< 1	< 1	16	< 1	< 1	19,000 D J	5.1	< 1	**19,022**	<0.5	NA	NA	<0.5	NA	ND	0.1	5.7	87.4	ND	ND	0.0022	7.33	13.8	3070	< 1000	-51	4.92
	08/18/08	**HRC INJECTION**																											
	10/02/08	< 5	< 1	< 1	20	< 1	< 1	50,000 D	7.2	< 1	**50,032**	5.23	0.116 J	5.8	< 0.461	NA	ND	0.0099	8.1	85.8	ND	ND	ND	7.27	13.7	3454	2213	-40	6.27
	12/18/08	< 2500	<500	<500	< 500	< 500	<500	34,000 D	< 500	< 1	**34,000**	0.6	< 0.8	< 0.8	< 0.8	NA	ND	1.2	4.4	58.8	ND	ND	ND	6.99	10.4	4089	NA	-76	2.87
	02/11/09	4.9 J	< 1	< 1	66	< 1	< 1	36,000 D,H	19	< 1	**36,088**	2.6	< 1.6	< 1.6	7.7	NA	< 0.05	0.91	5.57	84.4	< 0.0015	< 0.0015	< 0.001	7.17	13.4	5153	13	-71	2.14
	04/21/09	11	0.82 J	0.53 J	1	0.64 J	< 1	37,000 D	27	< 1	**37,032**	2.2	< 1	< 1	< 1	NA	< 0.05	1.8	5.19 D	98 D	< 0.0015	< 0.0015	2.2	7.22	13.7	4730	2.6	-115	1.23
	07/17/09	< 5	< 1	0.54 J	800	1	< 1	31,000 D	86	< 1	**31,890**	0.5 J	< 0.7	< 0.7	< 0.7	1.8	0.557	0.246	6.57 D	110 D	< 0.0015	< 0.0015	< 0.001	7.02	15.5	5656	2.0	-100	1.98
	03/29/10	< 500	< 97	< 170	< 500	< 500	< 220	25,000 D	< 500	< 120	**25,000**	4	< 5	< 5	< 5	NA	< 0.05	0.495	7.35	89.2 B	< 1.5	< 1.5	1	6.81	11.3	6748	3.3	-71	4.26
	06/02/11	< 10	< 0.19	< 0.34	4.8	< 1	< 0.44	49,000 D	12	< 1	**49,021**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.26	13.1	5350	6.0	-23	6
	06/05/12	< 10	< 150	< 270	< 1	< 1	< 350	70,000	< 1	< 720	**70,000**	NA	NA	NA	NA	NA	NA	4.5	NA	126	NA	NA	0.38 BJ	7.20	13.4	4892	3.4	593	4.58
	04/16/14	**IET INJECTION**																											
	06/19/14	< 260	< 38	< 68	< 160	< 180	< 88	17,000	170 D J	< 180	**17,170**	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.5	< 1.5	< 1	7.66	18.9	4929	60	-169	1.65
	09/03/14	< 260	< 38	< 68	6300	< 180	< 88	38,000 D	2700	< 180	**47,000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.5	1.7 J	210 D	7.41	17.0	4462	9.6	-156	0.81
	04/16/15	< 1300	< 190	< 340	1700	< 900	< 440	43,000	670 J	< 900	**45,370**	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 15	< 15	520	7.32	12.9	4335	22	-132	1.5
	08/13/15	< 1300	< 190	< 340	870 J	< 900	< 440	120,000 D	< 460	< 900	**120,870**	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 75	< 75	1,600	7.46	17.7	4964	39	-122	1.29
	12/18/15	< 1900	< 1000	< 700	910 J	< 700	< 700	190,000	350 J	< 70	**191,260**	NA	NA	NA	NA	COD=62	2.9	NA	NA	75	NA	NA	NA	7.57	11.4	3642	> 100	-51	1.12
	Mar & Apr 2016	**PERSULFOX INJECTIONS**																											
	06/13/16	< 9700	< 5000	< 3500	< 3500	< 3500	< 3500	180,000	< 880	< 350	**180,000**	NA	NA	NA	NA	COD=87	0.017 J	NA	NA	312	NA	NA	NA	7.18	17.3	6387	96.4	17	1.02
	09/21/16	< 3900	< 2000	< 1400	< 1400	< 1400	< 1400	110,000	470 J	< 140	**110,470**	NA	NA	NA	NA	COD=78	< 0.191	NA	NA	810	NA	NA	NA	7.17	21.6	6903	60.2	-130	1.38

BENCHMARK
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TABLE 3

SUMMARY OF SUBSURFACE SOIL/FILL ANALYTICAL RESULTS

275 Franklin Street & 432 Pearl Street Sites
BCP Sites No. C915208 & C915237
Buffalo, New York

PARAMETER [1]	Protection of Groundwater SCOs [2]	SAMPLE LOCATION (DEPTH)			
		B-4 (10')	B-5 (10')	B-6 (9')	B-6 (10.5')
		09/21/2016			
PID (ppm)	--	82.6	6,313	43.8 - 217	3,309
Volatile Organic Compounds (VOCs) - mg/kg [3]					
1,2-Dichlorobenzene	**1.1**	ND	**2.9 J**	ND	0.12 J
2-Butanone (MEK)	**0.12**	0.0018 J	ND	ND	ND
Acetone	**0.05**	0.017	ND	0.02	ND
Carbon disulfide	--	ND	110 J	ND	ND
cis-1,2-Dichloroethene	**0.25**	0.0074	ND	ND	ND
Tetrachloroethene	**1.3**	0.27	**92,000**	0.028	**1,100**
Toluene	**0.7**	ND	ND	ND	0.11 J
trans-1,2-Dichloroethene	**0.19**	0.00084 J	ND	ND	ND
Trichloroethene	**0.47**	0.0028	**2.9 J**	ND	0.1 J

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Values per 6NYCRR Part 375 Soil Cleanup Objectives (SCOs).
3. Sample results were reported by the laboratory in ug/kg and converted to mg/kg for comparisons to SCOs.

Definitions:

ND = Parameter not detected above laboratory detection limit.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.

Bold = Result exceeds Protection of Groundwater SCO.

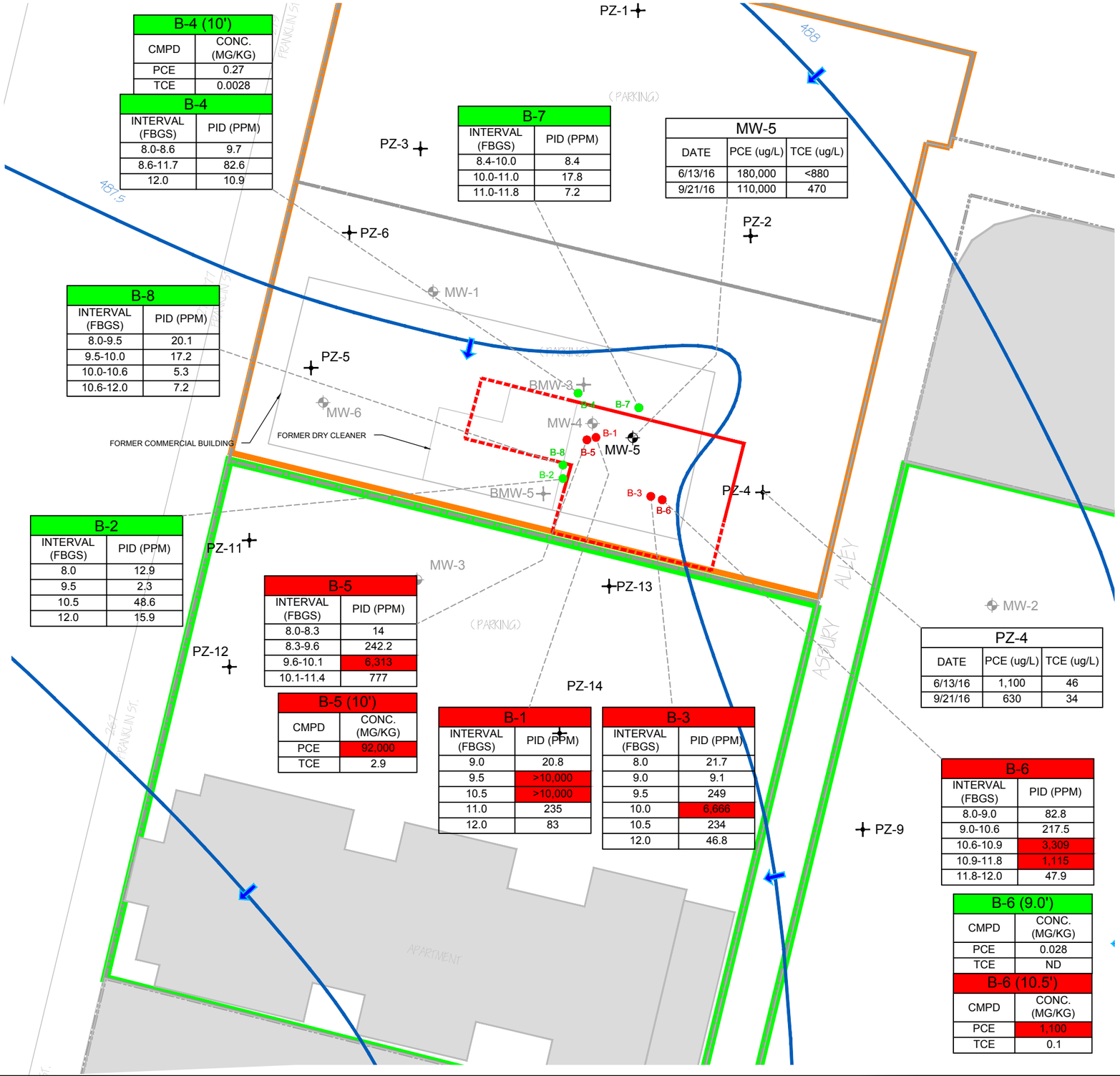
FIGURES

F:\CAD\Benchmark\Buffalo Development Corp\275 Franklin Street Site\RM (additional) Work Plan (Jan. 2016)\Analytical Data and Field Data\Figure 1; 2016 Analytical and Field Data1.dwg

LEGEND:

- 275 FRANKLIN STREET BCP SITE (BCP NO. C915208)
- 432 PEARL STREET BCP SITE (BCP NO. C915237)
- EXISTING BUILDING
- PARCEL LINE
- FENCE
- B-1 — PersulfOx PRE INJECTION BORINGS (MARCH 9, 2016)
- 488 — GROUNDWATER CONTOUR (shallow groundwater ≤ 16 fbgs) (dashed where inferred)
- GROUNDWATER FLOW DIRECTION (SEPT. 2014)
- MW-1 — DEEP / INTERMEDIATE / OFF-SITE MONITORING WELL
- MW-21S — OFF-SITE SHALLOW MONITORING WELL (4) (NYSDEC, May 2009)
- MW-21D — OFF-SITE DEEP MONITORING WELL (4) (NYSDEC, May 2009)
- MW-25S — OFF-SITE SHALLOW MONITORING WELL (3) (NYSDEC, September 2012)
- MW-5 — SHALLOW MONITORING WELL WITH GROUNDWATER ELEVATION (fmsl)
- PZ-4 — SHALLOW PIEZOMETER WITH GROUNDWATER ELEVATION (fmsl)
- BMW-3 — TEMPORARY MONITORING WELL (SEPTEMBER 2004)
- PB-4 — SOIL BORING SAMPLE LOCATION (9-21-16)
- ESTIMATED AREA FOR EXCAVATION (APPROX. 1,000 SF), DASHED WHERE INFERRED
- B-8 — OUTSIDE CONTAMINANT SOURCE AREA
- B-5 — CONTAMINANT SOURCE AREA

DEFINITIONS:
CMPD = COMPOUND
CONC. = CONCENTRATION
PPM = PARTS PER MILLION
FBGS = FEET BELOW GROUND SURFACE
PID = PHOTOIONIZATION DETECTOR
UG/L = MICROGRAMS PER LITER
MG/KG = MILLIGRAMS PER KILOGRAM



B-4 (10')	
CMPD	CONC. (MG/KG)
PCE	0.27
TCE	0.0028

B-4	
INTERVAL (FBGS)	PID (PPM)
8.0-8.6	9.7
8.6-11.7	82.6
12.0	10.9

B-7	
INTERVAL (FBGS)	PID (PPM)
8.4-10.0	8.4
10.0-11.0	17.8
11.0-11.8	7.2

MW-5		
DATE	PCE (ug/L)	TCE (ug/L)
6/13/16	180,000	<880
9/21/16	110,000	470

B-8	
INTERVAL (FBGS)	PID (PPM)
8.0-9.5	20.1
9.5-10.0	17.2
10.0-10.6	5.3
10.6-12.0	7.2

B-2	
INTERVAL (FBGS)	PID (PPM)
8.0	12.9
9.5	2.3
10.5	48.6
12.0	15.9

B-5	
INTERVAL (FBGS)	PID (PPM)
8.0-8.3	14
8.3-9.6	242.2
9.6-10.1	6,313
10.1-11.4	777

B-5 (10')	
CMPD	CONC. (MG/KG)
PCE	92,000
TCE	2.9

B-1	
INTERVAL (FBGS)	PID (PPM)
9.0	20.8
9.5	>10,000
10.5	>10,000
11.0	235
12.0	83

B-3	
INTERVAL (FBGS)	PID (PPM)
8.0	21.7
9.0	9.1
9.5	249
10.0	6,666
10.5	234
12.0	46.8

PZ-4		
DATE	PCE (ug/L)	TCE (ug/L)
6/13/16	1,100	46
9/21/16	630	34

B-6	
INTERVAL (FBGS)	PID (PPM)
8.0-9.0	82.8
9.0-10.6	217.5
10.6-10.9	3,309
10.9-11.8	1,115
11.8-12.0	47.9

B-6 (9.0')	
CMPD	CONC. (MG/KG)
PCE	0.028
TCE	ND

B-6 (10.5')	
CMPD	CONC. (MG/KG)
PCE	1,100
TCE	0.1

N

20' 0' 20' 40'

SCALE: 1 INCH = 20 FEET
SCALE IN FEET
(approximate)

DATE: OCTOBER 2016
DRAFTED BY: RFL

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0156-014-001

ANALYTICAL AND FIELD DATA

275 FRANKLIN STREET SITE
BUFFALO, NEW YORK
BCP NO. C915208
PREPARED FOR
BUFFALO DEVELOPMENT CORPORATION

FIGURE 1

ATTACHMENT 1

BORING LOGS

BENCHMARK

Project No: 0156-014-001

Borehole Number: B-1

Project: Pre-injection borings.

A.K.A.:

Client: Buffalo Development Corp.

Logged By: TAB

Site Location: 275-277 Franklin St, Buffalo NY

Checked By:

Benchmark Environmental Engineering & Science, PLLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0599

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 5000 / 10000)	Lab Sample	Well Completion Details or Remarks
0.0	0.0	Ground Surface							
	0.0	Asphalt							
	0.3	***Poorly Graded Sand with Gravel*** Grey, moist mostly fine gravel, some few sand, few coarse sand, medium dense, loose when disturbed.					5.5		
	0.6	***Silty Sand with Fill*** Brown, moist, mostly fine sand, little non-plastic fines, peices of concrete, medium dense, loose when disturbed.	1	NA	2.2		15.0		
	3.0	***Poorly Graded Sand with Silt*** Brown, moist, mostly fine sand, few non-plastic fines, medium dense, loose when disturbed.							
	4.0	***Poorly Graded Sand*** Brown, moist, mostly fine sand, little medium sand, trace non-plastic fines, medium dense, loose when disturbed.					1.9		
5.0			2	NA	2.6				
	8.0	As above, wet (9.0 fbgs), chemical like odor.					48.5		
							20.8		
							9999		
	9.5	***Sandy Lean Clay*** Reddish brown, wet, mostly medium plasticity fines, some fine sand, medium toughness, medium dry strength, stiff, chemical like odor.							
10.0	10.0		3	NA	3.8		9999		
		Poorly Graded Sand As above, (8.0 to 9.5 fbgs).					235		
		End of boring 12.0fbgs.					83.0		
	12.0	End of Borehole							

Drilled By: Zoladz, Inc.
Drill Rig Type: Geoprobe 6610DT
Drill Method: Direct push.
Comments:
Drill Date(s): 3/9/16

Hole Size: 3-inch
Stick-up: NA
Datum:

Sheet: 1 of 1

Project No: 0156-014-001

Borehole Number: B-2

Project: Pre-injection borings.

A.K.A.:

Client: Buffalo Development Corp.

Logged By: TAB

Site Location: 275-277 Franklin St, Buffalo NY

Checked By:

Benchmark Environmental Engineering & Science, PLLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0599

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 25 / 50)	Lab Sample	Well Completion Details or Remarks
0.0	Ground Surface								
	0.0	***Asphalt***							
	0.3	***Poorly Graded Sand with Gravel*** Grey, moist mostly fine gravel, some few sand, few coarse sand, medium dense, loose when disturbed.							
	0.6	***Silty Sand with Fill*** Brown, moist, mostly fine sand, little non-plastic fines, peices of concrete, medium dense, loose when disturbed.	1	NA	1.5		1.6, 12.8		
	3.0	***Poorly Graded Sand with Silt*** Brown, moist, mostly fine sand, few non-plastic fines, medium dense, loose when disturbed.							
	4.0	***Poorly Graded Sand*** Brown, moist, mostly fine sand, little medium sand, trace non-plastic fines, medium dense, loose when disturbed.	2	NA	3.1		5.5, 6.5, 7.3, 7.2, 12.4		
5.0									
	8.0	As above, wet at 9.0 fbgs.					7.2, 2.3		*First water 9.0 fbgs.*
	9.5	***Sandy Lean Clay*** Reddish brown, wet, mostly medium plasticity fines, some fine sand, medium toughness, medium dry strength, stiff.	3	NA	3.9		48.6, 15.9		
10.0	10.0	***Poorly Graded Sand*** As above, (8.0 to 9.5fbgs).							
		End of boring 12.0fbgs.							
	12.0	End of Borehole							

Drilled By: Zoladz, Inc.
Drill Rig Type: Geoprobe 6610DT
Drill Method: Direct push.

Drill Date(s): 3/9/16

Hole Size: 3-inch
Stick-up: NA
Datum:

Sheet: 1 of 1

Project No: 0156-014-001

Borehole Number: B-3

Project: Pre-injection borings.

A.K.A.:

Client: Buffalo Development Corp.

Logged By: TAB

Site Location: 275-277 Franklin St, Buffalo NY

Checked By:

Benchmark Environmental Engineering & Science, PLLC
2558 Hamburg Turnpike, Suite 300
Buffalo, NY 14218
(716) 856-0599

SUBSURFACE PROFILE			SAMPLE						
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol	PID VOCs ppm (0 / 500 / 1000)	Lab Sample	Well Completion Details or Remarks
0.0	Ground Surface								
	0.0	***Asphalt***							
	0.3	***Poorly Graded Sand with Gravel*** Grey, moist mostly fine gravel, some few sand, few coarse sand, medium dense, loose when disturbed.					1.5		
	0.6	***Silty Sand with Fill*** Brown, moist, mostly fine sand, little non-plastic fines, peices of concrete, medium dense, loose when disturbed.	1	NA	1.1		6.1		
	4.0	***Poorly Graded Sand*** Brown, moist, mostly fine sand, little medium sand, trace non-plastic fines, medium dense, loose when disturbed.	2	NA	2.4		10.7 12.8 2.9 4.1 21.7		First water 9.0 fbgs.
5.0	8.0	As above, wet (9.0 fbgs), chemical like odor.					10.0 9.1 249		
	9.5	***Sandy Lean Clay*** Reddish brown, wet, mostly medium plasticity fines, some fine sand, medium toughness, medium dry strength, stiff, chemical like odor.	3	NA	3.9		6666 234		
10.0	10.5	***Poorly Graded Sand*** As above, (8.0 to 9.5 fbgs).							
		End of boring 12.0fbgs.					46.8		
	12.0	End of Borehole							

Drilled By: Zoladz, Inc.
Drill Rig Type: Geoprobe 6610DT
Drill Method: Direct push.
Comments:
Drill Date(s): 3/9/16

Hole Size: 3-inch
Stick-up: NA
Datum:

Sheet: 1 of 1