

## 2.0 FIELD INVESTIGATION PROGRAM

This section provides an overview of the field activities associated with the supplemental field program. In addition, this section provides information on data management, and chemical data validation and usability.

### 2.1 Organization and Overview of Field Program Activities

Consistent with the initial field program completed in the Fall of 2000, environmental samples collected as part of the supplemental field program from on-site locations have been grouped into what is referred to as the On-site Field Investigation Program, and samples collected from off-site locations have been grouped into what is referred to as the Off-site Field Investigation Program. However, the on-site field investigation includes “off-site” samples collected adjacent to the Bay Shore Site as far south as Union Boulevard. The Off-site Field Investigation Program includes all other off-site locations.

Consistent with the Supplemental Field Investigation Work Plan and the operable unit designations discussed in **Section 1.5**, the On-site Field Investigation Program has been further divided into the following areas:

- Bay Shore Site and adjacent off-site locations (Operable Unit 1)
- The Bay Shore West Parcel (Operable Unit 1)
- The Bay Shore West Storage Lot Parcel (Operable Unit 3)

The Off-site Field Investigation Program has been divided into the following areas:

- The Bay Shore Plume IRM (Operable Units 1 and 2)
- O-Co-Nee Pond (Operable Unit 3)
- Watchogue Creek/Crum’s Brook (Operable Unit 4)

In addition, the supplemental field program included a private well and basement survey that was completed by KeySpan within populated areas downgradient of the Bay Shore/Brightwaters Former MGP Site.

The field investigation was conducted in order to meet the objectives defined in **Section 1.1** and included:

- Test pit excavation and sampling;
- Surface soil sampling;
- Subsurface soil sampling;
- Groundwater probe installation and sampling;
- Groundwater monitoring well installation and sampling;
- Perimeter air monitoring;
- Surveying and mapping;
- Private well and basement survey;
- Ambient outdoor and indoor air sampling; and
- Private groundwater well sampling.

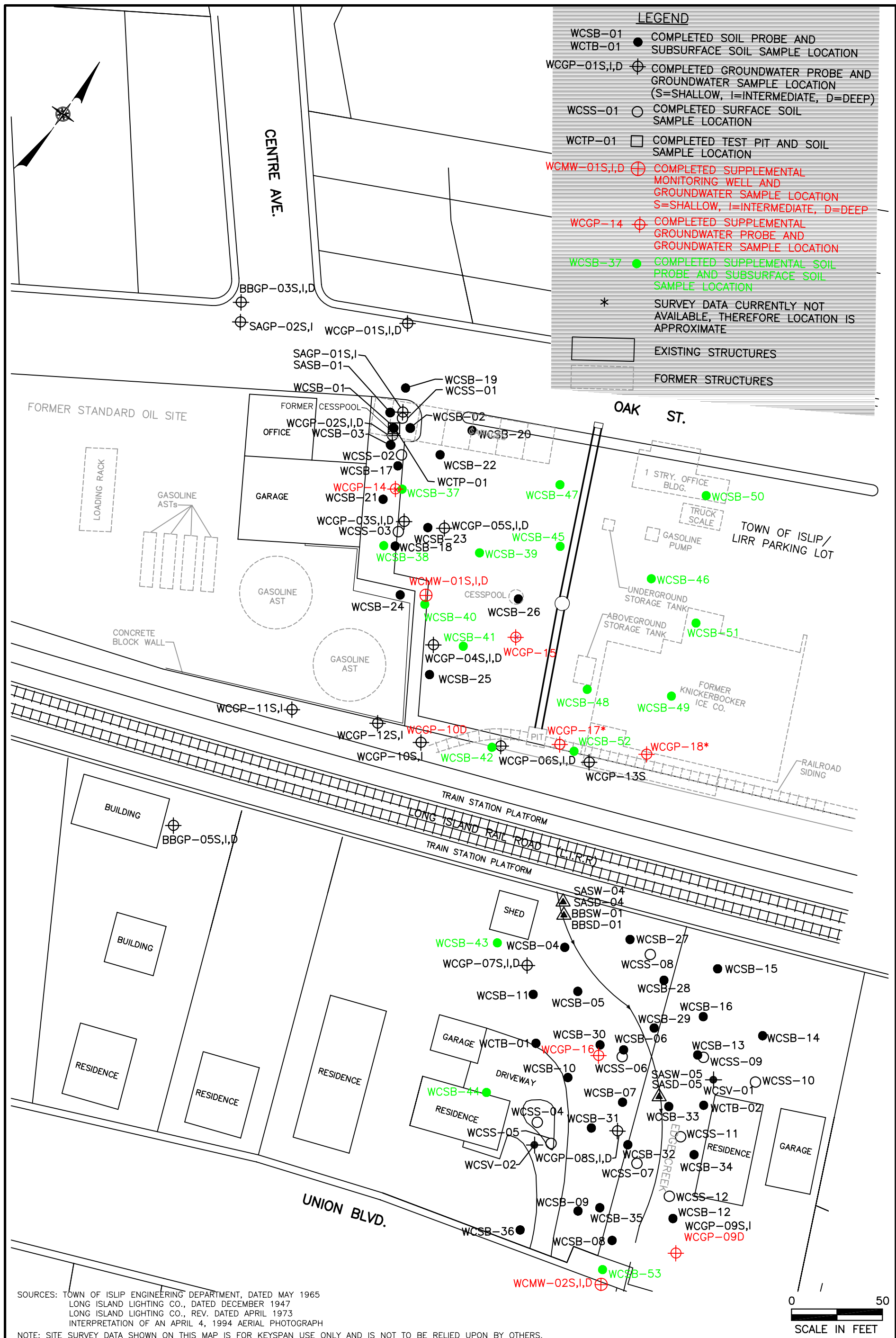
Environmental samples collected as part of the field investigation program were analyzed for various chemical constituents. The media sampled, chemical constituents analyzed and the laboratory methods associated with these analyses are summarized in **Table 2-1**. On-site and adjacent off-site sample locations are shown on **Drawing 2A**. Off-site sample locations are shown on **Drawing 2B**. The sample locations from the Watchogue Creek/Crum's Brook area are shown on **Figure 2-1**. Locations where private groundwater well and air samples were collected are shown on **Figure 2-2**. All drawings are provided in a map pocket at the end of this section.

**TABLE 2-1**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**SAMPLE MEDIA, CHEMICAL CONSTITUENTS AND ANALYTICAL METHODS**

<b>CHEMICAL CONSTITUENTS</b>	<b>SAMPLE MEDIA AND ANALYTICAL METHOD</b>	
	<b>Soil</b>	<b>Groundwater</b>
BTEX	USEPA Method 8021	USEPA Method 8021
PAHs	USEPA Method 8270	USEPA Method 8270
RCRA Metals	USEPA Methods 6010/7471	--
PCBs	USEPA 8082	--
Total Organic Carbon	USEPA Method 9060	--
Petroleum Fingerprint and Total Petroleum Hydrocarbons (TPHCs)	Method 310.13	Method 310.13

**Notes:**

--: Not applicable.



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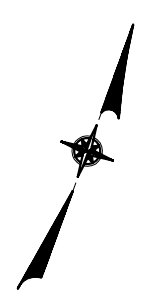
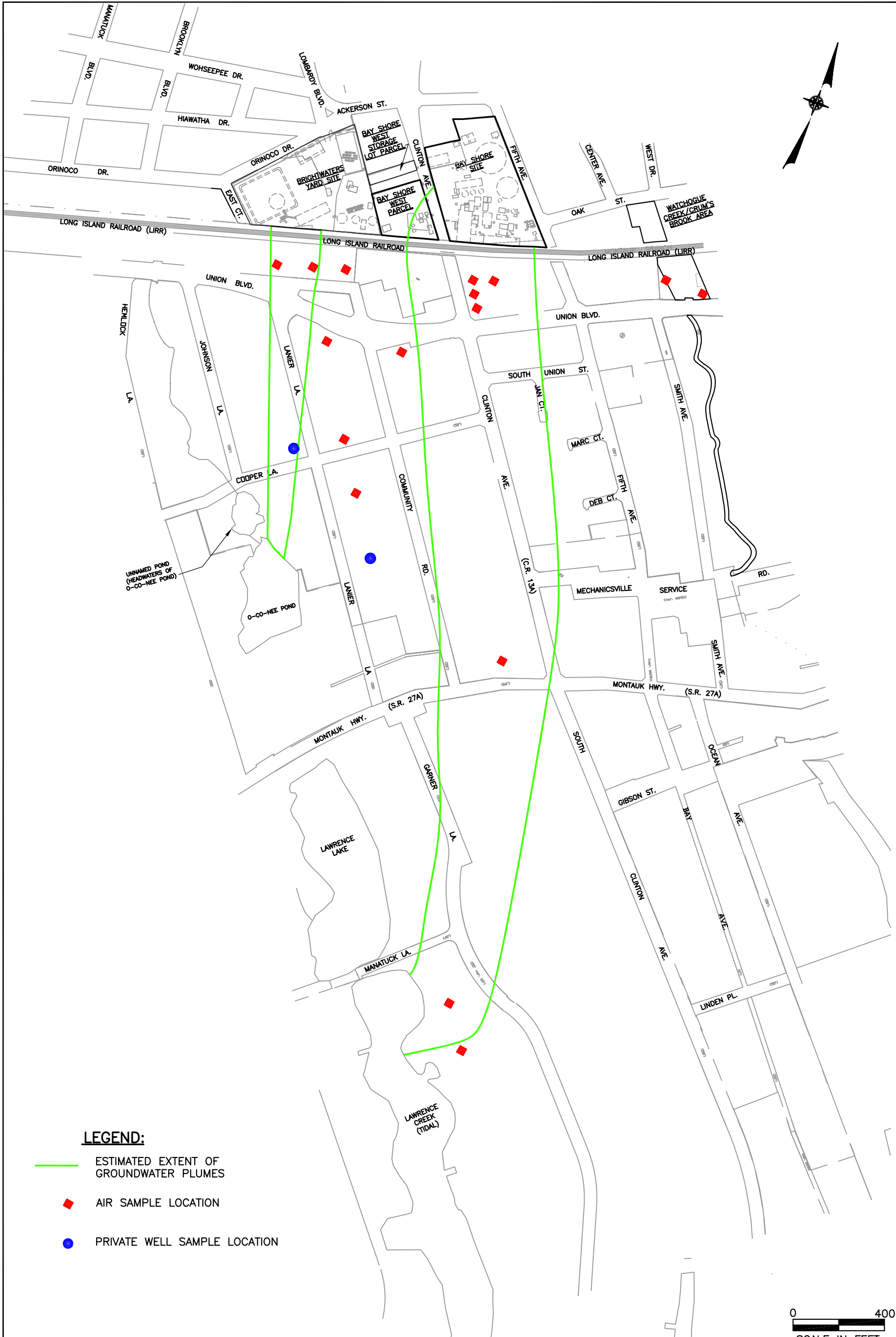
WATCHOGUE CREEK/CRUM'S BROOK AREA  
 SAMPLE LOCATION MAP



Dvirka and Bartilucci  
 Consulting Engineers  
 A Division of William F. Cosulich Associates, P.C.

FIGURE 2-1

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**LEGEND:**

- ESTIMATED EXTENT OF GROUNDWATER PLUMES
- ◆ AIR SAMPLE LOCATION
- PRIVATE WELL SAMPLE LOCATION



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**PRIVATE GROUNDWATER WELL AND AIR SAMPLE LOCATION MAP**

FIGURE 2-2



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## 2.2 Field Methods/Procedures

Drilling and sampling methodologies and procedures are generally described in this section. Additional detailed descriptions of methodologies and procedures are provided in the Generic Work Plan for the project entitled, “Bay Shore/Brightwaters Former MGP Site, Investigation Work Plan,” Volume II: Generic Work Plan, dated August 1999.

### Surface Soil Sampling

Surface soil samples were either collected from a depth of 0 to 2, 6 or 8 inches below ground surface (bgs) utilizing a dedicated polyethylene scoop and placed into laboratory-supplied glass bottles. All samples were screened utilizing a photoionization detector (PID) for the presence of volatile organic compounds (VOCs).

### Test Pits

Each test pit was completed using a tire-mounted or track-mounted backhoe starting with the removal of top soil or cover material. Each test pit proceeded with the excavated material being temporarily stockpiled adjacent to the excavation and with the shallow visibly clean material being segregated from any deeper soil, which may have exhibited visible signs of staining, elevated PID readings and/or odors. Excavated soil was characterized by a field geologist using the Unified Soil Classification System and screened for the presence of VOCs using a calibrated PID. Photographs were also taken of the excavation. All observations and PID measurements were recorded by the field geologist in a field book. In addition, test pit logs are included in **Appendix A**. After completing each test pit, all excavated material was placed back into the excavation, with the segregated visibly “clean” surficial material being placed into the excavation last. After compacting the excavation, 6 to 12 inches of crushed stone was placed over the excavation area.

### Subsurface Soil Sampling

Subsurface soil samples were collected using either a direct push (Geoprobe) sampling technique with a decontaminated probe sampler or through continuous core retrieval in conjunction with a roto-sonic vibratory drill rig. The samples were screened for VOCs utilizing a photoionization detector (PID); inspected for staining, discoloration, nonaqueous phase liquid (NAPL), ash, tar and other MGP-residuals; checked for odors; and logged by a geologist using the Unified Soil Classification system. Boring logs are included in **Appendix A**.

Before commencement of soil probing and drilling activities and between boring locations, all “down-hole” probing equipment, including drill casing, core barrel samplers and probe rods, was decontaminated using a steam cleaner/pressure washer and/oralconox and water at the decontamination pad. Soil probe samplers were also decontaminated between each use by thoroughly washing withalconox and water, using a brush to remove particulate matter or surface film, followed by a thorough rinsing with tap water. All liquids generated from the decontamination process were pumped into an on-site storage tank for subsequent off-site disposal by KeySpan.

During soil probe/boring installation, a PID was used to monitor VOCs in the breathing zone and at the probe holes and boreholes. The PID was calibrated on at least a daily basis, using isobutylene gas at a concentration of 100 parts per million (ppm) in air. Equipment calibration was documented in the instrument calibration log.

Upon completion of soil probes, recovered sample material that was not retained for laboratory analysis was placed in an on-site roll-off for subsequent off-site disposal by KeySpan. Each probe hole was either allowed to naturally collapse into itself or, if located in a potential source area, pressure grouted. All probe holes were restored at grade to the original condition. For example, asphalt areas were replaced with asphalt, concrete areas were replaced with concrete and grass and soil areas were restored with grass and soil.

Soil cuttings generated during the completion of each soil boring were placed in lined and covered roll-off containers for subsequent off-site disposal by KeySpan.

### Groundwater Probes

Groundwater probe samples were collected by driving probe rods to the designated sample depth and retracting 4 feet to expose a decontaminated stainless steel screen. Dedicated polyethylene tubing was inserted into the rod assembly and purged with a peristaltic pump until approximately three casing volumes of groundwater were discharged. The screen, check valve and rods were decontaminated and new tubing was used between each interval. Water quality parameters including pH, conductivity, turbidity, dissolved oxygen, temperature and salinity were monitored utilizing a calibrated Horiba U-22 multiple parameter instrument. Additionally, any evidence of odors, sheens or the presence of free product was noted. All observations and results were logged in project field books. Groundwater samples were then collected from the pump discharge tubing in laboratory-supplied glass bottles at a flow rate of less than one-quarter gallon per minute.

Upon completion, each bore hole was allowed to naturally collapse into itself. Bore holes in potential source areas were pressure grouted to grade. All bore holes were restored at grade with the same material that was originally in place, as described previously. Purge water generated during the sampling process was transported back to the site and placed in an on-site storage tank for off-site disposal by KeySpan at a later date.

### Groundwater Monitoring Well Installation

The number of wells and the depth and location of each well was presented in the NYSDEC-approved work plans, and was based on the results of the groundwater probe sampling program, the soil probe sampling program and the direction of groundwater flow. Monitoring wells were installed at three general depth intervals as discussed below.



- Water Table/Shallow Groundwater - Monitoring well clusters installed as part of this investigation included one shallow monitoring well screened in the glacial sediments. The 10-foot screens generally lie approximately three quarters below the water table and one quarter above to account for natural fluctuation in the level of the water table. The objective of the shallow well was to collect and analyze representative samples in order to characterize the water quality of the shallow groundwater zone and, secondly, to obtain potentiometric head elevations needed to determine groundwater flow patterns. For the purpose of this investigation, shallow groundwater is considered to be groundwater encountered at the water table to a depth of 26 feet below ground surface (bgs).
- Intermediate Groundwater - Intermediate groundwater monitoring wells were installed within the glacial sediments with the majority of the 10-foot well screens set between 30 and 45 feet bgs. For the purpose of this investigation, the intermediate groundwater zone is defined at a depth of between 26 and 50 feet bgs. The objective of the intermediate wells was to collect and analyze representative samples in order to characterize the water quality of the intermediate groundwater zone and, secondly, to obtain potentiometric head elevations needed to determine groundwater flow patterns.
- Deep Groundwater - Deep groundwater monitoring wells were generally installed within the deep glacial sand and immediately above the top of the clay-rich Magothy sediments. For the purpose of this investigation, deep groundwater is considered groundwater between 50 and 80 feet bgs. The objective of the deep wells was to obtain and analyze a representative sample in order to characterize the water quality of the deep groundwater zone located immediately above the Magothy sediments and, secondly, to obtain potentiometric head elevations needed to determine the vertical gradient between the shallow, intermediate and deep groundwater zones. In addition, monitoring well BMW-05D2 was installed below the clay-rich Magothy formation. The objective of this well was to collect and analyze a representative sample in order to characterize the water quality below the top of the Magothy formation but within the Magothy aquifer downgradient of the Bay Shore Site.

Before commencement of drilling activities and between well locations, all “down-hole” drilling equipment (i.e., drill casing, core barrel samplers, rods, etc.) was decontaminated using a steam cleaner/pressure washer at the decontamination pad. Core barrel samplers were also decontaminated between each use by thoroughly washing withalconox and water, using a brush to remove particulate matter or surface film, followed by a thorough rinsing with tap water.

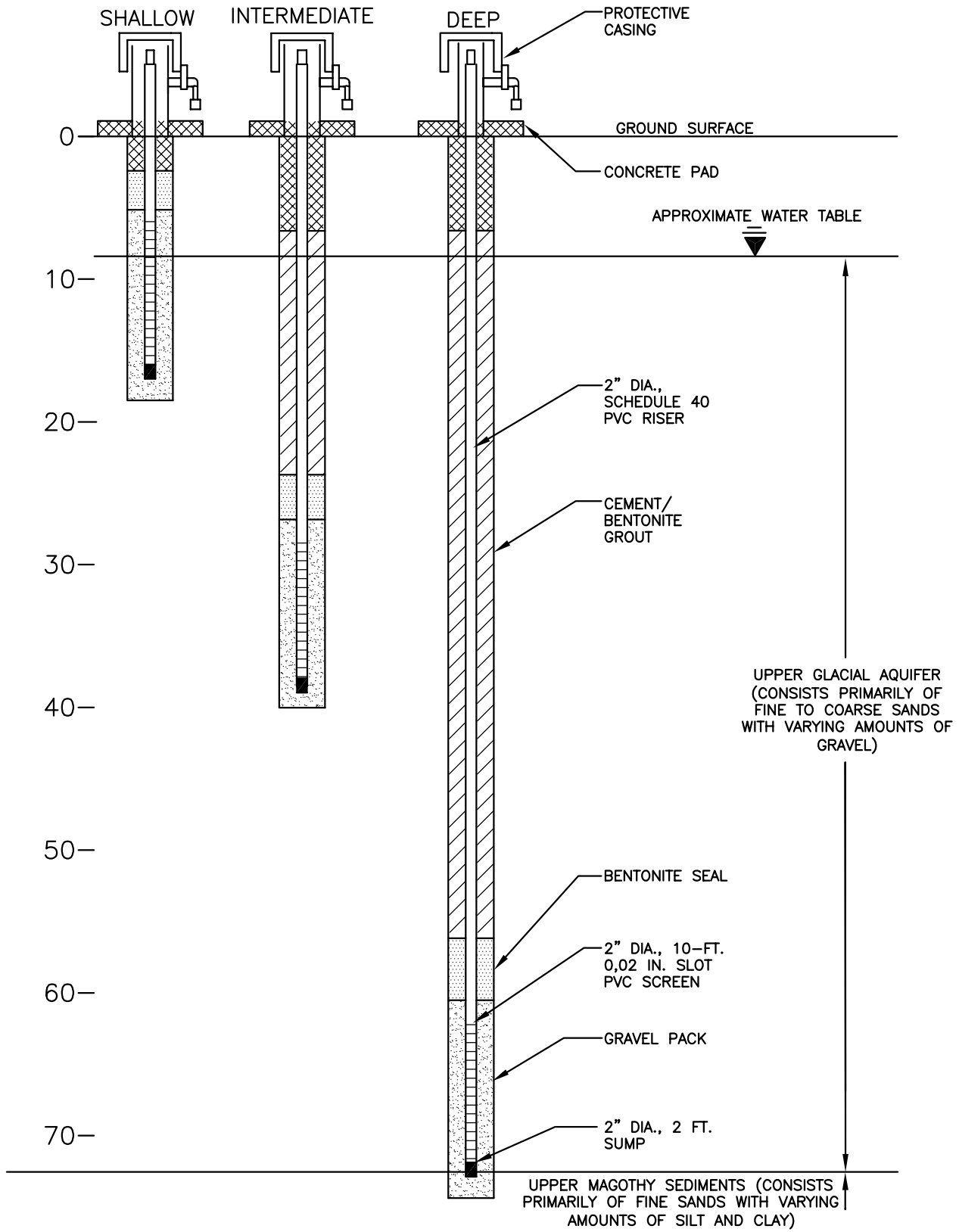
All on-site monitoring wells (BMW-17S,I, BMW-18S,I,D and BMW-19S,I,D) were installed using the roto-sonic vibratory drill method and constructed with 2-inch diameter Schedule 40 polyvinyl chloride (PVC) well screens and casings. The wells were fitted with a

10-foot long well screen having either 0.010-inch, where fine sand/silt was encountered, or 0.020-inch slotted openings. Below the monitoring well screen, a 2-foot sump was installed on all wells. A solid 2-inch diameter, PVC well casing or riser extended from the screen to grade. All the off-site wells installed during the supplemental field program were installed using either the direct push Geoprobe method, the roto-sonic vibratory drill method, or the hollow stem auger drill method. The monitoring wells were constructed with 1-inch diameter Schedule 40 PVC and fitted with a 10-foot long prepacked well screen having 0.010-inch slotted openings. A 2-foot sump was installed below each monitoring well except for BMW-24D where a 1/2-foot end cap was installed at the bottom of the well.

All on-site wells were fitted with above grade (“stick-up”) locking steel casings. All off-site wells were fitted with flush-mounted locking steel protective casings. **Figure 2-3** shows the typical construction of a monitoring well cluster with above grade (“stick-up”) locking steel casings installed as part of this field investigation program. **Table 2-2** summarizes the completed well construction details. In addition, the boring logs for these monitoring wells are included in **Appendix A**. Monitoring well BMW-05D2 was installed using the roto-sonic vibratory drilling method. Monitoring well BMW-05D2 was installed as a double-case well with the outer casing grouted into the low permeable unit to avoid vertical migration of chemical constituents from the upper glacial aquifer into the underlying Magothy aquifer. The 2-inch diameter well was constructed of Schedule 40 PVC well screen and casing within the 6-inch outer casing effectively sealing off the Upper Glacial aquifer from the underlying Magothy aquifer. The well was fitted with a 10-foot long well screen having 0.020-inch slotted openings.

A Number 2 graded gravel was set from about 1 foot below the bottom of the monitoring well sump to a point approximately 3 feet above the top of the well screen. A slurry composed of bentonite clay and water was pumped into the annulus via tremie pipe above the gravel pack. Typically this seal was at least 2 feet thick. A cement and bentonite mix was pumped into the annulus via tremie pipe, from the top of the bentonite seal to the surface.

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BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION  
BAY SHORE, NEW YORK



### TYPICAL CONSTRUCTION OF NEW MONITORING WELL CLUSTERS

FIGURE 2-3

**TABLE 2-2  
BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION  
MONITORING WELL CONSTRUCTION SUMMARY**

MONITORING WELL	WELL DEPTH (feet bgs)	TOTAL DEPTH (feet bgs)	GROUND SURFACE ELEVATION (feet)	MEASURING POINT ELEVATION (feet) <sup>(1)</sup>	CASING DIAMETER (inches)	SCREEN DEPTHS (feet bgs)		ANNULAR FILLS (feet bgs)		
						INTERVAL	DESCRIPTION	INTERVAL	TYPE	MATERIALS
BBMW-05D2	136.50	226.00	23.06	25.35	2.00	126.50-136.50	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement/Bentonite
								1.00-120.00	Backfill	Bentonite Grout
								120.00-123.90	Seal	Bentonite
								123.90-126.5	Filter	On Morie Sand #1
BBMW-06ST	15.00	17.00	25.24	28.34	1.00	5.00-15.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-2.00	Backfill	Cement/Bentonite
								2.00-3.00	Seal	Bentonite
								3.00-4.00	Filter	On Morie Sand #1
BBMW-17S	15.50	18.00	23.70	25.99	2.00	5.50-15.50	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-3.83	Seal	Bentonite
								3.83-18.00	Filter	On Morie Sand #00
BBMW-17I	40.50	42.00	23.46	25.87	2.00	30.50-40.50	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-24.75	Backfill	Bentonite Grout
								24.75-28	Seal	Bentonite
BBMW-18S	16.00	18.00	22.56	24.96	2.00	6.00-16.00	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-4.00	Seal	Bentonite Chips
								4.00-18.00	Filter	On Morie Sand #1
BBMW-18I	40.00	42.00	22.51	24.95	2.00	30.00-40.00	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-24.00	Backfill	Cement/Bentonite Grout
								24.00-27.00	Seal	Bentonite
BBMW-18D	70.00	88.00	22.45	25.03	2.00	60.00-70.00	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-53.00	Backfill	Cement/Bentonite Grout
								53.00-57.00	Seal	Bentonite
BBMW-19S	16.00	18.00	22.91	25.28	2.00	6.00-16.00	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-2.00	Backfill	Cement/Bentonite Grout
								2.00-4.00	Seal	Bentonite Chips
BBMW-19I	39.60	42.00	22.90	25.44	2.00	29.60-39.60	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-23.00	Backfill	Cement/Bentonite Grout
								23.00-26.60	Seal	Bentonite Chips
BBMW-19D	74.75	88.00	22.81	25.33	2.00	64.75-74.75	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-59.50	Backfill	Bentonite Grout
								59.50-61.83	Seal	Bentonite Chips
BBMW-20S	14.00	16.00	20.29	20.18	1.00	4.00-14.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-2.00	Seal	Bentonite
								2.00-3.00	Filter	On Morie Sand #1
								3.00-16.00	Filter	Pre-packed Sand #00

**TABLE 2-2 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**MONITORING WELL CONSTRUCTION SUMMARY**

MONITORING WELL	WELL DEPTH (feet bgs)	TOTAL DEPTH (feet bgs)	GROUND SURFACE ELEVATION (feet)	MEASURING POINT ELEVATION (feet) <sup>(1)</sup>	CASING DIAMETER (inches)	SCREEN DEPTHS (feet bgs)		ANNULAR FILLS (feet bgs)		
						INTERVAL	DESCRIPTION	INTERVAL	TYPE	MATERIALS
BBMW-20I	45.00	47.00	20.33	20.21	1.00	35.00-45.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-31.00	Backfill	Bentonite Grout
								31.00-33.00	Seal	Bentonite
								33.00-34.00	Filter	On Morie Sand #1
								34.00-47.00	Filter	Pre-packed Sand #00
BBMW-20D	72.00	74.00	20.30	20.16	1.00	62.00-72.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-59.00	Backfill	Bentonite Grout
								59.00-60.00	Seal	Bentonite Pellets
								60.00-61.00	Filter	On Morie Sand #1
								61.00-74.00	Filter	Pre-packed Sand #00
BBMW-21S	17.50	19.00	23.94	26.41	2.00	7.50-17.50	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-3.00	Backfill	Cement/Bentonite Grout
								3.00-4.00	Seal	Bentonite
BBMW-21I	40.00	43.00	23.94	26.47	2.00	30.00-40.00	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-25.00	Backfill	Cement/Bentonite Grout
								25.00-28.00	Seal	Bentonite
								28.00-43.00	Filter	On Morie Sand #1
BBMW-21D	76.33	78.33	23.90	26.41	2.00	66.33-76.33	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-60.00	Backfill	Bentonite Grout
								60.00-63.25	Seal	Bentonite Chips
								63.25-78.33	Filter	On Morie Sand #1
BBMW-22S	10.00	17.00	22.31	24.71	2.00	5.00-10.00	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-3.00	Seal	Bentonite Chips
								3.00-17.00	Filter	On Morie Sand #1
BBMW-22I	40.00	42.00	22.24	24.65	2.00	30.00-40.00	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-23.00	Backfill	Cement/Bentonite Grout
								23.00-26.50	Seal	Bentonite
								26.50-42.00	Filter	On Morie Sand #1
BBMW-22D	74.00	76.00	22.27	24.73	2.00	64.00-74.00	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-55.40	Backfill	Bentonite Grout
								55.40-58.00	Seal	Bentonite
								58.00-76.00	Filter	On Morie Sand #1
BBMW-23S	15.00	17.00	20.47	20.21	1.00	5.00-15.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-3.00	Seal	Bentonite
								3.00-4.00	Filter	Wellgravel #2
								4.00-17.00	Filter	Pre-packed Sand #00
BBMW-23I	43.00	45.00	20.52	20.29	1.00	33.00-43.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-28.00	Backfill	Bentonite Grout
								28.00-30.00	Seal	Bentonite
								30.00-32.00	Filter	Wellgravel #2
								32.00-45.00	Filter	Pre-packed Sand #00
BBMW-23D	59.50	60.50	20.52	20.27	1.00	49.50-59.50	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-44.50	Backfill	Bentonite Grout
								44.50-46.50	Seal	Bentonite
								46.50-48.50	Filter	Wellgravel #2
								48.50-60.50	Filter	Pre-packed Sand #00

**TABLE 2-2 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**MONITORING WELL CONSTRUCTION SUMMARY**

MONITORING WELL	WELL DEPTH (feet bgs)	TOTAL DEPTH (feet bgs)	GROUND SURFACE ELEVATION (feet)	MEASURING POINT ELEVATION (feet) <sup>(1)</sup>	CASING DIAMETER (inches)	SCREEN DEPTHS (feet bgs)		ANNULAR FILLS (feet bgs)		
						INTERVAL	DESCRIPTION	INTERVAL	TYPE	MATERIALS
BBMW-23D2	73.00	76.20	20.48	19.68	2.00	63.00-73.00	Slotted Schedule 40 PVC	0.00-1.00	Seal	Cement
								1.00-59.00	Backfill	Cement/Bentonite Grout
								59.00-61.00	Seal	Bentonite
								61.00-76.20	Filter	Wellgravel #1
BBMW-24S	14.00	16.00	19.35	19.15	1.00	4.00-14.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-2.00	Seal	Bentonite
								2.00-3.00	Filter	On Morie Sand #1
								3.00-16.00	Filter	Pre-packed Sand #00
BBMW-24I	42.00	44.00	19.25	19.00	1.00	32.00-42.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-28.00	Backfill	Bentonite Grout
								28.00-30.00	Seal	Bentonite Chips
								30.00-31.00	Filter	On Morie Sand #1
BBMW-24D	69.50	70.00	19.00	18.77	1.00	59.50-69.50	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-55.00	Backfill	Bentonite Grout
								55.00-57.00	Seal	Bentonite Chips
								57.00-58.50	Filter	On Morie Sand #1
BBMW-25S	14.00	16.00	14.53	14.25	1.00	4.00-14.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-2.00	Seal	Bentonite
								2.00-3.00	Filter	On Morie Sand #1
								3.00-16.00	Filter	Pre-packed Sand #00
BBMW-25I	35.00	37.00	14.49	14.22	1.00	25.00-35.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-21.00	Backfill	Bentonite Grout
								21.00-23.00	Seal	Bentonite
								23.00-24.00	Filter	On Morie Sand #1
BBMW-25D	72.00	74.00	14.43	14.21	1.00	62.00-72.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-58.00	Backfill	Bentonite Grout
								58.00-60.00	Seal	Bentonite Pellets
								60.00-61.00	Filter	On Morie Sand #1
WCMW-01S	12.00	14.00	19.55	19.31	1.00	2.00-12.00	Pre-packed, 20/40 mesh	0.00-0.50	Seal	Cement
								0.50-1.00	Seal	Bentonite
								1.00-2.00	Filter	Well Gravel #2
								2.00-14.00	Filter	Pre-packed Sand #00
WCMW-01I	45.00	47.00	19.37	19.07	1.00	35.00-45.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-19.00	Backfill	Bentonite Grout
								19.00-21.00	Seal	Bentonite
								21.00-34.00	Filter	Well Gravel #2
WCMW-01D	74.00	75.00	19.05	18.78	1.00	64.00-74.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-62.00	Backfill	Bentonite Grout
								62.00-64.00	Filter	Gravel Pack
								64.00-74.00	Filter	Pre-packed Sand #00
WCMW-02S	13.00	15.00	16.54	16.20	1.00	3.00-13.00	Pre-packed, 20/40 mesh	0.00-0.50	Seal	Cement
								0.50-1.00	Seal	Bentonite
								1.00-2.00	Filter	Well Gravel #2
								2.00-15.00	Filter	Pre-packed Sand #00

**TABLE 2-2 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**MONITORING WELL CONSTRUCTION SUMMARY**

MONITORING WELL	WELL DEPTH (feet bgs)	TOTAL DEPTH (feet bgs)	GROUND SURFACE ELEVATION (feet)	MEASURING POINT ELEVATION (feet) <sup>(1)</sup>	CASING DIAMETER (inches)	SCREEN DEPTHS (feet bgs)		ANNULAR FILLS (feet bgs)		
						INTERVAL	DESCRIPTION	INTERVAL	TYPE	MATERIALS
WCMW-02I	44.50	46.50	16.47	16.23	1.00	34.50-44.50	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-29.50	Backfill	Bentonite Grout
								29.50-31.50	Seal	Bentonite
								31.50-33.50	Filter	Well Gravel #2
								33.50-46.50	Filter	Pre-packed Sand #00
WCMW-02D	72.00	74.00	16.39	16.11	1.00	62.00-72.00	Pre-packed, 20/40 mesh	0.00-1.00	Seal	Cement
								1.00-57.00	Backfill	Bentonite Grout
								57.00-59.00	Seal	Bentonite
								59.00-61.00	Filter	Well Gravel #2
								61.00-74.00	Filter	Pre-packed Sand #00

**NOTES:**

<sup>(1)</sup> Top of casing elevation.  
bgs: Below ground surface

The gravel pack, bentonite seal and cement grout were placed into the annulus in a manner that ensured complete placement, free of any voids or drill cuttings that might jeopardize the integrity of the groundwater monitoring well.

Soil generated during the installation of each well was placed into covered roll-off containers for proper off-site transportation and disposal by KeySpan.

The new groundwater monitoring wells were developed after installation. The well development protocol for the 2-inch diameter wells on-site and off-site was the airlift method followed by pumping with a submersible pump. For the 1-inch diameter wells installed off-site, a peristaltic pump was used for development. Well BMW-23D2 was developed by using a submersible pump. During development activities, the purge water was monitored for flow rate, pH, conductivity, turbidity, dissolved oxygen, temperature, salinity and depth to water. The development process continued until the turbidity readings were 50 Nephelometric Turbidity Units (NTUs) or less and stabilization of the measured field parameters was achieved. All development water was temporarily containerized on-site in an aboveground storage tank. After waste characterization, all containerized liquids were removed from the site for proper off-site transportation and disposal by KeySpan.

### Groundwater Sampling

In order to meet the objectives outlined in the Supplemental Field Investigation Work Plan, a number of groundwater samples were collected from selected wells located on-site, adjacent, upgradient and downgradient to the Bay Shore site. The groundwater samples were collected using a peristaltic pump following the procedures outlined in the generic work plan.

In addition, the existing monitoring wells were also sampled at this time. Prior to sampling, the total depth and depth to water at each well was measured and recorded in order to estimate purge volumes. An oil/water interface probe was used to determine if any nonaqueous phase liquid (NAPL) was present within each well.



Monitoring wells were sampled using disposable weighted plastic bailers after purging the equivalent of three to five well volumes of groundwater from each well. Each well was purged using a peristaltic pump. During purging, groundwater was pumped through a 3-inch diameter flow cell. The groundwater entered through the bottom of the flow cell and exited through a tube near the top. The probes from the Horiba-U22 were placed into the flow cell so that the parameters for pH, specific conductance, temperature, turbidity, dissolved oxygen, ORP and salinity could be monitored and recorded using field instrumentation. Groundwater was carefully poured from the bailers into laboratory-supplied glass bottles. While the vast majority of groundwater samples exhibited a turbidity of well below 50 NTUs, some of the existing monitoring wells yielded highly turbid samples even after extensive purging. Therefore, groundwater from these wells was filtered in the field prior to filling the sample bottles intended for inorganic analysis.

After completing sampling activities, the weighted bailer used in sampling the monitoring well was slowly lowered to the bottom of the well in an effort to determine if dense nonaqueous phase liquid (DNAPL) had accumulated within the well sump. All purge water was transferred into the on-site storage tank for subsequent off-site disposal by KeySpan.

### *Air Sampling*

Air samples were collected in Summa canisters as 1-hour composites under low atmospheric pressure conditions. Summa canisters are stainless steel vessels that have been cleaned and certified contaminant-free by the contract laboratory. Each Summa canister was shipped to the sampling site under a high vacuum (-30 inches Hg) to ensure that the canister remained free of contaminants prior to use. The following atmospheric conditions/parameters were generally recorded/measured during sample collection: barometric pressure, temperature, relative humidity and wind direction and speed.

## 2.3 On-site Field Investigation Program

The investigation activities completed as part of the On-site Field Investigation Program are summarized in **Table 2-3**. The on-site (and adjacent off-site) sample locations are shown on **Drawing 2A**.

### 2.3.1 Bay Shore Site and Adjacent Off-site Locations

#### Surface Soil

A total of seven surface soil samples were collected at the site and immediately adjacent to the site for PCB analysis. The analytical results of these surface soil samples are presented and discussed in **Section 4.2.1.1**.

#### Subsurface Soil

A total of 39 soil probes and borings were advanced within the site and adjacent off-site locations. Boring logs are included in **Appendix A**. Soil probes were advanced to at least 76 feet below grade. Samples were collected continuously from ground surface to the top of the Magothy formation in order to characterize subsurface soil conditions and to determine the vertical and horizontal extent of chemical constituents. However, in cases where tar staining and strong hydrocarbon-like odors were observed at the planned termination depth, the soil probes were advanced until at least 10 feet of visibly “clean” soil had been sampled. In addition, additional soil samples were selected for chemical analysis when these conditions were encountered in order to define soil conditions vertically. The analytical results of the subsurface soil samples collected from on-site and adjacent off-site soil probes are presented and discussed in **Section 4.2.1.2**.

**TABLE 2-3  
BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS															
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>				
Surface Soil Sampling	Soil	4	7	BBSS-30	6"	BBSS-30(0-6")								■								
				BBSS-31	6"	BBSS-31(0-6")									■							
				BBSS-32	6"	BBSS-32(0-6")										■						
				BBSS-33	6"	BBSS-33(0-6")										■						
				BBSS-36	6"	BBSS-36(0-6")										■						
				BBSS-37	6"	BBSS-37(0-6")											■					
				BBSS-38	6"	BBSS-38(0-6")											■					
Subsurface Soil Borings	--	31	39	BBSB-37	50'	BBSB-37(4-6)	■	■														
Subsurface Soil Boring Samples	Soil	111	171	BBSB-37	50'	BBSB-37(8-10)	■	■														
						BBSB-37(12-14)	■	■														
						BBSB-37(48-50)	■	■														
				BBSB-38	28'	BBSB-38(6-8)	■	■														
						BBSB-38(10-12)	■	■														
						BBSB-38(24-26)	■	■														
				BBSB-39	40'	BBSB-39(4-6)	■	■														
						BBSB-39(10-12)	■	■														
						BBSB-39(12-14)	■	■														
				BBSB-39	40'	BBSB-39(38-40)	■	■														
						BBSB-40	44'	BBSB-40(4-6)	■	■												
								BBSB-40(8-10)	■	■												
				BBSB-40(21-23)	■			■														
				BBSB-40	44'	BBSB-40(42-44)	■	■														
						BBSB-41	52'	BBSB-41(2-4)	■	■												
BBSB-41(9-11)	■	■																				
BBSB-41(49-51)	■	■																				
BBSB-42	106'	BBSB-42(8-10)	■	■																		
		BBSB-42(11-13)	■	■																		
		BBSB-42(16-18)															■					
		BBSB-42(21-23)	■	■																		
		BBSB-42(63-65)															■					
BBSB-42(67-69)	■	■																				

**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS															
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>				
Subsurface Soil Boring Samples (cont.)				BBSB-43	25'	BBSB-43(0-2)	■	■														
						BBSB-43(9-11)	■	■														
						BBSB-43(23-25)	■	■														
				BBSB-44	25'	BBSB-44(4-6)	■	■														
						BBSB-44(10-12)	■	■														
						BBSB-44(24-25)	■	■														
				BBSB-45	26'	BBSB-45(10-12)	■	■														
						BBSB-45(14-16)	■	■														
						BBSB-45(22-24)	■	■														
				BBSB-46	52'	BBSB-46(8-10)	■	■														
						BBSB-46(24-25)	■	■														
						BBSB-46(48-50)	■	■														
				BBSB-47	40'	BBSB-47(0-2)	■	■														
						BBSB-47(6-8)	■	■														
						BBSB-47(10-12)	■	■											■			
						BBSB-47(16-18)	■	■											■			
						BBSB-47(36-38)	■	■														
				BBSB-48	86'	BBSB-48(7-9)	■	■														
						BBSB-48(12-14)	■	■														
						BBSB-48(39-41)	■	■														
BBSB-48(83-85)	■	■																				
BBSB-49	86'	BBSB-49(4-6)	■	■																		
		BBSB-49(9-11)	■	■																		
		BBSB-49(24-26)																■				
		BBSB-49(26-28)	■	■																		
		BBSB-49(64-66)																■				
BBSB-49(68-70)	■	■																				

**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>					
Subsurface Soil Boring Samples (cont.)				BBSB-50	86'	BBSB-50(7-9)	■	■															
						BBSB-50(12-14)	■	■															
						BBSB-50(21-23)																	■
						BBSB-50(26-28)	■	■															
						BBSB-50(64-66)																	■
				BBSB-50(68-70)	■	■																	
				BBSB-51	106'	BBSB-51(7-9)	■	■															
						BBSB-51(18-20)	■	■															
						BBSB-51(36-38)	■	■															
						BBSB-51(96-98)	■	■															
				BBSB-52	86'	BBSB-52(1-3)	■	■															
						BBSB-52(6-8)	■	■															
						BBSB-52(13-14)	■	■															
						BBSB-52(33-35)	■	■															
						BBSB-52(84-86)	■	■															
				BBSB-53	86'	BBSB-53(6-8)	■	■															
						BBSB-53(19-21)	■	■															
						BBSB-53(26-28)	■	■															
						BBSB-53 (66-68)	■	■															
				BBSB-54	106'	BBSB-54(7-9)	■	■															■
						BBSB-54(13-15)	■	■															
						BBSB-54(22-24)	■	■															
						BBSB-54(53-55)	■	■															
				BBSB-55	76'	BBSB-55(12-14)	■	■															
						BBS-55 (16-18)	■	■															
						BBS-55 (20-22)	■	■															
						BBSB-55 (70-72)	■	■															

**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																		
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>							
Subsurface Soil Boring Samples (cont.)				BBSB-56	86'	BBSB-56(9-11)	■	■																	
						BBSB-56(12-14)	■	■																	
						BBSB-56(21-23)																	■		
						BBSB-56(43-44)	■	■																	
						BBSB-56(68-70)																		■	
						BBSB-56(71-73)	■	■																	
				BBSB-57	76'	BBSB-57(10-12)	■	■																	
						BBSB-57(20-22)	■	■																	
						BBSB-57(54-56)	■	■																	
						BBSB-57(64-66)	■	■																	
				BBSB-58	76'	BBSB-58(6-8)	■	■															■		
						BBSB-58(13-15)	■	■															■		
						BBSB-58(22-24)	■	■																	
						BBSB-58(46-48)	■	■																	
						BBSB-58(73-75)	■	■																	
				BBSB-59	28'	BBSB-59(9-11)	■	■																	
						BBSB-59(16-18)	■	■																	
						BBSB-59(24-26)	■	■																	
				BBSB-60	32'	BBSB-60(8-10)	■	■																	
						BBSB-60(20-22)	■	■																	
						BBSB-60(28-30)	■	■																	
				BBSB-61	76'	BBSB-61(6-8)	■	■																	
						BBSB-61(12-14)	■	■																	
						BBSB-61(40-42)	■	■																	
						BBSB-61(70-72)	■	■																	
						BBSB-61(74-75.5)	■	■																	
				BBSB-62	76'	BBSB-62(0-2)	■	■																	
						BBSB-62(12-14)	■	■																	
						BBSB-62(40-42)	■	■																	
						BBSB-62(74-76)	■	■																	

**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>					
Subsurface Soil Boring Samples (cont.)				BBSB-63	76'	BBSB-63(6-8)	■	■								■							
						BBSB-63(8-10)	■	■															
						BBSB-63(12-14)	■	■															
						BBSB-63(34-36)	■	■												■			
						BBSB-63(64-65)	■	■															
						BBSB-63(74-75)	■	■															
				BBSB-64	76'	BBSB-64(5-7)	■	■															
						BBSB-64(9-11)	■	■															
						BBSB-64(16-18)	■	■															
						BBSB-64(44-46)	■	■															
				BBSB-65	86'	BBSB-65(9-11)	■	■															
						BBSB-65(11-13)	■	■															
						BBSB-65(16-18)																	■
						BBSB-65(21-23)	■	■															
						BBSB-65(62-64)																	■
				BBSB-66	83'	BBSB-66(9-11)	■	■															
						BBSB-66(12-14)	■	■															
						BBSB-66(24-26)	■	■													■		
						BBSB-66(36-37)	■	■															
						BBSB-66(53-54)	■	■															
						BBSB-66(64-66)	■	■															
				BBSB-67	76'	BBSB-67(12-14)	■	■															
						BBSB-67(28-30)	■	■															
						BBSB-67(66-68)	■	■															
BBSB-67(72-74)	■	■																					

**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																				
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>									
Subsurface Soil Boring Samples (cont.)				BBSB-81	106'	BBSB-81(7-9)	■	■																			
						BBSB-81(16-18)	■	■																			
						BBSB-81(36-38)	■	■																			
						BBSB-81(63-65)																		■			
						BBSB-81(69-71)	■	■																			
						BBSB-81(81-83)	■	■																			
				BBSB-82	86'					BBSB-82(10-12)	■	■															
										BBSB-82(30-32)	■	■															
										BBSB-82(50-52)	■	■															
										BBSB-82(69-71)	■	■															
				BBSB-86	78'					BBSB-86(8-10)	■	■															
										BBSB-86(15-17)	■	■															
										BBSB-86(48-50)	■	■															
										BBSB-86(76-78)	■	■															
				BBSB-87	70'					BBSB-87(7-9)	■	■															
										BBSB-87(19-21)	■	■															
										BBSB-87(48-50)	■	■															
										BBSB-87(68-70)	■	■															
				BBSB-88	72'					BBSB-88(10-12)	■	■															
										BBSB-88(20-22)	■	■															
										BBSB-88(50-52)	■	■															
										BBSB-88(70-72)	■	■															
				BBSB-89	76'					BBSB-89(10-12)	■	■															
										BBSB-89(12-14)	■	■															
										BBSB-89(25-27)	■	■															
										BBSB-89(46-48)	■	■															
										BBSB-89(70-72)	■	■															



**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS															
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>				
Subsurface Soil Boring Samples (cont.)				BBSB-90	74'	BBSB-90(8-10)	■	■														
						BBSB-90(12-14)	■	■								■						
						BBSB-90(48-50)	■	■														
						BBSB-90(72-74)	■	■														
				BBSB-105	76'	BBSB-105(8-10)	■	■														
						BBSB-105(16-18)	■	■														
						BBSB-105(68-70)	■	■														
						BBSB-105(72-74)	■	■														
Groundwater Probes	--	18	20	BBGP-57	35'	BBGP-57(9-13)	■	■														
Groundwater Probe Samples	Groundwater	78	105			BBGP-57	35'	BBGP-57(31-35)	■	■												
				BBGP-58	35'			BBGP-58(9-13)	■	■												
						BBGP-58	35'	BBGP-58(31-35)	■	■												
				BBGP-59	35'			BBGP-59(8-12)	■	■												
						BBGP-59	35'	BBGP-59(31-35)	■	■												
								BBGP-60	35'	BBGP-60(8-12)	■	■										
				BBGP-60	35'	BBGP-60(20-24)	■			■												
						BBGP-60(31-35)	■			■												
				BBGP-61	75'	BBGP-61(8-12)	■	■														
						BBGP-61	75'	BBGP-61(26-30)	■	■												
								BBGP-61(40-44)	■	■												
						BBGP-61	75'	BBGP-61(56-60)	■	■												
BBGP-61(71-75)	■	■																				
BBGP-62	75'	BBGP-62(8-12)	■	■																		
		BBGP-62	75'	BBGP-62(26-30)	■	■																
				BBGP-62(40-44)	■	■																
		BBGP-62	75'	BBGP-62(56-60)	■	■																
BBGP-62(71-75)	■			■																		

**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																				
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>									
Groundwater Probe Samples (cont.)				BBGP-63	75'	BBGP-63(8-12)	■	■																			
						BBGP-63(26-30)	■	■																			
						BBGP-63(40-44)	■	■																			
						BBGP-63(56-60)	■	■																			
						BBGP-63(71-75)	■	■																			
				BBGP-64	75'					BBGP-64(8-12)	■	■															
										BBGP-64(26-30)	■	■															
										BBGP-64(40-44)	■	■															
										BBGP-64(56-60)	■	■															
										BBGP-64(71-75)	■	■															
				BBGP-65	75'					BBGP-65(8-12)	■	■															
										BBGP-65(26-30)	■	■															
										BBGP-65(40-44)	■	■															
										BBGP-65(56-60)	■	■															
										BBGP-65(71-75)	■	■															
				BBGP-66	78'					BBGP-66(6-10)	■	■															
										BBGP-66(14-18)	■	■															
										BBGP-66(24-28)	■	■															
										BBGP-66(36-40)	■	■															
										BBGP-66(48-52)	■	■															
BBGP-66(66-70)	■	■																									
BBGP-67	72'					BBGP-67(9-13)	■	■																			
						BBGP-67(16-20)	■	■																			
						BBGP-67(28-32)	■	■																			
						BBGP-67(48-52)	■	■																			
						BBGP-67(68-72)	■	■																			

**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>					
Groundwater Probe Samples (cont.)				BBGP-68	70'	BBGP-68(9-13)	■	■															
						BBGP-68(20-24)	■	■															
						BBGP-68(32-36)	■	■															
						BBGP-68(48-52)	■	■															
						BBGP-68(60-64)	■	■															
						BBGP-68(66-70)	■	■															
				BBGP-69	75'	BBGP-69(9-13)	■	■															
						BBGP-69(20-24)	■	■															
						BBGP-69(34-38)	■	■															
						BBGP-69(40-44)	■	■															
						BBGP-69(56-60)	■	■															
				BBGP-70	75'	BBGP-70(9-13)	■	■															
						BBGP-70(20-24)	■	■															
						BBGP-70(34-38)	■	■															
						BBGP-70(48-52)	■	■															
						BBGP-70(63-67)	■	■															
				BBGP-71	74'	BBGP-71(6-10)	■	■															
						BBGP-71(20-24)	■	■															
						BBGP-71(38-42)	■	■															
						BBGP-71(56-60)	■	■															
				BBGP-72	75'	BBGP-72(8-12)	■	■															
						BBGP-72(16-20)	■	■															
						BBGP-72(24-28)	■	■															
						BBGP-72(32-36)	■	■															
						BBGP-72(40-44)	■	■															
						BBGP-72(48-52)	■	■															
						BBGP-72(56-60)	■	■															
						BBGP-72(64-68)	■	■															
BBGP-72(71-75)	■	■																					

**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																		
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>							
Groundwater Probe Samples (cont.)				BBGP-73	76'	BBGP-73(8-12)	■	■																	
						BBGP-73(16-20)	■	■																	
						BBGP-73(24-28)	■	■																	
						BBGP-73(32-36)	■	■																	
						BBGP-73(40-44)	■	■																	
						BBGP-73(48-52)	■	■																	
						BBGP-73(56-60)	■	■																	
						BBGP-73(64-68)	■	■																	
				BBGP-73(72-76)	■	■																			
				BBGP-74	76'	BBGP-74(8-12)	■	■																	
						BBGP-74(16-20)	■	■																	
						BBGP-74(24-28)	■	■																	
						BBGP-74(32-36)	■	■																	
						BBGP-74(40-44)	■	■																	
						BBGP-74(48-52)	■	■																	
						BBGP-74(56-60)	■	■																	
						BBGP-74(64-68)	■	■																	
				BBGP-74(72-76)	■	■																			
				BBGP-89	44'	BBGP-89(7.5-11.5)	■	■																	
						BBGP-89(16-20)	■	■																	
						BBGP-89(24-28)	■	■																	
						BBGP-89(32-36)	■	■																	
						BBGP-89(40-44)	■	■																	
				BBGP-90	36'	BBGP-90(8-12)	■	■																	
						BBGP-90(16-20)	■	■																	
						BBGP-90(24-28)	■	■																	
						BBGP-90(32-36)	■	■																	
				Groundwater Monitoring Well Sampling	Groundwater	21	55	BBMW-04D	73'	BBMW-04D	■	■													
BBMW-05D	74'	BBMW-05D	■					■																	
BBMW-05D2	136.5'	BBMW-05D2	■					■																	
BBMW-06ST	15'	BBMW-06ST	■																						
BBMW-06ST		BBMW-06ST	■					■																	

**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS															
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>				
Groundwater Monitoring Well Sampling (cont.)				BBMW-06S	15'	BBMW-06S	■															
						BBMW-06S	■	■														
				BBMW-06I			40'	BBMW-06I	■	■												
				BBMW-06D			76'	BBMW-06D	■	■												
				BBMW-08D			75'	BBMW-08D	■	■												
				BBMW-10S			15.50'	BBMW-10S	■	■												
				BBMW-10I			35'	BBMW-10I	■	■												
				BBMW-10D			73'	BBMW-10D	■	■												
				BBMW-11D			71'	BBMW-11D	■	■												
				BBMW-12S	15'	BBMW-12S	■	■														
						BBMW-12S	■	■														
				BBMW-12I	40'	BBMW-12I	■	■														
						BBMW-12I	■	■														
				BBMW-12D	72.5'	BBMW-12D	■	■														
						BBMW-12D	■	■														
				BBMW-14S			15'	BBMW-14S	■	■												
				BBMW-14I2			25'	BBMW-14I2	■	■												
				BBMW-14I			40'	BBMW-14I	■	■												
				BBMW-14D			75'	BBMW-14D	■	■												
				BBMW-17S			15.5'	BBMW-17S	■	■												
				BBMW-17I			40.5'	BBMW-17I	■	■												
				BBMW-18S			16'	BBMW-18S	■	■												
				BBMW-18I			40'	BBMW-18I	■	■												
				BBMW-18D			70'	BBMW-18D	■	■												
BBMW-19S			16'	BBMW-19S	■	■																
BBMW-19I			39.60'	BBMW-19I	■	■																
BBMW-19D			74.75'	BBMW-19D	■	■																
BBMW-20S			14'	BBMW-20S	■	■																
BBMW-20I			45'	BBMW-20I	■	■																
BBMW-20D			72'	BBMW-20D	■	■																
BBMW-21S			17.5'	BBMW-21S	■	■																
BBMW-21I			40'	BBMW-21I	■	■																

**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS														
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>			
Groundwater Monitoring Well Sampling (cont.)				BBMW-21D	76.33'	BBMW-21D	■	■								■					
				BBMW-22S	10'	BBMW-22S	■	■													
				BBMW-22I	40'	BBMW-22I	■	■													
				BBMW-22D	74'	BBMW-22D	■	■											■		
						BBMW-22D													■		
				BBMW-23S	15'	BBMW-23S	■	■													
				BBMW-23I	43'	BBMW-23I	■	■													
				BBMW-23D	59.5'	BBMW-23D	■	■													
				BBMW-23D2	73'	BBMW-23D2	■	■													
				MW-04S	14'	MW-04S	■	■													
				MW-04D	45'	MW-04D	■	■													
				MW-05S	14'	MW-05S	■	■													
				MW-05D	45.50'	MW-05D	■	■													
				MW-07S	12'	MW-07S	■	■													
				MW-07D	45'	MW-07D	■	■													
				MW-08S	12'	MW-08S	■	■													
MW-08D	45'	MW-08D	■	■																	
MW-09S	14'	MW-09S	■	■																	
Groundwater Monitoring Well Sampling	Soil	0	3	BBMW-18D	70'	BBMW18D										■					
				BBMW-21	76.33'	BBMW-21(33-35)															
						BBMW-21(73-75)															
Test Pit Soil Sampling	Soil	11	16	BBTP-03	6'	BBTP-03 (5-6)	■	■								■					
				BBTP-04	6'	BBTP-04 (5-6)	■	■													
				BBTP-05	10'	BBTP-05(6-8)	■	■													
				BBTP-06A	10'	BBTP-06A(9-10)	■	■													
				BBTP-06B	10'	BBTP-06B(9-10)	■	■													
				BBTP-07	10'	BBTP-07(7-8)	■	■													
				BBTP-08	6'	BBTP-08(6)	■	■													
				BBTP-09	8'	BBTP-09(7-8)	■	■													
				BBTP-10	8'	BBTP-10(5-7)	■	■													
BBTP-10(4"PIPE)														■							

**TABLE 2-3 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE SITE AND ADJACENT OFF-SITE AREAS FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS														
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis <sup>(1)</sup>			
Test Pit Soil Sampling (cont.)				BBTP-11	10'	BBTP-11(6-7)	■	■													
						BBTP-11(9-10)	■	■							■						
				BBTP-12	8"	BBTP-12(6-8)	■	■													
				BBTP-13	8"	BBTP-13(3-5)	■	■									■				
				BBTP-14	9'	BBTP-14(7-9)	■	■													
						BBTP-14(7-9) (2)	■	■													

**Notes:**

<sup>(1)</sup> Includes grain size and specific gravity only  
 -- : Not applicable.  
 TPH: Total petroleum hydrocarbons  
 TOC : Total organic carbon.

### Groundwater Probes

Twenty groundwater probes were completed within the Bay Shore site and adjacent off-site locations. The purpose of the groundwater probes that were completed during the supplemental field program was to identify zones of elevated BTEX and PAHs and to characterize and define the vertical and areal extent of NAPL in suspected source areas. The groundwater probes were also completed at the Bay Shore site and within adjacent off-site locations to provide additional data to identify zones of NAPL. Two to seven groundwater samples were collected at each on-site probe location. In addition, up to nine groundwater samples were collected from several adjacent off-site groundwater probe locations. The selection of the sample intervals was based on the current understanding of BTEX/PAHs and NAPL distribution and field observations (i.e., presence of sheen, visible tar/oil blebs or odor).

### Groundwater Monitoring Wells

A total of 23 new groundwater monitoring wells were installed at the Bay Shore site and adjacent off-site locations.

Three monitoring well clusters were installed on-site. Monitoring well clusters BMW-18 and BMW-19 each consist of a shallow (S), intermediate (I) and deep (D) monitoring well. Monitoring well cluster BMW-17 consists of a shallow and intermediate monitoring well. Well clusters BMW-18S,I,D and BMW-19S,I,D were installed along the southwestern boundaries of the property, and BMW-17S,I was installed on the central section of the Bay Shore site downgradient of the former Drip Oil Tanks.

Four monitoring well clusters were installed at adjacent off-site locations downgradient of the Bay Shore site. Monitoring well clusters BMW-20S,I,D, BMW-21S,I,D, BMW-22S,I,D and BMW-23S,I,D1,D2, were installed in the area immediately downgradient of the Bay Shore site, south of the Long Island Rail Road. A deep monitoring well, BMW-05D2, and a test groundwater monitoring well, BMW-06ST, were installed in the area



immediately downgradient and adjacent to the Bay Shore site, south of the Long Island Rail Road (**Section 2.2**).

The new monitoring wells and all of the existing monitoring wells located in the Bay Shore site and adjacent off-site locations were sampled for BTEX/PAHs. In addition, all of the wells were checked for DNAPL using a bailer.

The analytical results of groundwater samples collected from on-site and adjacent off-site monitoring wells and groundwater probes are presented and discussed in **Section 4.2.1.3**.

#### Test Pits

Fourteen test pits were excavated on-site. The test pits were excavated to the water table and ranged from a depth of 6 to 10 feet bgs. The objectives of the test pits included:

- Observe shallow soil conditions
- Determine if NAPL is present at the water table
- Locate and identify former MGP structure foundations

Four test pits were excavated toward the southeastern vicinity of the site with test pits BBTP-06A and BBTP-06B located at the Tar Tank area; and BBTP-07, BBTP-08 and BBTP-09 located at the Tar Settling Tank/Tar Separator area.

Two test pits were excavated toward the southwestern area of the site with test pit BBTP-12 located in the vicinity of the transformer/accumulator and BBTP-14 in the cesspool area.

The central portion of the site had four test pits that were excavated with test pit BBTP-13 located in the vicinity of the Naphthalene Scrubber/Scrubber Pump Room. Test pit BBTP-11 was advanced adjacent to the Tar and Drip Oil Collection Pit/Exhauster House, while BBTP-04 and BBTP-05 were excavated adjacent to the former Relief Gas Holder pad.

BBTP-10 was located by the Boiler House/Gas Holder at the southern end of the site, and BBTP-03 and BBTP-03A were excavated in the northern-central area of the site in the vicinity of the Main Storage Gas Holder.

One to two soil samples were collected per test pit for laboratory analysis depending on size and contamination observed at the test pit. The analytical results of the on-site test pit soil samples are presented and discussed in **Section 4.2.1.2**.

#### Perimeter Air Monitoring

During the completion of on-site field activities, perimeter air monitoring was conducted at the site boundary. A PID and a dust monitoring instrument were used to detect any potential off-site migration of VOCs or dust emanating from the on-site field operations. Readings were taken at established air monitoring stations located at approximately 200-foot intervals around the site perimeter and recorded in a project field book.

During the excavation of test pits, calibrated air monitoring instruments were also employed to monitor for potential releases of VOCs and/or dust related to these operations. Upwind and downwind air monitoring stations were established at each test pit location. Each monitoring station contained a data logging PID and a data logging dust meter. In addition, a PID was used to monitor the air quality within the worker's breathing zone and to quantitatively measure any VOCs being emitted from the borehole or drill cuttings.

All air monitoring instruments were calibrated on a daily basis prior to the start of field work. The calibration records have been retained in the project files. All data from the stationary air monitoring stations were electronically downloaded to the on-site computer at the conclusion of the day's work. This information is also available in the project files.

### 2.3.2 Bay Shore West Parcel

The investigation activities completed at the Bay Shore West Parcel and the Brightwaters Yard during the supplemental field program are summarized in **Table 2-4**. The sample locations are shown in **Drawing 2A**.

#### Subsurface Soil

Using the direct push (Geoprobe) method, a total of 25 soil borings were completed within the Bay Shore West Parcel. The purpose of the subsurface soil borings at the Bay Shore West parcel was to delineate the vertical and areal extent of BTEX/PAHs in subsurface soil in the vicinity of the soil boring BBSB-25 completed during the initial field program. The soil borings were completed to a depth of between 20 and 26 feet bgs. Two samples were collected at each probe location in the majority of the soil borings. The selection of the sample intervals was based on field observations. Specifically, one sample was collected in the zone exhibiting the highest PID reading and most visible contamination, and another in the visibly “clean” soil to delineate the vertical extent of the BTEX/PAHs. Additional borings were required on and off the Bay Shore West Parcel to delineate the areal extent of the BTEX/PAHs adjacent and downgradient of BBSB-25. The results of the soil borings are discussed in **Section 4.2.2.1**.

#### Groundwater Probes

Four groundwater probes were completed along the southern edge of the Bay Shore West Parcel. The groundwater probes, BBGP-85, BBGP-86, BBGP-87 and BBGP-88, were added to the supplemental field program to further delineate the vertical and areal extent of the BTEX/PAHs downgradient of the Bay Shore West Parcel. In addition, groundwater monitoring wells in the Bay Shore West Parcel and Brightwaters Yard were sampled as part of the supplemental field program. This included BMW-09S,I,D, BMW-13D and MW-03S,D.

The results of the groundwater sampling program are discussed in **Section 4.2.2.2**.

**TABLE 2-4**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**SUMMARY OF BAY SHORE WEST PARCEL/BRIGHTWATERS YARD FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS															
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis				
Subsurface Soil Borings	--	7	25	BBSB-68	26'	BBSB-68(8-10)	■	■														
Subsurface Soil Boring Samples	Soil	22	58			BBSB-68(12-14)	■	■														
						BBSB-68(24-26)	■	■														
				BBSB-69	26'	BBSB-69(6-8)	■	■														
						BBSB-69(10-12)	■	■														
						BBSB-69(24-26)	■	■														
				BBSB-70	30'	BBSB-70(8-10)	■	■														
						BBSB-70(16-18)	■	■														
						BBSB-70(22-24)	■	■														
						BBSB-70(27-29)	■	■														
				BBSB-71	26'	BBSB-71(5-7)	■	■														
						BBSB-71(9-11)	■	■								■						
						BBSB-71(16-18)	■	■														
				BBSB-72	26'	BBSB-72(4-6)	■	■														
						BBSB-72(8-10)	■	■														
						BBSB-72(24-25.5)	■	■														
				BBSB-73	26'	BBSB-73(4-6)	■	■														
						BBSB-73(10-12)	■	■														
						BBSB-73(24-26)	■	■														
				BBSB-78	26'	BBSB-78(0-2)	■	■														
						BBSB-78(9-11)	■	■														
						BBSB-78(24-25)	■	■														
				BBSB-79	20'	BBSB-79(6-7)	■	■														
						BBSB-79(16-18)	■	■														
				BBSB-80	20'	BBSB-80(6-7)	■	■														
						BBSB-80(8.5-9.5)	■	■														
						BBSB-80(16-18)	■	■														
				BBSB-83	20'	BBSB-83(8-10)	■	■														
BBSB-83(18-20)	■	■																				
BBSB-84	20'	BBSB-84(8-10)	■	■																		
		BBSB-84(18-20)	■	■																		
BBSB-91	24'	BBSB-91(10-12)	■	■																		
		BBSB-91(22-24)	■	■																		

**TABLE 2-4 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE WEST PARCEL/BRIGHTWATERS YARD FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS															
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis				
Subsurface Soil Boring Samples (cont.)				BBSB-92	24'	BBSB-92(8-10)	■	■														
						BBSB-92(20-22)	■	■														
				BBSB-93	24'	BBSB-93(6-8)	■	■														
						BBSB-93(18-20)	■	■														
				BBSB-94	24'	BBSB-94(10-12)	■	■														
						BBSB-94(18-20)	■	■														
				BBSB-95	24'	BBSB-95(8-10)	■	■														
						BBSB-95(18-20)	■	■														
				BBSB-96	24'	BBSB-96(8-10)	■	■														
						BBSB-96(18-20)	■	■														
				BBSB-97	24'	BBSB-97(8-10)	■	■														
						BBSB-97(22-24)	■	■														
				BBSB-98	24'	BBSB-98(8-10)	■	■														
						BBSB-98(22-24)	■	■														
				BBSB-99	24'	BBSB-99(8-10)	■	■														
						BBSB-99(22-24)	■	■														
				BBSB-100	10'	BBSB-100(8-10)	■	■														
				BBSB-101	24'	BBSB-101(10-12)	■	■														
						BBSB-101(22-24)	■	■														
				BBSB-102	24'	BBSB-102(9-11)	■	■														
BBSB-102(22-24)	■	■																				
BBSB-103	24'	BBSB-103(8-10)	■	■																		
		BBSB-103(22-24)	■	■																		
BBSB-104	20'	BBSB-104(4-6)	■	■																		
		BBSB-104(16-18)	■	■																		
Groundwater Probes	--	0	4	BBGP-85	10'	BBGP-85(6-10)	■	■														
Groundwater Probe Samples	Groundwater	0	6	BBGP-86	10'	BBGP-86(6-10)	■	■														
				BBGP-87	24'	BBGP-87(8-12)	■	■														
						BBGP-87(20-24)	■	■														
				BBGP-88	24'	BBGP-88(8-12)	■	■														
BBGP-88(20-24)	■	■																				

**TABLE 2-4 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF BAY SHORE WEST PARCEL/BRIGHTWATERS YARD FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS													
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis		
Groundwater Monitoring Well Sampling	Groundwater	0	6	BBMW-09S	15'	BBMW-09S	■	■												
				BBMW-09I	40'	BBMW-09I	■	■												
				BBMW-09D	72'	BBMW-09D	■	■												
				BBMW-13D	72'	BBMW-13D	■	■												
				MW-03S	13'	MW-03S	■	■												
				MW-03D	45'	MW-03D	■	■												

**Notes:**

-- : Not applicable.  
 TPH: Total petroleum hydrocarbons  
 TOC : Total organic carbon.

### 2.3.3 Bay Shore West Storage Lot

The investigation activities completed at the Bay Shore West Storage Lot during the supplemental field program are summarized in **Table 2-5**. The sample locations are shown in **Drawing 2A**.

#### Surface Soil

Two surface soil samples were collected in the vicinity of previous surface soil sample BBSS-13 at the Bay Shore West Storage Lot Parcel. The purpose of the soil sampling was to determine the areal extent of PAHs identified in surface soil in this area during the initial site characterization.

The analytical results of the surface soil samples collected at the Bay Shore West Storage Parcel are presented and discussed in **Section 4.2.3.1**.

## **2.4 Off-site Field Investigation Program**

The Off-site Field Investigation Program completed during the supplemental field program has been grouped as:

- Bay Shore Plume IRM Investigation
- O-Co-Nee Pond Supplemental Investigation
- Watchogue Creek/Crum's Brook Supplemental Investigation
- Private Well and Basement Survey
- Air Sampling
- Private Groundwater Well Sampling

The adjacent off-site sample locations (as well as the on-site) are shown on **Drawing 2A**. Off-site sample locations are shown on **Drawing 2B**. Both are provided in a map pocket at the

**TABLE 2-5**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**SUMMARY OF BAY SHORE WEST STORAGE LOT PARCEL FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS											
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis
Surface Soil Sampling	Soil	2	2	BBSS-34	6"	BBSS-34(0-6")		■										
				BBSS-35	6"	BBSS-35(0-6")		■										

**Notes:**  
 TPH: Total petroleum hydrocarbons  
 TOC : Total organic carbon.



end of this section of the report. Locations where private groundwater well and air samples were collected are shown on **Figure 2-2**, presented earlier.

#### 2.4.1 Bay Shore Plume IRM Investigation

The Bay Shore groundwater plume IRM investigation was completed to obtain additional stratigraphic and geotechnical data needed to further characterize the plume and obtain additional data needed to design and implement an IRM. The investigation activities completed as part of the Bay Shore Plume IRM Investigation are summarized in **Table 2-6**.

##### Subsurface Soil

Four soil probes were installed within the Bay Shore Plume. All the probes were completed to depths ranging from 72 to 76-feet bgs, the top of the confining Magothy formation. Continuous soil samples were collected at each probe location from grade to termination depth. The samples were characterized for stratigraphy, presence of any NAPL and related MGP material and any hydrocarbon-like odors. Based on field observations, three to four samples per bore hole were submitted to the laboratory for geotechnical analysis. One sample (BBSB-76 [17 to 19 feet]) was submitted for analysis of BTEX/PAHs. The boring logs are included in **Appendix A** and the results are discussed in **Section 4.3.1.1**.

##### Groundwater Probes

A total of 10 groundwater probes were completed within the vicinity of the Bay Shore site groundwater plume to determine groundwater quality immediately downgradient of the Bay Shore site and to further delineate off-site migration of BTEX/PAHs and NAPL.

Where possible, all the groundwater probes were extended to the top of the Magothy formation. After reaching the targeted depth, samples were collected at each probe location starting with the deepest sample first and then “pulling back” the sampler to the next depth until reaching the shallowest sample, typically at the groundwater table. The selection of the sample

**TABLE 2-6  
BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION  
SUMMARY OF BAY SHORE PLUME IRM FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																						
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	TOC	Field Parameters <sup>(1)</sup>	Geochemical Parameters <sup>(2)</sup>	Geotechnical Parameters <sup>(3)</sup>											
Subsurface Soil Borings	--	4	4	BBSB-74	76'	BBSB-74(8-10)													■										
Subsurface Soil Boring Samples	Soil	12	13	BBSB-74	76'	BBSB-74(16-18)													■										
						BBSB-74(52-54)														■									
						BBSB-75	72'	BBSB-75(8-10)														■							
				BBSB-75	72'	BBSB-75(52-54)																■							
						BBSB-75(68-70)																■							
						BBSB-76	72'	BBSB-76(8-10)															■						
				BBSB-76	72'	BBSB-76(17-19)	■	■															■						
						BBSB-76(40-44)																	■						
						BBSB-76(60-64)																	■						
				BBSB-77	74'	BBSB-77(8-10)																	■						
BBSB-77(32-36)																			■										
BBSB-77(56-58)																			■										
Groundwater Probes	--	10	10	BBGP-75	76'	BBGP-75(8-12)	■	■									■	■											
Groundwater Probe Samples	Groundwater	60	71	BBGP-75	76'	BBGP-75(16-20)	■	■										■	■										
						BBGP-75(24-28)	■	■													■	■							
						BBGP-75(32-36)	■	■															■	■					
						BBGP-75(40-44)	■	■																■	■				
						BBGP-75(48-52)	■	■															■	■					
						BBGP-75(56-60)	■	■																■	■				
						BBGP-75(64-68)	■	■																■	■				
						BBGP-75(72-76)	■	■																	■	■			
				BBGP-76	73'	BBGP-76(8-12)	■	■															■	■					
						BBGP-76(16-20)	■	■																■	■				
						BBGP-76(24-28)	■	■																	■	■			
						BBGP-76(32-36)	■	■																	■	■			
						BBGP-76(40-44)	■	■																		■	■		
						BBGP-76(48-52)	■	■																		■	■		
						BBGP-76(56-60)	■	■																		■	■		
						BBGP-76(64-68)	■	■																		■	■		
				BBGP-76(69-73)	■	■																		■	■				
				BBGP-77	70'	BBGP-77(8-12)	■	■																■	■				
						BBGP-77(16-20)	■	■																	■	■			
						BBGP-77(24-28)	■	■																		■	■		
BBGP-77(32-36)	■	■																				■	■						
BBGP-77(40-44)	■	■																				■	■						
BBGP-77(48-52)	■	■																		■	■								

**TABLE 2-6 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**SUMMARY OF BAY SHORE PLUME IRM FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS															
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	TOC	Field Parameters <sup>(1)</sup>	Geochemical Parameters <sup>(2)</sup>	Geotechnical Parameters <sup>(3)</sup>				
Groundwater Probe Samples (cont.)						BBGP-77(54-58)	■	■														
						BBGP-77(60-64)	■	■									■	■				
						BBGP-77(66-70)	■	■														
				BBGP-78	70'	BBGP-78(6-10)	■	■										■	■			
						BBGP-78(14-18)	■	■										■	■			
						BBGP-78(22-26)	■	■											■	■		
						BBGP-78(32-36)	■	■											■	■		
						BBGP-78(48-52)	■	■											■	■		
						BBGP-78(66-70)	■	■											■	■		
				BBGP-79	70'	BBGP-79(6-10)	■	■											■	■		
						BBGP-79(14-18)	■	■											■	■		
						BBGP-79(22-26)	■	■											■	■		
						BBGP-79(32-36)	■	■											■	■		
						BBGP-79(48-52)	■	■											■	■		
				BBGP-80	64'	BBGP-80(6-10)	■	■											■	■		
						BBGP-80(16-20)	■	■											■	■		
						BBGP-80(26-30)	■	■											■	■		
						BBGP-80(36-40)	■	■											■	■		
						BBGP-80(48-52)	■	■											■	■		
				BBGP-81	80'	BBGP-81(6-10)	■	■											■	■		
						BBGP-81(16-20)	■	■											■	■		
						BBGP-81(26-30)	■	■											■	■		
						BBGP-81(36-40)	■	■											■	■		
						BBGP-81(48-52)	■	■											■	■		
				BBGP-82	80'	BBGP-82(6-10)	■	■											■	■		
						BBGP-82(16-20)	■	■											■	■		
						BBGP-82(26-30)	■	■											■	■		
						BBGP-82(36-40)	■	■											■	■		
						BBGP-82(48-52)	■	■											■	■		
						BBGP-82(56-60)	■	■											■	■		
				BBGP-83	60'	BBGP-83(6-10)	■	■											■	■		
						BBGP-83(16-20)	■	■											■	■		

**TABLE 2-6 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**SUMMARY OF BAY SHORE PLUME IRM FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS														
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	TOC	Field Parameters <sup>(1)</sup>	Geochemical Parameters <sup>(2)</sup>	Geotechnical Parameters <sup>(3)</sup>			
Groundwater Probe Samples (cont.)						BBGP-83(26-30)	■	■								■	■				
						BBGP-83(36-40)	■	■								■	■				
						BBGP-83(46-50)	■	■								■	■				
						BBGP-83(56-60)	■	■								■	■				
				BBGP-84	60'	BBGP-84(6-10)	■	■								■	■				
						BBGP-84(16-20)	■	■								■	■				
						BBGP-84(26-30)	■	■								■	■				
						BBGP-84(36-40)	■	■								■	■				
						BBGP-84(46-50)	■	■							■	■					
						BBGP-84(56-60)	■	■							■	■					
Groundwater Monitoring Well Sampling	Groundwater	18	45	BBMW-01S	15'	BBMW-01S	■	■													
				BBMW-01I	42'	BBMW-01I	■	■													
				BBMW-01D	78.5'	BBMW-01D	■	■													
				BBMW-02S	15'	BBMW-02S	■	■													
				BBMW-02I	40'	BBMW-02I	■	■													
				BBMW-02D	83'	BBMW-02D	■	■													
				BBMW-03S	13'	BBMW-03S	■	■											■	■	
						BBMW-03S	■	■													
				BBMW-03I	40'	BBMW-03I	■	■											■	■	
						BBMW-03I	■	■													
				BBMW-03D	62'	BBMW-03D	■	■											■	■	
						BBMW-03D	■	■													
				BBMW-07S	15'	BBMW-07S	■	■													
				BBMW-07I	40'	BBMW-07I	■	■													
				BBMW-07D	65'	BBMW-07D	■	■													
				BBMW-15S	15'	BBMW-15S	■	■													
				BBMW-15I2	28'	BBMW-15I2	■	■													
				BBMW-15I	45'	BBMW-15I	■	■													
				BBMW-15D	80'	BBMW-15D	■	■													
				BBMW-24S	14'	BBMW-24S	■	■													
				BBMW-24I	42'	BBMW-24I	■	■													
				BBMW-24D	69.5'	BBMW-24D	■	■													
				BBMW-25S	14'	BBMW-25S	■	■													
				BBMW-25I	35'	BBMW-25I	■	■													
BBMW-25D	72'	BBMW-25D	■	■																	
BS-01S	15'	BS-01S	■	■																	
GM-03S	21.78'	GM-03S	■	■											■	■					
		GM-03S	■	■																	
GM-03I	45.03'	GM-03I	■	■										■	■						

**TABLE 2-6 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**SUMMARY OF BAY SHORE PLUME IRM FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS													
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	TOC	Field Parameters <sup>(1)</sup>	Geochemical Parameters <sup>(2)</sup>	Geotechnical Parameters <sup>(3)</sup>		
Groundwater Monitoring Well Sampling (cont.)						GM-03I	■	■												
				GM-03D	68.18'	GM-03D	■	■								■	■			
				GM-05S	20.10'	GM-03D	■	■												
						GM-05S	■	■												
				GM-05I	48.05'	GM-05S	■	■												
						GM-05I	■	■												
				GM-05D	75.95'	GM-05I	■	■												
						GM-05D	■	■												
				GMP-01	30'	GM-05D	■	■												
						GMP-01	■	■												
				GMP-02	23'	GMP-01	■	■												
						GMP-02	■	■												
				GMP-04	20.50'	GMP-02	■	■												
						GMP-04	■	■												
MW-16AS	13'	MW-16AS	■	■																

**Notes:**  
<sup>(1)</sup> Includes pH, specific conductance, temperature, turbidity, dissolved oxygen, and redox potential  
<sup>(2)</sup> Includes ammonia, BOD, CO<sub>2</sub>, chloride, COD, plate count, iron, dissolved iron, ferrous iron, manganese, dissolved manganese, and orthophosphate  
<sup>(3)</sup> Includes grain size and specific gravity only  
 -- : Not applicable.  
 TOC : Total organic carbon.

intervals was based on the current understanding of the stratigraphic and geochemical characteristics of the plume. Additionally, existing groundwater monitoring wells BMWW-03S, BMWW-03I, BMWW-03D, GM-03S, GM-03I, GM-03D, GM-05S, GM-05I, GM-05D, GMP-01, GMP-02 and GMP-04, were sampled for both BTEX/PAHs and geochemical parameters.

#### Groundwater Monitoring Wells

Two new monitoring well clusters, BMWW-24S,I,D and BMWW-25S,I,D, were installed at off-site locations in order to characterize off-site groundwater. The new monitoring wells and all the existing monitoring wells were sampled as part of the off-site groundwater monitoring well sampling program. The results are discussed in **Section 4.3.1.2**.

#### 2.4.2 O-Co-Nee Pond Investigation

In order to determine whether the Brightwaters Yard Plume is entering O-Co-Nee Pond and its headwaters, pore water, surface water and surface water sediment samples were collected as part of the supplemental field investigation. The investigation activities completed as part of the O-Co-Nee Pond Supplemental Investigation are summarized in **Table 2-7**.

#### Pore Water Sampling

Six pore water samples were collected at O-Co-Nee Pond to meet the objectives of the supplemental field program. The pore water samples were collected by advancing the 6-inch stainless steel well screen attached to 1-inch threaded steel pipe into the sand deposits immediately underlying the pond sediment. A dedicated polyethylene tubing was then connected to the well screen. Using a peristaltic pump with a flow rate of 70 millimeters per minute, pore water was purged from the screen zone and sampled directly from the tubing. After field measurements of pH, temperature and conductivity had stabilized, pore water samples were collected directly from the discharge tubing. The well screen and associated steel pipe was decontaminated before the collection of each sample. The results of the sampling are discussed in **Section 4.3.2.2**.

**TABLE 2-7  
BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION  
SUMMARY OF O-CO-NEE POND FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS														
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis			
Pore Water Sampling	Water	6	6	BWPW-01	1.67'	BWPW-01	■	■													
				BWPW-02	1.67'	BWPW-02	■	■													
				BWPW-03	1.67'	BWPW-03	■	■													
				BWPW-04	1.67'	BWPW-04	■	■													
				BWPW-05	1.67'	BWPW-05	■	■													
				BWPW-06	1.67'	BWPW-06	■	■													
Surface Water Sampling	Water	12	11	BWSW-01	bottom+12"	BWSW-01(B+12)	■	■													
					bottom	BWSW-01(B)	■	■													
				BWSW-02	bottom+12"	BWSW-02(B+12)	■	■													
					bottom	BWSW-02(B)	■	■													
				BWSW-03	bottom+12"	BWSW-03(B+12)	■	■													
					bottom	BWSW-03(B)	■	■													
				BWSW-04	bottom+12"	BWSW-04(B+12)	■	■													
					bottom	BWSW-04(B)	■	■													
				BWSW-05	bottom+12"	BWSW-05(B+12)	■	■													
					bottom	BWSW-05(B)	■	■													
				BWSW-06	bottom	BWSW-06(B)	■	■													
				Surface Water Sediment Sampling	Soil	12	12	BWSW-01	0-6"	BWSW-01(0-6)	■	■									
6-12"	BWSW-01(6-12)	■	■																■		
BWSW-02	0-6"	BWSW-02(0-6)	■					■													■
	6-12"	BWSW-02(6-12)	■					■													■
BWSW-03	0-6"	BWSW-03(0-6)	■					■													■
	6-12"	BWSW-03(6-12)	■					■													■
BWSW-04	0-6"	BWSW-04(0-6)	■					■													■
	6-12"	BWSW-04(6-12)	■					■													■
BWSW-05	0-6"	BWSW-05(0-6)	■					■													■
	6-12"	BWSW-05(6-12)	■					■													■
BWSW-06	0-6"	BWSW-06(0-6)	■					■													■
	6-12"	BWSW-06(6-12)	■					■													■

**Notes:**  
 TPH: Total petroleum hydrocarbons  
 TOC : Total organic carbon.

### Surface Water and Sediment Sampling

Eleven surface water samples and twelve sediment samples were collected at the pore water locations at O-Co-Nee Pond. At each location, two surface water samples were collected; one at a depth of 12 inches above the pond bottom and one at the sediment/water interface immediately above the pond bottom. Similarly, two sediment samples were collected at each pore water sample location; one at a depth of 0 to 6 inches below the pond bottom and one at 6 to 12 inches below the pond bottom. Surface water samples were collected by slowly immersing the laboratory supplied sample containers into the surface water body being careful not to disturb the surface water sediment. Water quality parameters including pH, specific conductance, turbidity, dissolved oxygen, temperature and salinity were measured in the field utilizing a calibrated Horiba U-10 multiple parameter instrument. All samples were collected during dry conditions (i.e., no precipitation within the prior 3 days) in order to sample surface water at or near base flow conditions and to minimize any possible influence of storm water runoff on the chemical quality of the surface water. The results are discussed in **Sections 4.3.2.3** and **4.3.2.4**.

#### 2.4.3 Watchogue Creek/Crum's Brook Investigation

**Table 2-8** summarizes all the investigation activities completed during the Watchogue Creek Supplemental Investigation. All sample locations are shown on **Figure 2-1**.

### Subsurface Soil

Seventeen soil borings were installed within the former cesspool area and adjacent locations. Originally, six soil borings in the former Cesspool and two soil borings in the former pond area were proposed for the supplemental field program. However, additional borings were required to delineate the vertical and areal extent of the BTEX/PAHs and any MGP-related impacts based on field observations. Using the direct push (Geoprobe) method, continuous soil samples were collected from ground surface to the top of the Magothy unit. The soil samples were characterized noting any presence of staining, visible tar or NAPL and hydrocarbon-like odors. Samples exhibiting any visible staining and/or NAPL and hydrocarbon-like odors were



**TABLE 2-8  
BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION  
SUMMARY OF WATCHOGUE CREEK/CRUM'S BROOK FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis					
Surface Soil Sampling	Soil	0	1	WC-SOP*	6"	WC-SOP	■	■	■							■							
Subsurface Soil Borings	--	8	17	WCSB-37	75'	WCSB-37(8-10)	■	■															
Subsurface Soil Boring Samples	Soil	32	66			WCSB-37(21-23)	■	■															
						WCSB-37(45-47)	■	■															
						WCSB-37(73-75)	■	■															
				WCSB-38	76'	WCSB-38(4-6)	■	■															
						WCSB-38(13-15)	■	■															
						WCSB-38(48-50)	■	■															
						WCSB-38(72-74)	■	■															
				WCSB-39	76'	WCSB-39(8-10)	■	■															
						WCSB-39(26-28)	■	■															
						WCSB-39(54-56)	■	■															
						WCSB-39(72-74)	■	■															
				WCSB-40	76'	WCSB-40(8-10)	■	■															
						WCSB-40(12-14)	■	■															
						WCSB-40(50-52)	■	■															
						WCSB-40(74-76)	■	■															
				WCSB-41	76'	WCSB-41(6-8)	■	■															
WCSB-41(12-14)	■	■																					
WCSB-41(24-26)	■	■																					
WCSB-41(70-72)	■	■																					
WCSB-42	74'	WCSB-42(8-10)	■	■																			
		WCSB-42(25-27)	■	■																			
		WCSB-42(56-58)	■	■																			
		WCSB-42(72-74)	■	■																			
WCSB-43	66'	WCSB-43(0-2)	■	■																			
		WCSB-43(16-18)	■	■																			
		WCSB-43(50-52)	■	■																			
		WCSB-43(64-66)	■	■																			

**TABLE 2-8 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF WATCHOGUE CREEK/CRUM'S BROOK FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS															
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis				
Subsurface Soil Boring Samples (cont.)				WCSB-44	76'	WCSB-44(0-2)	■	■														
						WCSB-44(13-15)	■	■														
						WCSB-44(48-50)	■	■														
						WCSB-44(68-70)	■	■														
				WCSB-45	74'	WCSB-45(6-8)	■	■														
						WCSB-45(20-22)	■	■														
						WCSB-45(44-45.5)	■	■														
						WCSB-45(70-72)	■	■														
				WCSB-46	52'	WCSB-46(6-8)	■	■														
						WCSB-46(20-22)	■	■														
						WCSB-46(48-50)	■	■														
				WCSB-47	74'	WCSB-47(10-12)	■	■														
						WCSB-47(22-24)	■	■														
						WCSB-47(50-52)	■	■														
				WCSB-48	76'	WCSB-48(6-8)	■	■														
						WCSB-48(20-22)	■	■										■				
						WCSB-48(26-28)	■	■										■				
						WCSB-48(62-64)	■	■														
				WCSB-49	56'	WCSB-49(4-6)	■	■														
						WCSB-49(8-10)	■	■										■				
						WCSB-49(48-50)	■	■														
				WCSB-50	52'	WCSB-50(8-10)	■	■														
						WCSB-50(20-22)	■	■														
						WCSB-50(50-52)	■	■														
				WCSB-51	52'	WCSB-51(10-12)	■	■														
						WCSB-51(30-32)	■	■														
						WCSB-51(48-50)	■	■														

**TABLE 2-8 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF WATCHOGUE CREEK/CRUM'S BROOK FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis					
Subsurface Soil Boring Samples (cont.)				WCSB-52	72'	WCSB-52(8-10)	■	■															
						WCSB-52(10-12)	■	■															
						WCSB-52(28-30)	■	■															
						WCSB-52(48-50)	■	■															
				WCSB-53	75'	WCSB-52(70-72)	■	■															
						WCSB-53(5-7)	■	■															
						WCSB-53(25-27)	■	■															
						WCSB-53(45-47)	■	■															
Groundwater Probes	--	5	7	WCGP-09D	69'	WCSB-53(70-72)	■	■															
Groundwater Probe Samples	Groundwater	21	37	WCGP-09D	69'	WCGP-09D(2-6)	■	■															
						WCGP-09D(12-16)	■	■															
						WCGP-09D(26-30)	■	■															
						WCGP-09D(36-40)	■	■															
						WCGP-09D(48-52)	■	■															
				WCGP-10D	75'	WCGP-09D(65-69)	■	■															
						WCGP-10D(5-9)	■	■															
						WCGP-10D(36-40)	■	■															
						WCGP-10D(52-56)	■	■															
				WCGP-14	76'	WCGP-10D(71-75)	■	■															
						WCGP-14(4.5-8.5)	■	■															
						WCGP-14(18-22)	■	■															
						WCGP-14(30-34)	■	■															
				WCGP-15	74'	WCGP-14(56-60)	■	■															
						WCGP-14(72-76)	■	■															
						WCGP-15(4-8)	■	■															
WCGP-15(18-22)	■	■																					
						WCGP-15(30-34)	■	■															
						WCGP-15(56-60)	■	■															
						WCGP-15(70-74)	■	■															

**TABLE 2-8 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**

**SUMMARY OF WATCHOGUE CREEK/CRUM'S BROOK FIELD INVESTIGATION PROGRAM ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS															
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	Petroleum Fingerprint/TPH	Full TCL/TAL	TOC	Geotechnical Analysis				
Groundwater Probe Samples (cont.)				WCGP-16	69'	WCGP-16(2-6)	■	■														
						WCGP-16(12-16)	■	■														
						WCGP-16(26-30)	■	■														
						WCGP-16(36-40)	■	■														
						WCGP-16(48-52)	■	■														
				WCGP-17	71'					WCGP-17(4-8)	■	■										
										WCGP-17(8-12)	■	■										
										WCGP-17(18-22)	■	■										
										WCGP-17(28-32)	■	■										
										WCGP-17(42-46)	■	■										
				WCGP-18	71'					WCGP-18(4-8)	■	■										
										WCGP-18(8-12)	■	■										
										WCGP-18(18-22)	■	■										
										WCGP-18(28-32)	■	■										
										WCGP-18(67-71)	■	■										
Groundwater Monitoring Well Sampling	Groundwater	6	6	WCMW-01S	12'	WCMW-01S	■	■														
				WCMW-01I	45'	WCMW-01I	■	■														
				WCMW-01D	74'	WCMW-01D	■	■														
				WCMW-02S	13'	WCMW-02S	■	■														
				WCMW-02I	44.5'	WCMW-02I	■	■														
				WCMW-02D	72'	WCMW-02D	■	■														

**Notes:**

\*: Former Standard Oil Property  
 -- : Not applicable.  
 TPH: Total petroleum hydrocarbons  
 TOC : Total organic carbon.

submitted to the laboratory for analysis. The soil boring logs are included in **Appendix A** and results are discussed in **Section 4.3.3.2**.

### Groundwater Probes

A total of seven groundwater probes were completed within the Watchogue Creek/Crum's Brook area as part of the supplemental field program. The groundwater probes were advanced to a depth ranging from 69 to 76 feet below ground surface, representing the top of the low permeability unit referred to as the Magothy formation. After reaching the targeted depth, between four and seven samples were collected at each probe location starting with the deepest sample first and then "pulling back" the sampler to the next depth until reaching the shallowest sample, typically at the groundwater table. The sample intervals were based on both field observations in soil borings and the current understanding of BTEX/PAHs trends at the Watchogue Creek/Crum's Brook area.

### Monitoring Wells

Two monitoring well clusters, WCMW-01S,I,D and WCMW-02S,I,D, were installed in the Watchogue Creek/Crum's Brook area to monitor groundwater at and downgradient of the former pond area as part of the supplemental field program. The monitoring wells were sampled for BTEX/PAHs and the results are discussed in **Section 4.3.3.3**.

#### 2.4.4 Private Well and Basement Survey

As part of the supplemental field program, a private well and basement survey was conducted. The purpose of the survey was to identify any residences and/or businesses in the study area that might be utilizing private wells, the extent to which groundwater may be infiltrating the basements of these structures along with a request for other pertinent information necessary to meet the objectives of the survey. As part of initiating the program, a total of 289 questionnaires were mailed out to property owners/occupants within the survey area. The survey area was defined to include all residents and businesses located within downgradient areas

associated with the Bay Shore site. The findings of the Private Well and Basement Survey are discussed in the Final Qualitative Exposure Assessment presented in **Appendix F**.

#### 2.4.5 Air Sampling

Forty-one indoor and ambient (outdoor) air samples were collected from nine private properties. One-hour composite samples were typically collected inside with at least one outdoor composite ambient air sample collected during each day that indoor air sampling was conducted. All samples were analyzed for volatile organic compounds (VOCs) and naphthalene. **Table 2-9** summarizes the air sampling activities conducted during the supplemental field program. Note that an additional 26 samples were collected during the initial field program. The analytical results associated with all air samples collected during both field programs are presented and discussed in **Section 4.3.4.1**.

#### 2.4.6 Private Groundwater Well Sampling

The completed private well and basement survey (**Section 2.4.4**) identified two private wells located downgradient of the former MGP site. One well was identified as being actively used for irrigation purposes. A sample was collected from this well at the pump discharge line after letting the pump run for approximately 10 minutes. The second well was identified as being inactive without an operable pump. As a result, an attempt was made to collect a representative groundwater sample from this well using a peristaltic pump. However, due to the poor recharge of the well, a sufficient volume of sample could not be collected. On a second attempt, a sample was successfully collected from this well using a disposable hand bailer. All samples were analyzed for VOCs/SVOCs. **Table 2-10** summarizes the private groundwater well sampling activities. The analytical results are presented and discussed in **Section 4.3.4.2**.

### 2.5 **Water Level Measurements**

Groundwater level measurements were recorded at available monitoring wells on four different occasions. Measurements were taken from either a notch on the inner casing or from a

**TABLE 2-9  
BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION  
SUMMARY OF AMBIENT OUTDOOR AND INDOOR AIR SAMPLING ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																	
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	VOCs	Naphthalene	TOC	Geotechnical Analysis						
Air Sampling	Air	--	41	Private Property #4 (2nd Round)	--	BB83A01											■	■						
						BB83A02														■	■			
				Private Property #4 (3rd Round)	--	BB83A01															■	■		
						BB83A02															■	■		
						BB83A03															■	■		
				Private Property #9	--	BB09A01															■	■		
						BB09A02															■	■		
						BB09A03															■	■		
						BB09A04															■	■		
						BB09A05															■	■		
						BB09A06															■	■		
						BB09A07															■	■		
						BB09A08															■	■		
						BB09A09															■	■		
						BB09A10															■	■		
				Private Property #10	--	BB87A01															■	■		
						BB87A02															■	■		
						BB87A03															■	■		
				Private Property #10 (2nd Round)	--	BB87A01															■	■		
						BB87A02															■	■		
						BB87A03															■	■		
				Private Property #11	--	BB79A01															■	■		
						BB79A02															■	■		
						BB79A03															■	■		
				Private Property #12	--	BB63A01															■	■		
						BB63A02															■	■		
						BB63A03															■	■		
				Private Property #13	--	BB13A01															■	■		
						BB13A02															■	■		
						BB13A03															■	■		

**TABLE 2-9 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**SUMMARY OF AMBIENT OUTDOOR AND INDOOR AIR SAMPLING ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS																	
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	VOCs	Naphthalene	TOC	Geotechnical Analysis						
Air Sampling (cont.)				Private Property #14	--	BB14A01										■	■							
						BB14A02											■	■						
						BB14A03												■	■					
				Private Property #15	--	BB15A02													■	■				
						BB15A02 (duplicate)														■	■			
				Private Property #16	--	BB59A01														■	■			
						BB59A02															■	■		
						BB59A03															■	■		

**Notes:**  
-- : Not applicable  
TOC : Total organic carbon



**TABLE 2-10**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**SUMMARY OF PRIVATE GROUNDWATER WELL SAMPLING ACTIVITIES**

ACTIVITY	SAMPLE MEDIA	QUANTITY		SITE ID	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS												
		PROPOSED	ACTUAL				BTEX	PAHs	RCRA Metals	Total Cyanide	Free Cyanide	Total Phenols	PCBs	Iron & Manganese	VOCs	SVOCs	TOC	Geotechnical Analysis	
Private Well Sampling	Groundwater	--	2	Private Well 1	--	PW-1										■	■		
				Private Well 2	--	PW-2											■	■	

**Notes:**  
 -- : Not applicable.  
 TOC : Total organic carbon.

point on the northernmost side of the inner casing of each monitoring well. Groundwater level measurements were recorded utilizing a Solinist water level indicator to an accuracy of 0.01-foot. In addition, a Solinist interface meter was utilized to determine whether free-product was present in any of the wells and, if present, measure its thickness. Groundwater level data is summarized in **Table 2-11**.

## **2.6 Surveying and Mapping**

All existing and new monitoring well locations, casing elevations, soil probes/borings, groundwater probes, surface soil sampling locations, test pit locations, air sample locations and soil vapor probe locations were surveyed by a licensed surveyor and located on a base map. Top of casing measurements for monitoring wells were utilized in determining groundwater elevations. Surveyed locations for completed sample points are shown on **Drawings 2A** and **2B** and on **Figure 2-1** provided in this section of the report.

## **2.7 Laboratory Analysis and Data Management**

The data collected as part of and in support of the field investigations for the site and surrounding areas was managed using the GIS/Key Data Management System.

GIS/Key was utilized for the management of both geological and chemical data. Boring logs and monitoring well construction logs were entered into GIS/Key in order to establish a geological database and produce geologic cross sections across the site.

The analytical data was transmitted by the laboratory, Mitkem Corporation, in both hard copy and electronic disk deliverable (EDD) format. The EDD was submitted in a database file (dbf) format for direct import into GIS/Key. Once the data was imported into GIS/Key, reports were generated and checked against the hard copy data packages to ensure data integrity and completeness.

**TABLE 2-11**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**GROUNDWATER MEASUREMENTS AND CALCULATED ELEVATIONS**

MONITORING WELL	DATE OF MEASUREMENT	MEASURING POINT ELEVATION	DEPTH TO WATER	WATER ELEVATION
		(feet above MSL)	(feet)	(feet above MSL)
BBMW-01S	4/29/02	20.64	7.00	13.64
	6/7/02		7.16	13.48
BBMW-01I	4/29/02	20.15	6.60	13.55
	6/7/02		6.76	13.39
BBMW-01D	4/29/02	20.17	7.00	13.17
	6/7/02		6.73	13.44
BBMW-02S	3/26/02	17.95	5.54	12.41
	6/6/02		5.49	12.46
BBMW-02I	3/26/02	18.10	5.7	12.40
	6/6/02		5.64	12.46
BBMW-02D	3/26/02	18.31	5.89	12.42
	6/6/02		5.83	12.48
BBMW-03S	3/26/02	12.39	3.82	8.57
	6/6/02		3.79	8.60
BBMW-03I	3/26/02	12.68	4.08	8.60
	6/6/02		4.07	8.61
BBMW-03D	3/26/02	12.27	3.7	8.57
	6/6/02		3.64	8.63
BBMW-04D	3/25/02	20.92	6.47	14.45
	6/7/02		5.77	15.15
	8/28/02		7.72	13.20
BBMW-05D	3/25/02	26.46	11.95	14.51
	6/6/02		11.86	14.60
	8/28/02		13.22	13.24
BBMW-05D2	3/25/02	25.35	10.27	15.08
	6/6/02		10.45	14.90
	8/28/02		11.97	13.38
BBMW-06S	3/25/02	28.34	14.04	14.30
	6/7/02		13.62	14.72
	8/28/02		15.29	13.05
BBMW-06ST	3/25/02	28.34	14.25	14.09
	6/7/02		13.70	14.64
	8/28/02		15.39	12.95
BBMW-06I	3/25/02	28.76	14.52	14.24
	6/7/02		14.08	14.68
	8/28/02		15.77	12.99
BBMW-06D	3/25/02	28.29	14.09	14.20
	6/7/02		13.65	14.64
	8/28/02		15.35	12.94
BBMW-07S	3/26/02	13.75	7.64	6.11
	6/7/02		7.22	6.53
BBMW-07I	3/26/02	13.57	7.47	6.10
	6/7/02		7.00	6.57
BBMW-07D	3/26/02	13.52	7.44	6.08
	6/7/02		6.99	6.53
BBMW-08D	3/25/02	26.52	11.28	15.24
	6/6/02		11.15	15.37
	8/28/02		12.59	13.93
BBMW-09S	6/7/02	23.15	7.09	16.06
	8/28/02		9.32	13.83

**TABLE 2-11 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**GROUNDWATER MEASUREMENTS AND CALCULATED ELEVATIONS**

MONITORING WELL	DATE OF MEASUREMENT	MEASURING POINT ELEVATION	DEPTH TO WATER	WATER ELEVATION
		(feet above MSL)	(feet)	(feet above MSL)
BBMW-09I	6/7/02	23.19	7.19	16.00
	8/28/02		9.41	13.78
BBMW-09D	6/7/02	23.62	7.65	15.97
	8/28/02		9.82	13.80
BBMW-10S	3/25/02	26.62	11.71	14.91
	6/6/02		11.42	15.20
	8/28/02		12.99	13.63
BBMW-10I	3/25/02	26.41	11.54	14.87
	6/6/02		11.59	14.82
	8/28/02		12.81	13.60
BBMW-10D	3/25/02	26.37	11.46	14.91
	6/6/02		11.33	15.04
	8/28/02		12.74	13.63
BBMW-11D	3/25/02	25.72	10.9	14.82
	6/6/02		10.81	14.91
	8/28/02		12.17	13.55
BBMW-12S	3/25/02	25.03	10.25	14.78
	6/6/02		10.17	14.86
	8/28/02		11.51	13.52
BBMW-12I	3/25/02	25.04	10.3	14.74
	6/6/02		10.2	14.84
	8/28/02		11.55	13.49
BBMW-12D	3/25/02	25.56	10.78	14.78
	6/6/02		10.71	14.85
	8/28/02		12.04	13.52
BBMW-13D	3/25/02	24.95	10.15	14.8
	6/7/02		9.35	15.60
	8/28/02		11.42	13.53
BBMW-14S	3/25/02	26.53	11.27	15.26
	6/6/02		11.23	15.30
	8/28/02		12.58	13.95
BBMW-14I	3/25/02	27.06	11.81	15.25
	6/6/02		11.72	15.34
	8/28/02		13.11	13.95
BBMW-14I2	3/25/02	26.41	11.18	15.23
	6/6/02		11.08	15.33
	8/28/02		12.49	13.92
BBMW-14D	3/25/02	27.32	12.08	15.24
	6/6/02		11.98	15.34
	8/28/02		13.39	13.93
BBMW-15S	3/26/02	17.09	5.86	11.23
	6/6/02		5.82	11.27
BBMW-15I	3/26/02	17.12	5.8	11.32
	6/6/02		5.75	11.37
BBMW-15I2	3/26/02	16.99	5.9	11.09
	6/6/02		5.86	11.13
BBMW-15D	3/26/02	16.79	5.62	11.17
	6/6/02		5.57	11.22

**TABLE 2-11 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**GROUNDWATER MEASUREMENTS AND CALCULATED ELEVATIONS**

MONITORING WELL	DATE OF MEASUREMENT	MEASURING POINT ELEVATION	DEPTH TO WATER	WATER ELEVATION
		(feet above MSL)	(feet)	(feet above MSL)
BBMW-17S	3/25/02	25.99	10.55	15.44
	6/6/02		10.41	15.58
	8/28/02		11.89	14.10
BBMW-17I	3/25/02	25.87	10.39	15.48
	6/6/02		10.26	15.61
	8/28/02		11.72	14.15
BBMW-18S	3/25/02	24.96	9.91	15.05
	6/6/02		9.77	15.19
	8/28/02		11.20	13.76
BBMW-18I	3/25/02	24.95	9.93	15.02
	6/6/02		9.78	15.17
	8/28/02		11.22	13.73
BBMW-18D	3/25/02	25.03	9.96	15.07
	6/6/02		9.81	15.22
	8/28/02		11.26	13.77
BBMW-19S	3/25/02	25.28	10.45	14.83
	6/6/02		10.32	14.96
	8/28/02		11.72	13.56
BBMW-19I	3/25/02	25.44	10.58	14.86
	6/6/02		10.43	15.01
	8/28/02		11.86	13.58
BBMW-19D	3/25/02	25.33	10.48	14.85
	6/6/02		10.34	14.99
	8/28/02		11.77	13.56
BBMW-20S	6/6/02	20.18	6.07	14.11
	8/28/02		7.38	12.80
BBMW-20I	6/6/02	20.21	6.11	14.10
	8/28/02		7.41	12.80
BBMW-20D	6/6/02	20.16	6.07	14.09
	8/28/02		7.37	12.79
BBMW-21S	3/25/02	26.41	12.01	14.40
	6/7/02		11.52	14.89
	8/28/02		13.28	13.13
BBMW-21I	3/25/02	26.47	12.07	14.40
	6/7/02		11.55	14.92
	8/28/02		13.33	13.14
BBMW-21D	3/25/02	26.41	12.01	14.40
	6/7/02		11.52	14.89
	8/28/02		13.27	13.14
BBMW-22S	3/25/02	24.71	10.39	14.32
	6/6/02		10.31	14.40
	8/28/02		11.64	13.07
BBMW-22I	3/25/02	24.65	10.35	14.30
	6/6/02		10.27	14.38
	8/28/02		11.59	13.06
BBMW-22D	3/25/02	24.73	10.41	14.32
	6/6/02		10.33	14.40
	8/28/02		11.66	13.07
BBMW-23S	6/6/02	20.21	6.55	13.66

**TABLE 2-11 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**GROUNDWATER MEASUREMENTS AND CALCULATED ELEVATIONS**

MONITORING WELL	DATE OF MEASUREMENT	MEASURING POINT ELEVATION	DEPTH TO WATER	WATER ELEVATION
		(feet above MSL)	(feet)	(feet above MSL)
BBMW-23I	6/6/02	20.29	6.58	13.71
BBMW-23D	6/6/02	20.27	6.63	13.64
BBMW-23D2	6/18/02	19.68	5.81	13.87
BBMW-24S	4/26/02	19.15	7.26	11.89
	6/6/02		7.78	11.37
BBMW-24I	4/26/02	19.00	7.53	11.47
	6/6/02		7.66	11.34
BBMW-24D	4/26/02	18.77	7.35	11.42
	6/6/02		7.40	11.37
BBMW-25S	4/26/02	14.25	5.52	8.73
	6/6/02		5.47	8.78
BBMW-25I	4/26/02	14.22	5.51	8.71
	6/6/02		5.43	8.79
BBMW-25D	4/26/02	14.21	5.50	8.71
	6/6/02		5.35	8.86
BBSW-06	6/7/02	3.19	1.91	1.28
BBSW-07	6/7/02	7.93	1.75	6.18
BBSW-13	6/6/02	14.12	3.28	10.84
BBSW-14	6/7/02	16.05	3.23	12.82
WCMW-01S	6/7/02	19.31	4.29	15.02
WCMW-01I	5/17/02	19.07	4.26	14.81
	6/7/02		3.98	15.09
WCMW-01D	5/29/02	18.78	4.25	14.53
	6/7/02		3.69	15.09
WCMW-02S	6/7/02	16.20	2.38	13.82
WCMW-02I	6/7/02	16.23	2.37	13.86
WCMW-02D	6/7/02	16.11	2.23	13.88
BS-01S	4/29/02	17.08	4.05	13.03
	6/6/02		4.55	12.53
BS-02S	6/10/02	14.81	2.25	12.56
BS-02I	6/10/02	14.86	2.34	12.52
BS-02D	6/10/02	14.82	2.24	12.58
GM-02AS	6/6/02	22.18	10.46	11.72
GM-02AI	6/6/02	22.25	10.40	11.85
GM-02AD	6/6/02	22.15	10.30	11.85
GM-03S	4/26/02	16.54	6.31	10.23
	6/7/02		6.17	10.37
GM-03I	4/26/02	16.64	6.50	10.14
	6/7/02		6.26	10.38
GM-03D	4/26/02	16.72	6.45	10.27
	6/7/02		6.33	10.39
GM-05S	3/26/02	6.95	3.21	3.74
	6/7/02		2.52	4.43
GM-05I	3/26/02	7.14	3.30	3.84
	6/7/02		2.55	4.59
GM-05D <sup>1</sup>	3/26/02	9.35	< 0.00	9.35
	6/7/02		0.84	8.51

**TABLE 2-11 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**GROUNDWATER MEASUREMENTS AND CALCULATED ELEVATIONS**

MONITORING WELL	DATE OF MEASUREMENT	MEASURING POINT ELEVATION	DEPTH TO WATER	WATER ELEVATION
		(feet above MSL)	(feet)	(feet above MSL)
GM-06S	3/26/02	10.72	6.63	4.09
	6/7/02		6.06	4.66
GM-06I	3/26/02	10.72	6.63	4.09
	6/7/02		5.99	4.73
GM-06D	3/26/02	10.85	6.74	4.11
	6/7/02		6.17	4.68
GM-07S	3/26/02	11.72	8.60	3.12
	6/7/02		8.12	3.60
GM-07I	3/26/02	11.69	8.53	3.16
	6/7/02		8.01	3.68
GM-07D	3/26/02	11.92	8.75	3.17
	6/7/02		8.21	3.71
GM-08S	3/26/02	4.91	3.26	1.65
	6/7/02		2.56	2.35
GM-08I	3/26/02	5.05	3.41	1.64
	6/7/02		2.71	2.34
GM-08D	3/26/02	4.91	3.29	1.62
	6/7/02		2.53	2.38
GM-09S	3/26/02	4.21	2.85	1.36
	6/7/02		1.99	2.22
GM-09I	3/26/02	4.36	3.03	1.33
	6/7/02		2.18	2.18
GM-09D	3/26/02	4.03	2.68	1.35
	6/7/02		1.85	2.18
GM-10AD	3/26/02	9.12	6.95	2.17
	6/7/02		6.21	2.91
MW-01S	8/28/02	20.72	5.70	15.02
MW-01D	8/28/02	20.53	5.82	14.71
MW-02S	6/7/02	22.62	6.38	16.24
	8/28/02		8.83	13.79
MW-02D	6/7/02	22.69	6.51	16.18
	8/28/02		8.68	14.01
MW-02DD	6/7/02	22.70	7.23	15.47
	8/28/02		9.38	13.32
MW-03	6/7/02	20.53	5.77	14.76
	8/28/02		6.12	14.41
MW-03S	3/25/02	23.88	8.87	15.01
	6/7/02		8.08	15.80
	8/28/02		10.14	13.74
MW-03D	3/25/02	23.81	8.76	15.05
	6/7/02		8.00	15.81
	8/28/02		10.04	13.77
MW-04	6/10/02	20.36	4.31	16.05
	8/28/02		6.18	14.18
MW-04S	3/25/02	20.40	5.59	14.81
	6/7/02		5.32	15.08
	8/28/02		7.23	13.17
MW-04D	3/25/02	21.14	6.66	14.48
	6/7/02		6.01	15.13
	8/28/02		7.90	13.24

**TABLE 2-11 (continued)**  
**BAY SHORE/BRIGHTWATERS FORMER MGP SITE FINAL REMEDIAL INVESTIGATION**  
**GROUNDWATER MEASUREMENTS AND CALCULATED ELEVATIONS**

MONITORING WELL	DATE OF MEASUREMENT	MEASURING POINT ELEVATION	DEPTH TO WATER	WATER ELEVATION
		(feet above MSL)	(feet)	(feet above MSL)
MW-05S <sup>2</sup>	3/25/02	21.03	6.50	14.53
	6/6/02		10.55	14.58
	8/28/02	25.13	11.89	13.24
MW-05D <sup>2</sup>	3/25/02	21.41	6.92	14.49
	6/6/02		10.86	14.59
	8/28/02	25.45	12.21	13.24
MW-07S	3/25/02		9.92	15.45
	6/6/02	25.37	9.83	15.54
	8/28/02		11.70	13.67
MW-07D	3/25/02		10.41	14.92
	6/6/02	25.33	10.31	15.02
	8/28/02		11.68	13.65
MW-08S	3/25/02		10.55	15.28
	6/6/02	25.83	10.41	15.42
	8/28/02		11.88	13.95
MW-08D	3/25/02		10.93	15.27
	6/6/02	26.20	10.78	15.42
	8/28/02		12.23	13.97
MW-09S	6/7/02	26.44	10.07	16.37
	8/28/02		11.60	14.84
MW-16S	6/7/02		6.82	16.55
	8/28/02	23.37	9.45	13.92
MW-16I	6/7/02		6.92	16.18
	8/28/02	23.10	9.14	13.96
MW-16D	6/7/02		6.88	16.22
	8/28/02	23.10	9.09	14.01
MW-16AS	3/26/02		5.86	11.50
	6/6/02	17.36	5.80	11.56
MW-29S	8/28/02	19.39	4.79	14.60
MW-29D	8/28/02	19.49	4.91	14.58
MW-34S	4/23/02		2.66	14.04
	6/6/02	16.70	2.58	14.12
MW-34I	4/23/02		2.77	13.92
	6/6/02	16.69	2.68	14.01
MW-34D	4/23/02		2.61	13.92
	6/6/02	16.53	2.51	14.02
GMP-01	3/26/02		3.61	3.61
	6/7/02	7.22	2.93	4.29
GMP-02	3/26/02		4.03	3.41
	6/7/02	7.44	3.33	4.11
GMP-04	3/26/02		2.78	2.12
	6/7/02	4.90	2.28	2.62

**Notes:**

<sup>1</sup>: Artesian well

<sup>2</sup>: Monitoring well converted to stick up after round of samples in late March



## 2.8 Data Validation/Data Usability

Analytical data packages submitted by Mitkem Corporation Inc. were validated in accordance with New York State Environmental Conservation (NYSDEC) 10/95 Analytical Services Protocol (ASP) Quality Assurance/Quality Control (QA/QC) requirements. Data validation was performed by D&B's QA/QC officer, who meets the qualifications required by NYSDEC to perform data validation.

The data packages were reviewed for transcription errors, as well as compliance with analytical methods and QA/QC requirements.

### 2.8.1 Sample Collection and Analysis

The field program consisted of collecting samples from various environmental media including surface soil, subsurface soil, Geoprobe groundwater and monitoring well groundwater. Sample collection was performed in accordance with the procedures set forth in the Work Plan for the Bay Shore/Brightwaters Former MGP site, dated August 1999. The water and soil samples were analyzed by Mitkem, a subcontractor to D&B, in accordance with the USEPA SW-846 methods stipulated in the work plan, as well as NYSDEC ASP QA/QC requirements. Mitkem participates in the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) for all analyses performed as part of this project. Mitkem also complies with the NYSDOH Contract Laboratory Program (CLP).

A summary of the analytical sampling program was previously presented in **Table 2-1**. The environmental samples were primarily analyzed for the following parameters:

<u>Sample Type</u>	<u>Analytical Parameters</u>
Groundwater Probes	BTEX, PAHs, geochemical parameters
Monitoring Well Groundwater	BTEX, PAHs, geochemical parameters
Soil Probe/Borings (Subsurface Soil)	BTEX, PAHs
Surface Soil	PCBs and/or PAHs, BTEX, RCRA Metals

In addition to the above analyses, some of the soil probe samples were also analyzed for petroleum fingerprints. Analytical methods and detection limits are presented in **Appendix B**.

### 2.8.2 Data Quality Objectives

The primary objective of this investigation was to obtain valid defensible data to be used to determine the nature, extent and sources of chemical constituents at the site, as well as the preparation of a human exposure assessment and identify, evaluate and recommend a cost effective, environmentally sound long-term remedial action plan. The data was also utilized during the remedial investigation to monitor for the health and safety of workers at the site and potential receptors off-site. This objective was achieved by designing a sampling program to encompass the entire site and surrounding area.

To ensure data quality, several types of quality control (QC) measures were implemented. QC samples were collected (field blanks, spikes and duplicates) at a rate of 1 per 20 environmental samples. Trip blanks accompanied all shipments of water samples that required volatile organic or BTEX analysis. All samples for organic analyses were spiked with surrogate and/or internal standard compounds in order to determine the integrity/reliability of the sample results.

To determine the comparability of the sample results, matrix spikes and matrix spike duplicates were analyzed for the organic parameters and spikes and duplicates were run for inorganic parameters. In addition, the analytical methods also require that specific laboratory QA/QC measures be taken during analysis (i.e., calibrations, blanks, control samples, spiked blanks, etc.).

### 2.8.3 Data Quality and Usability

In order to determine the quality and usability of the sample results, the data packages, submitted by the laboratories, were validated. Data validation was performed in accordance with

NYSDEC 10/95 ASP QA/QC requirements. A validation report/summary sheet was prepared for each sample delivery group (SDG) or data package. Copies of the reports are maintained in the project files.

Twenty percent of the environmental samples results, as well as all QA/QC results, were reviewed to yield a “20% validation” as required by the work plan.

Overall, the quality of the data was good and the results were determined to be usable for environmental assessment purposes. The findings of the validation process are summarized below.

### General Findings

Sample analyses were performed within the NYSDEC 10/95 ASP specified holding times. All calibrations were run in accordance with the specified methods.

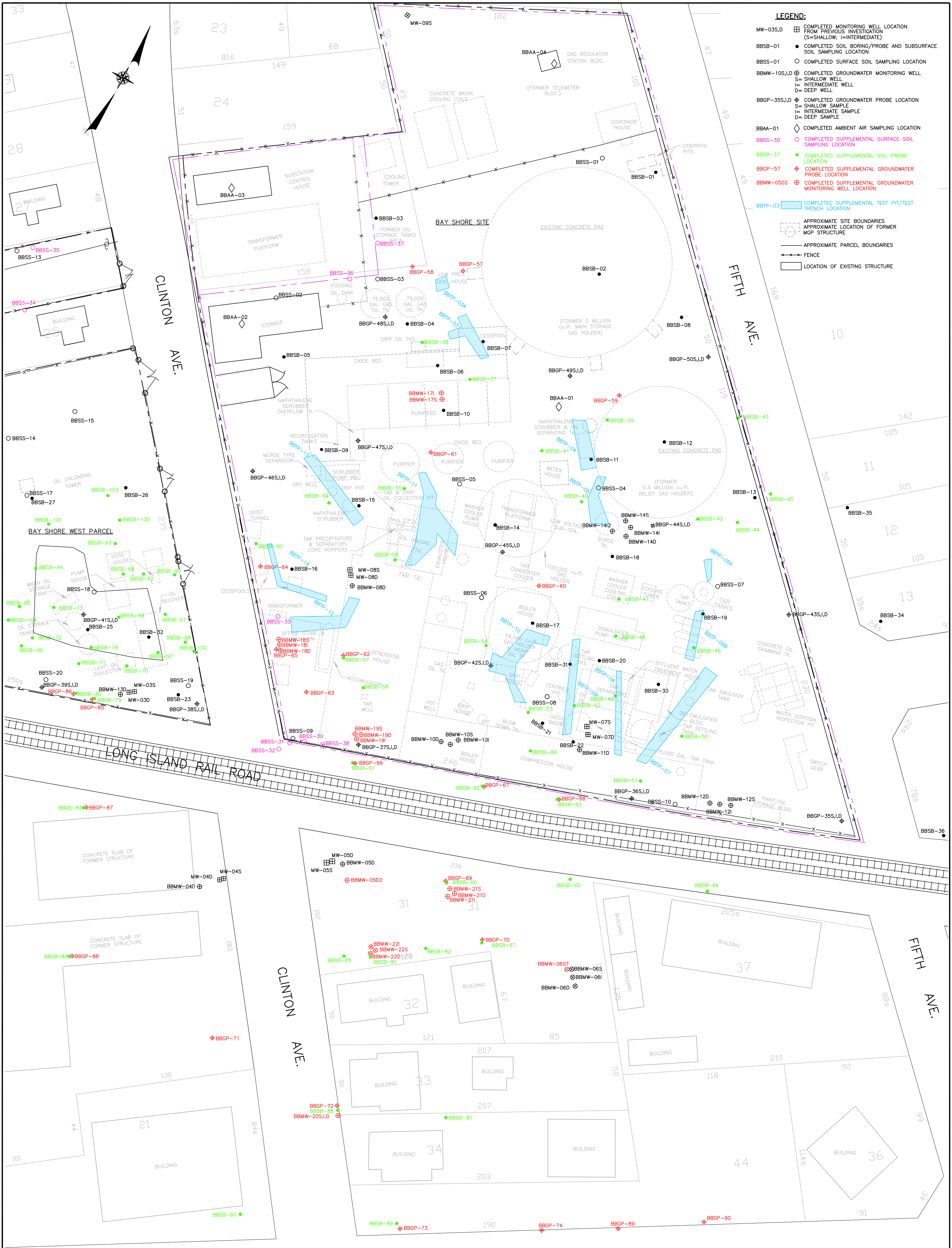
Several samples had surrogate recoveries outside QC limits. The samples were reanalyzed, as required by the NYSDEC ASP. The data summary tables contain the “best set” of data that were deemed to be most contractually compliant.

BTEX and PAH compound concentrations were calculated using the response factors from the initial calibrations which is acceptable with USEPA SW-846 methodologies.

Several samples required analysis and/or reanalysis due to compound concentrations exceeding the instrument calibration range. The best set of results have been included in the data summary table.

No other problems were identified. All results have been deemed valid and usable for environmental assessment, as qualified above.



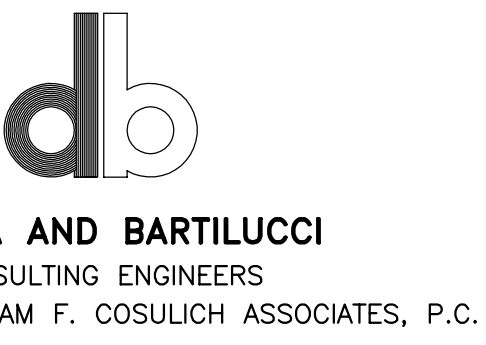
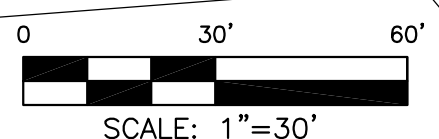


**LEGEND:**

- MW-03S,D [Symbol] COMPLETED MONITORING WELL LOCATION FROM PREVIOUS INVESTIGATION (S=SHALLOW, I=INTERMEDIATE)
- BBSB-01 [Symbol] COMPLETED SOIL BORING/PROBE AND SUBSURFACE SOIL SAMPLING LOCATION
- BBSS-01 [Symbol] COMPLETED SURFACE SOIL SAMPLING LOCATION
- BBMW-10S,I,D [Symbol] COMPLETED GROUNDWATER MONITORING WELL (S=SHALLOW WELL, I=INTERMEDIATE WELL, D=DEEP WELL)
- BBGP-35S,I,D [Symbol] COMPLETED GROUNDWATER PROBE LOCATION (S=SHALLOW SAMPLE, I=INTERMEDIATE SAMPLE, D=DEEP SAMPLE)
- BBAA-01 [Symbol] COMPLETED AMBIENT AIR SAMPLING LOCATION
- BBSS-30 [Symbol] COMPLETED SUPPLEMENTAL SURFACE SOIL SAMPLING LOCATION
- BBSS-37 [Symbol] COMPLETED SUPPLEMENTAL SOIL PROBE LOCATION
- BBGP-57 [Symbol] COMPLETED SUPPLEMENTAL GROUNDWATER PROBE LOCATION
- BBMW-05D2 [Symbol] COMPLETED SUPPLEMENTAL GROUNDWATER MONITORING WELL LOCATION
- BBTP-03 [Symbol] COMPLETED SUPPLEMENTAL TEST PIT/TEST TRENCH LOCATION
- [Symbol] APPROXIMATE SITE BOUNDARIES
- [Symbol] APPROXIMATE LOCATION OF FORMER MGP STRUCTURE
- [Symbol] APPROXIMATE PARCEL BOUNDARIES
- [Symbol] FENCE
- [Symbol] LOCATION OF EXISTING STRUCTURE

SOURCES: BASE MAP PREPARED FROM INTERPRETATION OF AERIAL PHOTOGRAPH DATED, APRIL 4, 1994. APPROXIMATE LOCATIONS OF FORMER MGP STRUCTURES BASED ON INTERPRETATION OF AERIAL PHOTOGRAPH DATED APRIL 1, 1964 AND THE FOLLOWING CONSTRUCTION DRAWINGS PROVIDED BY KEYSpan:  
 1. PLAN OF GAS WORKS, DATED APRIL 1941, REVISED 1948 AND 1974.  
 2. 75,000 GAL. OIL TANK LOCATION PLAN, DATED 11/23/27, REVISION: 1928, 1931, 1933 AND 1935.  
 3. DEMOLITION PLAN WEST OF CLINTON AVE., REVISION DATE 3/22/76.

NOTE: SITE SURVEY DATA SHOWN ON THIS MAP IS FOR KEYSpan USE ONLY AND IS NOT TO BE RELIED UPON BY OTHERS.



**BAY SHORE/BRIGHTWATERS  
 FORMER MGP SITE FINAL REMEDIAL INVESTIGATION  
 BAY SHORE, NEW YORK**

**BAY SHORE SITE, BAY SHORE  
 WEST PARCEL AND ADJACENT  
 OFF-SITE AREAS SAMPLE  
 LOCATION MAP**

PROJECT NO. 1620-B	DRAWING NO. <b>2A</b>
DATE: JANUARY 2003	
SCALE: AS SHOWN	

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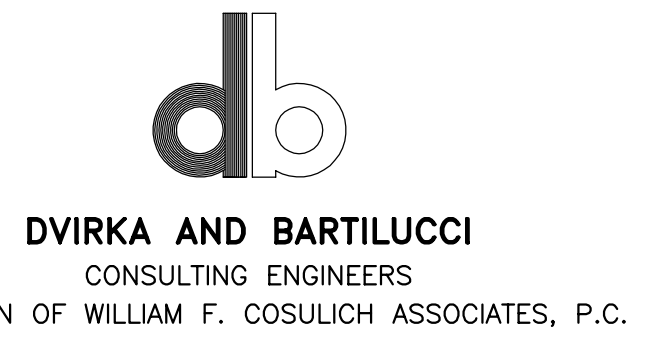


- LEGEND:**
- GM-01S,I,D MW-04S,I,D   COMPLETED MONITORING WELL FROM PREVIOUS INVESTIGATION  
S=SHALLOW; I=INTERMEDIATE; D=DEEP
  - MW-01S,I,D BS-01S   COMPLETED SOIL BORING CONVERTED TO MICROWELL AND/OR MONITORING WELL FROM PREVIOUS INVESTIGATION  
S=SHALLOW; I=INTERMEDIATE; D=DEEP
  - GMP-01   EXISTING SUFFOLK COUNTY MONITORING POINT
  - BBMW-01S,I,D   COMPLETED GROUNDWATER MONITORING WELL LOCATION  
S=SHALLOW; I=INTERMEDIATE; D=DEEP
  - BBGP-01S,I,D BB-01S,I,D   COMPLETED GROUNDWATER PROBE LOCATION  
S=SHALLOW; I=INTERMEDIATE; D=DEEP
  - BBSV-01   COMPLETED SOIL VAPOR/GAS PROBE LOCATION
  - BBSW-01 BBSD-01   COMPLETED SURFACE WATER AND SEDIMENT SAMPLE LOCATION
  - LCPW-01 LCSW-01 LCSD-01   COMPLETED SURFACE WATER, SEDIMENT AND PORE WATER SAMPLE LOCATION
  - BBSB-74   COMPLETED SUPPLEMENTAL SOIL PROBE LOCATION
  - BBGP-75   COMPLETED SUPPLEMENTAL GROUNDWATER PROBE LOCATION
  - BBMW-21S,I,D   COMPLETED SUPPLEMENTAL GROUNDWATER MONITORING WELL LOCATION S=SHALLOW; I=INTERMEDIATE; D=DEEP
  - BWPW-01 BWSW-01 BWSW-01   COMPLETED SUPPLEMENTAL PORE WATER, SURFACE WATER, AND SURFACE WATER SEDIMENT SAMPLE LOCATION
  - BBSW-14   COMPLETED SUPPLEMENTAL SURFACE WATER SAMPLING LOCATION
  - ESTIMATED LIMIT OF BAY SHORE SITE BTEX/PAH PLUME BASED ON 100 ug/l TOTAL BTEX AND 100 ug/l TOTAL PAH CONCENTRATION ISOPLETHS
  - ESTIMATED LIMIT OF BRIGHTWATERS YARD BTEX/PAH PLUME BASED ON 100 ug/l TOTAL BTEX AND 100 ug/l TOTAL PAH CONCENTRATION ISOPLETHS

SOURCE: BASE MAP SITE SURVEY DATA PROVIDED BY KEYSpan ENERGY SURVEY DIVISION.  
 NOTE: SITE SURVEY DATA SHOWN ON THIS MAP IS FOR KEYSpan USE ONLY AND IS NOT TO BE RELIED UPON BY OTHERS

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**BAY SHORE/BRIGHTWATERS  
 FORMER MGP SITE FINAL REMEDIAL INVESTIGATION  
 BAY SHORE, NEW YORK**

**OFF-SITE SAMPLE LOCATION MAP**

1620-B	DRAWING NO.
JANUARY 2003	DATE
AS SHOWN	SCALE

