D&B Engineers and Architects, P.C.

FRANKLIN CLEANERS GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

Latitude 40.688°, Longitude 73.627°

REPORT TITLE

Site Management Quarterly Report No. 48

REPORTING PERIOD

June 2016 through August 2016

CLIENT

New York State Department of Environmental Conservation

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Environmental Remediation
625 Broadway, 12th Floor, Albany, New York 12233

Site

NYSDEC Site No. 130050, Franklin Cleaners Site Groundwater Extraction and Treatment System Village of Rockville Centre, Town of Hempstead, Nassau County, New York

Project Background and Site Description

The Franklin Cleaners groundwater extraction and treatment system (GWE&TS) is actively recovering and treating the "leading edge" of a chlorinated solvent-contaminated groundwater plume emanating from the former Franklin Cleaners dry cleaner site, located approximately one mile upgradient of the GWE&TS, in the Village of Hempstead, Nassau County, New York. The groundwater plume is primarily composed of tetrachloroethene (PCE). The Franklin Cleaners GWE&TS has been in operation since September 2004. Refer to *Figure 1* for a site location map depicting the treatment system location.

Groundwater Extraction and Treatment System Overview

The GWE&TS consists of two 6-inch diameter wells screened approximately 75 to 90 feet below grade. Extracted groundwater is conveyed via underground piping to a low-profile stacked-tray air stripper located in the GWE&TS building. The treated groundwater is discharged from the air stripper to a wet well equipped with two series-configured submersible pumps, which convey the treated water via underground piping to a Nassau County Department of Public Works storm sewer manhole in accordance with all applicable discharge standards. Exhaust gas from the air stripper was treated utilizing two series-configured granular activated carbon (GAC) vessels; however, based on historic low contaminant concentrations detected in the air stripper exhaust gas, the air stripper exhaust piping was reconfigured to bypass the GAC vessels and discharge exhaust gas directly to the atmosphere in June 2011, per the direction of the NYSDEC. The GWE&TS is equipped with instrumentation and controls which allow for automated startup and operation, and an autodial alarm notification system. Refer to *Figure 2* for an "as-built" treatment system layout diagram.

Regulatory Requirements/Cleanup Goals

Site-specific remedial goals have been established through the remedy selection process as defined in 6 NYCRR Part 375-1.10, and are documented in the Record of Decision (ROD), dated March 1998. The site-specific remedial goals outlined in the March 1998 ROD are provided in *Attachment A*. The overall goal is to meet all appropriate Standards, Criteria, and Guidance (SCGs) and to be protective of human health and the environment. Implementation of the GWE&TS is specifically focused on the following goals:

- Reduce, control, or eliminate contaminated media to the extent practicable.

- Eliminate the potential for exposure to contaminated groundwater.
- Provide for attainment of SCGs for groundwater, soil and indoor air within the limits of the affected area, to the extent practical.

Remedial System Optimization (RSO) Plume Redelineation

A plume redelineation program was completed in June and July 2014 as part of an overall larger and ongoing Remedial System Optimization (RSO) evaluation undertaken to improve the efficiency, effectiveness and net environmental benefit of the current GWE&TS. The plume redelineation program was completed in order to identify the current horizontal and vertical extents of the remaining groundwater plume associated with the Site.

The results of the plume redelineation program were documented in the July 2015 Plume Redelineation Summary Report. Based on the plume redelineation program and given that the greatest current PCE exceedances were identified upgradient of the Site, the groundwater plume currently being captured by the GWE&TS may have, in part, resulted from an off-site "source area" located upgradient of the site. It should be noted that the November 1998 RI/FS identified at least three former dry cleaners known to have existed in an upgradient arrangement with respect to the Site. Once the upgradient "source areas" are identified and addressed, it may be warranted to pursue alternate remedial actions, such as a chemical injection program, to address any residual contamination at that time.

Treatment System Operational Status

Throughout this reporting period the NYSDEC Remedial Services Contractor has reported low-level alarm conditions at EW-2 resulting in extended downtime at the start of this reporting period and reoccurring issues proceeding. In an effort, to mitigate this down time and keep the GWE&TS system running the NYSDEC Remedial Service Contractor decided to lower the flow rate at EW-2 from an average of 6.0 gpm to 4.5 gpm. EW-2 is slated to be re-developed to increase the yield of the extraction well.

Treatment System Performance Summary

The GWE&TS performance during the current reporting period and since inception in September 2004 is summarized below. System monitoring and sampling results are further detailed below in the following subsection.

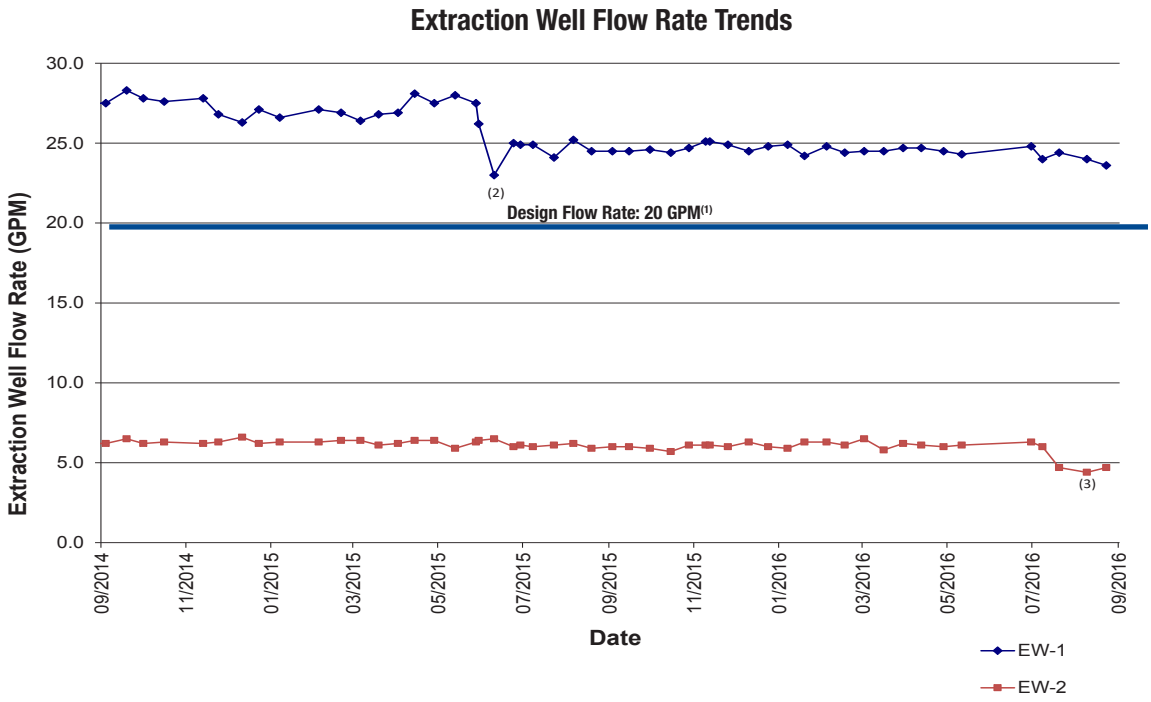
Treatment System Performance Summary[2]

Parameter	Quarter 48 (June 1, 2016 through August 31, 2016)	Quarter 47 (March 1, 2016 through May 31, 2016)	Totals to Date (2004 through current Quarter)
Influent			
EW-1 Average Pumping Rate (gal per min)	24.2	24.5	34.2
EW-1 Total Flow Volume (gal)	2,268,600	3,149,822	192,966,890
EW-1 Maximum Influent PCE Concentration (ug/l)	4.4	5.8	44
EW-2 Average Pumping Rate (gal per min)	5.2	6.1	5.3
EW-2 Total Flow Volume (gal)	485,954	776,728	30,152,873
EW-2 Maximum Influent PCE Concentration (ug/l)	110	100	370
Influent Total Flow Volume (gal)	2,754,554	3,926,550	223,119,763
Effluent			
Effluent Total Flow Volume (gal)	3,209,065	4,540,930	268,179,174
Maximum Effluent PCE Concentration (ug/l)	Nondetect	Nondetect	1.0
VOC Removal Summary			
Total PCE Removal (lbs)	0.32	0.77	57.34
Average PCE Removal Rate (lbs/hr)	3.28 E-04	3.58E-04	4.56E-04
PCE Removal Efficiency Range (%)	99.40-99.53	99.46 - 99.51	90.00-99.84

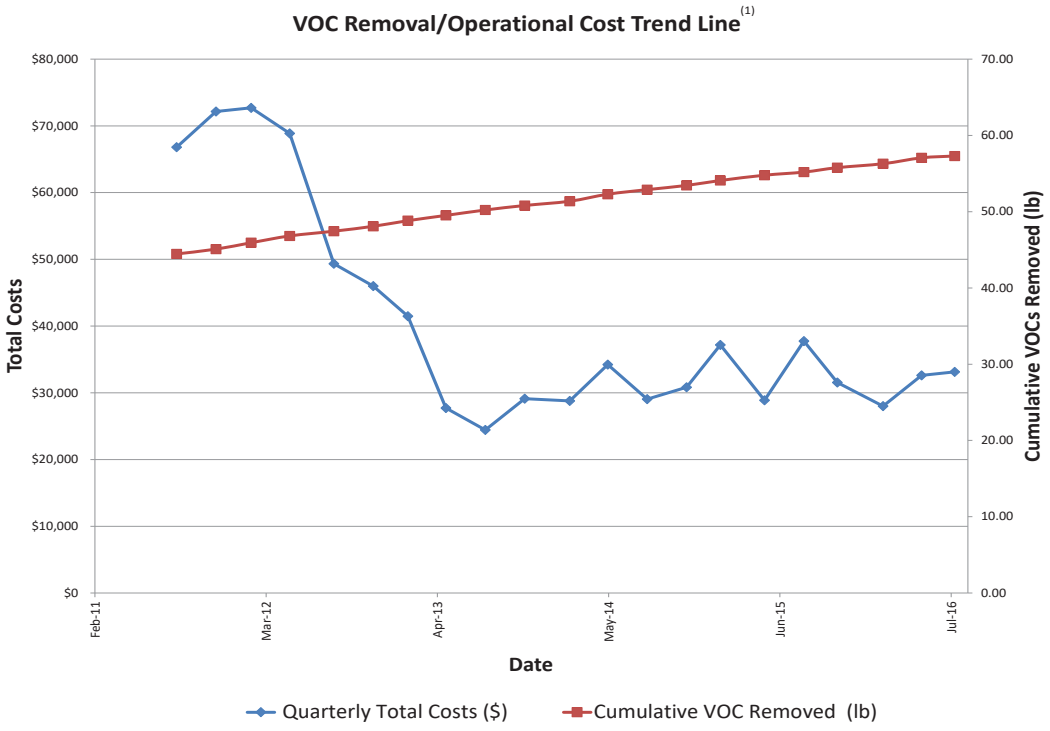
Notes:

1. System influent and effluent pumping rates and volumes are monitored on a bi-weekly basis. Due to total flow volume inconsistencies, replacement of the influent flow meters was performed on June 23, 2011. Total flow volume inconsistencies remained with respect to influent/effluent flow; therefore, the effluent flow meter was replaced on May 2, 2012. Although the system influent and effluent total flow volumes have been more consistent since the effluent flow meter replacement, system influent and effluent total flow volumes remain dissimilar.

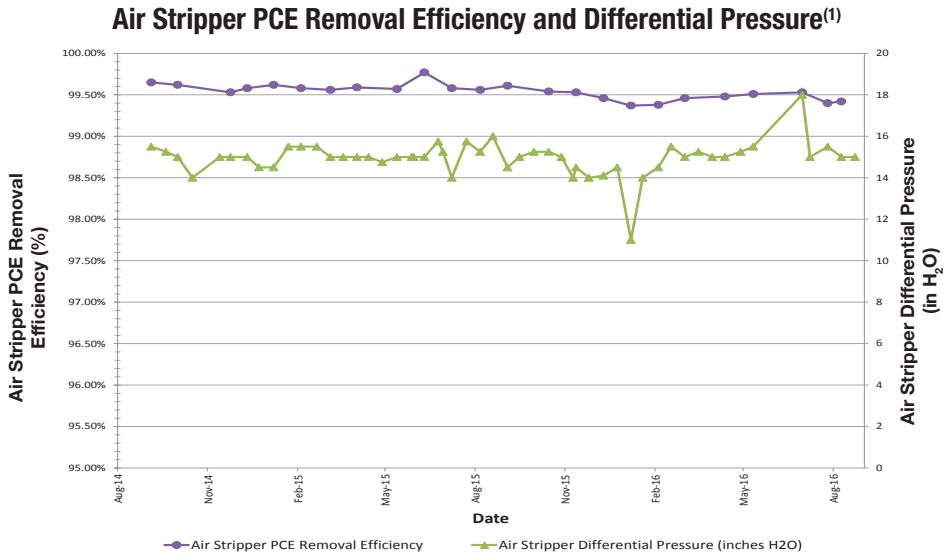
2. More detailed contaminant concentration information is provided below.



1. Based on the results of capture zone design modeling, containment of the Franklin Cleaners chlorinated plume (at an approximate 450-foot width) would be achieved with the GWE&TS operating at a minimum required pumping rate of 20 gpm, in a one or two extraction well scenario. Extraction well EW-1 has been operating at an average flow rate of approximately 35 gpm since system start-up to provide for a greater factor of safety and ensure the full width of the plume is captured. Extraction well EW-2 has been operating at an average flow rate of approximately 5 gpm since system start-up due to the elevated VOC concentrations present within this well. It should be noted that the maximum yield for EW-2 has historically been limited to a range of 5 to 7 gpm due to a high silty/clay component in the screened interval of this extraction well.
2. After a system shut down that occurred on May 31, 2015, the system was restarted by the NYSDEC Remedial Services Contractor on June 10, 2015 at a slightly lower VFD frequency setting (approximately 60 to 63 Hz.) than prior to the shut down (approximately 66 to 68 Hz.)
3. The flow rate for EW-2 was slightly decreased during this reporting period due to several low-level alarm conditions reported throughout the reporting period. EW-2 is slated to be re-developed in an effort to increase the yield of the well.



1. A plume redelineation program was completed In June and July, 2014, per recommendations of the RSO evaluation of the Site. Costs associated with the RSO and associated plume redelineation program, including subcontractor, engineering costs and sample analyses have been excluded from the routine operational costs to date, and total approximately $205,000, based on the cost information provided by the NYSDEC. As a detailed breakdown of the NYSDEC Remedial Services Contractor's RSO-related costs are not available to D&B, the total VOC removal costs during the associated reporting period were calculated utilizing an average of the monthly subcontractor costs from January 2013 to December 2013, prior to the beginning of the RSO evaluation activities.



1. The approximate PCE removal efficiency for the low-profile stacked-tray air stripper ranged from 99.40% to 99.53% during this reporting period. Additionally, the average differential pressure across the low-profile air stripper was well below 45 inches of water (manufacturer's recommended threshold for equipment maintenance) during this reporting period.

Treatment System Operation and Maintenance

Routine and non-routine system maintenance activities are discussed below. A table summarizing the required routine equipment maintenance, as well as a summary of the alarm conditions and associated system runtime/downtime for this reporting period, are provided below. Refer to *Attachment B* for operation and maintenance logs, as prepared by the NYSDEC Remedial Services Contractor for this reporting period.

Routine Treatment System Monitoring and Equipment Maintenance Schedule Summary

Inspection/ Maintenance Item	Manufacturer	Model Number	Frequency	Maintenance Summary					
				Current Reporting Period			Next Reporting Period		
				Jun-16	Jul-16	Aug-16	Sept-16	Oct-16	Nov-16
System Monitoring	--	--	Bi-Weekly	6/30/16 [1]	7/8/16 7/26/16	8/9/16 8/23/16			
Extraction Well Pumps	Grundfos Pump Corp.	Redi-Flo-4 Model 25E3	As needed based on flow trends						
Air Stripper	Carbonair	STAT Model 180	As needed based on differential pressure readings						
Pressure Blower Maintenance	New York Blower Company	Model 2506A	Bi-Monthly	6/30/16	7/19/16 7/26/16	8/9/16 8/23/16			
Vapor Carbon Vessels	Tetrasolv Filtration Inc.	Model VF-1000	As needed based on PID screening results						
Wet Well Submersible Pump Maintenance	Flygt Corporation	Model CP3085	Annual						
Sump Pump	Grundfos Pump Corp.	Model KP-350	As needed						
Blower Vent Screen Cleaning/Maintenance	--	--	As needed						
Flow Meter Vault Effluent Screen Cleaning/Maintenance	--	--	Annually						
Wet Well Strainer Cleaning/Maintenance	--	--	Annually						

: Planned activity

Notes:
1. Per NYSDEC direction, only one routine monitoring event was completed in June 2016 due to budget limitations.

Non-Routine Treatment System Maintenance

Non-routine system maintenance activities were not conducted during this reporting period.

Facility Maintenance

- On July 19, 2016 the NYSDEC Remedial Services Contractor was on site responding to an alarm condition. While on Site the Remedial Services Contractor conducted landscaping activities and assesed potential traffic safety issues in preparation for the upcoming EW-2 well development.
- On June 30, July 19, July 26 and August 9, 2016 the NYSDEC Remedial Services Contractor was on-site to conduct landscaping activities.

Alarm Conditions

The following alarm conditions occurred during this reporting period:

- On June 30, 2016 the NYSDEC Remedial Services Contractor was on-site to conduct routine system monitoring and observed that the GWE&TS was not operating. Although the date and time of shutdown was not reported by the NYSDEC Remedial Services Contractor, based on review of the NYSDEC Remedial Service Contractors' operational time logs, D&B determined that the GWE&TS shut down occurred on June 9, 2016. The NYSDEC Remedial Services Contractor restarted the GWE&TS upon departure from the site.
- On July 8, 2016 the GWE&TS shut down due to a "low level" condition at extraction well EW-2. The NYSDEC Remedial Services Contractor reset and restarted the GWE&TS on that same day.
- On July 11, 2016 the GWE&TS shut down due to a general system alarm. The NYSDEC Remedial Services Contractor reset and restarted the GWE&TS that same day.
- On July 13, 2016 the GWE&TS shut down due to a "low level" condition at extraction well EW-2. The NYSDEC Remedial Services Contractor reset and restarted the GWE&TS on that same day.
- On July 16, 2016 the GWE&TS shut down due to a "low level" condition at extraction well EW-2. The NYSDEC Remedial Services Contractor reset and restarted the GWE&TS on July 19, 2016.
- On July 22, 2016 the GWE&TS shut down due to a "low level" condition at extraction well EW-2. The NYSDEC Remedial Services Contractor reset and restarted the GWE&TS that same day.
- On July 26, 2016 the GWE&TS shut down due to a "low level" condition at extraction well EW-2. The NYSDEC Remedial Services Contractor reset and restarted the GWE&TS that same day.

Treatment System Runtime/Downtime Summary

Runtime - Current Reporting Period[1]	1,565 hours	70.9%
Downtime - Current Reporting Period[1]	643 hours	29.1%
Total Runtime to Date[2]	94,776 hours	90.64%
Total Downtime to Date	9,782 hours	9.36%

1. Total elapsed time for current reporting period, 2,208 hours (June 1, 2016 through August 31, 2016).
2. Based on a system start-up date of September 20, 2004.

Treatment System Monitoring and Sampling Results

Per the requirements of the NYSDEC-approved schedule, monthly, quarterly and semi-annual system sampling was completed by the NYSDEC Remedial Services Contractor, as follows:

Treatment System and Groundwater Sampling Summary

Sampling Location	Monthly VOC (EPA Method 8260)	Semi-Annual VOC (EPA Method TO-15)	Monthly Iron & Manganese (EPA Methods 6010)	Semi-Monthly Effluent pH (Field Screening)
Extraction Well EW-1 and EW-2 Influent	6/30/16, 7/26/16, 8/9/16	NA	NA	NA
Air Stripper Aqueous-phase Effluent	6/30/16, 7/26/16, 8/9/16	NA	6/30/16, 7/26/16, 8/9/16	6/30/16, 7/8/16, 7/26/16, 8/9/16, 8/23/16
Air Stripper Vapor-phase Effluent	--[1]	NA	NA	NA

NA: Not a routine sample collection location.

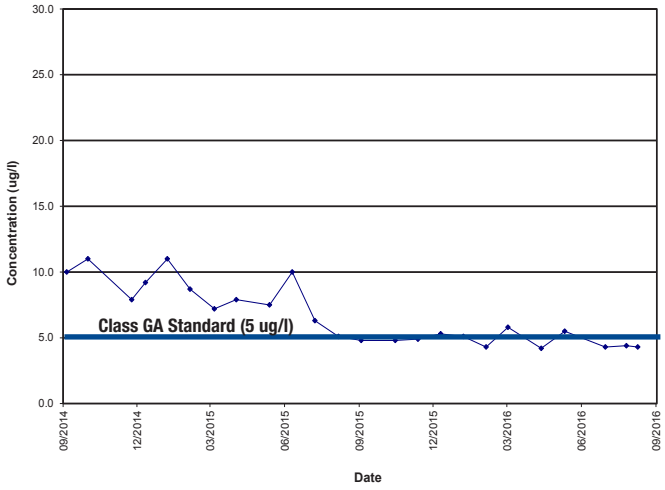
1. Monthly effluent vapor samples are collected utilizing tedlar bags and analyzed utilizing a hand-held photoionization detector (PID).

Extraction Wells - Treatment System Influent PCE Concentration Ranges/Averages[1]

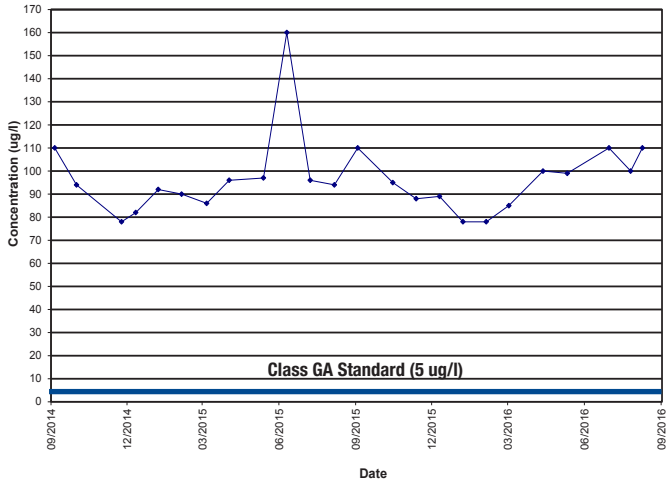
Sample Location	Current Reporting Period	Previous Reporting Period	Average for Most Recent 1-year Period	Average to Date	Groundwater Standard
Extraction Well EW-1	4.3 ug/l - 4.4 ug/l	4.2 ug/l - 5.8 ug/l	4.8 ug/l	16 ug/l	5.0 ug/l (Class GA)
Extraction Well EW-2	100 ug/l - 110 ug/l	85 ug/l - 100 ug/l	95.0 ug/l	91 ug/l	5.0 ug/l (Class GA)

1. It should be noted that chloroform, methyl tert-butyl ether (MTBE) and/or TCE were detected in one or more influent samples collected from extraction well EW-2; however, these compounds were detected at concentrations well below their respective Class GA Groundwater Standards.

Extraction Well EW-1 Influent PCE Concentration Trend Line



Extraction Well EW-2 Influent PCE Concentration Trend Line



Aqueous-Phase Air Stripper Effluent Concentration Ranges

Discharge Permit Parameters	Current Reporting Period	Previous Reporting Period	Site-Specific Effluent Limit
PCE	ND	ND	5.0 ug/l
TCE	ND	ND	10.0 ug/l
1,1-DCE	ND	ND	10.0 ug/l
Cis-1,2-DCE	ND	ND	10.0 ug/l
1,1,1-TCA	ND	ND	10.0 ug/l
Iron	428 ug/l - 2,620 ug/l	92.1 ug/l - 452 ug/l	1,000 ug/l
Manganese	25.2 ug/l - 76.7 ug/l	10.7 ug/l - 28.5 ug/l	1,000 ug/l
pH (Field Screening Results)[1]	6.86 - 8.91	6.54 - 7.46	6.5 - 8.5

Notes:

ND: Constituent concentration below the analytical detection limit.

Site-specific effluent limits, per the SPDES permit equivalency. Red font denotes an exceedance of the site-specific effluent limits.

1. In addition to the pH readings collected on a monthly basis, as provided on the analytical data tables in Attachment C, the NYSDEC Remedial Services Contractor collects pH readings on a semi-monthly basis during routine system monitoring events. The provided pH screening results incorporate both sets of data.

Treatment System Vapor-Phase Discharge		
	Current Reporting Period	*Site-Specific Discharge Limit*
Total VOC Concentrations (field screening with PID)[1]	0.0 - 0.2 ppm	NA
Total VOC Concentrations (laboratory analysis)[2]	--	NA
Average Pressure Blower Flow Rate	645 cfm	NA
Maximum Total VOC Emissions[3]	0.003 lbs/hr	0.5 lbs/hr[4]

--: Not analyzed

NA: Not applicable

ppm: parts per million

1. The PID screening is utilized as a means to instantaneously monitor total vapor-phase VOC discharge concentrations.
2. Vapor-phase discharge samples for laboratory analysis via Method TO-15 are collected on a semi-annual basis and were not collected during this reporting period. Vapor-phase effluent samples for laboratory analysis were last collected on April 12, 2016.
3. Total VOC emissions were calculated utilizing the "worst-case" scenario data obtained with a PID.
4. The site-specific effluent limit of 0.5 lbs/hr was developed in consultation with the NYSDEC as a means to monitor the vapor-phase VOCs discharged by the GWE&TS.

Groundwater Monitoring Summary

The network of groundwater monitoring wells were sampled on July 6, 2016, with the exception of ASMW-7, which was sampled on July 13, 2016, as permission must be obtained by Molloy College prior to sampling this well. The network of groundwater monitoring wells were sampled to determine groundwater quality at, and in the vicinity of, the leading edge of the groundwater contaminant plume associated with the Site. Groundwater samples were collected from three groundwater monitoring wells located in close proximity to the leading edge of the Franklin Cleaners plume (ASMW-1 through ASMW-3), and four groundwater monitoring wells located downgradient of the leading edge of the plume (ASMW-4 through ASMW-7). It should be noted that, according to the routine ground water sampling schedule, groundwater samples were only to be collected from ASMW-1, ASMW-2, and ASMW-4 during this reporting period; however, the NYSDEC Remedial Services Contractor inadvertently collected groundwater samples from the complete network of monitoring wells. The NYSDEC Remedial Services Contractor will adhere to the routine groundwater sampling schedule moving forward.

Note that groundwater monitoring well ASMW-4 acts as an early warning or "sentinel" well for a cluster of Village of Rockville Centre public supply wells located downgradient of the treatment system building. The locations of the groundwater monitoring wells are depicted on *Figure 3*.

Groundwater Monitoring Well Condition Summary:

All of the sampled groundwater monitoring wells were found to be accessible during the groundwater monitoring/sampling events conducted on July 6 and 13, 2016. All groundwater monitoring wells were located as indicated on the site map and the concrete well pads (where applicable), protective casings, surface seals, well IDs, PVC well risers, well plugs and locks were observed to be present and in good condition, with the following exceptions:

- The concrete well pad at monitoring well ASMW-5 was observed to be damaged due to heavy vehicular traffic through the area. According to information provided by NYSDEC Remedial Services Contractor, it is recommended that the manhole be raised or the well casing be lowered.
- A lock is not present at monitoring wells ASMW-4 and ASMW-5. The locks at monitoring wells ASMW-4 and ASMW-5 need to be replaced.
- The well IDs for monitoring wells ASMW-5 and ASMW-6 are not visible.

Field inspection logs for all groundwater monitoring wells assessed during this period are provided in Attachment D.

Groundwater Monitoring Results Summary:

A headspace reading was collected at each of the sampled groundwater monitoring wells immediately after the removal of the well plugs utilizing a PID. Total VOC concentrations in all groundwater monitoring wells were non-detect.

Below is a detailed summary of PCE concentrations in site groundwater. Refer to *Attachment C* for analytical data results.

Groundwater Monitoring Wells - PCE Concentrations

	Leading Edge Monitoring Wells			Sentinel Monitoring Wells				Class GA Groundwater Standard
Monitoring Well[1]	**ASMW-1**	**ASMW-2**	**ASMW-3**	**ASMW-4**	**ASMW-5**	**ASMW-6**	**ASMW-7**	
Current Reporting Period	47 ug/l	0.75 ug/l	ND	ND	ND	ND	ND	5.0 ug/l
Previous Reporting Period	21 ug/l	0.55 ug/l	0.18	ND	ND	ND	ND	5.0 ug/l
2-Year PCE Trend Analysis[2]	Increasing	Stable	Stable	Stable	Stable	Stable	Stable	

ND: Constituent concentration below the analytical detection limit.

--: Not sampled.

Red font denotes an exceedance of the Class GA Groundwater Standard.

In addition to PCE, chloroform, MTBE and 1,1,1-trichloroethane were detected in one or more groundwater monitoring well during this reporting period; however, these compounds were detected at concentrations well below their respective Class GA Standards.

1. Click on monitoring well IDs with blue text for graphs depicting PCE concentrations over the last 2 years in wells exhibiting exceedances of the Class GA Groundwater Standard for this and the previous reporting period.
2. Trend analysis is calculated based on an increase or decrease of 5.0 ug/l over a 2-year time frame.

A figure depicting the current PCE concentrations in groundwater is provided as *Figure 4*.

Data Validation:

All sample results have been reviewed by D&B and deemed valid and usable for environmental assessment purposes. Data Validation Checklists are presented in *Attachment E*. Based on D&B's review, qualification of the data was necessary for the following analyses:

- The percent recoveries (%Rs) were above the quality control (QC) limits for 1,2-dichloropropane, isopropylbenzene, o-xylene and styrene in the laboratory control sample (LCS), matrix spike (MS) sample and/or matrix spike duplicate (MSD) sample associated with the samples collected on June 30, 2016. These compounds were not detected in the associated samples; therefore, qualification of the data was not necessary.
- The relative percent difference (RPD) was above the QC limit for chloroethane in the samples collected on July 6, 2016. Chloroethane was not detected in the associated samples; therefore, qualification of the data was not necessary.
- The RPD was above the QC limit for 1,4-dioxane in the sample collected from ASMW-7 on July 13, 2016. 1,4-Dioxane was not detected in the sample collected from ASMW-7; therefore, qualification of the data was not necessary.
- The %R was above the QC limit for chloroethane in the LCS associated with the samples collected on July 26, 2016. Chloroethane was not detected in the associated samples; therefore, qualification of the data was not necessary.
- The RPD was above the QC limits for bromomethane, chloroethane, chloromethane, dichlorodifluoromethane, trichlorofluoromethane and vinyl chloride in the samples collected on July 26, 2016. These analytes were not detected in the associated system samples; therefore qualification of the data was not necessary.

All analytical data have been submitted to the NYSDEC in the required EQuIS format upon receipt of the data from the NYSDEC Remedial Services Contractor.

Treatment System Operational Costs

The total cost of operation of the GWE&TS from June 1, 2016 through August 31, 2016 was approximately $33,142. This total includes engineering and subcontractor costs, as well as utility costs associated with the operation of the GWE&TS (electric and telephone). It should be noted that this total does not include any administrative costs incurred by the NYSDEC in support of this project throughout this reporting period. A review of these costs is provided below.

Reporting Period Cost Summary[1]

COST ITEM	CURRENT REPORTING PERIOD BUDGET EXPENDED (June 1, 2016 through August 31, 2016)	PREVIOUS REPORTING PERIOD BUDGET EXPENDED (March 1, 2015 through May 31, 2016)
ENGINEERING SUPPORT		
D&B Engineers and Architects, P.C.	$14,706	$18,582
SUBCONTRACTORS		
NYSDEC Remedial Services Contractor[2] (Routine/Non-Routine Maintenance Activities)	$11,563	$7,616
Test America (Analytical Laboratory)	$880	$1,198
SUB-TOTAL	$12,443	$8,814
UTILITIES		
Electric	$5,993	$5,207
SUB-TOTAL	$5,993	$5,207
TOTAL COSTS	$33,142	$32,603
AVERAGE COST/MONTH	$11,047	$10,868
COST/POUND OF VOC REMOVED	$103,569[3]	$42,342[4]

1. The treatment system costs include monthly utility charges, maintenance costs and engineering costs. Capital construction costs and NYSDEC project management effort are not included in this evaluation. Total costs to date since July 2006 are approximately $1,697,031.
2. All expenses and labor are incorporated into the NYSDEC Remedial Services Contractor overall costs, excluding electric and telephone costs.
3. Based on a total of approximately 0.32 lbs of total VOCs removed during this reporting period.
4. Based on a total of approximately 0.77 lbs of total VOCs removed during the previous reporting period.

Findings and Recommendations

Findings:

- General: Routine monitoring is conducted on a bi-weekly basis per the NYSDEC-approved schedule. However, due to budget limitations and as per NYSDEC direction, monitoring was put on hold during June 2016. As such, only one monitoring event was completed in June of this reporting period.
- Extraction Well Contaminants and Flow: The analytical results of the system influent samples demonstrate that groundwater extraction wells EW-1 and EW-2 continue to capture VOC-contaminated groundwater. Extraction well EW-1 operated at an average flow rate of 24.2 gpm and extraction well EW-2 operated at an average flow rate of 5.2 gpm throughout this reporting period. However, it should be noted that the flow rate at EW-2 was slightly decreased during this reporting period due to several low-level alarm conditions reported throughout this reporting period. EW-2 is slated for re-development in an effort to increase the yield of the well.
- GWE&TS Routine Maintenance and Monitoring: Routine monitoring during this reporting period was not conducted in accordance with the bi-monthly schedule due to budget limitations, as discussed above. In addition, maintenance

of the pressure blower during this monitoring period was not completed in accordance with the routine bi-monthly schedule. This item was completed on five occasions during this reporting period, rather than the one required time. The NYSDEC Remedial Services Contractor indicated that maintenance of the pressure blower is being conducted more frequently than the NYSDEC-approved schedule as the "maintenance is critical, not time consuming and ensures that the task is not overlooked."

- Treatment System Runtime: The treatment system was operational for approximately 70.9% of this reporting period (approximately 1,565 hours). The downtime observed during this reporting period (643 hours or 29.1%) was primarily due to "low-level" conditions present in well EW-2.
- Low Level in EW-2: As previously discussed, several "low level" alarm conditions occurred at well EW-2 during this reporting period resulting in system downtime.
- Air Stripper: The air stripper continues to operate efficiently and within its design specifications.
- Air Stripper Discharge Parameters (aqueous-phase): All aqueous-phase discharge analytes were non-detect or detected at concentrations below their respective site-specific effluent limits, except for iron detected at a concentration of 2,620 ug/l and pH measured at 8.91 s.u. on June 30, 2016 in excess of their limits of 1,000 ug/l and 8.5 s.u., respectively.
- Air Stripper Discharge Parameters (vapor-phase): The vapor-phase discharge piping outlet exhibited VOC concentrations ranging from non-detect to a max of 0.2 ppm, as detected utilizing a PID. Total VOC concentrations were well below the site-specific total VOC effluent limit of 0.5 lbs/hr.
- Groundwater Monitoring Well Inspection/Sampling Summary: All of the sampled groundwater monitoring wells were found to be accessible during the groundwater monitoring/sampling events conducted on July 6 and 13, 2016. All groundwater monitoring wells were located as indicated on the site map and the concrete well pads (where applicable), protective casings, surface seals, well IDs, PVC well risers, well plugs and locks were observed to be present and in good condition, with the following exceptions:
    - The concrete well pad at monitoring well ASMW-5 was observed to be damaged due to heavy vehicular traffic through the area. According to information provided by NYSDEC Remedial Services Contractor, it is recommended that the well manhole be raised or the well casing be lowered.
    - A lock is not present at monitoring wells ASMW-4 and ASMW-5. The lock at monitoring wells ASMW-4 and ASMW-5 need to be replaced.
    - The well IDs for monitoring wells ASMW-5 and ASMW-6 are not visible.
  - Monitoring Well PCE Exceedances: PCE was detected at a concentration of 47 ug/l in groundwater monitoring well ASMW-1, exceeding the Class GA Standard of 5.0 ug/l. PCE concentrations in ASMW-1 have been slightly irregular, over the last 2 years (ranging from 19 ug/l in October, 2015 to a maximum of 57 ug/l, detected in July 2015). Additionally, PCE concentrations are exhibiting an increasing trend over the last two years.

Recommendations:

- General Treatment System:
  - Continue operation of the GWE&TS.
  - D&B recommends that the NYSDEC Remedial Services Contractor record more clear and detailed descriptions of completed field activities and issues encountered, as well as alarm triggers, downtime dates and times and the steps taken to bring the GWE&TS back online on the Site Activities and System Operation Logs, as appropriate. In addition, logs received over the last several quarters have included multiple copies of logs, including some differing information. Furthermore, it is recommended that the NYSDEC Remedial Services Contractor provide more detail regarding which screens are being inspected and cleaned (i.e. blower vent screen, flow meter vault effluent screen and wet well strainer). As such, D&B further recommends that the NYSDEC Remedial Services Contractor make an effort to provide one set of logs with all descriptions and dates of activities clearly indicated. These steps will help enable D&B to better understand the current status of the GWE&TS and facilitate more efficient preparation of the Site Management Quarterly Reports.

- GWE&TS Routine Maintenance and Monitoring: Based on the requirements of the NYSDEC-approved schedule, routine maintenance of the pressure blower should be completed on a bi-monthly frequency and routine system monitoring should be completed on a semi-monthly basis. It is recommended that the NYSDEC Remedial services Contractor conduct routine maintenance and monitoring as per the approved schedule in order to limit the completion of unnecessary work and associated costs.
- Low Level EW-2: It is recommended that the NYSDEC Remedial Services Contractor redevelop EW-2 to ensure it is able to provide sufficient yield to prevent a low groundwater level in the well during operations of the submersible pump.

- Monitoring Well PCE Exceedances: Wide fluctuations of PCE concentrations have been detected in ASMW-1 over the last several sampling events. As such, it is recommended that the NYSDEC verify that proper and consistent sampling procedures are being utilized to sample ASMW-1 and other monitoring wells. In addition, D&B will closely monitor PCE concentrations within this well.
- Groundwater Monitoring Well Repairs: Based on field monitoring of the network of groundwater monitoring wells it is recommended that the NYSDEC Remedial Services Contractor install new locks on wells ASMW-4 and ASMW-5. It is also recommended that the manhole cover, protective casing and surface seal present at ASMW-5 be repaired and replaced. Based on the recommendations presented in the May 2012 RSO Report, the following monitoring well repair-related items have not yet been addressed:
  - Re-survey any wells where the casing elevation has changed as a result of the completed well repair activities.

Reclassification/Delisting Evaluation

The Site was originally listed as a Class 2 Inactive Hazardous Waste Site by the NYSDEC on June 17, 1993. Since this time, completion of the following project phases has occurred, as summarized below:

Project Phases and Completion Dates

Project Phase	Completion Date
Remedial Investigation	03/1998
Remedial Design	02/2001
Groundwater Extraction and Treatment System Construction	07/2003 (2)
Remedial Action (Source Area Remediation)	03/2007 (1)

1. Source area contaminated soil and groundwater were remediated with the Air Sparge/Soil Vapor Extraction (AS/SVE) system beginning in September 2003. The on-site AS/SVE system has successfully removed the contaminants from the vadose zone and greatly diminished groundwater contaminants to below detectable limits. Although confirmation soil samples met the required remedial goals, a subslab depressurization system replaced the on-site AS/SVE system in 2006 due to the detection of elevated vapor phase VOC concentrations in the basement level and below the basement floor slab.
2. Construction of the GWE&TS was completed in July 2003. The GWE&TS was placed into routine operation in September 2004 and currently continues to meet remedial objectives as originally designed.

Given the above, NYSDEC reclassified the Franklin Cleaners GWE&TS Site on December 11, 2012, pursuant to the requirements identified in 6 NYCRR §375-2.7, as a Class 4 Site since the NYSDEC determined that the site no longer presents a significant threat to public health and/or the environment based on remedial efforts performed to date and implementation of the July 2012 Site Management Plan (SMP). In addition, the NYSDEC has implemented a post-remedial indoor air study within the source area structures/buildings to verify current site conditions. Site delisting is not feasible at this time, as all remediation and post-remediation activities have not been satisfactorily completed.

Report Certification:

I have personally examined and am familiar with the information submitted in the referenced report. To the best of my knowledge and belief, and based upon my inquiry of those individuals immediately responsible for obtaining the information reported therein, I certify that the submitted information is true, accurate, and complete.

Project Director: _____ 5-11-17

Richard M. Walka — **Date**
Senior Vice President

Project Manager: _____ 5/11/17

James Van Horn — **Date**
Project Manager