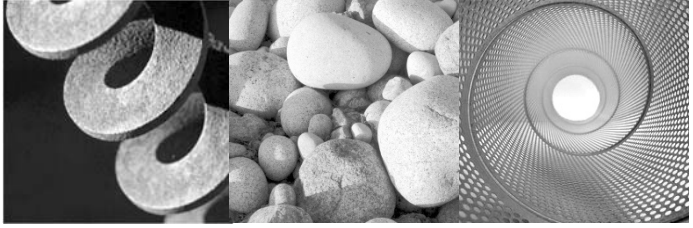

GEI Consultants

Consulting
Engineers and
Scientists

Groundwater Monitoring Report
October 2016 (Q4-2016) Baseline Sampling Event

Rockaway Park Former MGP Site

Rockaway Park
Queens County, New York
Order on Consent Index No. D1-0002-98-11
Site No. 2-41-029

Submitted to:
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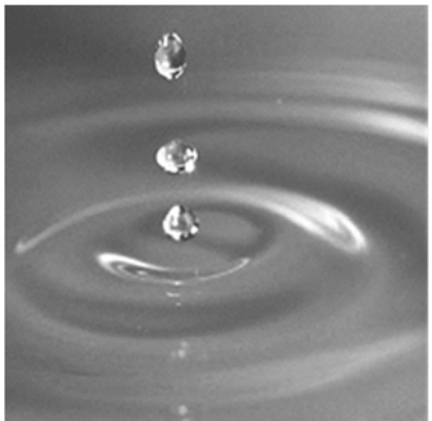

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1. Introduction and Site Background

This report presents the October 2016 groundwater monitoring results for the Rockaway Park Former Manufactured Gas Plant (MGP) site located in Rockaway Park, Queens County, New York (the Site) (**Figure 1**). This report has been prepared in accordance with the requirements of Section 6 of *DER-10* (Division of Environmental Remediation) *Technical Guidance for Site Investigation and Remediation*; the Order on Consent, Index No. D1-0002-98-11 signed by National Grid Corporation (National Grid) and the New York State Department of Environmental Conservation (NYSDEC), and the *Draft Site Management Plan* (SMP), *Rockaway Park Former Manufactured Gas Plant, Rockaway Park, New York* prepared by GEI Consultants, Inc. P.C. (GEI), dated March 2017.

1.1 Site Description

The former Gas Works and former electric substation are identified as Block 16166 and Lot 155 and the majority of Lot 110 on the Queens Tax Map (herein referred to as the "On-Site Property"). The On-Site Property is an approximately 8.9-acre area and is bounded by Beach Channel Drive to the north, Rockaway Freeway to the south, Beach 108th Street to the east, and Rockaway Freeway to the west (see **Figure 2**).

The bulkhead area, which was historically used for off-loading of coal for the former Gas Works, is located North of the On-Site Property. This property, located north of Beach Channel Drive between Rockaway Freeway and Beach 108th Street is identified as Block 16166 Lot 177 on the Queens Tax Map (herein referred to as the "Off-Site Property"). The Off-Site Property is an approximately 1.0-acre area and is bounded by Jamaica Bay to the north, and Beach Channel Drive to the south (see **Figure 2**). National Grid does not own the Off-Site Property.

1.2 Site History

The Rockaway MGP began operations in the late 1870s. The plant was operated by Rockaway Electric Light Co., Town of Hempstead Gas & Electric Company, and later the Queensboro Gas and Electric Company from the late 1870s to 1926. In 1926, Queensboro Gas and Electric Company became a subsidiary of the Long Island Lighting Company (LILCO). LILCO operated the plant from 1926 to approximately 1958, when most of the facilities were demolished. In 1998, KeySpan Corporation acquired the former MGP property through a merger of LILCO and Brooklyn Union Gas Company.

In 1894, the plant consisted of two gas holders, a generator, purifiers and scrubbers. The records indicate that the MGP operated carbureted water gas and coal carbonization processes during early gas production. After 1905, the carbureted water gas process was the only process used during gas production. In 1912, the MGP expanded to the north and east and a portion of the southern property boundary was located beneath the present Rockaway Freeway. The plant now included a half-million cubic foot gas holder, several oxide tanks, generator and boiler buildings, engine room, several oil tanks, and a condenser.

The plant expanded in the mid-1920s to a strip of land to the north of the existing plant. This land was created when Jamaica Bay was filled in during Beach Channel Drive Construction. In 1933, the plant figuration included several additional structures that could allow increased gasification, tar and oil separation and storage, and coke and gas storage. These structures included a 2-million cubic foot gas holder, drip oil tanks, skimming basin, condensers, oxide enclosure, generator ash storage bin, tar separator, tar settling and drying tanks, and tar de-emulsifier. The MGP ceased operations in 1957 and was demolished in 1958.

Five industrial supply wells were formerly located on the MGP property. A mixture of clay, liquid mud, and cement were used to abandon these wells. Three of the wells were abandoned in the 1930s and the abandonment dates of the other two wells are not known.

In October 2002, the NYSDEC approved the National Grid's request to reclassify the northwestern portion of the Rockaway Park former MGP site on the Registry of Inactive Hazardous Waste Disposal Sites. This portion of the Site is the current active substation. It was delisted based on investigation results and a risk assessment which concluded that the construction worker subsurface-soil exposure in the proposed substation area did not pose an unacceptable carcinogenic health threat or non-cancer health hazard.

1.3 Site Remedy

The NYSDEC-approved remedy for the Site involved four components. The following is a summary of the Remedial Actions performed at the Site:

- A shallow excavation was completed to the approximate depth of the water table at 8-feet below grade at the Site. Outside of the shallow excavation limits, the upper two feet of material was removed to accommodate the installation of the On-Site Soil Cover System. Approximately 165,292 tons of material was excavated and disposed of off site.
- A composite dense non-aqueous phase liquid (DNAPL) migration barrier was constructed at the Site to contain impacted materials at the Site. The location of composite On-Site DNAPL migration barrier is depicted in **Figure 2** and consists of the following components:
    - A 695-foot long Waterloo Barrier® sheet pile barrier was installed. The Waterloo Barrier® sheet piling was installed to depths of 50-feet on the flanks and 60 feet in the center of the wall.
    - Soil-cement jet grout columns were installed to a depth of approximately 120 feet below ground surface (ft bgs) with a continuous 5-foot wall overlap with the 250-foot long center section of the Waterloo Barrier® sheet piles.
- The Off-Site DNAPL migration barrier consists of a 137-foot long Waterloo Barrier® sheet pile barrier. The Waterloo Barrier® sheet piling was installed to depths of 60 to 70 feet bgs.
- A Cover System was installed on both the On-Site and Off-Site Properties.
    - The On-Site Soil Cover System consists of an 18-inch layer of well graded sandy soil material overlain with 6 inches of 2.5-inch crushed stone and underlain with a fabric demarcation barrier between the On-Site Soil Cover System and the subgrade materials.

    - The Off-Site Composite Cover System consists of either a 24-inch layer of clean fill meeting the Restricted Residential Use SCOs underlain with a fabric demarcation barrier between the Composite Cover System and the subgrade materials or an asphalt/concrete surface, underlain with 6-inches of clean fill and a fabric demarcation barrier.
- Forty-one passive DNAPL recovery wells were installed. One of the recovery wells was destroyed in 2015 and was not replaced with approval from the NYSDEC. The locations of the remaining 40 recovery wells are depicted in Figure 2.

In accordance with the Decision Document and the Draft SMP, National Grid began annual post remedy monitoring of the groundwater at the Site in the Fourth Quarter of 2016 (Q4 2016). This data will provide a baseline of groundwater analytical results following completion of the remedy to evaluate the overall effectiveness of the remedial action.

1.4 Geology

Three major stratigraphic units were identified during the Remedial Investigation (RI) and Final RI drilling program:

- Recent/post glacial fill
- Barrier island deposits
- Glacial outwash deposits

A general description of the three stratigraphic units is provided below.

Fill Material

Fill material is distributed throughout the site investigation areas and was placed in a series of land area expansions from approximately the 1800s to the 1930s. The Sanborn Fire Insurance maps indicate that approximately the northern two-thirds of the site investigation areas were part of Jamaica Bay in 1894. Retaining wall remnants are still present at the Site and mark former bulkheads that supported these filling activities.

Fill material observed at the site consisted primarily of sand with minor amounts of finer and coarser material. The fill material also includes variable amounts of coal, tar coke, clinkers, slag wood, concrete, brick, ash, glass, and crushed shell fragments. Fill materials were encountered to approximately 10 to 15 ft bgs in most of the site areas. Fill was observed to approximately 30 ft bgs in the bulkhead area.

Barrier Island Deposits

Underlying the fill unit throughout much of the Site are sandy, shell-bearing deposits interpreted as recent near-shore, beach, and dune deposits. These are identified as the barrier island deposits. The barrier island deposits contain minor amounts of silt and clay lenses. In addition, shell-bearing layers ranging from approximately 2 feet to 29 feet thick were observed. These layers sometimes contained coarser sand and gravels. The barrier island deposits were observed through the depths of most

borings in the site investigation areas. The deposits are approximately 55 to 70 feet thick throughout the Site.

Underlying the barrier island deposits at approximately 55 to 70 ft bgs, a distinct color change was observed from gray to brown in borings located throughout the Site. This was interpreted as a transition between the barrier island deposits and the glacial outwash deposits. The transitional zone is approximately 35 to 40 feet thick. Also, a silty sand layer was observed between 65 and 95 ft bgs in this transitional layer.

Glacial Deposits

Underneath the transitional zone, glacial deposits consisting of primarily well-sorted brown outwash sands were encountered. The glacial deposits were encountered at approximately 95 to 105 ft bgs. Some silty sand lenses were observed in the borings at approximately 100 ft bgs in some of the borings.

1.5 Hydrogeology

There is one shallow, unconfined aquifer beneath the Site. Wells were installed at consistent, yet arbitrary, depth intervals in order to evaluate different groundwater zones of the aquifer during the RI. The zones selected are identified as follows: shallow "S" (wells screened at the water table ranging from 2 to 17 feet ft bgs), intermediate "I" (wells screened from 17 to 45 ft bgs), deep "D" (wells screened from 45 to 90 ft bgs), and deep (2) "D2" (wells screened from 90 to 105 ft bgs). Groundwater depths were collected from all accessible monitoring wells at low and high tides based on the survey tidal mark and tide charts obtained from the National Oceanic and Atmospheric Administration. The water table was observed at approximately 8 ft bgs during monitoring events at the Site.

Three tidal studies have been conducted to confirm the groundwater flow at and adjacent to the Site. In general, groundwater at low tide on the eastern portion of the Site flows northeast towards Jamaica Bay, and shallow groundwater on the western portion of the Site flows northwest towards Jamaica Bay. At high tide, the shallow groundwater contour map depicts the presence of a groundwater divide (or trough) on the Site from the former location of PZ-06 on the southwest corner to the former location of MW-02 on the eastern edge of the Site. This trough is the result of high tidal levels within Jamaica Bay causing shallow groundwater to flow southerly toward the Site during high tide. However, this effect does not "over-ride" the dominant shallow discharge pattern toward Jamaica Bay across the entire Site, thus creating a localized trough. South of the trough, the shallow groundwater still flows north toward Jamaica Bay, even during high tide.

1.6 Historical Groundwater Monitoring Event Summary

Two groundwater monitoring events were conducted at the Site prior to 2016. Groundwater sample collection and analysis were conducted in February 2009 and October 2014. The baseline sampling was completed in Q4 2016 and annual sampling will begin in the Fourth Quarter of 2017 (Q4 2017).

2. Rockaway Park Site and Adjacent Off-site Areas

2.1 Baseline Groundwater Monitoring Event Summary

Event Dates: October 25-27, 2016

Site Phase: Post Remedial Annual Groundwater Monitoring

Location: Rockaway Park Former MGP Site

2.2 Monitoring Program

2.2.1 Number of Wells

A total of 63 monitoring wells and recovery wells are located at or adjacent to the Site. The monitoring well and recovery well locations are depicted in **Figure 2**. Fifty-nine wells are included in the post-remedy baseline sampling plan at the Site. A total of 50 monitoring wells and recovery wells were sampled. Recovery well RW-08A was over-drilled and abandoned in place during the September and October 2016 well replacement activities. Monitoring wells RPMW-20S, RPMW-20I, RPMW-21S, RPMW-21I, RPMW-25S were either identified as destroyed or could not be located during the October 2016 groundwater sampling event. Monitoring well and recovery well locations are depicted in **Figure 2**.

2.2.2 Hydrological Data

Groundwater levels were measured at 59 monitoring wells and recovery wells on October 25, 2016 between high and low tide. Depth to groundwater and calculated groundwater elevations are provided in **Table 1**. Shallow, intermediate, deep, and deep (2) groundwater contours and elevations for the October 2016 sampling event are depicted in **Figure 3**. The groundwater flow direction was generally to the north towards Jamaica Bay in the shallow zone. The groundwater flow direction in the intermediate zone is to the northwest. The groundwater flow direction in the deep zone is to the northwest and the groundwater flow direction in the deep (2) zone is to the north. The depth to water and water table elevation data for the shallow, intermediate, deep, and deep (2) portions of the aquifer are presented below in **Tables 2a-2d**.

Shallow Groundwater Zone

Table 2a – Shallow Groundwater Measurements

Well ID	Depth to Water (feet)	Water Elevation (feet above MSL)
RPMW-01S	7.04	-0.17
RPMW-02S	10.21	-0.17
RPMW-03S	6.30	-0.08
RPMW-11S	7.21	0.97
RPMW-14S	11.46	0.91
RPMW-17S	5.66	0.37
RPMW-19S	6.29	Not Calculated/Not Surveyed
RPMW-26S	5.71	Not Calculated/Not Surveyed
RW-05A	8.66	0.58
RW-06A	8.66	0.73
RW-13A	7.68	1.07

Intermediate Groundwater Zone

Table 2b – Intermediate Groundwater Measurements

Well ID	Depth to Water (feet)	Water Elevation (feet above MSL)
RPMW-01I	7.60	-0.91
RPMW-02I	10.52	-0.49
RPMW-03I	7.34	-0.93
RPMW-11I	8.45	-0.25
RPMW-14I	10.82	0.88
RPMW-17I	8.84	Not Calculated/Not Surveyed
RW-03	9.51	0.69
RW-04A	11.03	-1.05
RW-05B	9.01	0.42
RW-07A	9.07	0.98
RW-09	9.48	1.06
RW-10	9.74	0.99
RW-11	10.56	0.32
RW-12A	9.36	1.31
RW-12B	11.00	0.10
RW-14B	7.92	0.70
RW-16A	7.59	0.75
RW-17A	7.16	0.74
RW-18A	9.95	-1.44
RW-02A	10.73	-2.08
RW-02B	11.59	-2.63
RW-01A	10.51	-1.96
RW-19A	9.57	-1.08
RW-20A	9.56	-1.17

Deep Groundwater Zone

Table 2c – Deep Groundwater Measurements

Well ID	Depth to Water (feet)	Water Elevation (feet above MSL)
RPMW-03D	7.30	-0.18
RPMW-11D	10.19	-2.07
RPMW-14D	11.94	1.08
RPMW-17D	5.75	Not Calculated/Not Surveyed
RW-04B	10.95	-1.26
RW-05C	10.37	-0.72
RW-06B	9.41	0.36
RW-07B	9.89	0.43
RW-08B	9.24	0.41
RW-13B	7.95	1.09
RW-15A	8.25	0.62
RW-17B	2.87	5.89
RW-18B	11.08	-2.55
RW-18C	11.17	-2.67
RW-02C	11.90	-3.11
RW-01B	11.35	-2.71
RW-01C	11.00	-2.38
RW-19B	11.20	-2.67
RW-19C	11.49	-2.96
RW-20B	11.02	-2.67
RW-20C	11.22	-3.01

Deep (2) Groundwater Zone

Table 2d – Deep (2) Groundwater Measurements

Well ID	Depth to Water (feet)	Water Elevation (feet above MSL)
RPMW-14D2	10.38	1.23
RW-15B	8.73	-0.04
RW-16B	7.40	1.84

2.2.3 NAPL Gauging

All of the existing wells in the groundwater monitoring network are gauged for the presence of non-aqueous phase liquid (NAPL) during each groundwater monitoring event. The thickness measurements recorded during the baseline sampling event are shown below in **Table 3.**

Table 3 – DNAPL Gauging Measurements

Well ID	September 2012 DNAPL Thickness (feet)	September 2012 DNAPL Thickness (feet)	October 2016 DNAPL Thickness (feet)	Estimated Recovery Rate (feet/day)
RW-03	Not Installed	Not Installed	0.083	Not Calculated
RW-05B	Not Observed	Not Observed	5.0	0.0034

Well ID	September 2012 DNAPL Thickness (feet)	September 2012 DNAPL Thickness (feet)	October 2016 DNAPL Thickness (feet)	Estimated Recovery Rate (feet/day)
RW-06A	0.7	0.4	5.5	0.0034
RW-06B	0.4	0.3	1.0	0.0005
RW-07A	Not Observed	Not Observed	0.417	0.0003
RW-07B	Not Observed	Not Observed	3.5	0.0023
RW-13A	Not Observed	Not Observed	0.5	0.0003
RW-15B	Not Observed	Not Observed	0.667	0.0004
RW-16A	0.2	0.3	0.833	0.0004
RW-16B	5.7	0.95	5.5	0.0031
RW-17A	Trace	0.15	0.25	0.0001

Historically, the recovery rates for DNAPL at recovery wells RW-06A and RW-16B and the recovery rates from former monitoring wells collected in 2003 and 2005 during previous recovery rate evaluations have been approximately 0.04 feet/day. Over the 4-year period between October 5, 2012 and October 2016, recovery rates ranged between 0.0001 and 0.0034 feet/day.

2.2.4 Groundwater Analytical Sampling

The 2016 groundwater sampling event was performed on October 25-27, 2016 and included all accessible wells on the annual sampling list. If monitoring wells with measurable thicknesses of NAPL were identified during the sampling event they were not be sampled in accordance with the provisions of the SMP. A total of 50 monitoring wells and recovery wells were sampled for the following analytes:

- Volatile organic compounds (VOCs) via Environmental Protection Agency (EPA) Method 8260
- Semi-volatile organic compounds (SVOCs) via EPA Method 8270
- Total Cyanide via EPA Method 9012B
- Free Cyanide via EPA Method 9016

2.2.5 Analytical Results

The discussion below focuses on the analytical results from the current baseline sampling event. The laboratory analytical results for the October 2016 sampling event are included in **Table 4**. Trends in groundwater concentrations will be evaluated after future sampling events.

<u>VOCs</u>

VOC detections above the New York State Technical and Operational Guidance Series (TOGS), 1.1.1 – Ambient Water Quality Standards and Guidance Values (AWQS) for Class GA groundwater were generally limited to benzene, toluene, ethylbenzene and xylene (BTEX). Exceptions include detections of acetone in RW-01A and RW-19A, chloroform in RPMW-02D, RW-02B, RW-02C, and RW-18B. Additionally concentrations of isoproplybenzene in 23 samples exceeded the AWQS, ranging from 1.2 to 32 times the AWQS value. Total BTEX concentrations ranged from less than method detection limits (ND) in 12 of the 50 wells sampled, to 7,630 micrograms per liter (µg/L) in

RPMW-17S. Individual BTEX compound concentrations above the AWQS were identified in thirty-three of the thirty-nine wells with detections. The detections in wells with exceedances of the AWQS are summarized in **Table 4**.

SVOCs

SVOC detections above the AWQS included both PAHs and other SVOCs. Total PAH concentrations ranged from ND in 15 of the 50 wells sampled to 7,589 µg/L in RW-12B. Additionally, concentrations of biphenyl (1,1-biphenyl), bis(2-ethylhexyl)phalate, 4-methylphenol, and phenol exceeded the AWQS in 12, 4, 2, and 8 of the 50 wells, respectively. The detections in wells with concentrations above the AWQS are summarized in **Table 4**.

Other

Total and free cyanide were analyzed in each well sampled during the baseline event. Free cyanide was detected in twenty samples. Total cyanide was detected in 44 of 50 wells with 11 samples exceeding the AWQS. Trends will be evaluated after future sampling events.

2.3 Future Plans

- Begin annual post-remedy sampling in Q4 2017 as proposed in the SMP.
- Submit future groundwater data in the Periodic Review Report following approval of the SMP.

Tables

Table 1. Water Level Measurements and Calculated Groundwater Elevations
Baseline Groundwater Monitoring Report - Q4 2016
Rockaway Park Former MGP Site
Rockaway Park, New York

Monitoring Well ID	Well Diameter/Type	Screened Interval (ft bgs)	Total Depth (ft bgs)	Top of Casing Elevation (feet NAVD88)	Location	Depth To Water	Groundwater Elevation (feet NAVD88)	Time of Water Measurement
RPMW-01S	2-inch PVC	5-15	17	6.87	Beach Channel Drive	**7.04**	**-0.17**	**1028**
RPMW-01I	2-inch PVC	35-45	47	6.69	Beach Channel Drive	**7.60**	**-0.91**	**1029**
RPMW-02S	2-inch PVC	5-15	17	10.04	Beach Channel Drive	**10.21**	**-0.17**	**1007**
RPMW-02I	2-inch PVC	35-45	47	10.03	Beach Channel Drive	**10.52**	**-0.49**	**1108**
RPMW-02D	2-inch PVC	64-74	76	10.01	Beach Channel Drive	**NM**	**NC**	**NC**
RPMW-02D2	2-inch PVC	95-105	107	10.07	Beach Channel Drive	**NM**	**NC**	**NC**
RPMW-03S	2-inch PVC	5-15	17	6.22	Beach Channel Drive	**6.30**	**-0.08**	**1054**
RPMW-03I	2-inch PVC	35-45	47	6.41	Beach Channel Drive	**7.34**	**-0.93**	**1053**
RPMW-03D	2-inch PVC	65-75	77	7.12	Beach Channel Drive	**7.30**	**-0.18**	**1052**
RPMW-04S	2-inch PVC	5-15	17	Not Surveyed	Substation	**NM**	**NC**	**NC**
RPMW-04I	2-inch PVC	35-45	47	Not Surveyed	Substation	**NM**	**NC**	**NC**
RPMW-11S	2-inch PVC	5-15	17	8.18	Beach Channel Drive	**7.21**	**0.97**	**1021**
RPMW-11I	2-inch PVC	35-45	47	8.2	Beach Channel Drive	**8.45**	**-0.25**	**1022**
RPMW-11D	2-inch PVC	65-75	77	8.12	Beach Channel Drive	**10.19**	**-2.07**	**1023**
RPMW-14S	2-inch PVC	5-15	17	12.37	On-Site	**11.46**	**0.91**	**1101**
RPMW-14I	2-inch PVC	35-45	47	11.7	On-Site	**10.82**	**0.88**	**1102**
RPMW-14D	2-inch PVC	66-76	78	13.02	On-Site	**11.94**	**1.08**	**1103**
RPMW-14D2	2-inch PVC	95-105	107	11.61	On-Site	**10.38**	**1.23**	**1103**
RPMW-17S	2-inch PVC	5-15	17	6.03	Beach 108th Street	**5.66**	**0.37**	**1039**
RPMW-17I	2-inch PVC	35-45	47	Not Surveyed	Beach 108th Street	**8.84**	**NC**	**1044**
RPMW-17D	2-inch PVC	65-75	77	Not Surveyed	Beach 108th Street	**5.75**	**NC**	**1145**
RPMW-19S	1-inch PVC	2.3-12.3	12.3	Not Surveyed	Beach Channel Drive	**6.29**	**NC**	**1138**
RPMW-26S	1-inch PVC	3-13	13	Not Surveyed	Beach 108th Street	**5.71**	**NC**	**1035**
RW-01A	4-inch PVC	22-32	37	8.55	Beach Channel Drive	**10.51**	**-1.96**	**1021**
RW-01B	4-inch PVC	41-51	56	8.64	Beach Channel Drive	**11.35**	**-2.71**	**1004**
RW-01C	4-inch PVC	61-71	76	8.62	Beach Channel Drive	**11.00**	**-2.38**	**1000**
RW-02A	4-inch PVC	15-25	30	8.65	Beach Channel Drive	**10.73**	**-2.08**	**1015**
RW-02B	4-inch PVC	35-45	50	8.96	Beach Channel Drive	**11.59**	**-2.63**	**1014**
RW-02C	4-inch PVC	60-70	75	8.79	Beach Channel Drive	**11.90**	**-3.11**	**1023**
RW-03	4-inch PVC	15-25	30	10.2	On-Site	**9.51**	**0.69**	**1032**
RW-04A	4-inch PVC	30-40	45	9.98	On-Site	**11.03**	**-1.05**	**1030**
RW-04B	4-inch PVC	40-60	65	9.69	On-Site	**10.95**	**-1.26**	**1029**
RW-05A	4-inch PVC	10-20	25	9.24	On-Site	**8.66**	**0.58**	**1037**
RW-05B	4-inch PVC	25-40	45	9.43	On-Site	**9.01**	**0.42**	**1038**
RW-05C	4-inch PVC	40-50	55	9.65	On-Site	**10.37**	**-0.72**	**1039**
RW-06A	4-inch PVC	10-20	25	9.39	On-Site	**8.66**	**0.73**	**1035**
RW-06B	4-inch PVC	50-60	65	9.77	On-Site	**9.41**	**0.36**	**1034**
RW-07A	4-inch PVC	10-30	35	10.05	On-Site	**9.07**	**0.98**	**1027**
RW-07B	4-inch PVC	40-60	65	10.32	On-Site	**9.89**	**0.43**	**1026**
RW-08B	4-inch PVC	40-60	65	9.65	On-Site	**9.24**	**0.41**	**1025**
RW-09	4-inch PVC	5-30	35	10.54	On-Site	**9.48**	**1.06**	**1023**
RW-10	4-inch PVC	5-30	35	10.73	On-Site	**9.74**	**0.99**	**1022**
RW-11	4-inch PVC	20-40	45	10.88	On-Site	**10.56**	**0.32**	**1020**
RW-12A	4-inch PVC	20-35	40	10.67	On-Site	**9.36**	**1.31**	**1017**
RW-12B	4-inch PVC	35-50	55	11.1	On-Site	**11.00**	**0.10**	**1019**
RW-13A	4-inch PVC	5-20	25	8.75	On-Site	**7.68**	**1.07**	**1042**
RW-13B	4-inch PVC	55-60	65	9.04	On-Site	**7.95**	**1.09**	**1043**
RW-14B	4-inch PVC	10-30	35	8.62	On-Site	**7.92**	**0.70**	**1045**
RW-15A	4-inch PVC	40-60	65	8.87	On-Site	**8.25**	**0.62**	**1049**
RW-15B	4-inch PVC	80-100	105	8.69	On-Site	**8.73**	**-0.04**	**1047**
RW-16A	4-inch PVC	10-30	35	8.34	On-Site	**7.59**	**0.75**	**1054**
RW-16B	4-inch PVC	90-110	115	9.24	On-Site	**7.40**	**1.84**	**1053**
RW-17A	4-inch PVC	10-30	35	7.9	On-Site	**7.16**	**0.74**	**1051**
RW-17B	4-inch PVC	70-90	95	8.76	On-Site	**2.87**	**5.89**	**1050**
RW-18A	4-inch PVC	22-32	37	8.51	Beach Channel Drive	**9.95**	**-1.44**	**1010**
RW-18B	4-inch PVC	42-52	57	8.53	Beach Channel Drive	**11.08**	**-2.55**	**1008**
RW-18C	4-inch PVC	62-72	77	8.5	Beach Channel Drive	**11.17**	**-2.67**	**1011**
RW-19A	4-inch PVC	19-29	34	8.49	Beach Channel Drive	**9.57**	**-1.08**	**1003**
RW-19B	4-inch PVC	41-51	56	8.53	Beach Channel Drive	**11.20**	**-2.67**	**1002**
RW-19C	4-inch PVC	61-71	76	8.53	Beach Channel Drive	**11.49**	**-2.96**	**1000**
RW-20A	4-inch PVC	22-32	37	8.39	Beach Channel Drive	**9.56**	**-1.17**	**959**
RW-20B	4-inch PVC	41-51	56	8.35	Beach Channel Drive	**11.02**	**-2.67**	**958**
RW-20C	4-inch PVC	61-71	76	8.21	Beach Channel Drive	**11.22**	**-3.01**	**957**

Notes:
ft bgs - Feet below ground surface
PVC - polyvinyl chloride
NAVD 88 - North American Vertical Datum 1988
All measurements were collected on October 25, 2017.
NM - Not Measured
NC - Not Calculated

Table 4. Groundwater Analysis Results
Baseline Groundwater Monitoring Report - Q4 2016
Rockaway Park Former MGP Site
Rockaway Park, New York

		Sample Name	RPMW-01S	RPMW-01I	Dup-03	RPMW-02S	RPMW-02I	RPMW-02D	RPMW-02D2	RPMW-03S	RPMW-03I	RPMW-03D	RPMW-04S
		Sample Date	10/27/2016	10/27/2016	10/27/2016	10/25/2016	10/25/2016	10/25/2016	10/25/2016	10/27/2016	10/27/2016	10/27/2016	10/27/2016
		Parent Sample			RPMW-01I								
Analyte	**Units**	**NYS AWQS**											
BTEX	ug/L												
Benzene		1	1 U	1 U	1 U	1 U	**0.22 J**	**0.2 J**	**1.1**	**1.2**	**63**	**0.1 J**	1 U
Toluene		5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene		5	1 U	1 U	1 U	1 U	**2.8**	**0.31 J**	**7.8**	**2.5**	**2.7**	1 U	1 U
o-Xylene		5	1 U	1 U	1 U	1 U	**0.65 J**	1 U	**0.51 J**	**0.57 J**	**0.51 J**	1 U	1 U
m/p-Xylene		5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**0.33 J**	**0.34 J**	1 U	1 U
Total BTEX (ND=0)		NE	ND	ND	ND	ND	**3.67**	**0.51**	**9.41**	**4.6**	**66.55**	**0.1**	ND
Other VOCs	ug/L												
Acetone		50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane		50	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide		60	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform (Trichloromethane)		7	1 U	1 U	1 U	1 U	1 U	**7.6**	**0.25 J**	1 U	1 U	1 U	1 U
Cyclohexane		NE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene		5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene		5	1 U	1 U	1 U	1 U	**0.72 J**	1 U	1 U	**0.46 J**	**8.8**	1 U	1 U
Methyl ethyl ketone (2-Butanone)		50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl tert-butyl ether (MTBE)		10	1 U	**0.63 J**	**0.62 J**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-pentanone (MIBK)		NE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylcyclohexane		NE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride		5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene		5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride		2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
NYSDEC PAH17	ug/L												
Acenaphthene		20	4.7 U	24 U	25 U	**24**	**19**	48 U	**0.44 J**	**10 J**	**12 J**	4.7 U	24 U
Acenaphthylene		NE	4.7 U	24 U	25 U	**0.57 J**	**30**	**4.3 J**	4.8 U	95 U	48 U	4.7 U	24 U
Anthracene		50	4.7 U	24 U	25 U	**2.5 J**	**2.5 J**	**6.6 J**	4.8 U	95 U	48 U	4.7 U	24 U
Benzo(a)anthracene		0.002	4.7 U	24 U	25 U	4.9 U	4.6 U	**5.5 J**	4.8 U	95 U	48 U	4.7 U	24 U
Benzo(b)fluoranthene		0.002	4.7 U	24 U	25 U	4.9 U	4.6 U	48 U	4.8 U	95 U	48 U	4.7 U	24 U
Benzo(k)fluoranthene		0.002	4.7 U	24 U	25 U	4.9 U	4.6 U	48 U	4.8 U	95 U	48 U	4.7 U	24 U
Benzo(g,h,i)perylene		NE	4.7 U	24 U	25 U	4.9 U	4.6 U	**3.3 J**	4.8 U	95 U	48 U	4.7 U	24 U
Benzo(a)pyrene		0	4.7 U	24 U	25 U	4.9 U	4.6 U	**4.8 J**	4.8 U	95 U	48 U	4.7 U	24 U
Chrysene		0.002	4.7 U	24 U	25 U	4.9 U	4.6 U	**3.3 J**	4.8 U	95 U	48 U	4.7 U	24 U
Fluoranthene		50	4.7 U	24 U	25 U	**2.8 J**	**4.7**	**15 J**	4.8 U	95 U	48 U	4.7 U	24 U
Fluorene		50	4.7 U	24 U	25 U	**0.85 J**	**23**	**7.3 J**	4.8 U	95 U	48 U	4.7 U	24 U
Indeno(1,2,3-cd)pyrene		0.002	4.7 U	24 U	25 U	4.9 U	4.6 U	48 U	4.8 U	95 U	48 U	4.7 U	24 U
2-Methylnaphthalene		NE	4.7 U	24 U	25 U	4.9 U	**0.78 J**	48 U	4.8 U	95 U	48 U	4.7 U	24 U
Naphthalene		10	4.7 U	24 U	25 U	4.9 U	4.6 U	48 U	4.8 U	95 U	48 U	4.7 U	24 U
Phenanthrene		50	4.7 U	24 U	25 U	**7.8**	**26**	**43 J**	4.8 U	95 U	48 U	4.7 U	24 U
Pyrene		50	4.7 U	24 U	25 U	**4.1 J**	**7.9**	**21 J**	**1.8 J**	95 U	48 U	4.7 U	24 U
Total PAH (17) (ND=0)		NE	ND	ND	ND	**42.62**	**113.88**	**114.1**	**2.24**	**10**	**12**	ND	ND

Table 4. Groundwater Analysis Results
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Rockaway Park Former MGP Site
Rockaway Park, New York

		Sample Name	RPMW-01S	RPMW-01I	Dup-03	RPMW-02S	RPMW-02I	RPMW-02D	RPMW-02D2	RPMW-03S	RPMW-03I	RPMW-03D	RPMW-04S
		Sample Date	10/27/2016	10/27/2016	10/27/2016	10/25/2016	10/25/2016	10/25/2016	10/25/2016	10/27/2016	10/27/2016	10/27/2016	10/27/2016
		Parent Sample			RPMW-01I								
Analyte	**Units**	**NYS AWQS**											
NYSDEC PAH17 Other SVOCs	ug/L												
Acetophenone		NE	4.7 U	24 U	25 U	4.9 U	4.6 U	48 U	4.8 U	95 U	48 U	4.7 U	24 U
Benzaldehyde		NE	4.7 UJ	24 UJ	25 UJ	4.9 U	4.6 U	48 U	4.8 U	95 U	48 U	4.7 UJ	24 U
Biphenyl (1,1-Biphenyl)		5	4.7 U	24 U	25 U	4.9 U	**11**	48 U	4.8 U	95 U	48 U	4.7 U	24 U
Bis(2-ethylhexyl)phthalate		5	4.7 U	**16 J**	25 U	**2.4 J**	4.6 U	48 U	4.8 U	95 U	48 U	4.7 U	24 U
Carbazole		NE	4.7 U	24 U	25 U	4.9 U	**1.3 J**	48 U	4.8 U	95 U	48 U	4.7 U	24 U
Dibenzofuran		NE	9.3 U	48 U	50 U	**0.64 J**	**2.2 J**	95 U	9.6 U	190 U	96 U	9.3 U	48 U
2,4-Dimethylphenol		50	4.7 U	24 U	25 U	4.9 U	4.6 U	48 U	4.8 U	95 U	48 U	4.7 U	24 U
2,4-Dinitrotoluene		5	4.7 U	24 U	25 U	4.9 U	4.6 U	48 U	4.8 U	95 U	48 U	4.7 U	24 U
2,6-Dinitrotoluene		5	4.7 U	24 U	25 U	4.9 U	4.6 U	48 U	4.8 U	95 U	48 U	4.7 U	24 U
2-Methylnaphthalene		NE	4.7 U	24 U	25 U	4.9 U	**0.78 J**	48 U	4.8 U	95 U	48 U	4.7 U	24 U
4-Methylphenol (p-Cresol)		1	9.3 U	48 U	50 U	9.8 U	9.3 U	95 U	9.6 U	190 U	96 U	9.3 U	48 U
2-Nitroaniline		5	9.3 UJ	48 UJ	50 UJ	9.8 U	9.3 U	95 U	9.6 U	190 U	96 U	9.3 UJ	48 U
Phenol		1	4.7 U	24 U	25 U	4.9 U	4.6 U	48 U	4.8 U	95 U	48 U	4.7 U	24 U
Cyanides	ug/L												
Free Cyanide		NE	**21.6 J**	5 UJ	5 UJ	**2.7 J**	5 U	5 U	5 U	5 U	5 U	5 UJ	**8**
Total Cyanide		200	**930 J**	**26 J**	**24 J**	**220**	10 U	10 U	10 U	**11 J**	**19 J**	10 R	**340 J**

Table 4. Groundwater Analysis Results
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Analyte	Units	Sample Name / Sample Date / Parent Sample / NYS AWQS	RPMW-04I 10/27/2016	RPMW-11S 10/27/2016	RPMW-11I 10/27/2016	RPMW-11D 10/27/2016	RPMW-14S 10/25/2016	RPMW-14I 10/25/2016	RPMW-14D 10/25/2016	RPMW-14D2 10/25/2016	RPMW-17S 10/25/2016	RPMW-17I 10/25/2016	RPMW-17D 10/25/2016
BTEX	ug/L												
Benzene		1	**0.098 J**	**2.4**	**720**	1 U	**300**	1 U	**0.1 J**	**1.7**	**210**	**210**	1 U
Toluene		5	1 U	1 U	**19 J**	1 U	**5.1 J**	1 U	1 U	1 U	**160**	**7.7**	1 U
Ethylbenzene		5	**45**	1 U	**1600**	1 U	**720**	1 U	**0.5 J**	1 U	**5500**	**190**	**0.68 J**
o-Xylene		5	**8.3**	1 U	**240**	1 U	**310**	1 U	1 U	1 U	**1000**	**12**	1 U
m/p-Xylene		5	**1.1**	1 U	**72**	1 U	**340**	1 U	1 U	1 U	**760**	**3.2**	1 U
Total BTEX (ND=0)		NE	**54.498**	**2.4**	**2651**	ND	**1675.1**	ND	**0.6**	**1.7**	**7630**	**422.9**	**0.68**
Other VOCs	ug/L												
Acetone		50	5 U	5 U	25 U	5 U	10 U	5 U	5 U	5 U	100 U	5 U	5 U
Bromodichloromethane		50	1 U	1 U	5 U	1 U	2 U	1 U	1 U	1 U	20 U	1 U	1 U
Carbon disulfide		60	1 U	1 U	5 U	1 U	2 UJ	1 UJ	1 UJ	**1.9 J**	20 U	1 U	1 U
Chloroform (Trichloromethane)		7	1 U	1 U	5 U	1 U	2 U	1 U	1 U	1 U	20 U	1 U	1 U
Cyclohexane		NE	1 U	1 U	5 U	1 U	**1.4 J**	1 U	1 U	1 U	**8.4 J**	**4.4**	1 U
cis-1,2-Dichloroethene		5	1 U	1 U	5 U	1 U	2 U	1 U	1 U	1 U	20 U	1 U	1 U
Isopropylbenzene		5	**14**	1 U	**69**	1 U	**66**	1 U	1 U	1 U	**160**	**100**	1 U
Methyl ethyl ketone (2-Butanone)		50	5 U	5 U	25 U	5 U	10 U	5 U	5 U	5 U	100 U	5 U	5 U
Methyl tert-butyl ether (MTBE)		10	1 U	1 U	**6.6**	1 U	2 U	**0.35 J**	1 U	1 U	20 U	**0.8 J**	1 U
4-Methyl-2-pentanone (MIBK)		NE	5 U	5 U	25 U	5 U	10 U	5 U	5 U	5 U	100 U	5 U	5 U
Methylcyclohexane		NE	1 U	1 U	5 U	1 U	**0.73 J**	1 U	1 U	1 U	20 U	**4.2**	1 U
Methylene chloride		5	1 U	1 U	5 U	1 U	2 U	1 U	1 U	1 U	20 U	1 U	1 U
Styrene		5	1 U	1 U	5 U	1 U	2 U	1 U	1 U	1 U	20 U	1 U	1 U
Vinyl chloride		2	1 U	1 U	5 U	1 U	2 U	1 U	1 U	**0.62 J**	20 U	1 U	1 U
NYSDEC PAH17	ug/L												
Acenaphthene		20	**13 J**	**0.6 J**	**200 J**	4.5 U	**4.9 J**	4.8 U	4.7 U	24 U	**3.6 J**	**2.4 J**	4.7 U
Acenaphthylene		NE	**36**	**0.4 J**	**7.3**	4.5 U	24 U	4.8 U	4.7 U	24 U	**0.61 J**	**0.81 J**	4.7 U
Anthracene		50	25 U	4.8 U	**18 J**	4.5 U	24 U	4.8 U	4.7 U	24 U	**1.1 J**	**1.2 J**	4.7 U
Benzo(a)anthracene		0.002	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 U	4.7 U	24 U	4.7 U	4.6 U	4.7 U
Benzo(b)fluoranthene		0.002	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 U	4.7 U	24 U	4.7 U	4.6 U	4.7 U
Benzo(k)fluoranthene		0.002	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 U	4.7 U	24 U	4.7 U	4.6 U	4.7 U
Benzo(g,h,i)perylene		NE	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 UJ	4.7 U	24 U	4.7 U	4.6 U	4.7 U
Benzo(a)pyrene		0	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 UJ	4.7 U	24 U	4.7 U	4.6 U	4.7 U
Chrysene		0.002	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 U	4.7 U	24 U	4.7 U	4.6 U	4.7 U
Fluoranthene		50	25 U	4.8 U	**11 J**	4.5 U	24 U	4.8 U	4.7 U	24 U	**1.1 J**	4.6 U	4.7 U
Fluorene		50	25 U	4.8 U	**24 J**	4.5 U	**2.4 J**	4.8 U	4.7 U	24 U	**2.9 J**	4.6 U	4.7 U
Indeno(1,2,3-cd)pyrene		0.002	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 UJ	4.7 U	24 U	4.7 U	4.6 U	4.7 U
2-Methylnaphthalene		NE	25 U	4.8 U	**97 J**	4.5 U	24 U	4.8 U	4.7 U	24 U	**11**	4.6 U	4.7 U
Naphthalene		10	25 U	4.8 U	**2200**	4.5 U	**120**	4.8 U	4.7 U	24 U	**470**	4.6 U	4.7 U
Phenanthrene		50	**4.9 J**	4.8 U	**76 J**	4.5 U	**2.5 J**	4.8 U	4.7 U	24 U	**2.9 J**	4.6 U	4.7 U
Pyrene		50	25 U	**0.39 J**	**15 J**	4.5 U	24 U	4.8 U	4.7 U	24 U	**0.66 J**	4.6 U	4.7 U
Total PAH (17) (ND=0)		NE	**53.9**	**1.39**	**2648.3**	ND	**129.8**	ND	ND	ND	**493.87**	**4.41**	ND

Table 4. Groundwater Analysis Results
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Analyte	Units	Sample Name / Sample Date / Parent Sample / NYS AWQS	RPMW-04I 10/27/2016	RPMW-11S 10/27/2016	RPMW-11I 10/27/2016	RPMW-11D 10/27/2016	RPMW-14S 10/25/2016	RPMW-14I 10/25/2016	RPMW-14D 10/25/2016	RPMW-14D2 10/25/2016	RPMW-17S 10/25/2016	RPMW-17I 10/25/2016	RPMW-17D 10/25/2016
NYSDEC PAH17 Other SVOCs	ug/L												
Acetophenone		NE	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 U	4.7 U	24 U	4.7 U	4.6 U	4.7 U
Benzaldehyde		NE	25 U	4.8 UJ	4.8 U	4.5 U	24 UJ	4.8 U	4.7 U	24 U	4.7 U	4.6 U	4.7 U
Biphenyl (1,1-Biphenyl)		5	25 U	4.8 U	**31**	4.5 U	24 U	4.8 U	4.7 U	24 U	**2.4 J**	4.6 U	4.7 U
Bis(2-ethylhexyl)phthalate		5	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 U	4.7 U	24 U	4.7 U	4.6 U	4.7 U
Carbazole		NE	25 U	4.8 U	**28**	4.5 U	24 U	4.8 U	4.7 U	24 U	**1.1 J**	**0.31 J**	4.7 U
Dibenzofuran		NE	49 U	9.5 U	**9.5 J**	9 U	49 U	9.6 U	9.4 U	47 U	**0.75 J**	9.2 U	9.5 U
2,4-Dimethylphenol		50	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 U	4.7 U	24 U	**1.1 J**	4.6 U	4.7 U
2,4-Dinitrotoluene		5	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 U	4.7 U	24 U	4.7 U	4.6 U	4.7 U
2,6-Dinitrotoluene		5	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 U	4.7 U	24 U	4.7 U	4.6 U	4.7 U
2-Methylnaphthalene		NE	25 U	4.8 U	**97 J**	4.5 U	24 U	4.8 U	4.7 U	24 U	**11**	4.6 U	4.7 U
4-Methylphenol (p-Cresol)		1	49 U	9.5 U	9.6 U	9 U	49 U	9.6 U	9.4 U	47 U	9.4 U	9.2 U	9.5 U
2-Nitroaniline		5	49 U	9.5 UJ	9.6 UJ	9 U	49 UJ	9.6 U	9.4 U	47 U	9.4 U	9.2 U	9.5 U
Phenol		1	25 U	4.8 U	4.8 U	4.5 U	24 U	4.8 U	4.7 U	24 U	4.7 U	4.6 U	4.7 U
Cyanides	ug/L												
Free Cyanide		NE	5 U	5 UJ	**2.6 J**	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Cyanide		200	**50 J**	**110 J**	**8.3 J**	10 R	**92 J**	**5.3 J**	10 UJ	**26 J**	**31**	**19 J**	10 U

Table 4. Groundwater Analysis Results
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		Sample Name	RPMW-19S	RPMW-26S	RW-01A	RW-02A	RW-02B	RW-02C	RW-04A	RW-04B	RW-05A	RW-05C	RW-08B
		Sample Date	10/26/2016	10/27/2016	10/25/2016	10/25/2016	10/27/2016	10/27/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016
		Parent Sample											
Analyte	**Units**	**NYS AWQS**											
BTEX	ug/L												
Benzene		1	**30**	1 U	**7.6**	**1.6**	1 U	1 U	**690**	**3.6**	**12**	**3700**	**1200**
Toluene		5	1 U	1 U	**1.2 J**	1 U	1 U	1 U	**43**	**2 J**	1 U	**15 J**	**9.4 J**
Ethylbenzene		5	**0.44 J**	1 U	**3.2**	**0.93 J**	1 U	1 U	**2200**	**130**	**11**	**2600**	**1200**
o-Xylene		5	1 U	1 U	**0.92 J**	1 U	1 U	1 U	**530**	**46**	**2.4**	**410**	**220**
m/p-Xylene		5	**0.52 J**	1 U	**1.2**	1 U	1 U	1 U	**320**	**1.7**	**0.97 J**	**98**	**28**
Total BTEX (ND=0)		NE	**30.96**	ND	**14.12**	**2.53**	ND	ND	**3783**	**183.3**	**26.37**	**6823**	**2657.4**
Other VOCs	ug/L												
Acetone		50	5 U	5 U	**70**	5 U	5 U	5 U	25 U	5 U	5 U	50 U	25 U
Bromodichloromethane		50	1 U	1 U	1 U	1 U	**0.75 J**	**2.1**	5 U	1 U	1 U	10 U	5 U
Carbon disulfide		60	1 U	1 U	**1.8**	**1.3 J**	1 U	1 U	**2.2 J**	1 U	1 U	**3.9 J**	**2.1 J**
Chloroform (Trichloromethane)		7	1 U	1 U	1 U	1 U	**22**	**30**	5 U	1 U	1 U	10 U	5 U
Cyclohexane		NE	**0.83 J**	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	10 U	5 U
cis-1,2-Dichloroethene		5	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	10 U	5 U
Isopropylbenzene		5	**89**	1 U	1 U	**0.89 J**	1 U	1 U	**63**	**6.1**	**11**	**52**	**35**
Methyl ethyl ketone (2-Butanone)		50	5 U	5 U	**4 J**	5 U	5 U	5 U	25 U	5 U	5 U	50 U	25 U
Methyl tert-butyl ether (MTBE)		10	**0.32 J**	**0.81 J**	1 U	**0.16 J**	1 U	1 U	5 U	1 U	**0.2 J**	10 U	5 U
4-Methyl-2-pentanone (MIBK)		NE	5 U	5 U	**0.73 J**	5 U	5 U	5 U	25 U	5 U	5 U	50 U	25 U
Methylcyclohexane		NE	**0.71 J**	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	10 U	5 U
Methylene chloride		5	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	10 U	5 U
Styrene		5	1 U	1 U	**0.55 J**	1 U	1 U	1 U	5 U	1 U	1 U	10 U	5 U
Vinyl chloride		2	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	10 U	5 U
NYSDEC PAH17	ug/L												
Acenaphthene		20	**64**	4.9 U	**7.5 J**	**20**	24 U	25 U	**180 J**	**22**	**350**	**72 J**	**120**
Acenaphthylene		NE	**0.71 J**	4.9 U	**1.6 J**	4.9 U	24 U	25 U	**15 J**	**16**	**3.7 J**	4.9 UJ	48 U
Anthracene		50	**0.36 J**	4.9 U	**1.8 J**	4.9 U	24 U	25 U	**6.3 J**	**1.6 J**	**13**	**5 J**	**4.5 J**
Benzo(a)anthracene		0.002	4.8 U	4.9 U	13 U	4.9 U	24 U	25 U	**1.3 J**	**0.39 J**	**3.9 J**	**1.6 J**	48 U
Benzo(b)fluoranthene		0.002	4.8 U	4.9 U	13 U	4.9 U	24 U	25 U	**0.84 J**	4.9 U	**1.9 J**	**0.88 J**	48 U
Benzo(k)fluoranthene		0.002	4.8 U	4.9 U	13 U	4.9 U	24 U	25 U	4.9 UJ	4.9 U	**0.74 J**	4.9 UJ	48 U
Benzo(g,h,i)perylene		NE	4.8 U	4.9 U	13 U	4.9 U	24 U	25 U	**0.36 J**	4.9 U	**0.96 J**	**0.4 J**	48 U
Benzo(a)pyrene		0	4.8 U	4.9 U	13 U	4.9 U	24 U	25 U	**1.1 J**	4.9 U	**2.4 J**	**1.2 J**	48 U
Chrysene		0.002	4.8 U	4.9 U	13 U	4.9 U	24 U	25 U	**1.3 J**	**0.35 J**	**3.3 J**	**1.6 J**	48 U
Fluoranthene		50	4.8 U	4.9 U	13 U	**0.71 J**	24 U	25 U	**4.7 J**	**1.3 J**	**22**	**4.5 J**	**4.1 J**
Fluorene		50	**0.63 J**	4.9 U	**1.7 J**	4.9 U	24 U	25 U	**62 J**	**10**	**150**	**25 J**	**20 J**
Indeno(1,2,3-cd)pyrene		0.002	4.8 U	4.9 U	13 U	4.9 U	24 U	25 U	4.9 UJ	4.9 U	**0.96 J**	**0.53 J**	48 U
2-Methylnaphthalene		NE	4.8 U	4.9 U	**3.4 J**	4.9 U	24 U	25 U	**150 J**	**2.3 J**	4.8 U	**290 J**	**60**
Naphthalene		10	4.8 U	4.9 U	**29**	**5.8 J**	24 U	25 U	**3700 J**	**19**	**5.3 J**	**5600 J**	**870**
Phenanthrene		50	4.8 U	4.9 U	**2.8 J**	**2 J**	24 U	25 U	**53 J**	**13**	**220**	**28 J**	48 U
Pyrene		50	**0.87 J**	4.9 U	13 U	**1 J**	24 U	25 U	**7 J**	**1.9 J**	**30**	**6.8 J**	**5.8 J**
Total PAH (17) (ND=0)		NE	**66.57**	ND	**47.8**	**29.51**	ND	ND	**4182.9**	**87.84**	**808.16**	**6037.51**	**1084.4**

Table 4. Groundwater Analysis Results
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Analyte	Units	Sample Name / Sample Date / Parent Sample / NYS AWQS	RPMW-19S 10/26/2016	RPMW-26S 10/27/2016	RW-01A 10/25/2016	RW-02A 10/25/2016	RW-02B 10/27/2016	RW-02C 10/27/2016	RW-04A 10/26/2016	RW-04B 10/26/2016	RW-05A 10/26/2016	RW-05C 10/26/2016	RW-08B 10/26/2016
NYSDEC PAH17 Other SVOCs	ug/L												
Acetophenone		NE	4.8 U	4.9 U	**8.3 J**	4.9 U	24 U	25 U	**2.5 J**	**0.56 J**	**2.1 J**	**3.8 J**	48 U
Benzaldehyde		NE	4.8 U	4.9 UJ	**1.5 J**	4.9 U	24 U	25 U	4.9 UJ	4.9 U	4.8 U	4.9 UJ	**2.7 J**
Biphenyl (1,1-Biphenyl)		5	4.8 U	4.9 U	13 U	4.9 U	24 U	25 U	**38 J**	**0.76 J**	**38**	**27 J**	**19 J**
Bis(2-ethylhexyl)phthalate		5	4.8 U	4.9 U	13 U	4.9 U	24 U	25 U	4.9 UJ	**7**	4.8 U	4.9 UJ	48 U
Carbazole		NE	**2.1 J**	4.9 U	**1.7 J**	4.9 U	24 U	25 U	**27 J**	**6.5**	**8.7**	**18 J**	**13 J**
Dibenzofuran		NE	**0.93 J**	9.8 U	25 U	9.9 U	49 U	49 U	**7.1 J**	**1.7 J**	**16**	**3.6 J**	96 U
2,4-Dimethylphenol		50	4.8 U	4.9 U	**1.8 J**	4.9 U	24 U	25 U	4.9 U	4.9 U	4.8 U	**0.74 J**	48 U
2,4-Dinitrotoluene		5	4.8 U	4.9 U	13 U	4.9 U	24 U	25 U	4.9 UJ	4.9 U	4.8 U	4.9 UJ	48 U
2,6-Dinitrotoluene		5	4.8 U	4.9 U	13 U	4.9 U	24 U	25 U	4.9 UJ	4.9 U	4.8 U	4.9 UJ	48 U
2-Methylnaphthalene		NE	4.8 U	4.9 U	**3.4 J**	4.9 U	24 U	25 U	**150 J**	**2.3 J**	4.8 U	**290 J**	**60**
4-Methylphenol (p-Cresol)		1	9.5 U	9.8 U	**9.6 J**	9.9 U	49 U	49 U	**0.96 J**	9.7 U	9.6 U	9.8 U	96 U
2-Nitroaniline		5	**0.51 J**	9.8 UJ	25 UJ	9.9 U	49 U	49 U	9.8 UJ	9.7 U	9.6 U	9.8 UJ	96 U
Phenol		1	4.8 U	4.9 U	**230**	4.9 U	24 U	25 U	4.9 U	4.9 U	4.8 U	**16**	**13 J**
Cyanides	ug/L												
Free Cyanide		NE	**6.5**	5 UJ	**3.2 J**	5 U	5 U	5 U	**4.1 J**	**1.5 J**	**8.7**	**20.6**	5 U
Total Cyanide		200	**200**	**12 J**	**510**	**180 J**	**2.7 J**	**2.4 J**	**54**	**20**	**200**	**540**	**310**

Table 4. Groundwater Analysis Results
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		Sample Name	RW-09	RW-10	RW-11	RW-12A	RW-12B	Dup-02	RW-13B	RW-14B	RW-15A	RW-17B	RW-18A
		Sample Date	10/26/2016	10/26/2016	10/27/2016	10/26/2016	10/26/2016	10/26/2016	10/25/2016	10/26/2016	10/26/2016	10/25/2016	10/25/2016
		Parent Sample						RW-12B					
Analyte	**Units**	**NYS AWQS**											
BTEX	ug/L												
Benzene		1	**1300**	**160**	**6.4**	**110**	**86**	**86**	**12**	**1700**	**45**	1 U	**41**
Toluene		5	**8.4 J**	**2.7 J**	1 U	10 U	10 U	10 U	1 U	**23 J**	**8.7 J**	1 U	**23**
Ethylbenzene		5	**770**	**310**	**9.1**	**2500**	**2400**	**2400**	**4.8**	**1700**	**1100**	1 U	**4.1**
o-Xylene		5	**150**	**62**	**1.6**	**610**	**580**	**570**	**1.3**	**280**	**430**	1 U	**6.7**
m/p-Xylene		5	**59**	**20**	**0.68 J**	**370**	**620**	**610**	**1.7**	**220**	**310**	1 U	**11**
Total BTEX (ND=0)		NE	**2287.4**	**554.7**	**17.78**	**3590**	**3686**	**3666**	**19.8**	**3923**	**1893.7**	ND	**85.8**
Other VOCs	ug/L												
Acetone		50	25 U	5 U	5 U	50 U	50 U	50 U	5 U	50 U	25 U	5 U	**29**
Bromodichloromethane		50	5 U	1 U	1 U	10 U	10 U	10 U	1 U	10 U	5 U	1 U	1 U
Carbon disulfide		60	**2.3 J**	1 U	1 U	**4.3 J**	10 U	**4.6 J**	1 UJ	**3.8 J**	**2.5 J**	1 UJ	**0.58 J**
Chloroform (Trichloromethane)		7	5 U	1 U	1 U	10 U	10 U	10 U	1 U	10 U	5 U	1 U	**0.28 J**
Cyclohexane		NE	5 U	1 U	1 U	10 U	10 U	10 U	1 U	10 U	5 U	1 U	1 U
cis-1,2-Dichloroethene		5	5 U	**0.34 J**	1 U	10 U	10 U	10 U	1 U	10 U	5 U	1 U	1 U
Isopropylbenzene		5	**20**	**42**	**1.9**	**42**	**61**	**62**	1 U	**45**	**24**	1 U	**0.39 J**
Methyl ethyl ketone (2-Butanone)		50	25 U	5 U	5 U	50 U	50 U	50 U	5 U	50 U	25 U	5 U	**3.8 J**
Methyl tert-butyl ether (MTBE)		10	5 U	**0.66 J**	**0.46 J**	10 U	10 U	10 U	1 U	10 U	**0.69 J**	1 U	**0.18 J**
4-Methyl-2-pentanone (MIBK)		NE	25 U	5 U	5 U	50 U	50 U	50 U	5 U	50 U	25 U	5 U	**16**
Methylcyclohexane		NE	5 U	**0.47 J**	1 U	10 U	10 U	10 U	1 U	10 U	5 U	1 U	1 U
Methylene chloride		5	5 U	1 U	1 U	10 U	10 U	10 U	1 U	10 U	5 U	1 U	**0.83 J**
Styrene		5	5 U	1 U	1 U	10 U	10 U	10 U	**0.67 J**	10 U	5 U	1 U	**1.4**
Vinyl chloride		2	5 U	1 U	1 U	10 U	10 U	10 U	1 U	10 U	5 U	1 U	1 U
NYSDEC PAH17	ug/L												
Acenaphthene		20	**120**	**160**	**27 J**	**100**	**250 J**	**290 J**	**0.6 J**	**120**	**120 J**	5 U	**12**
Acenaphthylene		NE	**2.1 J**	**3.1 J**	47 U	24 U	2500 U	480 U	**2.2 J**	**3.6 J**	240 U	5 U	4.9 U
Anthracene		50	**6.5 J**	**17 J**	**5.1 J**	**2.6 J**	2500 U	480 U	**1 J**	**7.5 J**	240 U	5 U	**0.45 J**
Benzo(a)anthracene		0.002	25 U	**3.4 J**	47 U	24 U	2500 U	480 U	**0.81 J**	47 U	240 U	5 U	4.9 U
Benzo(b)fluoranthene		0.002	25 U	24 U	47 U	24 U	2500 U	480 U	**0.52 J**	47 U	240 U	5 U	4.9 U
Benzo(k)fluoranthene		0.002	25 U	24 U	47 U	24 U	2500 U	480 U	4.8 U	47 U	240 U	5 U	4.9 U
Benzo(g,h,i)perylene		NE	25 U	24 U	47 U	24 U	2500 U	480 U	**0.48 J**	47 U	240 U	5 U	4.9 U
Benzo(a)pyrene		0	25 U	**2.4 J**	47 U	24 U	2500 U	480 U	**0.73 J**	47 U	240 U	5 U	4.9 U
Chrysene		0.002	25 U	**3.9 J**	47 U	24 U	2500 U	480 U	**0.73 J**	47 U	240 U	5 U	4.9 U
Fluoranthene		50	**4.3 J**	**9 J**	**6 J**	24 U	2500 U	480 U	**1.7 J**	**5.2 J**	240 U	5 U	4.9 U
Fluorene		50	**42**	**64**	**5.3 J**	**27**	2500 U	**61 J**	**1.6 J**	**46 J**	**42 J**	5 U	**1.8 J**
Indeno(1,2,3-cd)pyrene		0.002	25 U	24 U	47 U	24 U	2500 U	480 U	4.8 U	47 U	240 U	5 U	4.9 U
2-Methylnaphthalene		NE	**23 J**	**3.4 J**	47 U	24 U	**650 J**	**790**	**5.9**	**540 J**	**50 J**	5 U	**1.7 J**
Naphthalene		10	25 U	24 U	47 U	24 U	**5600**	**6400**	**27**	**6000**	**1600**	5 U	**13**
Phenanthrene		50	**38**	**52**	**9.7 J**	**16 J**	2500 U	**48 J**	**5.2**	**51**	**33 J**	5 U	**2.8 J**
Pyrene		50	**6.9 J**	**17 J**	**8.5 J**	24 U	2500 U	480 U	**2.8 J**	**7.3 J**	240 U	5 U	4.9 U
Total PAH (17) (ND=0)		NE	**242.8**	**335.2**	**61.6**	**145.6**	**6500**	**7589**	**51.27**	**6780.6**	**1845**	ND	**31.75**

Table 4. Groundwater Analysis Results
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		Sample Name	RW-09	RW-10	RW-11	RW-12A	RW-12B	Dup-02	RW-13B	RW-14B	RW-15A	RW-17B	RW-18A
		Sample Date	10/26/2016	10/26/2016	10/27/2016	10/26/2016	10/26/2016	10/26/2016	10/25/2016	10/26/2016	10/26/2016	10/25/2016	10/25/2016
		Parent Sample						RW-12B					
Analyte	**Units**	**NYS AWQS**											
NYSDEC PAH17 Other SVOCs	ug/L												
Acetophenone		NE	**2.8 J**	24 U	47 U	**12 J**	2500 U	480 U	4.8 U	**5.4 J**	240 U	5 U	**1.5 J**
Benzaldehyde		NE	25 U	24 U	47 U	24 U	2500 U	480 U	4.8 U	47 U	240 U	5 U	**1.1 J**
Biphenyl (1,1-Biphenyl)		5	**13 J**	**21 J**	47 U	**19 J**	2500 U	480 U	4.8 U	**21 J**	240 U	5 U	4.9 U
Bis(2-ethylhexyl)phthalate		5	25 U	24 U	47 U	24 U	2500 U	480 U	4.8 U	47 U	240 U	5 U	4.9 U
Carbazole		NE	**15 J**	**14 J**	47 U	**3.4 J**	2500 U	480 U	4.8 U	**18 J**	240 U	5 U	**0.68 J**
Dibenzofuran		NE	**4.8 J**	**5 J**	95 U	**3.1 J**	4900 U	960 U	9.6 U	**7.7 J**	490 U	10 U	9.8 U
2,4-Dimethylphenol		50	25 U	24 U	47 U	24 U	2500 U	480 U	4.8 U	**11 J**	240 U	5 U	4.9 U
2,4-Dinitrotoluene		5	25 U	24 U	47 U	24 U	2500 U	480 U	4.8 U	47 U	240 U	5 U	4.9 U
2,6-Dinitrotoluene		5	25 U	24 U	47 U	24 U	2500 U	480 U	4.8 U	47 U	240 U	5 U	**2.7 J**
2-Methylnaphthalene		NE	**23 J**	**3.4 J**	47 U	24 U	**650 J**	**790**	**5.9**	**540 J**	**50 J**	5 U	**1.7 J**
4-Methylphenol (p-Cresol)		1	49 U	48 U	95 U	49 U	4900 U	960 U	9.6 U	95 U	490 U	10 U	9.8 U
2-Nitroaniline		5	49 U	48 U	95 U	49 U	4900 U	960 U	9.6 U	95 U	490 U	10 U	9.8 U
Phenol		1	**95**	**6.7 J**	47 U	24 U	2500 U	480 U	4.8 U	**47**	240 U	5 U	**3.3 J**
Cyanides	ug/L												
Free Cyanide		NE	**12.5**	**10.8**	5 U	5 U	5 U	**1.7 J**	5 U	**2 J**	5 U	5 U	5 U
Total Cyanide		200	**160**	**200**	**150 J**	**85**	**71**	**69**	**3.2 J**	**41**	**7 J**	10 UJ	**19 J**

Table 4. Groundwater Analysis Results
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		Sample Name	RW-18B	RW-18C	RW-19A	RW-19B	Dup-01	RW-19C	RW-20A	RW-20B	RW-20C
		Sample Date	10/25/2016	10/25/2016	10/25/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016
		Parent Sample					RW-19B				
Analyte	**Units**	**NYS AWQS**									
BTEX	ug/L										
Benzene		1	**0.35 J**	1 U	**7.8**	**610**	**670**	**2**	**3.4**	**280**	**8.3**
Toluene		5	1 U	1 U	**1.7 J**	**12 J**	**12 J**	**2.3 J**	1 U	**3.5 J**	**1.4 J**
Ethylbenzene		5	1 U	1 U	**0.59 J**	**670**	**750**	**70**	1 U	**420**	**16**
o-Xylene		5	1 U	1 U	**0.7 J**	**87**	**94**	**18**	1 U	**52**	**5.7**
m/p-Xylene		5	1 U	1 U	**0.5 J**	**37**	**40**	**1.1**	1 U	**23**	**0.95 J**
Total BTEX (ND=0)		NE	**0.35**	ND	**11.29**	**1416**	**1566**	**93.4**	**3.4**	**778.5**	**32.35**
Other VOCs	ug/L										
Acetone		50	5 U	5 U	**210**	25 U	25 U	5 U	5 U	10 U	5 U
Bromodichloromethane		50	1 U	1 U	1 U	5 U	5 U	1 U	1 U	2 U	1 U
Carbon disulfide		60	**6 J**	**0.43 J**	**3.3**	**2.3 J**	**3.4 J**	**2.8**	**0.3 J**	**1.7 J**	**2**
Chloroform (Trichloromethane)		7	**9.1**	**0.69 J**	1 U	5 U	5 U	**2.4**	1 U	2 U	**0.42 J**
Cyclohexane		NE	1 U	1 U	1 U	5 U	5 U	1 U	1 U	2 U	1 U
cis-1,2-Dichloroethene		5	1 U	1 U	1 U	5 U	5 U	1 U	1 U	2 U	1 U
Isopropylbenzene		5	1 U	1 U	1 U	**33**	**37**	**8.1**	1 U	**26**	**2.1**
Methyl ethyl ketone (2-Butanone)		50	5 U	5 U	**5.3**	25 U	25 U	5 U	5 U	10 U	5 U
Methyl tert-butyl ether (MTBE)		10	1 U	1 U	**10**	5 U	5 U	1 U	1 U	2 U	1 U
4-Methyl-2-pentanone (MIBK)		NE	5 U	5 U	**8.6**	25 U	25 U	**1.3 J**	5 U	10 U	**1.3 J**
Methylcyclohexane		NE	1 U	1 U	1 U	5 U	5 U	1 U	1 U	2 U	1 U
Methylene chloride		5	1 U	1 U	**0.54 J**	5 U	5 U	1 U	1 U	2 U	1 U
Styrene		5	1 U	1 U	**1.4**	5 U	5 U	1 U	1 U	2 U	1 U
Vinyl chloride		2	1 U	1 U	1 U	5 U	5 U	1 U	1 U	2 U	1 U
NYSDEC PAH17	ug/L										
Acenaphthene		20	**16**	4.9 U	50 U	**63 J**	**63 J**	**2.6 J**	4.7 U	**78 J**	**0.43 J**
Acenaphthylene		NE	4.8 U	4.9 U	50 U	4.8 U	240 U	**0.99 J**	4.7 U	4.7 U	**8.2**
Anthracene		50	4.8 U	4.9 U	50 U	**2.1 J**	240 U	4.6 U	4.7 U	**4.6 J**	**0.43 J**
Benzo(a)anthracene		0.002	4.8 U	4.9 U	50 U	4.8 U	240 U	4.6 U	4.7 U	4.7 U	4.7 U
Benzo(b)fluoranthene		0.002	4.8 U	4.9 U	50 U	4.8 U	240 U	4.6 U	4.7 U	4.7 U	4.7 U
Benzo(k)fluoranthene		0.002	4.8 U	4.9 U	50 U	4.8 U	240 U	4.6 U	4.7 U	4.7 U	4.7 U
Benzo(g,h,i)perylene		NE	4.8 U	4.9 U	50 U	4.8 U	240 U	4.6 U	4.7 UJ	4.7 U	4.7 U
Benzo(a)pyrene		0	4.8 U	4.9 U	50 U	4.8 U	240 U	4.6 U	4.7 UJ	4.7 U	4.7 U
Chrysene		0.002	4.8 U	4.9 U	50 U	4.8 U	240 U	4.6 U	4.7 U	4.7 U	4.7 U
Fluoranthene		50	4.8 U	4.9 U	50 U	**2.1 J**	240 U	4.6 U	4.7 U	**2 J**	**0.45 J**
Fluorene		50	**2 J**	4.9 U	50 U	**10**	240 U	**1.8 J**	4.7 U	**24**	**0.58 J**
Indeno(1,2,3-cd)pyrene		0.002	4.8 U	4.9 U	50 U	4.8 U	240 U	4.6 U	4.7 UJ	4.7 U	4.7 U
2-Methylnaphthalene		NE	4.8 U	4.9 U	50 U	**45**	**61 J**	4.6 U	4.7 U	**110 J**	4.7 U
Naphthalene		10	4.8 U	4.9 U	50 U	**2100**	**2000**	**6.2 J**	4.7 U	**1900**	4.7 U
Phenanthrene		50	**3 J**	4.9 U	50 U	**16**	240 U	4.6 U	4.7 U	**28**	**0.85 J**
Pyrene		50	4.8 U	4.9 U	50 U	**3.1 J**	240 U	**0.72 J**	4.7 U	**2.2 J**	**0.71 J**
Total PAH (17) (ND=0)		NE	**21**	ND	ND	**2241.3**	**2124**	**12.31**	ND	**2148.8**	**11.65**

Table 4. Groundwater Analysis Results
Baseline Groundwater Monitoring Report - Q4 2016
Rockaway Park Former MGP Site
Rockaway Park, New York

		Sample Name	RW-18B	RW-18C	RW-19A	RW-19B	Dup-01	RW-19C	RW-20A	RW-20B	RW-20C
		Sample Date	10/25/2016	10/25/2016	10/25/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016	10/26/2016
		Parent Sample					RW-19B				
Analyte	**Units**	**NYS AWQS**									
NYSDEC PAH17 Other SVOCs	ug/L										
Acetophenone		NE	**0.56 J**	4.9 U	50 U	4.8 U	240 U	**0.7 J**	4.7 U	4.7 U	4.7 U
Benzaldehyde		NE	4.8 U	4.9 U	50 U	4.8 U	240 U	4.6 U	4.7 U	4.7 U	4.7 U
Biphenyl (1,1-Biphenyl)		5	4.8 U	4.9 U	50 U	**8.1**	240 U	4.6 U	4.7 U	**13**	4.7 U
Bis(2-ethylhexyl)phthalate		5	4.8 U	**3.6 J**	50 U	**5.9**	240 U	4.6 U	4.7 U	**69 J**	4.7 U
Carbazole		NE	**0.75 J**	4.9 U	50 U	**14**	240 U	**0.29 J**	4.7 U	**11**	4.7 U
Dibenzofuran		NE	9.5 U	9.7 U	99 U	**2.1 J**	470 U	**0.49 J**	9.5 U	**4.5 J**	9.4 U
2,4-Dimethylphenol		50	4.8 U	4.9 U	50 U	**0.9 J**	240 U	4.6 U	4.7 U	4.7 U	4.7 U
2,4-Dinitrotoluene		5	4.8 U	4.9 U	50 U	4.8 U	240 U	4.6 U	4.7 U	**0.63 J**	4.7 U
2,6-Dinitrotoluene		5	4.8 U	4.9 U	50 U	4.8 U	240 U	4.6 U	4.7 U	4.7 U	4.7 U
2-Methylnaphthalene		NE	4.8 U	4.9 U	50 U	**45**	**61 J**	4.6 U	4.7 U	**110 J**	4.7 U
4-Methylphenol (p-Cresol)		1	9.5 U	9.7 U	99 U	**15**	470 U	9.2 U	9.5 U	9.5 U	9.4 U
2-Nitroaniline		5	9.5 U	9.7 U	99 U	9.7 U	470 U	9.2 U	9.5 U	9.5 U	9.4 U
Phenol		1	**0.7 J**	4.9 U	50 U	**15**	240 U	4.6 U	4.7 U	4.7 U	4.7 U
Cyanides	ug/L										
Free Cyanide		NE	5 U	5 U	**7.2**	**7**	**6.5**	5 U	**12.5**	**37.1**	**1.7 J**
Total Cyanide		200	**23 J**	**2.4 J**	**950**	**300**	**300**	10 U	**280**	**500**	**2.2 J**

Table 4. Groundwater Analysis Results
Baseline Groundwater Monitoring Report - Q4 2016
Rockaway Park Former MGP Site
Rockaway Park, New York

Notes:

Analytes in blue are not detected in any sample
ug/L = micrograms per liter or parts per billion (ppb)

BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes
PAH = Polycyclic Aromatic Hydrocarbon
SVOC = Semi-Volatile Organic Compound
VOC = Volatile Organic Compound

Total BTEX and Total PAHs are calculated using detects only.

Total PAH16 is calculated using the EPA16 list of analytes: Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[g,h,i]perylene, Benzo[k]fluoranthene, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, and Pyrene

Total PAH17 is calculated using the EPA16 list of analytes plus 2-Methylnaphthalene

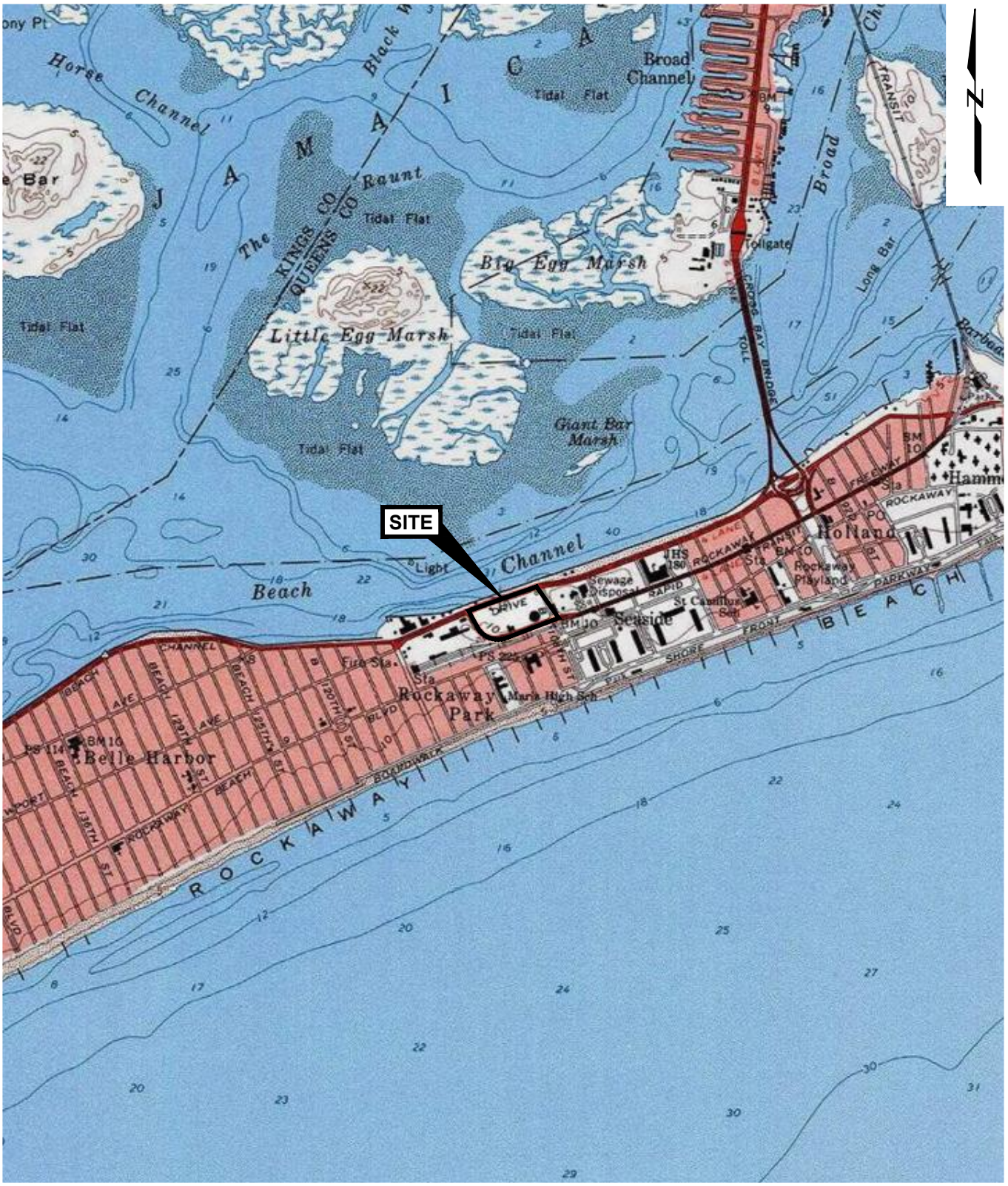
NYS AWQS = New York State Ambient Water Quality Standards and Guidance Values for GA groundwater
* indicates the value is a guidance value and not a standard

MGP = Manufactured Gas Plant
ND = Not Detected
NE = Not Established
NYSDEC = New York State Department of Environmental Conservation

Bolding indicates a detected result concentration
Gray shading and bolding indicates that the detected result value exceeds the NYS AWQS

Validation Qualifiers:
J = The result is an estimated value.
R = The result is rejected.
U = The result was not detected above the reporting limit.
UJ = The result was not detected at or above the reporting limit shown and the reporting limit is estimated.

Figures



0 2000 4000

SCALE: 1" = 2000'

SOURCE: Map created with TOPO! ® © 2001 National Geographic (www.nationalgeographic.com/topo)

Groundwater Monitoring Report Rockaway Park Former MGP Site Rockaway Park, New York	GEI Consultants	SITE LOCATION MAP
nationalgrid	Project 093150	May 2017 Fig. 1

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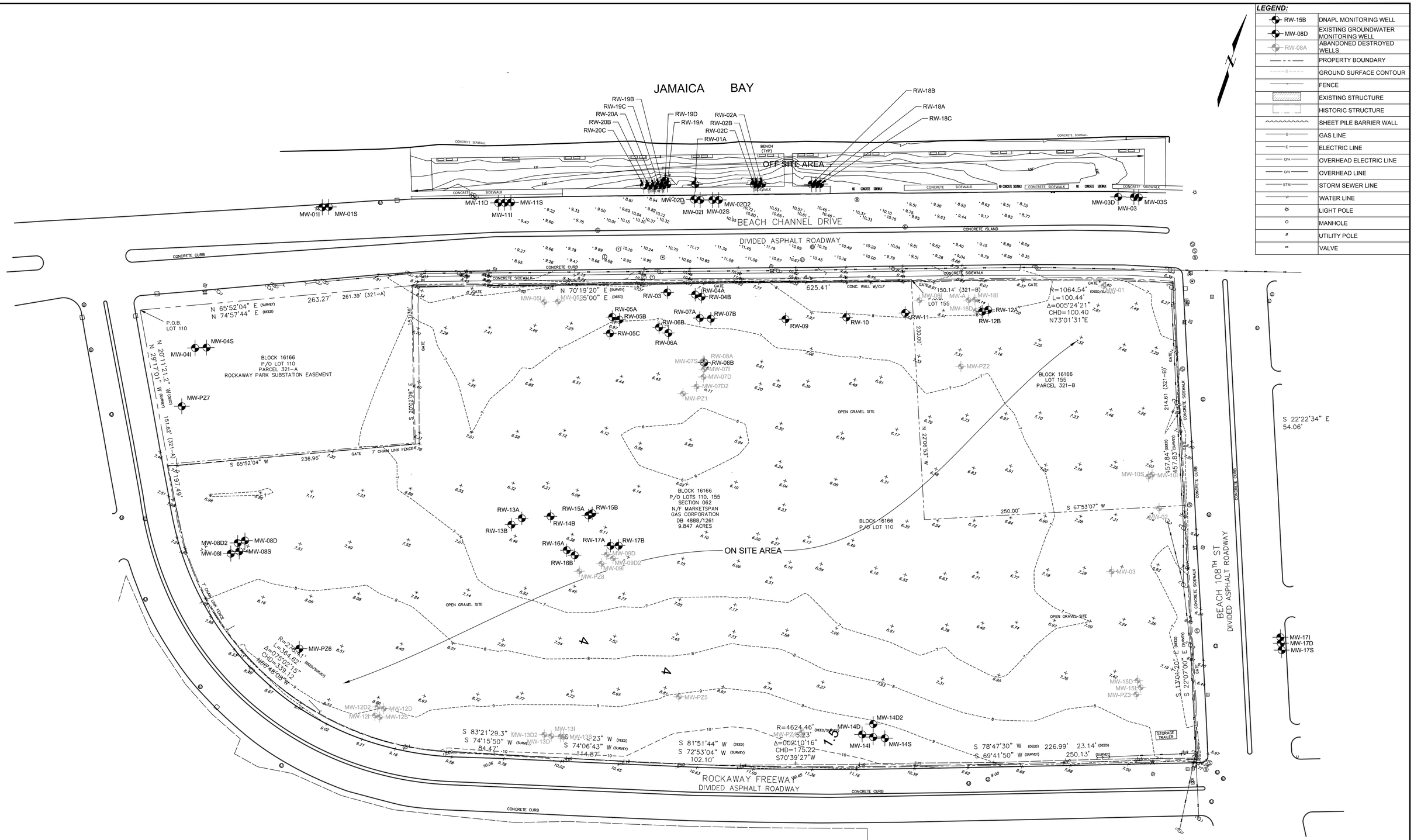

LEGEND:

RW-15B	DNAPL MONITORING WELL
MW-08D	EXISTING GROUNDWATER MONITORING WELL
RW-08A	ABANDONED DESTROYED WELLS
	PROPERTY BOUNDARY
	GROUND SURFACE CONTOUR
	FENCE
	EXISTING STRUCTURE
	HISTORIC STRUCTURE
	SHEET PILE BARRIER WALL
G	GAS LINE
E	ELECTRIC LINE
OH	OVERHEAD ELECTRIC LINE
OH	OVERHEAD LINE
STM	STORM SEWER LINE
W	WATER LINE
	LIGHT POLE
	MANHOLE
	UTILITY POLE
	VALVE

NOTE:

1. MONITOR WELL LOCATION AND ELEVATION TAKEN AT NORTH EDGE OF PVC PIPE. ELEVATION DATUM FOR ALL MONITOR WELLS IS BOROUGH OF QUEENS DATUM.

SOURCE:

1. BOUNDARY SURVEY, SECTION 062 - BLOCK 16166 - LOTS 110 & 155, ROCKAWAY PARK, QUEENS COUNTY, NEW YORK, PREPARED BY KENNON SURVEYING SERVICES INC., SCALE: 1" = 40', DATE: NOVEMBER 2016.

0 40 80
SCALE: 1" = 40'

Groundwater Monitoring Report
Rockaway Park Former MGP Site
Rockaway Park, New York

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MONITORING WELL LOCATION MAP

Project 093150 | May 2017 | Fig. 2

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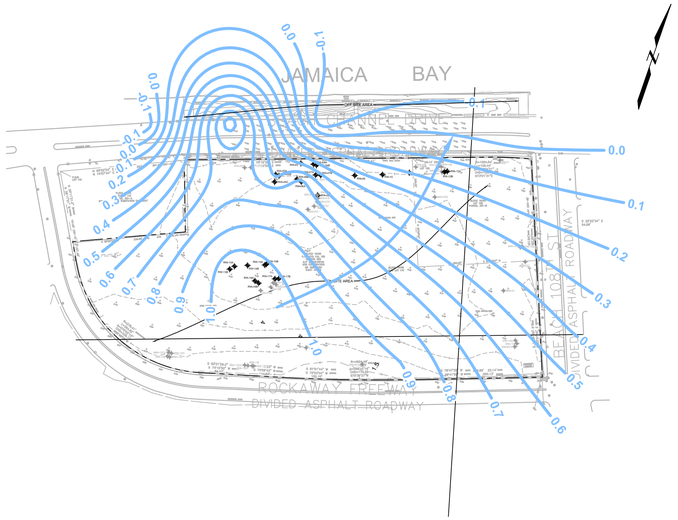
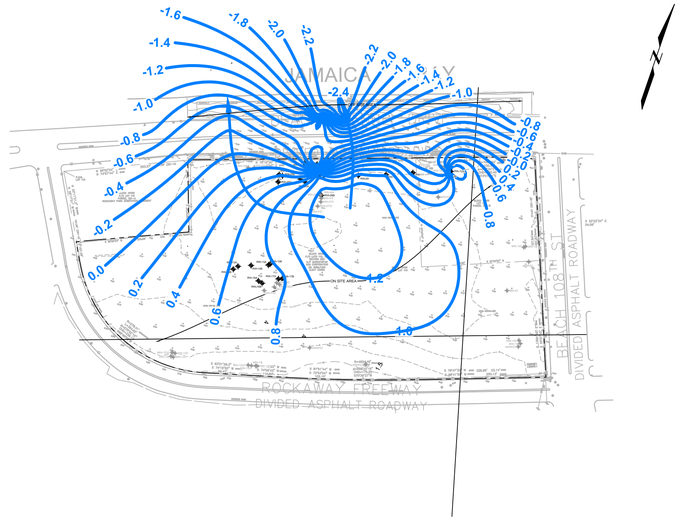
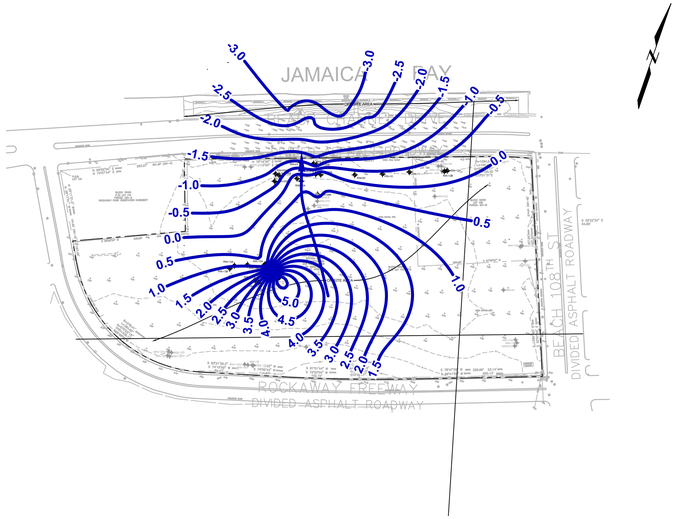


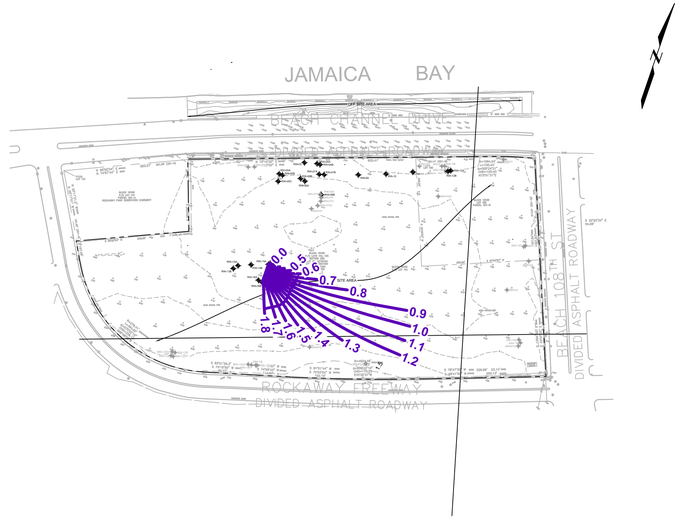
SHALLOW LOW TIDE
(SCREENED INTERVAL: 2 - 17 ft bgs)



INTERMEDIATE LOW TIDE
(SCREENED INTERVAL: 17 - 45 ft bgs)



DEEP LOW TIDE
(SCREENED INTERVAL: 45 - 90 ft bgs)



DEEP 2 LOW TIDE
(SCREENED INTERVAL: 90 - 105 ft bgs)

LEGEND:	
1.5	GROUNDWATER CONTOUR
	GROUNDWATER FLOW DIRECTION
	PROPERTY BOUNDARY
	FENCE
	EXISTING STRUCTURE
	HISTORIC STRUCTURE
	SHEET PILE BARRIER WALL
ft bgs	FEET BELOW GROUND SURFACE

0 75' 150' 300'
SCALE: 1" = 150'

NOTE:
1. CONTOURS ARE BASED ON THE OCTOBER 2016 SAMPLING EVENT.

SOURCE:
1. BOUNDARY SURVEY, SECTION 062 - BLOCK 16166 - LOTS 110 & 155, ROCKAWAY PARK, QUEENS COUNTY, NEW YORK, PREPARED BY KENNON SURVEYING SERVICES INC., SCALE: 1" = 40', DATE: NOVEMBER 2016.

Groundwater Monitoring Report
Rockaway Park Former MGP Site
Rockaway Park, New York

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GROUNDWATER CONTOURS

Project 093150 | May 2017 | Fig. 3

Sample ID	RW-20C
Sample Date	10/26/2016
Screen Interval (ft)	61-71
Total BTEX (µg/L)	**32.35**
Total PAH (µg/L)	**11.65**
Total Cyanide (µg/L)	**2.2 J**

Sample ID	RW-20B
Sample Date	10/26/2016
Screen Interval (ft)	41-51
Total BTEX (µg/L)	**778.5**
Total PAH (µg/L)	**2148.8**
Total Cyanide (µg/L)	**500**

Sample ID	RW-20A
Sample Date	10/26/2016
Screen Interval (ft)	22-32
Total BTEX (µg/L)	**3.4**
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	**280**

Sample ID	RW-19C
Sample Date	10/26/2016
Screen Interval (ft)	61-71
Total BTEX (µg/L)	**93.4**
Total PAH (µg/L)	**12.31**
Total Cyanide (µg/L)	10 U

Sample ID	RW-19B	Duplicate of RW-19B
Sample Date	10/26/2016	10/26/2016
Screen Interval (ft)	41-51	41-51
Total BTEX (µg/L)	**1416**	**1566**
Total PAH (µg/L)	**2241.3**	**2124**
Total Cyanide (µg/L)	**300**	**300**

Sample ID	RW-19A
Sample Date	10/25/2016
Screen Interval (ft)	19-29
Total BTEX (µg/L)	**11.29**
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	**950**

Sample ID	RPMW-02I
Sample Date	10/25/2016
Screen Interval (ft)	35-45
Total BTEX (µg/L)	**3.67**
Total PAH (µg/L)	**113.88**
Total Cyanide (µg/L)	10 U

Sample ID	RPMW-02S
Sample Date	10/25/2016
Screen Interval (ft)	5-15
Total BTEX (µg/L)	ND
Total PAH (µg/L)	**42.62**
Total Cyanide (µg/L)	**220**

Sample ID	RW-02C
Sample Date	10/27/2016
Screen Interval (ft)	60-70
Total BTEX (µg/L)	ND
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	**2.4 J**

Sample ID	RW-02B
Sample Date	10/27/2016
Screen Interval (ft)	35-45
Total BTEX (µg/L)	ND
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	**2.7 J**

Sample ID	RW-02A
Sample Date	10/25/2016
Screen Interval (ft)	15-25
Total BTEX (µg/L)	**2.53**
Total PAH (µg/L)	**29.51**
Total Cyanide (µg/L)	**180 J**

Sample ID	RW-18B
Sample Date	10/25/2016
Screen Interval (ft)	42-52
Total BTEX (µg/L)	**0.35**
Total PAH (µg/L)	**21**
Total Cyanide (µg/L)	**23 J**

Sample ID	RW-18A
Sample Date	10/25/2016
Screen Interval (ft)	22-32
Total BTEX (µg/L)	**85.8**
Total PAH (µg/L)	**31.75**
Total Cyanide (µg/L)	**19 J**

Sample ID	RW-18C
Sample Date	10/25/2016
Screen Interval (ft)	62-72
Total BTEX (µg/L)	ND
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	**2.4 J**

Sample ID	RPMW-02D
Sample Date	10/25/2016
Screen Interval (ft)	64-74
Total BTEX (µg/L)	**0.51**
Total PAH (µg/L)	**114.1**
Total Cyanide (µg/L)	10 U

Sample ID	RW-01A
Sample Date	10/25/2016
Screen Interval (ft)	22-32
Total BTEX (µg/L)	**14.12**
Total PAH (µg/L)	**47.8**
Total Cyanide (µg/L)	**510**

Sample ID	RPMW-02D2
Sample Date	10/25/2016
Screen Interval (ft)	95-105
Total BTEX (µg/L)	**9.41**
Total PAH (µg/L)	**2.24**
Total Cyanide (µg/L)	10 U

Sample ID	RW-08B
Sample Date	10/26/2016
Screen Interval (ft)	40-60
Total BTEX (µg/L)	**2657.4**
Total PAH (µg/L)	**1084.4**
Total Cyanide (µg/L)	**310**

Sample ID	RW-09
Sample Date	10/26/2016
Screen Interval (ft)	5-30
Total BTEX (µg/L)	**2287.4**
Total PAH (µg/L)	**242.8**
Total Cyanide (µg/L)	**160**

Sample ID	RW-10
Sample Date	10/26/2016
Screen Interval (ft)	5-30
Total BTEX (µg/L)	**554.7**
Total PAH (µg/L)	**335.2**
Total Cyanide (µg/L)	**200**

Sample ID	RPMW-11S
Sample Date	10/27/2016
Screen Interval (ft)	5-15
Total BTEX (µg/L)	**2.4**
Total PAH (µg/L)	**1.39**
Total Cyanide (µg/L)	**110 J**

Sample ID	RPMW-11I
Sample Date	10/27/2016
Screen Interval (ft)	35-45
Total BTEX (µg/L)	**2651**
Total PAH (µg/L)	**2648.3**
Total Cyanide (µg/L)	**8.3 J**

Sample ID	RPMW-11D
Sample Date	10/27/2016
Screen Interval (ft)	65-75
Total BTEX (µg/L)	ND
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	10 R

Sample ID	RPMW-01S
Sample Date	10/27/2016
Screen Interval (ft)	5-15
Total BTEX (µg/L)	ND
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	**930 J**

Sample ID	RPMW-01I	Duplicate of RPMW-01I
Sample Date	10/27/2016	10/27/2016
Screen Interval (ft)	35-45	5-15
Total BTEX (µg/L)	ND	ND
Total PAH (µg/L)	ND	ND
Total Cyanide (µg/L)	**26 J**	**24 J**

Sample ID	RPMW-03D
Sample Date	10/27/2016
Screen Interval (ft)	65-75
Total BTEX (µg/L)	**0.1**
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	10 R

Sample ID	RPMW-03I
Sample Date	10/27/2016
Screen Interval (ft)	35-45
Total BTEX (µg/L)	**66.55**
Total PAH (µg/L)	**12**
Total Cyanide (µg/L)	**19 J**

Sample ID	RPMW-03S
Sample Date	10/27/2016
Screen Interval (ft)	5-15
Total BTEX (µg/L)	**4.6**
Total PAH (µg/L)	**10**
Total Cyanide (µg/L)	**11 J**

Sample ID	RW-04A
Sample Date	10/26/2016
Screen Interval (ft)	30-40
Total BTEX (µg/L)	**3783**
Total PAH (µg/L)	**4182.9**
Total Cyanide (µg/L)	**54**

Sample ID	RW-04B
Sample Date	10/26/2016
Screen Interval (ft)	40-60
Total BTEX (µg/L)	**183.3**
Total PAH (µg/L)	**87.84**
Total Cyanide (µg/L)	**20**

Sample ID	RPMW-04I
Sample Date	10/27/2016
Screen Interval (ft)	35-45
Total BTEX (µg/L)	**54.498**
Total PAH (µg/L)	**53.9**
Total Cyanide (µg/L)	**50 J**

Sample ID	RPMW-04S
Sample Date	10/27/2016
Screen Interval (ft)	5-15
Total BTEX (µg/L)	ND
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	**340 J**

Sample ID	RW-05A
Sample Date	10/26/2016
Screen Interval (ft)	10-20
Total BTEX (µg/L)	**26.37**
Total PAH (µg/L)	**808.16**
Total Cyanide (µg/L)	**200**

Sample ID	RW-05C
Sample Date	10/26/2016
Screen Interval (ft)	40-50
Total BTEX (µg/L)	**6823**
Total PAH (µg/L)	**6037.51**
Total Cyanide (µg/L)	**540**

Sample ID	RW-13B
Sample Date	10/25/2016
Screen Interval (ft)	55-60
Total BTEX (µg/L)	**19.8**
Total PAH (µg/L)	**51.27**
Total Cyanide (µg/L)	**3.2 J**

Sample ID	RW-14B
Sample Date	10/26/2016
Screen Interval (ft)	10-30
Total BTEX (µg/L)	**3923**
Total PAH (µg/L)	**6780.6**
Total Cyanide (µg/L)	**41**

Sample ID	RW-15A
Sample Date	10/25/2016
Screen Interval (ft)	40-60
Total BTEX (µg/L)	**1893.7**
Total PAH (µg/L)	**1845**
Total Cyanide (µg/L)	**7 J**

Sample ID	RW-17B
Sample Date	10/25/2016
Screen Interval (ft)	70-90
Total BTEX (µg/L)	ND
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	10 UJ

Sample ID	RPMW-14D
Sample Date	10/25/2016
Screen Interval (ft)	66-76
Total BTEX (µg/L)	**0.6**
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	10 UJ

Sample ID	RPMW-14I
Sample Date	10/25/2016
Screen Interval (ft)	35-45
Total BTEX (µg/L)	ND
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	**5.3 J**

Sample ID	RPMW-14S
Sample Date	10/25/2016
Screen Interval (ft)	5-15
Total BTEX (µg/L)	**1675.1**
Total PAH (µg/L)	**129.8**
Total Cyanide (µg/L)	**92 J**

Sample ID	RPMW-14D2
Sample Date	10/25/2016
Screen Interval (ft)	95-105
Total BTEX (µg/L)	**1.7**
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	**26 J**

Sample ID	RPMW-19S
Sample Date	10/28/2016
Screen Interval (ft)	2.3-12.3
Total BTEX (µg/L)	**30.96**
Total PAH (µg/L)	**66.57**
Total Cyanide (µg/L)	**200**

Sample ID	RW-12A
Sample Date	10/26/2016
Screen Interval (ft)	20-35
Total BTEX (µg/L)	**3590**
Total PAH (µg/L)	**145.6**
Total Cyanide (µg/L)	**85**

Sample ID	RW-12B	Duplicate of RW-12B
Sample Date	10/26/2016	10/26/2016
Screen Interval (ft)	35-50	35-50
Total BTEX (µg/L)	**3686**	**3666**
Total PAH (µg/L)	**6500**	**7589**
Total Cyanide (µg/L)	**71**	**69**

Sample ID	RW-11
Sample Date	10/27/2016
Screen Interval (ft)	20-40
Total BTEX (µg/L)	**17.78**
Total PAH (µg/L)	**61.6**
Total Cyanide (µg/L)	**150 J**

Sample ID	RPMW-17I
Sample Date	10/25/2016
Screen Interval (ft)	35-45
Total BTEX (µg/L)	**422.9**
Total PAH (µg/L)	**4.41**
Total Cyanide (µg/L)	**19 J**

Sample ID	RPMW-17D
Sample Date	10/25/2016
Screen Interval (ft)	65-75
Total BTEX (µg/L)	**0.68**
Total PAH (µg/L)	ND
Total Cyanide (µg/L)	10 U

Sample ID	RPMW-17S
Sample Date	10/25/2016
Screen Interval (ft)	5-15
Total BTEX (µg/L)	**7630**
Total PAH (µg/L)	**493.87**
Total Cyanide (µg/L)	**31**

LEGEND:

- RW-01A — DNAPL MONITORING WELL
- MW-08D — EXISTING GROUNDWATER MONITORING WELL
- PROPERTY BOUNDARY
- GROUND SURFACE CONTOUR
- FENCE
- EXISTING STRUCTURE
- HISTORIC STRUCTURE
- SHEET PILE BARRIER WALL

NOTE:

1. MONITOR WELL LOCATION AND ELEVATION TAKEN AT NORTH EDGE OF PVC PIPE. ELEVATION DATUM FOR ALL MONITOR WELLS IS BOROUGH OF QUEENS DATUM.

SOURCE:

1. BOUNDARY SURVEY, SECTION 062 - BLOCK 16166 - LOTS 110 & 155, ROCKAWAY PARK, QUEENS COUNTY, NEW YORK, PREPARED BY KENNON SURVEYING SERVICES INC., SCALE: 1" = 40', DATE: NOVEMBER 2016.

SCALE: 1" = 40'

Groundwater Monitoring Report
Rockaway Park Former MGP Site
Rockaway Park, New York

nationalgrid

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GROUNDWATER ANALYTICAL RESULTS

Project 093150 | May 2017 | Fig. 4

\\gtb1v-fs01\ I:\Project\National Grid\Rockaway Park\093150\Figures\GW Monitoring Report\093150-GMR-FIGS.dwg - 5/2/2017