

J.C. Broderick & Associates, Inc.

Environmental / Construction Consulting & Testing



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March 1, 2016

Mr. Terrence Clark
Superintendent of Schools
Bethpage Union Free School District
Administration Building
10 Cherry Avenue
Bethpage, New York 11714

Re: Confirmation Sampling of Groundwater Monitoring Wells at

**Site: Bethpage High School
10 Cherry Avenue
Bethpage, New York 11714
Site Visit: February 19, 2016**

JCB#: 16-33543

Dear Mr. Clark:

J.C. Broderick & Associates, Inc. (JCB) was retained to perform confirmation sampling of groundwater monitoring wells at the above referenced school building. The site visit was performed by experienced JCB Consultants on the above referenced date and consisted of the following:

- On February 19, 2016, the three (3) on-site monitoring wells were checked for the presence of Light Non-Aqueous Phase Liquid (LNAPL) utilizing a Solinst® Model 122 Product/Water Interface Meter and depth to the groundwater table was recorded to the nearest 0.01 ft. A Groundwater Gradient Map was generated from this data and is attached as Appendix-A, Figure-2. The data obtained indicates a groundwater flow direction to the south along Stewart Avenue.

The following table summarizes the survey and groundwater data:

Table No. 2: Depth to Groundwater Gauged with Interface Meter				
Well Number	Depth to Product (ft)	Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)
MW-1	No Product	118.83	53.91	64.92
MW-2	No Product	119.18	54.65	64.53
MW-3	No Product	119.18	55.01	64.17

Notes:
ft = Feet

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Subsequent to the gauging, JCB collected a groundwater sample from each groundwater monitoring well. Prior to sampling, the casing volume of the monitoring well was calculated and a minimum of three (3) casing volumes of water was purged utilizing a disposable polyethylene bailer.

The following table summarizes the groundwater samples submitted for laboratory analysis:

Table No. 3: Summary of Groundwater Samples Submitted for Laboratory Analysis			
Sample ID#	Date Sampled	Description of Sample	Analysis Method
MW-1	11-04-15	Monitoring Well No. 1	EPA 524.2 List
MW-2	11-04-15	Monitoring Well No. 2	EPA 524.2 List
MW-3	11-04-15	Monitoring Well No. 3	EPA 524.2 List
Notes: EPA = Environmental Protection Agency			

Section No. 4.0: Laboratory Analytical Summary

Groundwater samples selected for laboratory analysis were placed into laboratory supplied containers, assigned individual identification numbers and then placed into an appropriately conditioned cooler. Chain of Custody documents were prepared and the samples were then delivered to an independent New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory for analysis.

Groundwater samples submitted for laboratory analysis were analyzed for Volatile Organic Compounds (VOCs) utilizing Environmental Protection Agency (EPA) Method 524.2 List.

York Analytical Laboratories, Inc. (York) provided laboratory analytical services. Copies of York's NYSDOH certifications are available upon request.

The laboratory analytical results for the groundwater sample was reviewed and compared to Table No. 1 of the *Ambient Water Quality Standards and Guidance Values of the New York State Department of Environmental Conservation, Division of Water, Technical and Operational Guidance Series (TOGS) (1.1.1)*.

The following table summarizes the Groundwater Analytical Results:

Table No. 1: Summary of Groundwater Samples Analysis Results							
Client Sample ID	Allowable Standards	MW-1	MW-1	MW-2	MW-2	MW-3	MW-3
EPA 524.2 Volatiles List	µg/L	11/7/15	2/19/16	11/7/15	2/19/16	11/7/15	2/19/16
Benzene	0.7	ND	ND	ND	ND	ND	ND
Bromobenzene	5	ND	ND	ND	ND	ND	ND
Bromochloromethane	5	ND	ND	ND	ND	ND	ND
Bromodichloromethane	50	ND	ND	ND	ND	ND	ND
Bromoform	50	ND	ND	ND	ND	ND	ND
Bromomethane	5	ND	ND	ND	ND	ND	ND
tert-Butyl-Benzene	5	ND	ND	ND	ND	ND	ND
n-Butylbenzene	5	ND	ND	ND	ND	ND	ND

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**Table No. 1:
 Summary of Groundwater Samples Analysis Results**

Client Sample ID	Allowable Standards	MW-1	MW-1	MW-2	MW-2	MW-3	MW-3
EPA 524.2 Volatiles List	µg/L	11/7/15	2/19/16	11/7/15	2/19/16	11/7/15	2/19/16
sec-Butyl-Benzene	5	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	5	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ND	ND	ND	ND	ND	ND
Chloroethane	5	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND
Chloromethane (Methyl Chloride)	5	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	5	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	5	ND	ND	ND	ND	ND	ND
Dibromochloromethane	50	ND	ND	ND	ND	ND	ND
Dibromomethane	5	ND	ND	ND	ND	ND	ND
1,2- Dichlorobenzene	3	ND	ND	ND	ND	ND	ND
1,4- Dichlorobenzene	3	ND	ND	ND	ND	ND	ND
1,3- Dichlorobenzene	3	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (Freon® 12)	5	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	5	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	5	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	5	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	1	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	5	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	5	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	0.4	ND	ND	ND	ND	ND	ND
1,1-Dichloropropylene	5	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	0.4	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	0.5	ND	ND	ND	ND	ND	ND
Isopropylbenzene	5	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	5	ND	ND	ND	ND	ND	ND
Methyl-tert-butyl ether (MtBE)	10	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	ND
Naphthalene	10	ND	ND	ND	ND	ND	ND
n-Propylbenzene	5	ND	ND	ND	ND	ND	ND
Styrene	5	ND	ND	ND	ND	ND	ND
1,1,1,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	5	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	5	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	5	ND	ND	ND	ND	ND	ND

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Table No. 1: Summary of Groundwater Samples Analysis Results							
Client Sample ID	Allowable Standards	MW-1	MW-1	MW-2	MW-2	MW-3	MW-3
EPA 524.2 Volatiles List	µg/L	11/7/15	2/19/16	11/7/15	2/19/16	11/7/15	2/19/16
1,1,1-Trichloroethane	5	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	1	ND	ND	ND	ND	ND	ND
Trichloroethylene	5	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (Freon® 11)	5	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	0.04	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND
o-Xylene	5	ND	ND	ND	ND	ND	ND
p- & m- Xylenes	5	ND	ND	ND	ND	ND	ND
Chlorodifluoromethane (Freon® 22)	N/A	ND	ND	24	1.9	0.9	1.4
Notes: µg/L = parts per billion N/A = Guidance Value Not Established by the New York State Department of Environmental Conservation at the time of this report ND = Not Detected							

The laboratory analysis results from the groundwater sample submitted from MW-1 **did not** reveal any elevated concentrations of VOCs, Freon® 11, Freon® 12 or Freon® 22 exceeding the above referenced guidance values.

The laboratory analysis results from the groundwater samples submitted from MW-2 and MW-3 **did not** reveal any elevated concentrations of VOCs, Freon® 11 or Freon® 12 exceeding the above referenced guidance values.

The laboratory analysis results from the groundwater samples submitted from MW-2 and MW-3 **did** reveal detectable concentrations of Freon® 22; however, no guidance value has been established by the New York State Department of Environmental Conservation (NYSDEC) regarding this compound.

Section No. 5.0: Quality Assurance and Quality Control (QA/QC) Procedures

In order to prevent cross-contamination between sampling locations, all re-usable sampling equipment which came into contact with sample materials was decontaminated prior to each use. Equipment used for sample collection was wiped clean, washed in a solution of Alconox and thoroughly rinsed with potable water. All down-hole equipment which did not come into contact with sample material was pressure rinsed with potable water prior to the start of each boring. New and dedicated polyethylene tubing was used for collection of each groundwater sample. All sampling personnel wore disposable latex, nylon, or nitrile gloves during sampling events. At a minimum, gloves were changed between boring locations and before each laboratory sample was collected. All collected samples were placed into an appropriately conditioned cooler for storage and were transported to the laboratory. Samples were maintained between 0°C and 8°C.

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Section No. 6.0: Conclusions and Recommendations

JCB collected confirmation samples from groundwater monitoring wells MW-2 and MW-3 to simulate the sampling performed in November 2015. The laboratory analysis results from the groundwater samples submitted from MW-2 and MW-3 confirmed the detection of Freon® 22; however, the concentration in MW-2 was significantly less (24 ppb vs 1.9 ppb) when compared to the November 2015 sample. It should be noted that currently no guidance value has been established by the New York State Department of Environmental Conservation (NYSDEC) regarding this compound.

Based on the findings of this confirmation sampling event, it appears the groundwater monitoring wells installed on the school property have revealed evidence of off-site contamination influencing the groundwater quality beneath the school property.

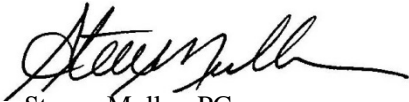
JCB recommends semi-annual monitoring and sampling of the three (3) on-site groundwater monitoring wells to gain additional groundwater quality data and to establish a concentration trend.

Sincerely,
J.C. Broderick & Associates, Inc.



Jeffrey V. Nannini

Environmental Scientist



Steven Muller, PG
Project Manager