Operation and Monitoring Report

June 2015 to May 2016
Gratwick Riverside Park Site
North Tonawanda, New York

City of North Tonawanda

GHD | 651 Colby Drive Waterloo Ontario N2V 1C2
007987 | Report No 45 | August 29 2016

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1. Introduction

This report is the 15th annual Operation and Monitoring Report (O&M Report) for the remedial actions constructed at the Gratwick-Riverside Park Site (Site) located in North Tonawanda, New York. This report covers the period from June 2015 to May 2016 and was prepared pursuant to Section 7.0 of the report entitled "Operation and Maintenance Manual" (O&M Manual) dated March 2002 (revised January 2004, May 2009 and June 2014). It is noted that New York State Department of Environmental Conservation (NYSDEC) approval for the O&M Manual was given on April 20, 2005. All O&M activities have been performed in accordance with the methods and frequencies specified in the O&M Manual and as modified in previous annual reports and approved by NYSDEC. In accordance with the approved monitoring changes, the groundwater is monitored annually in five wells and an additional seven wells are monitored once every 2 years as of May 2013. The surface water quality of the Niagara River adjacent to the Site is not impacted by the Site and is no longer monitored. The collected groundwater that is discharged from the Site is monitored semi-annually in accordance with the City of North Tonawanda Wastewater Discharge Permit (effective March 1, 2016). A copy of the permit is included in Appendix A.

2. Groundwater Withdrawal System (GWS)

Full-time operation of the Groundwater Withdrawal System (GWS) at the Site started on May 4, 2001. The objectives of the GWS are to:

i) Achieve and maintain an inward gradient from the Niagara River toward the GWS.

ii) Achieve and maintain an upward gradient from the fill alluvium layer beneath the GWS.

In order to determine whether the objectives are being met, hydraulic and chemical monitoring programs have been developed. These programs include Site groundwater and GWS effluent monitoring. The wells, manholes, wet wells, and storm sewer outfalls that comprise the monitoring network are shown on Figure 2.1. The monitoring programs are described in the following subsections.

2.1 Hydraulic Monitoring

Hydraulic monitoring consists of the collection of water levels in monitoring wells and manholes, and River water levels at the storm sewer outfalls. These data are then used to determine the vertical and horizontal gradients for the groundwater.

The water levels in four GWS manholes and in the River were monitored to confirm that an inward gradient exists. The water levels in five GWS manholes and in four monitoring wells installed near the GWS alignment in the materials directly overlying the confining unit were monitored to confirm that an upward gradient exists. The specific manholes and monitoring wells used to determine the horizontal and vertical gradients are listed in Table 2.1.

Groundwater elevations are measured on a monthly basis. The measured water levels for the time period June 2011 through May 2016 are provided in Table 2.2. The horizontal and vertical gradients

for this reporting period are provided in Tables 2.3 and 2.4, respectively. The water levels and horizontal and vertical gradients to May 2011 were previously provided and thus are not provided in this report.

The results for the horizontal gradient evaluation show that:

i) Inward horizontal gradients were achieved by May 11, 2001, within 1 week of the start of pumping the GWS.

ii) The inward gradients were maintained for the remainder of the 15 years except for a few short intervals in isolated areas.

There were two exceptions in the June 2015 through May 2016 reporting period as follows:

i) (i.e., November 2015 through April 2016 in the area of River North/MH2 and

ii) March through May 2016 in the area of River Middle/MH8).

The distance which groundwater may have migrated into the barrier wall during the period of outward gradient can be calculated using the equation:

Distance = velocity x time

The monitoring pair location of River North and MH2 has the longest period of outward gradients (i.e., outward gradients were measured from November 30, 2015 through May 26, 2016). Assuming the gradient changed direction at the mid-period between the October 30 and November 30, 2015 monitoring dates, an outward gradient existed for 208 days.

Groundwater velocity into the barrier wall was calculated using:

Velocity = Hydraulic conductivity (K) x Gradient/ Porosity

The design hydraulic conductivity for the barrier wall was 1E-07 cm/s (2.84E-04 ft/day). Testing performed during construction of the barrier wall showed all test results had lower K than 1E-07 cm/s. Thus, the design K was used for the calculation.

Gradient is calculated by the difference in water levels between the monitoring pair locations. The measured levels on May 26, 2016 had the greatest difference in water levels (i.e., 566.95 ft amsl in MH2 and 564.82 ft amsl in River North). Assuming the entire 2.13 foot difference occurs as head loss through the 30-inch thick barrier wall, results in a gradient of 0.852 ft/ft.

The barrier wall was constructed using fine-grained soil and clay. Clay-based soils have porosities ranging from 0.37 to 0.84 (Peck, Hanson and Thornburn, “Foundation Engineering, 2nd Edition”, John Wiley & Sons, Inc.). The lower the porosity, the farther migration into the barrier wall occurs. A conservative value of 0.25 was used for calculation.

Using the maximum head loss for the entire period of outward gradient combined with using the design K, which is greater than the constructed K of the barrier wall, and a porosity of 0.25 results in a conservative (greater) distance of migration into the barrier wall.

The calculated velocity is:

V = (0.852 x 2.83E-04)/ 0.25 = 9.64E-04 ft/day (0.35 ft/yr)

and the distance which groundwater migrated into the barrier wall is:

D = 9.64E-04 x 208 = 0.20 feet

Another way to look at this is that it would take approximately 5 years for the groundwater to migrate through the barrier wall at this very conservative velocity.

Thus, short periods of outward gradient (even 208 days) do not adversely affect the effectiveness of the remedy because:

i) The gradients were outward for only short periods of time.

ii) The outward gradients occurred over only a portion of the barrier wall.

iii) The 36-inch barrier wall is 6 inches thicker than the design thickness thereby providing extra protection.

iv) Any outward migration of Site groundwater into the barrier wall during the short periods of outward gradient is more than offset by the inward migration of river water into the barrier wall during the long periods of inward gradient.

v) The groundwater level on the upgradient side of the barrier wall was never higher than the elevation of the top pf the barrier wall (i.e., 568.5 ft amsl). Thus, no overtopping occurred.

The results for the vertical gradient evaluation showed that the vertical gradients during the June 2015 through May 2016 reporting period were continually upward for all four monitoring locations with the following exceptions (i.e., August and November 2015 and January 2016 in the area of MH8/MW-7; and April and May 2016 in the area of MH11/MW-8).

Short periods of downward gradient do not adversely affect the effectiveness of the remedy because:

i) The gradients were downward for only short periods of time.

ii) The downward gradients occurred along only a portion of the GWS.

iii) The barrier wall and thick alluvium clay till underlying the fill which the barrier wall was keyed into prevented the migration of impacted groundwater from the Site.

iv) Any downward migration of the Site's groundwater into the underlying fill alluvium layer during the short periods of downward migration is more than offset by upward migration during the long periods of upward gradient.

2.2 Groundwater Quality Monitoring

Groundwater quality monitoring consists of the collection of water samples from on-Site overburden monitoring wells (OGC-1 through OGC-8 and MW-6 through MW-9) and the analysis of these samples to determine the concentrations of chemicals in the groundwater. The purpose of the

groundwater quality monitoring program is to monitor the anticipated improvement in the quality of the overburden groundwater:

i) Between the barrier wall and the River (OGC-1 through OGC-4)

ii) In the fill/alluvium beneath the GWS (MW-6 through MW-9)

The MWs are located on the inside of the barrier wall and the OGCs are located between the barrier wall and the river.

Groundwater quality monitoring locations are presented on Figure 2.1 and the analytical parameters and frequency are listed in Table 2.5.

Groundwater sampling was performed on an annual basis between May 2004 and May 2008. As approved in the NYSDEC letter dated February 23, 2009 the sampling frequency for May 2009 through May 2012 was:

Annual	Once Every 2 Years (2010 and 2012)
MW 8	MW-6
MW-9	MW-7
OGC-3	OGC-1
OGC-4	OGC-2
OGC-6	OGC-5
OGC-7	
OGC-8	

As approved by the NYSDEC on March 27, 2013, the sampling frequency for May 2013 through May 2017 will be:

Annual	Once Every 2 Years (2014 and 2016)
MW-8	MW-6
MW-9	MW-7
OGC-3	OGC-1
OGC-6	OGC-2
OGC-7	OGC -4
	OGC-5
	OGC-8

2.2.1 Sample Results

A summary of compounds detected in the groundwater samples for this reporting period is provided in Table 2.6 and pH levels are provided in Table 2.7.

To evaluate the trends in the groundwater chemistry and evaluate the appropriate frequency of future sampling, the VOCs and SVOCs were summed and plotted on Figures 2.2 through 2.13 for each of the 12 monitoring wells included in the program. It is believed that the sum of the VOCs (i.e., TVOCs) and SVOCs (i.e., TSVOCs) best represent the trends in the groundwater chemistry.

Review of the TVOC and TSVOC concentrations for the 12 wells sampled in 2016 show the following trends:

i) TVOCs:

- Low level (i.e., no individual compounds with concentrations greater than Class GA levels) in 10 of the 12 wells (i.e., MW-6, MW-7, MW-9, OGC-1, OGC-2, OGC-3, OGC-4, OGC-5 (except benzene at 1.4 μg/L), OGC-7 and OGC-8)
- Decreasing concentrations in wells MW-8 and OGC-6

ii) TSVOCs:

- Low level (i.e., no individual compounds with concentrations greater than Class GA levels) in 9 of the 12 wells (i.e., MW-6, MW-7, OGC-1, OGC-2, and OGC-4 through OGC-8)
- Decreasing concentrations in two of the five wells (OGC-3 and OGC-6)
- Relatively constant concentrations with random fluctuations in OGC-3
- Increasing concentrations in MW-9. MW-9 is located on the landward side of the barrier wall. Thus this chemistry is not migrating to the river

All the wells had only low level TVOC concentrations in this reporting period, except for OGC-6 (135 micrograms per liter [μg/L]) which was a decrease from the 290 μg/L detected in May 2015. With regard to TSVOC concentrations, one well had higher concentrations, MW-9 (520 μg/L in May 2016 compared to 290 μg/L in May 2015).

In summary, the number of wells with no individual compounds above Class GA criteria, and decreasing or constant but fluctuating low level concentrations, except for TSVOCs in MW-9, shows that the groundwater is being remediated.

Additional description of the TVOC and TSVOC concentrations is provided in the following paragraphs.

Monitoring Wells On-Site - Inside Barrier Wall

The TVOC concentrations for MW-6 shown on Figure 2.2 have been less than 5 μg/L since May 2007. The TSVOC concentrations were low level (i.e., <5 μg/L) since May 2004 until May 2010 when they increased slightly to 20 μg/L. By May 2016 the TSVOC concentration had reduced to non-detect.

The TVOC and TSVOC concentrations for MW-7 on Figure 2.3 show that both TVOC and TSVOC have remained low level. TVOC concentrations ranged from non-detect to 4 μg/L since May 2006. TSVOC concentrations ranged from non-detect to 5 μg/L since May 2004.

The TVOC concentrations for MW-8 on Figure 2.4 show that the TVOC concentrations have decreased from 140 μg/L in May 2009 to 15 μg/L in May 2016. The TSVOC concentrations since May 2011 have generally been in the 70 to 100 μg/L range (May 2016 = 100 μg/L).

The TVOC concentrations for MW-9 on Figure 2.5 show that the TVOC concentrations ranged between 9 and 30 μg/L for the entire record period. The TSVOC concentrations have fluctuated

between 120 to 440 μg/L between August 2002 and May 2015 and then increased to 520 μg/L in May 2016.

All MWs are located on the inside of the barrier wall and a net inward gradient has been consistently maintained in the vicinity of these wells. Thus, the TVOCs and TSVOCs are not migrating to the Niagara River.

Monitoring Wells between Barrier Wall and River

The TVOC concentrations for OGC-1 on Figure 2.6 show that the concentrations since November 2003 ranged between non-detect and 4 μg/L. The TSVOC concentrations since November 2003 have fluctuated between non-detect and 3 μg/L.

The TVOC concentrations for OGC-2 on Figure 2.7 have been non-detect since May 2006. The TSVOC concentrations were all non-detect since monitoring of the remedy started except for the May 2014 sample which had a TSVOC concentration of 0.8 μg/L.

The TVOC concentrations for OGC-3 shown on Figure 2.8 have been less than 11 μg/L since May 2009 with the May 2016 sample result being 6.5 μg/L. The TSVOC concentrations have decreased from 300 μg/L in November 2003 to 100 μg/L in May 2016.

The TVOC concentrations for OGC-4 shown on Figure 2.9 fluctuated between non-detect and 6 μg/L for the time period from November 2002 to May 2010 and were non-detect since May 2010 until May 2016 (3.6 μg/L). The TSVOC concentrations have fluctuated widely but have continually decreased since May 2004 with a concentration of 0.43 μg/L in the May 2016 sample. The single compound responsible for the higher historic concentrations was phenol.

The TVOC concentrations for OGC-5 shown on Figure 2.10, ranged from non-detect to 5 μg/L since November 2003 (except for May 2008 at 5.8 μg/L). The TSVOC concentrations ranged from non-detect to 2 μg/L since February 2003.

The TVOC concentrations for OGC-6 shown on Figure 2.11 have continually decreased from 1,650 μg/L in the May 2013 sample to 135 μg/L in the May 2016 sample. The TSVOC concentrations decreased from 157 μg/L in May 2008 to 5 μg/L in the May 2016 sample.

The TVOC concentrations for OGC-7 shown on Figure 2.12 have decreased from 160 μg/L in November 2003 to 9.4 μg/L in the May 2016 sample. The TSVOC concentrations have been less than 2 μg/L since November 2001 (May 2016 result was non-detect).

The TVOC concentrations for OGC-8 shown on Figure 2.13 decreased from 460 μg/L in May 2001 to 29 μg/L in May 2004 and have ranged from non-detect to 30 μg/L since that time (May 2016 was 10 μg/L). The TSVOC concentrations decreased from 139 μg/L in August 2001 to 25 μg/L in May 2003 and have ranged from non-detect to 11 μg/L since that time (May 2016 was 2.8 μg/L).

The QA/QC Review/ Data Usability Summary of the May 2016 groundwater results are included in Appendix C. The raw laboratory data is provided on a CD included in Appendix D.

2.3 Effluent Monitoring Program

Groundwater from the GWS is discharged to the POTW without the need for pretreatment. The monitoring performed during the construction phase of the remedy clearly showed that the minimal chemical presence in the groundwater collected in the GWS is easily treated at the POTW and therefore no on-Site pretreatment is necessary. The effluent samples are collected at the monitoring station (meter building), which is located at the south end of the Site as shown on Figure 2.1. The analytical parameters monitored since 2007 are listed in Table 2.8.

2.3.1 Sample Results

Effluent samples are collected semi-annually and consist of a 24-hour composite sample collected for SVOCs, metals, and wet chemistry parameters. Three grab samples are also collected for VOCs at 8-hour intervals and the measured concentrations are averaged to give a 24-hour concentration.

QA/QC reviews of the discharge results to May 2015 have already been submitted to the NYSDEC. Thus, these reviews are not being resubmitted with this O&M Report. The QA/QC reviews of the discharge results from October 2015 and April 2016 are provided in Appendix C.

The effluent sample results for this reporting period are provided in Table 2.9. To assist in evaluating the chemical concentration trends in the effluent discharge from the GWS, the measured concentrations for the following parameters are plotted: TVOCs, TSVOCs, pH, total suspended solids (TSS), and biochemical oxygen demand (BOD) (see Figures 2.14 through 2.17). It is believed that these parameters are representative of the trends in the chemistry of the water discharged to the POTW and, as such, can also be used to determine an appropriate monitoring frequency for the effluent.

As shown on Figure 2.14, the TVOCs generally peak in the spring and then decline reaching a trough in the fall. This pattern may be attributable to additional flushing during the spring snow melt. The long-term trend of the TVOC concentrations shows an overall decrease with time from a peak concentration of 760 μg/L in April 2002 to a concentration of 12 μg/L in April 2016. The effluent TSVOC results on Figure 2.14 show no apparent seasonal pattern. The TSVOC concentrations decreased with time until March 2011 (non-detect) and then increased to 89 μg/L in the April 2015 sample. Since April 2015, the TSVO concentrations have continually declined to 17 μg/L in the April 2016 sample.

The pH levels are presented on Figure 2.15. As shown on Figure 2.15, the pH levels range between 7.3 and 11.6. An apparent trend in the pH levels is higher pH levels in the winter/spring and lower pH levels in the summer/fall.

The TSS concentrations presented on Figure 2.16 are generally low level (i.e., <20 mg/L) and show higher concentrations occurring in the early spring and late summer/fall with elevated concentrations (maximum of 278 milligrams per liter [mg/L]) in the spring of 2005. Because TSS may be related to the discharge flow rate, the monthly discharge volume (see Table 2.10) is plotted on Figure 2.18. Comparison of the results presented on these two figures shows an apparent correlation between higher flows and greater TSS concentrations except for the 2005 spring results.

The BOD concentrations are presented on Figure 2.17. As shown on Figure 2.17, BOD concentrations have randomly ranged from 4 to 29 mg/L since May 2002 with a one-time peak of 45 μg/L in September 2012. The BOD concentrations were compared with the discharge volume but showed no apparent correlation.

In summary, the trends and low level TVOC and TSVOC concentrations described above support the semi-annual sampling frequency in the current City of North Tonawanda Industrial Wastewater Discharge Permit.

2.4 GWS Operations

The volume of water pumped on a monthly basis from the Site to the City POTW for treatment is presented in Table 2.10 and plotted on Figure 2.18. The monthly volumes show that during the time period of initial dewatering of the Site (i.e., May and June 2001) the monthly volumes ranged from 2,300,000 to 2,900,000 gallons. For the time period from June 2007 to May 2015, not including the months when the flow meter malfunctioned, the monthly volumes ranged from 23,800 to 2,661,000 gallons except for March 2009 which had a volume of 4,239,000 gallons.

The total measured volume of water discharged from the Site for the time period from May 2001 to May 2016 was 124,563,100 gallons with 15,173,600 gallons (29 gallons per minute [gpm] average) pumped during the 12 months from June 2015 through May 2016.

Section 5.0 of the O&M Manual describes the procedures to be followed in case pumping of the GWS needs to be stopped to prevent the discharge of untreated water from the Site by the City POTW (i.e., wet weather shutdown). No wet weather shutdowns occurred during this reporting period from June 2015 to May 2016.

Furthermore, the treatment of the Site groundwater by the City POTW did not require any modifications to the standard operations of the City POTW and did not cause any operational upsets of the City POTW from June 2015 to May 2016.

2.5 GWS Maintenance

This section describes the primary GWS maintenance activities performed during the June 2015 through May 2016 time period. A listing of the maintenance activities are provided in Table 2.11

The forcemain in Pump Station (PS) #3 (MH-9) was inspected in October 2015 and found to be blocked with black viscous material (BVM). The forcemain from PS #3 to the “T” junction with the main 6-inch diameter forcemain was uncovered to expose the pipe. The “T” was replaced and the forcemain from the PS #3 pump to the “T” was cleaned and the pump was operational by October 14, 2015.

The monthly monitoring of the sediment in the GWS manholes indicated thicknesses typically ranging from 0.0 to 0.1 feet, except for MH-11 which had thicknesses ranging from 0.15 to 0.45 feet. In accordance with the addendum to the O&M Manual, provided as Appendix F in the June 2013 to May 2014 O&M Report, sediments are to be removed every five years unless the sediment thickness is deemed sufficient to adversely affect the operation of the GWS. The measured minimal

thicknesses were deemed not sufficient to adversely impact the operation of the GWS. Thus, no sediment removal occurred in the June 2015 to May 2016 period.

2.6 NYSDEC Correspondence

NYSDEC Comments on the Periodic Review Report for the time period of June 1, 2014 to May 31, 2015 were received on December 7, 2015. Responses to their comments were provided on April 27 and 28, 2016. Copies of the comments and responses are included in Appendix E.

In response to the NYSDEC comment regarding the BVM buildup in GWS forcemain, a conference call was held on May 19, 2016 to discuss the proposed plan to address the BVM buildup. The document titled “Work Plan, Groundwater Withdrawal System Forcemain Cleaning” was submitted on July 11, 2016.

3. Site Inspections

Site inspections were performed on a monthly basis. Copies of the Inspection Logs for the time period to May 2015 were previously submitted and thus are not being resubmitted with this O&M Report. The Monthly Inspection Logs for June 2015 through May 2016 are included in Appendix B. In summary, the June 2015 through May 2016 inspections identified:

i) Higher water levels in the southern portion of the GWS from June through September 2015 due to blockage of the forcemain with BVM in PS #3 (MH-15). Activities related to PS #3 are described in Section 2.5.

ii) Higher water levels in the middle portion of the GWS in April and May 2016 due to failure of the GWS pump in PS #2 (MH-9). Activities related to PS #2 are described in Section 2.5.

iii) Soil erosion with wire mesh exposed along portions of the shoreline from June 2015 through May 2016.

iv) Drift consisting of various sizes of dead trees occasionally partially blocked the River North outlet in June through November 2015. The drift was removed as needed.

v) The protective casing and riser for MW-7 were observed to be bent in August 27, 2015. The suspected cause was impact by a motor vehicle. The well was repaired on May 16, 2016.

Repair of the erosion is being performed on an intermittent basis by the City of North Tonawanda.

4. Conclusions/Recommendations

4.1 Operation and Maintenance

The constructed remedy is achieving the remedial action objectives.

A work plan to address the BVM in the GWS forcemain was submitted in July 11, 2016. The NYSDEC commented on July 11 that a camera should be used to inspect the cleaned force main.

This was agreed to on the same day. It is anticipated that the work will be performed in the late summer/fall of 2016.

4.2 Monitoring

The groundwater VOC concentrations are:

i) Less than Class GA levels in 10 of the 12 wells sampled (except for benzene at 1.4 µg/L in OGC-5)

ii) Decreasing in the other two wells

The groundwater SVOC concentrations are:

i) Less than Class GA levels in 9 of the 12 wells sampled

ii) Relatively constant in two of the wells

iii) Increasing in one well (i.e., MW-9) which is inside the barrier wall and does not discharge to the river

The groundwater sample collection frequency for the current 5-year period (i.e., May 2013 through May 2017) will be:

Annual	Once Every 2 Years (2014 and 2016)
MW 8	MW-6
MW-9	MW-7
OGC-3	OGC-1
OGC-6	OGC-2
OGC-7	OGC-4
	OGC-5
	OGC-8

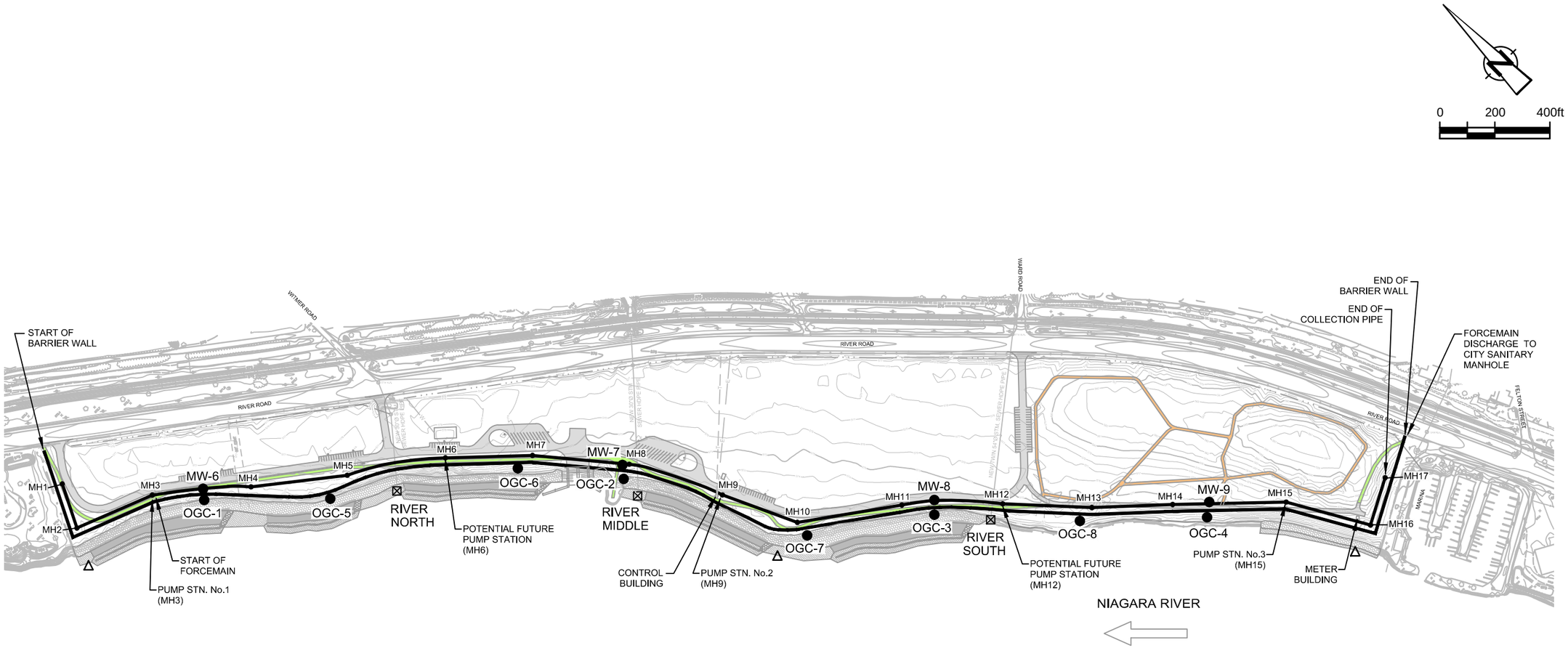
The individual VOC and SVOC compound concentrations in the wells scheduled to be sampled once every 2 years are all less than their respective Class GA levels. Thus, the results support the scheduled frequency for these wells.

Pursuant to the discharge permit effective March 1, 2016, semi-annual monitoring was performed during the time period June 2015 through May 2016. The trends in the effluent from the GWS to the POTW support the continuation of the sampling frequency at semi-annual. Flow monitoring will continue to be performed monthly as a check on the operation of the GWS.

Monthly monitoring of the sediment thickness in the GWS manholes will continue. The sediment is to be removed once every 5 years, if necessary. The sediment will be removed during low flow conditions which typically occur in late summer.

4.3 Notifications to City of North Tonawanda

Notifications of anomalies in the visual inspections, discharge volumes and/or groundwater levels were and will continue to be provided to the City of North Tonawanda Public Works Engineering and Wastewater Treatment Department within a few days of measurement of the anomaly to allow for timely maintenance.



LEGEND

- BARRIER WALL
- MH11 — GROUNDWATER COLLECTION SYSTEM
- ● OGC-1 MW-1 — MONITORING WELL LOCATION
- ⊠ RIVER SOUTH — SURFACE WATER LEVEL MONITORING LOCATION
- △ — SURFACE WATER CHEMICAL MONITORING LOCATION (NO SAMPLING AFTER APRIL 2008)

figure 2.1

MONITORING NETWORK
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

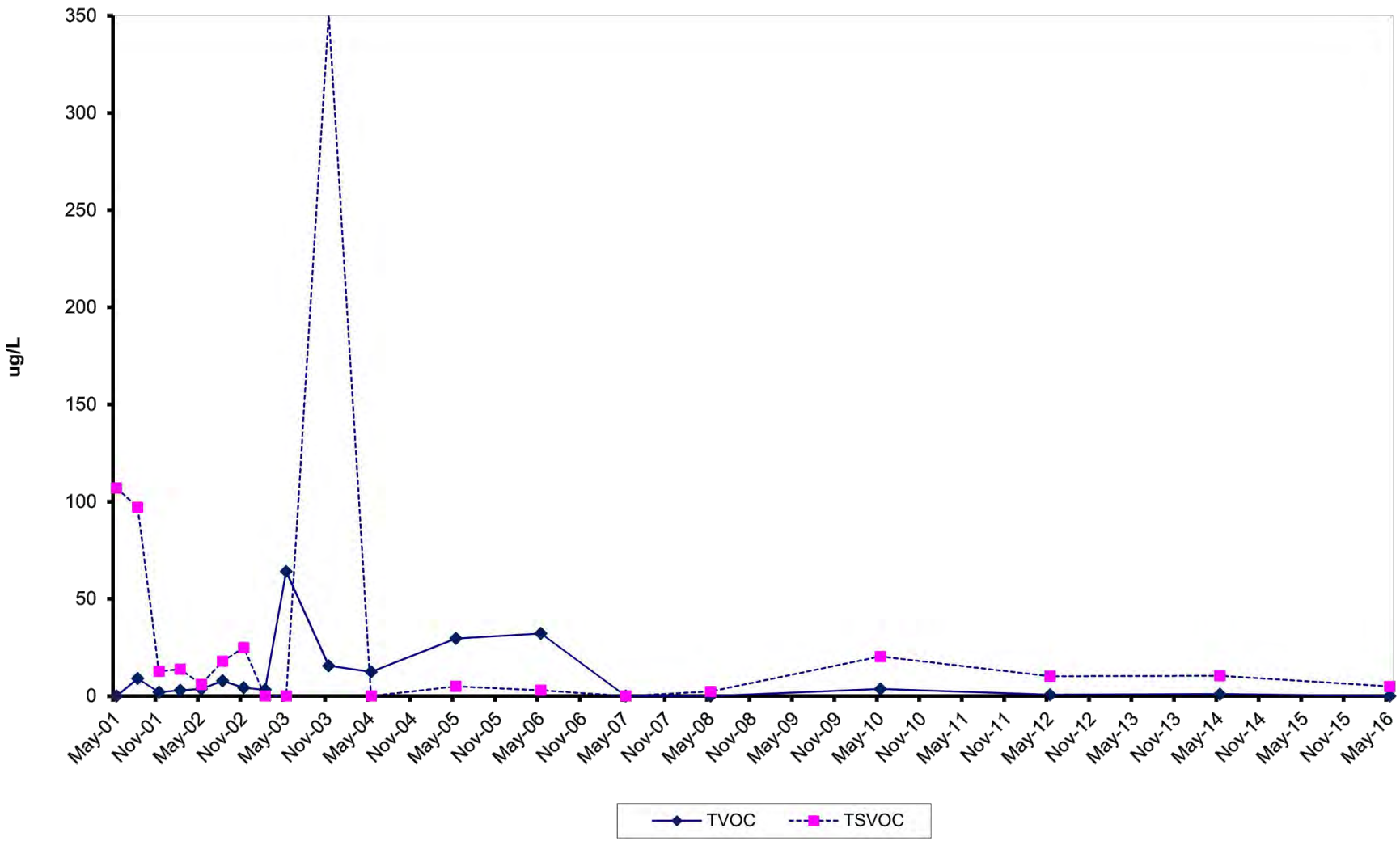


figure 2.2

MW-6 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

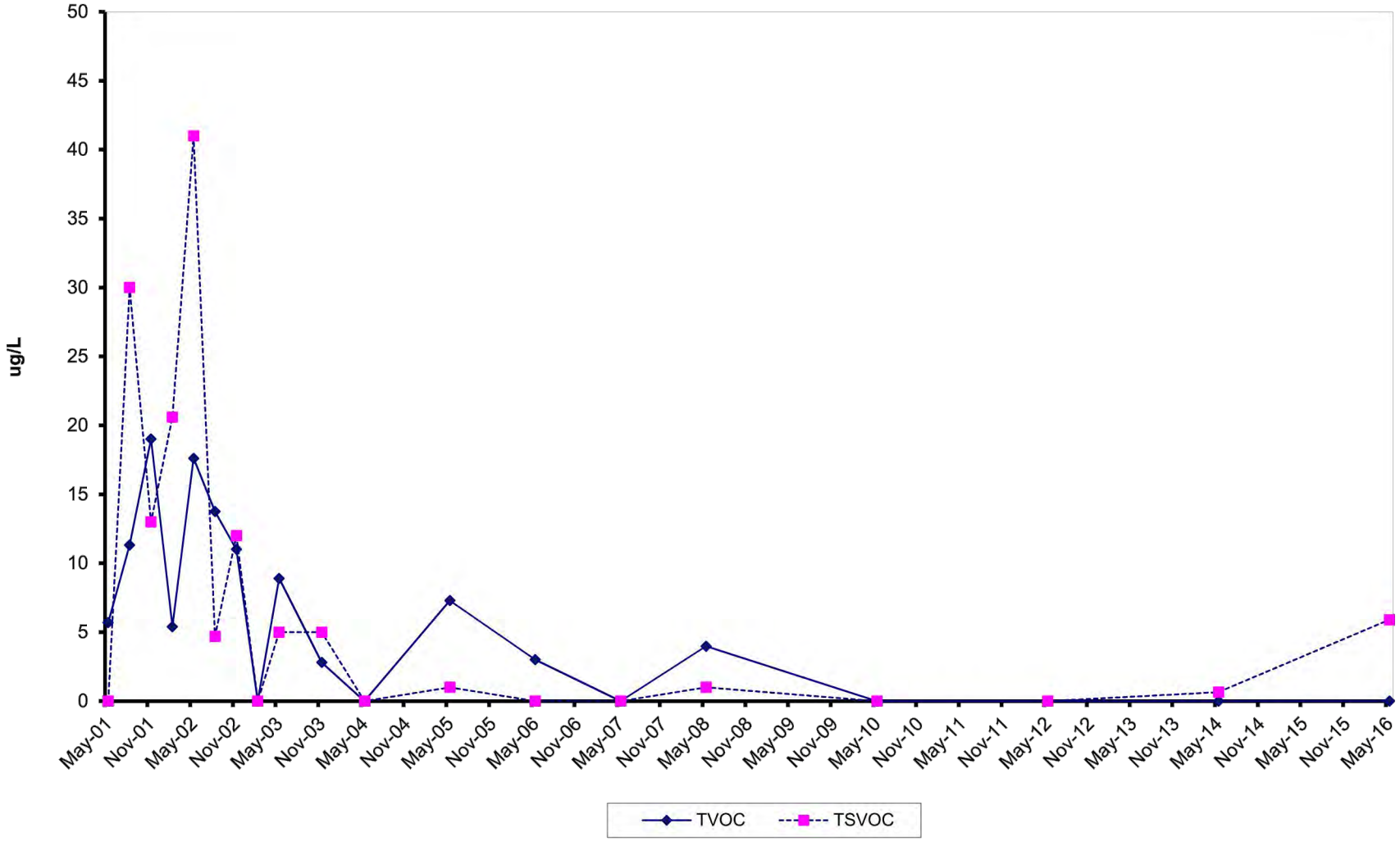


figure 2.3

MW-7 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

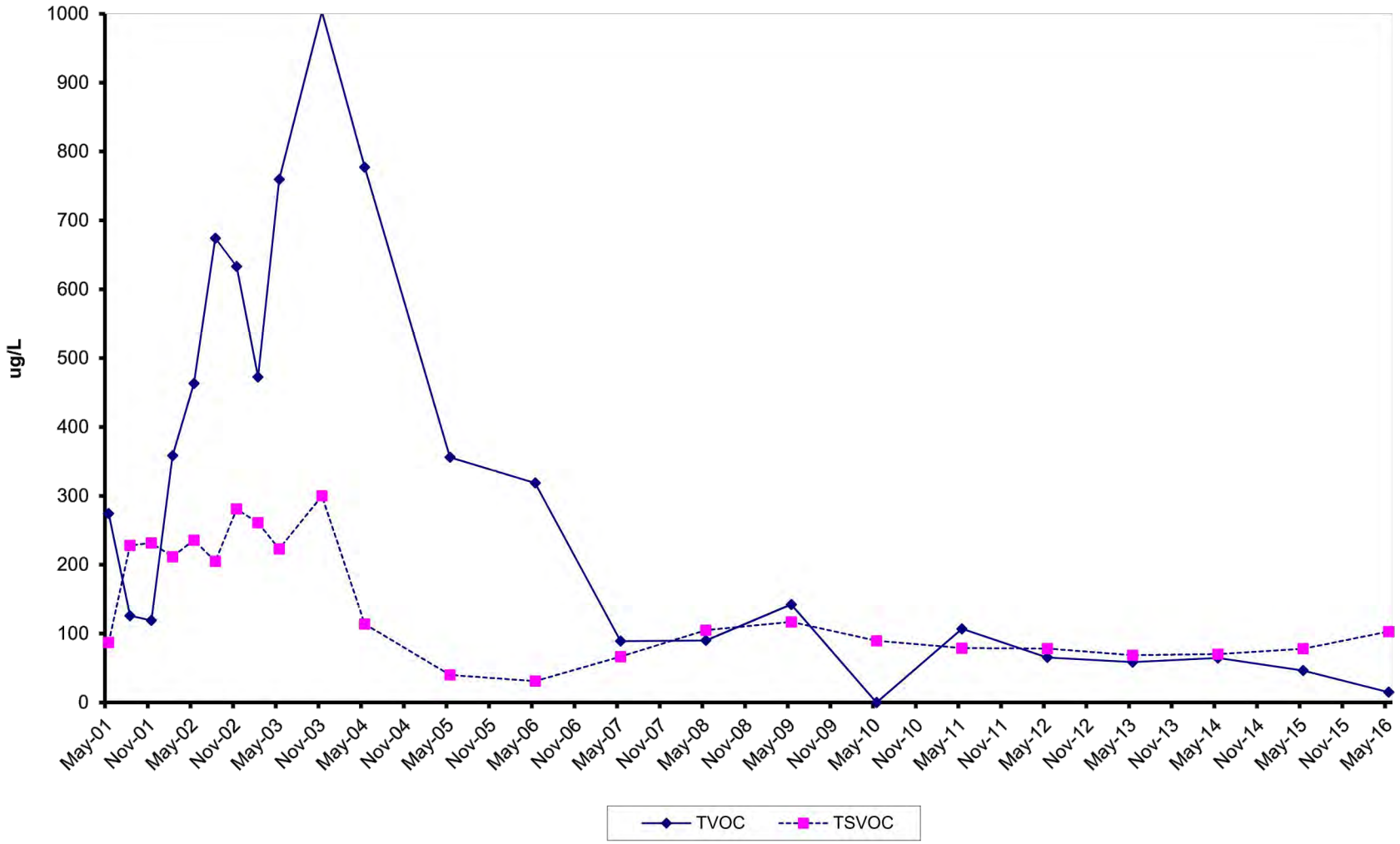


figure 2.4

MW-8 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

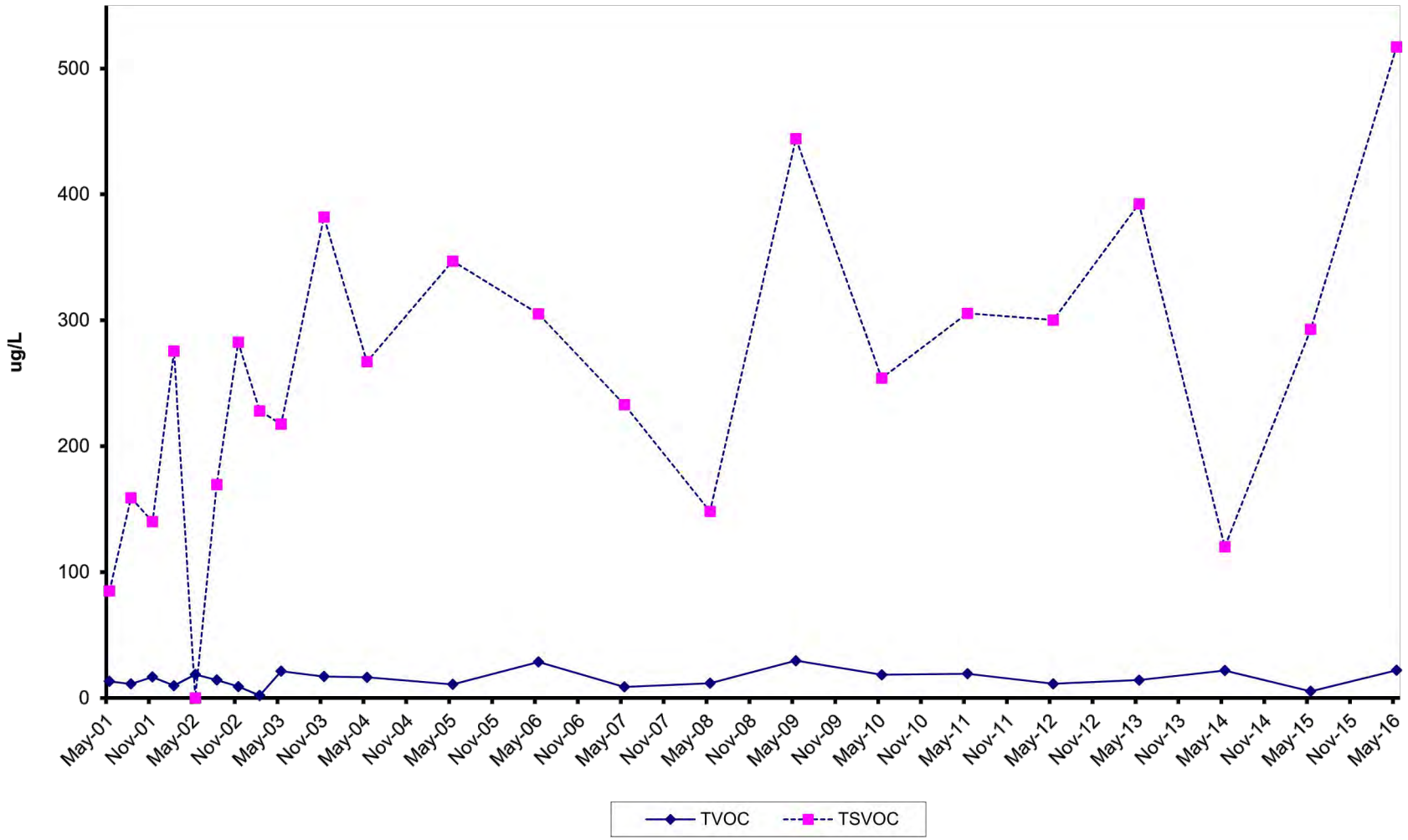


figure 2.5

MW-9 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

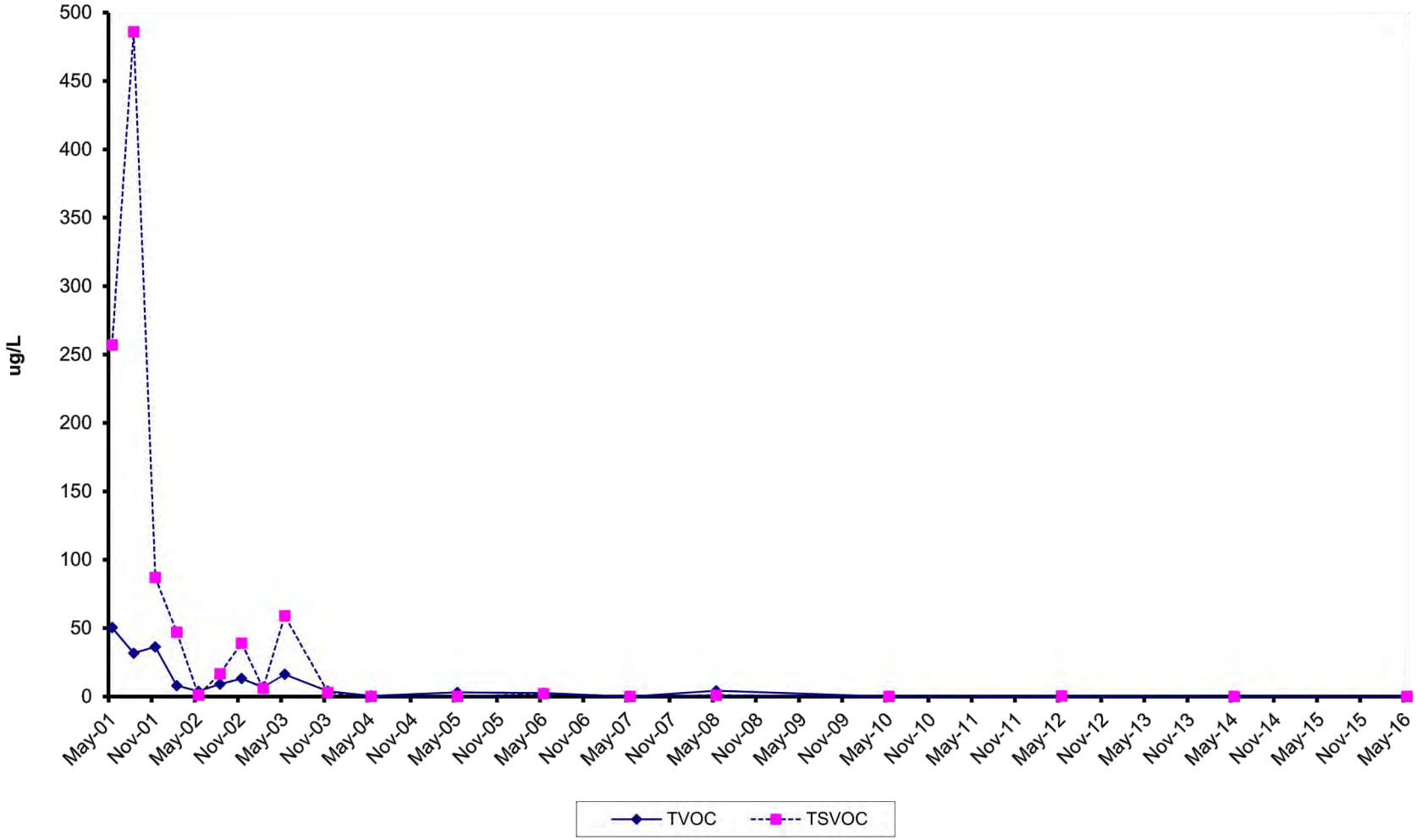


figure 2.6

OGC-1 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

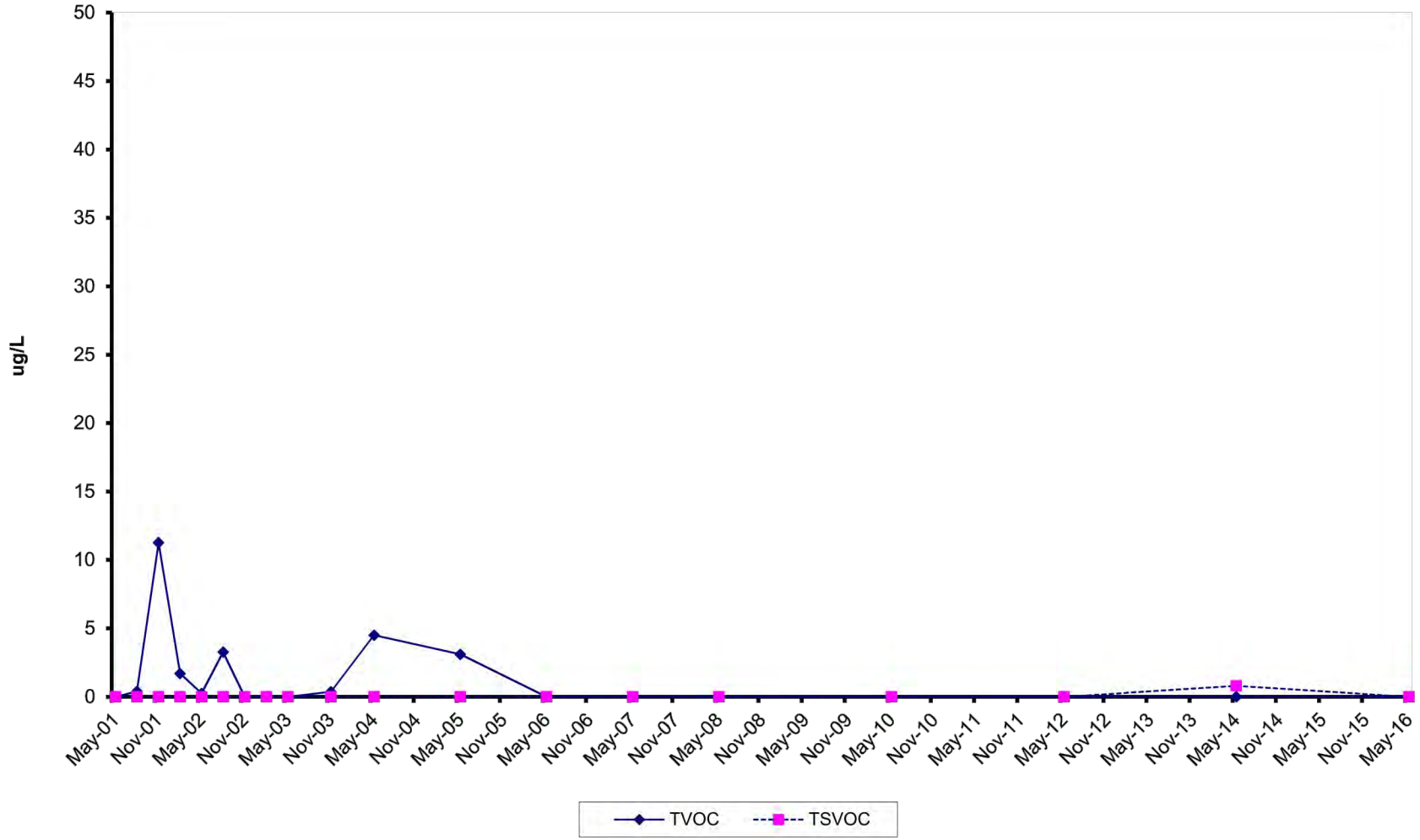


figure 2.7

OGC-2 TVOC AND TSVOC CONCENTRATIONS
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North Tonawanda, New York

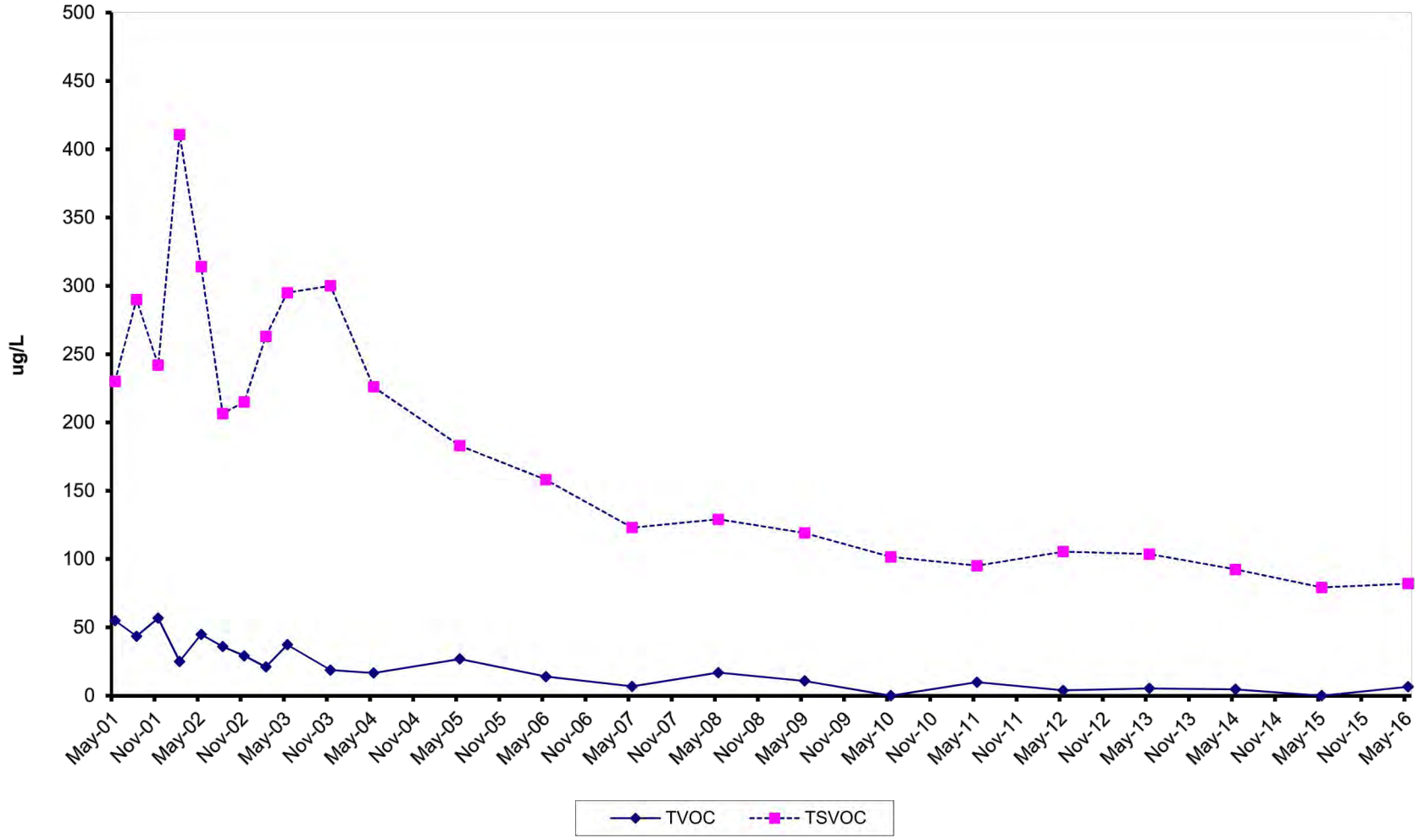

figure 2.8

OGC-3 TVOC AND TSVOC CONCENTRATIONS
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North Tonawanda, New York

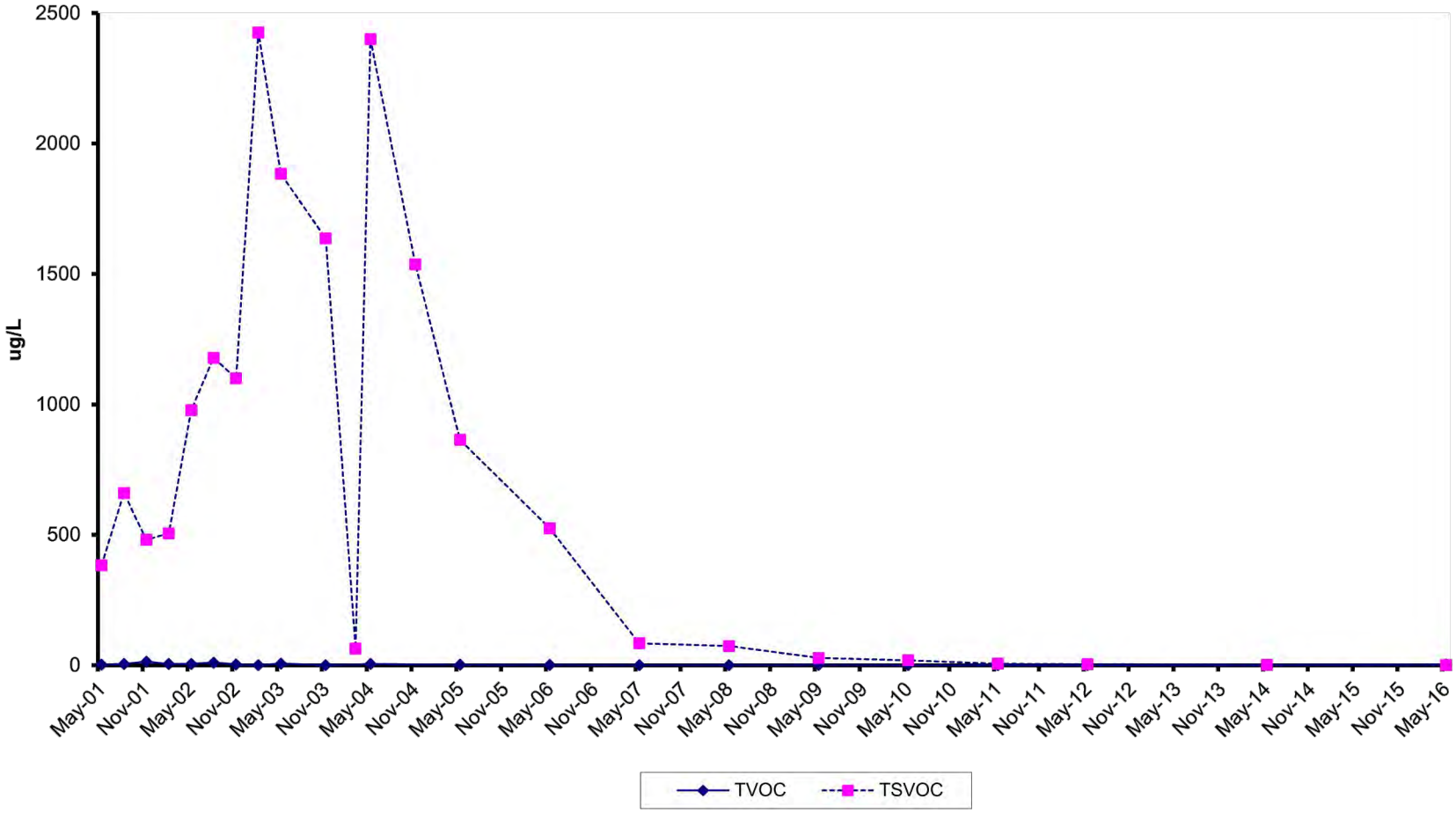

figure 2.9

OGC-4 TVOC AND TSVOC CONCENTRATIONS
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North Tonawanda, New York

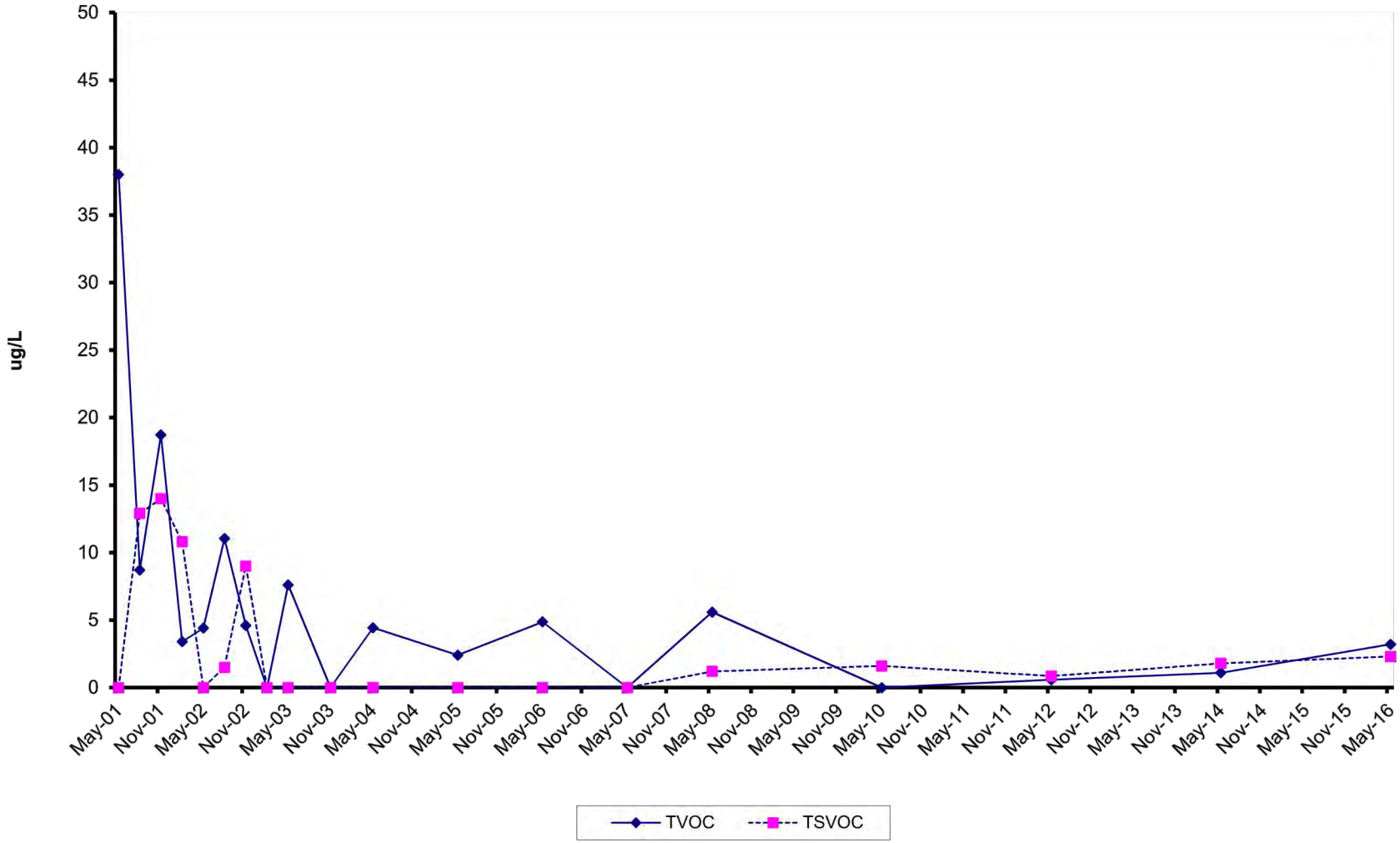

figure 2.10

OGC-5 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

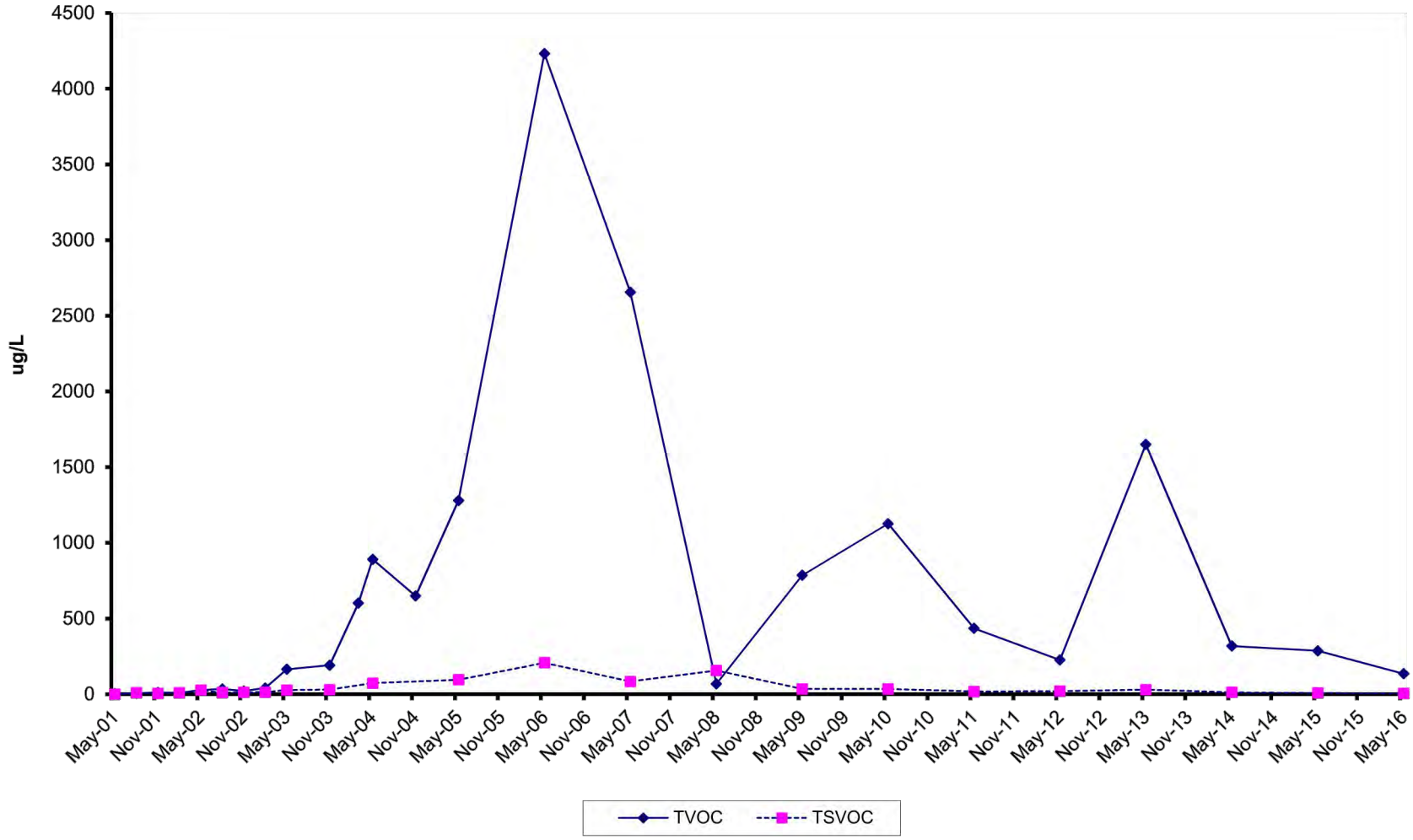

figure 2.11

OGC-6 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

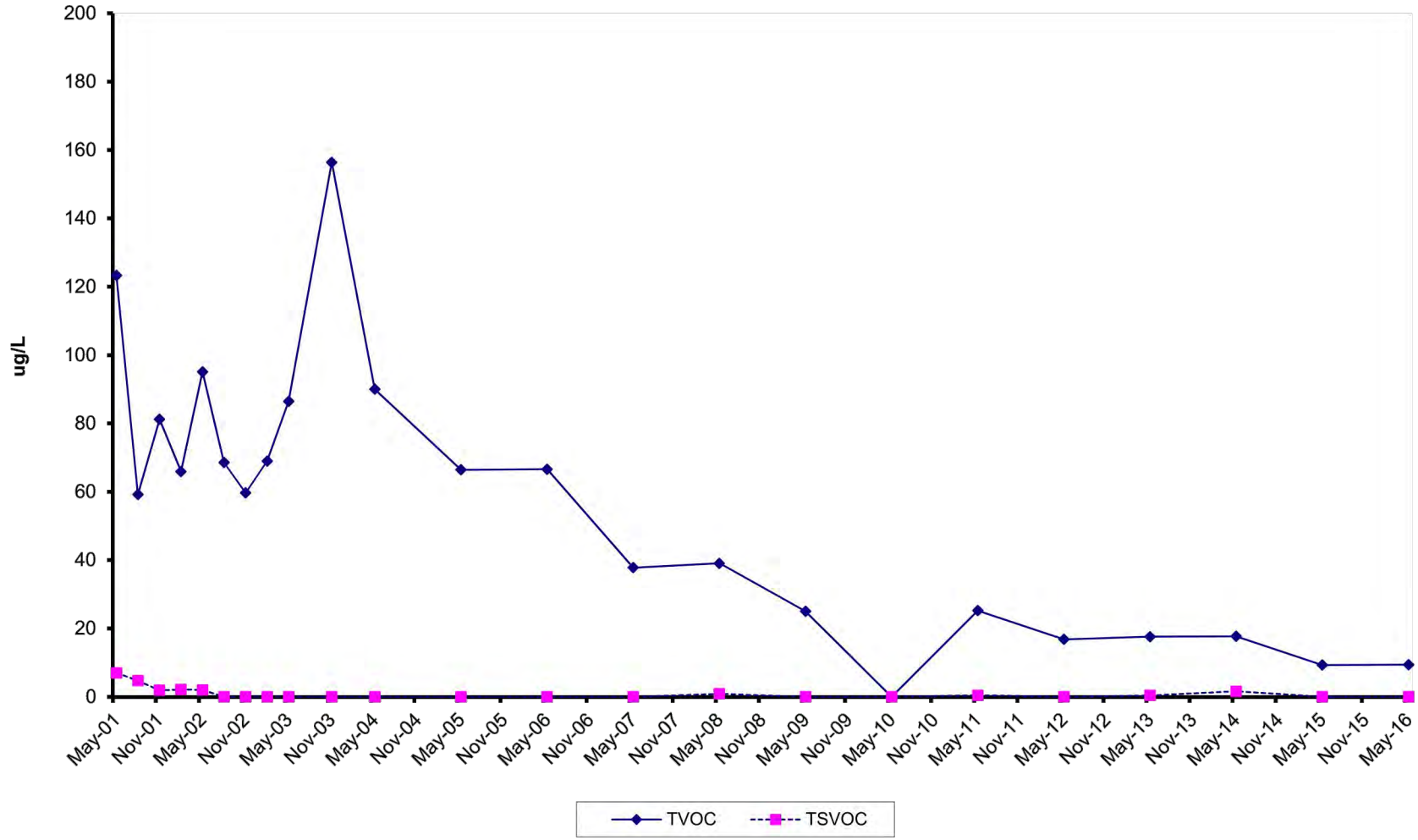

figure 2.12

OGC-7 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

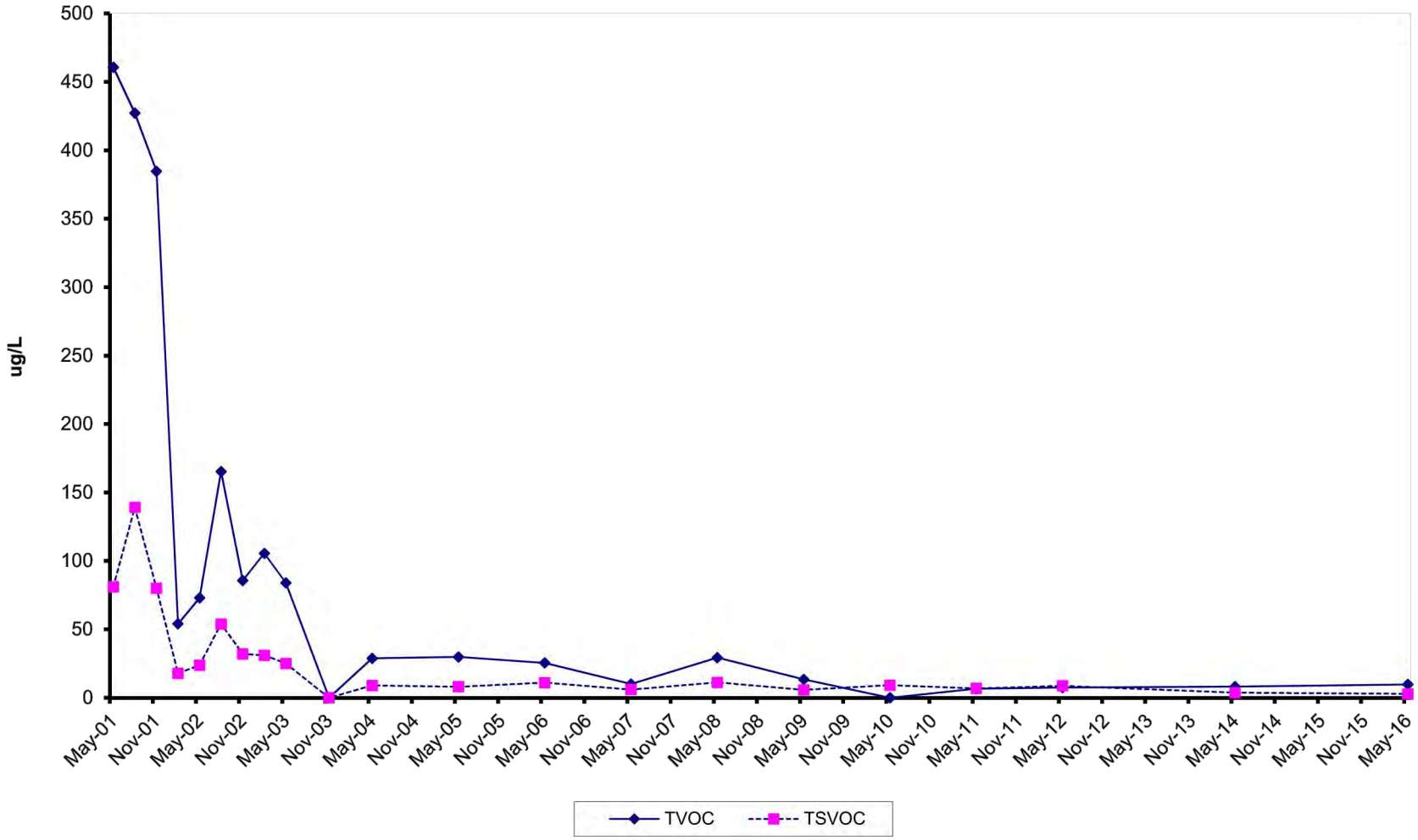

figure 2.13

OGC-8 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

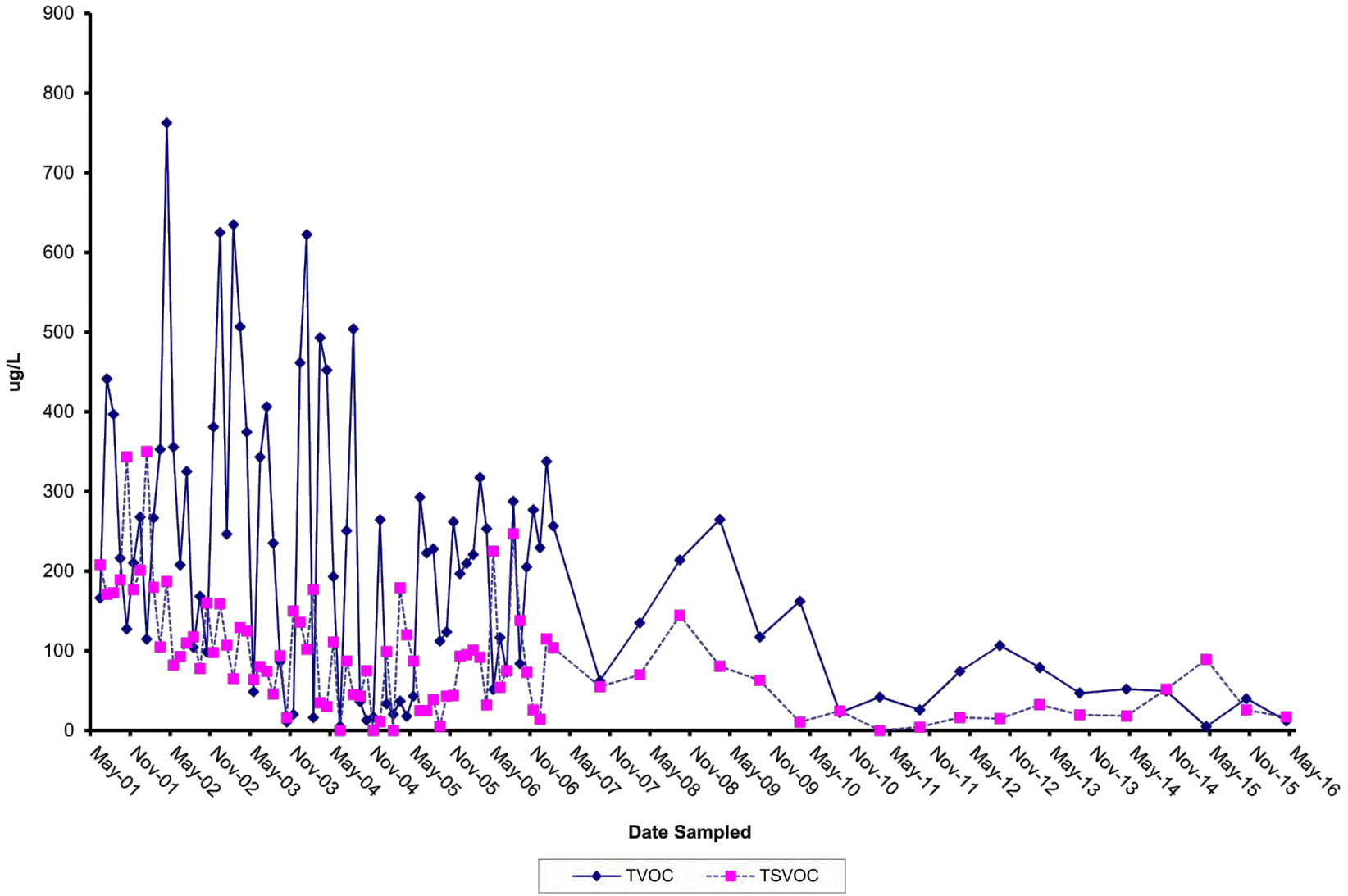

figure 2.14

EFFLUENT TVOCs AND TSVOCs vs. TIME
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

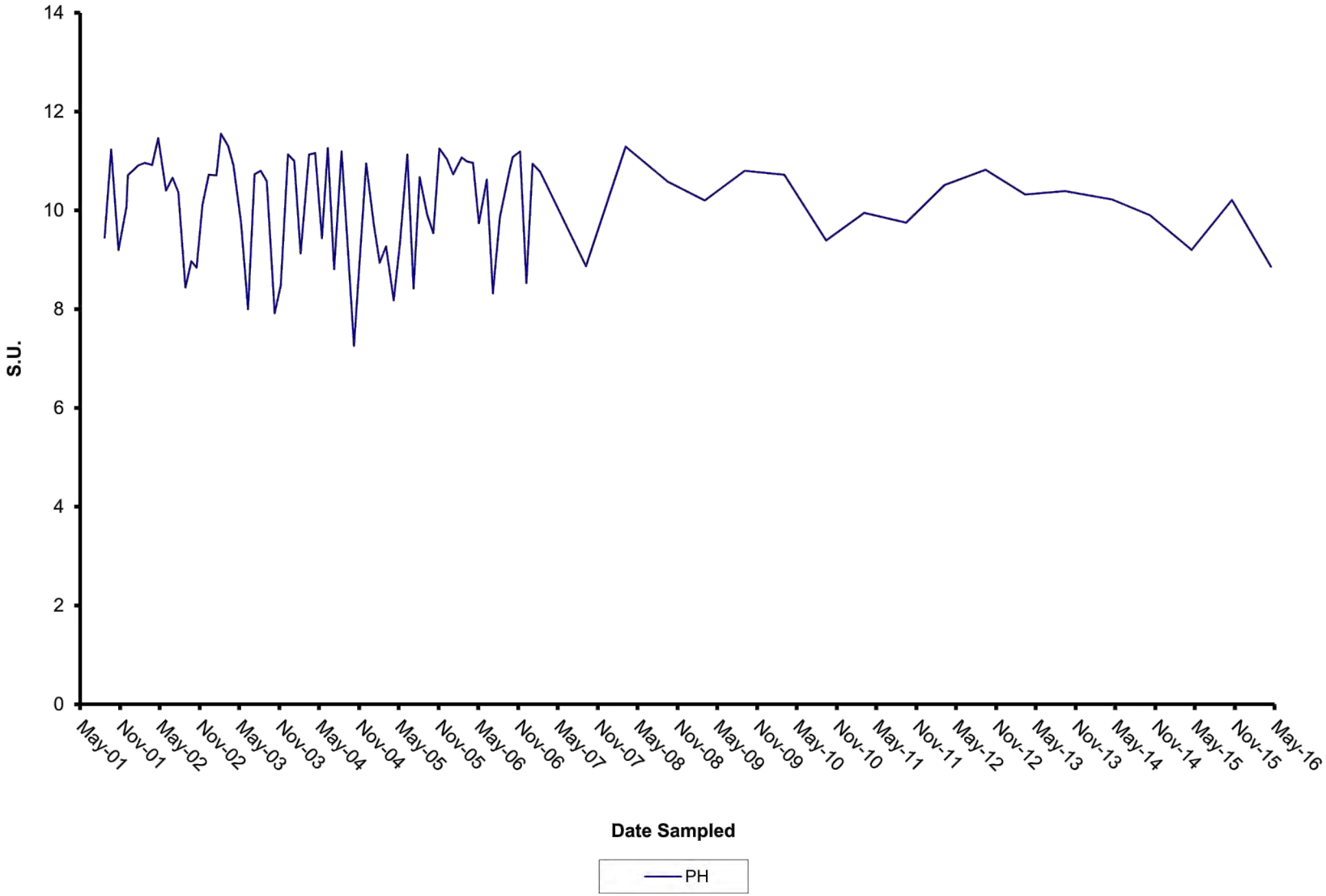

figure 2.15

EFFLUENT pH vs. TIME
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

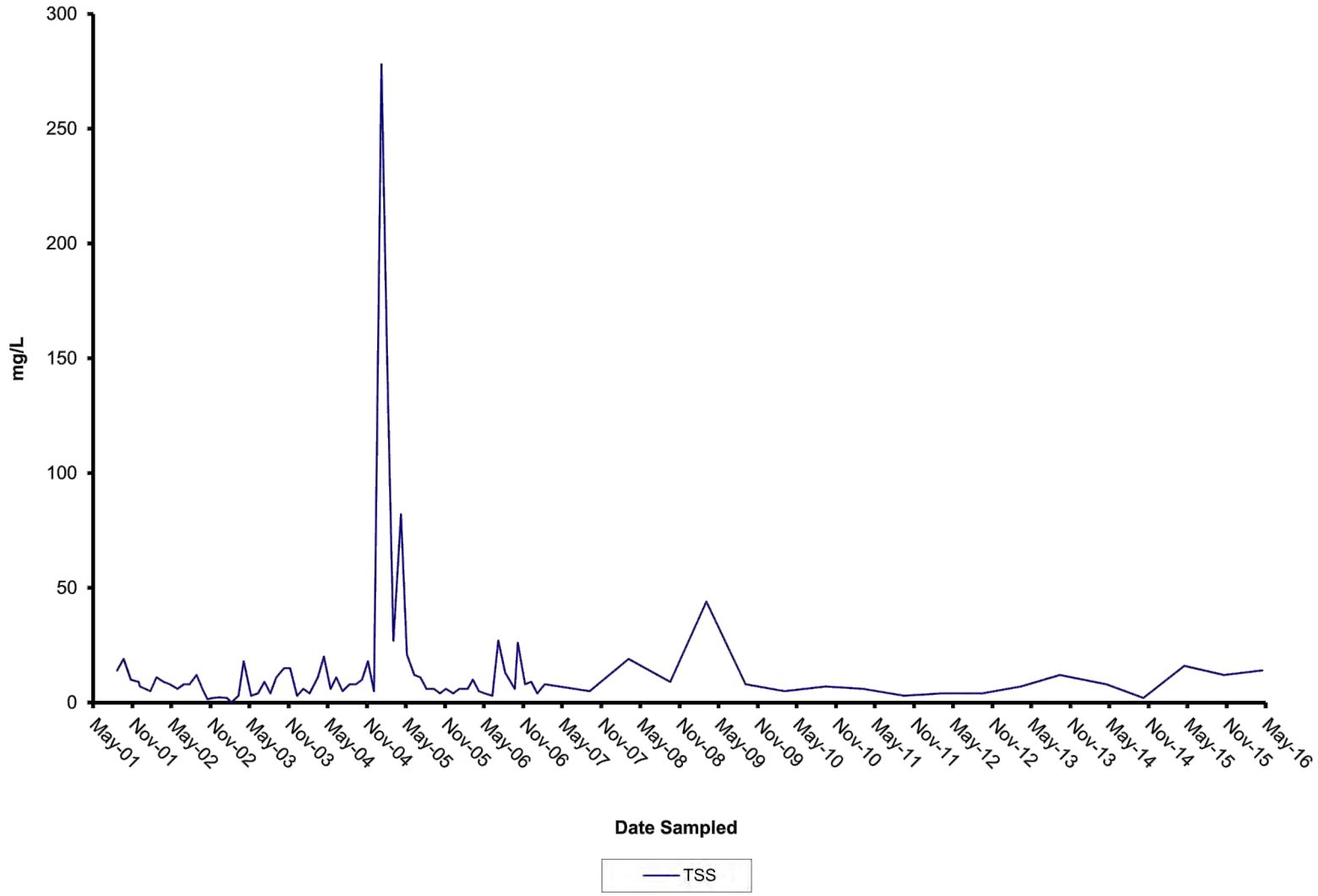

figure 2.16

EFFLUENT TOTAL SUSPENDED SOLIDS vs. TIME
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

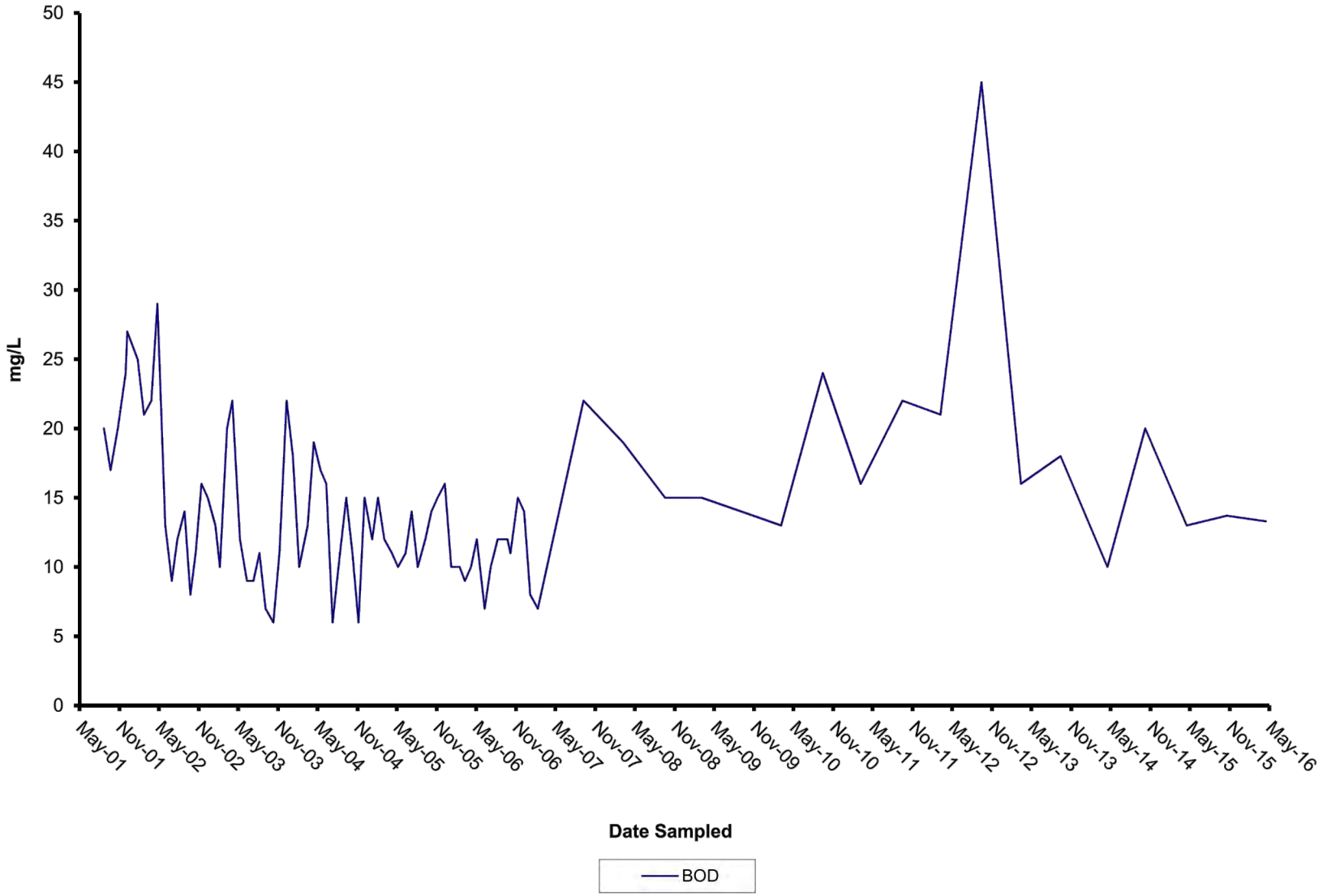

figure 2.17

EFFLUENT BOD vs. TIME
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

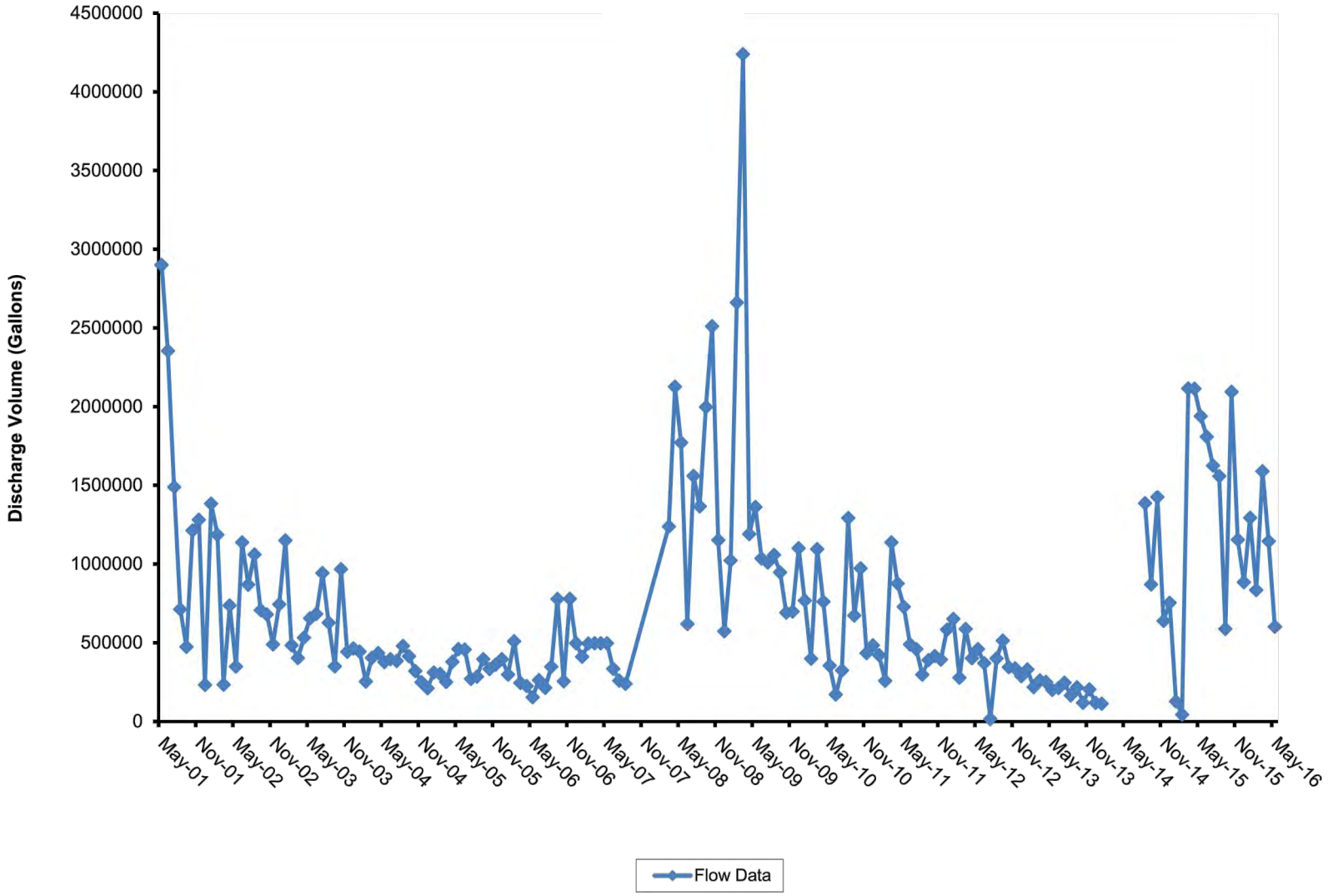

figure 2.18

EFFLUENT VOLUME vs. TIME
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Table 2.1

Groundwater Hydraulic Monitoring Locations
Operation and Maintenance
Gratwick-Riverside Park Site
North Tonawanda, New York

Inward Hydraulic Gradient Monitoring Locations

Inner [1]	Outer
MH2	Niagara River North (Downstream)
MH6	Niagara River North (Downstream)
MH8	Niagara River Middle
MH12	Niagara River South (Upstream)

Upward Hydraulic Gradient Monitoring Locations

Upper [1]	Lower
MH3	MW-6
MH8	MW-7
MH11	MW-8
MH14/MH15 [2]	MW-9

Frequency

- Weekly following GWS startup until six consecutive inward gradients are achieved.
- Monthly thereafter for the remainder of the initial 2-year period (review after 2 years).
- 2-Year and 5-Year reviews indicated that the monitoring frequency remain monthly.

Notes:

(1) These manholes will be monitored twice daily by POTW staff during a wet weather bypass event pursuant to Section 5.0 of the O&M Manual.

(2) Distance weighted averages of water levels used (MH14 - two thirds and MH15 - one third).

Table 2.2

Water Levels (FT AMSL)
Gratwick-Riverside Park Site
North Tonawanda, New York

Date	MH2	MH3	MH6	OGC-1	MW-6	OGC-5	River North	OGC-6	MH8	MW-7	OGC-2	River Middle	OGC-7
RIM Elevation	573.28	573.81	572.03						572.37				
TOC Elevation (ft amsl)				575.01	575.40	573.82	566.80	576.65		575.57	574.08	566.48	572.49
June 22, 2011	563.34	560.50	557.45	565.32	563.59	565.30	565.16	565.13	562.04	562.39	565.36	565.06	565.38
July 27, 2011	563.00	560.69	557.11	565.09	563.29	565.02	564.93	563.96	561.73	562.15	565.24	564.86	565.17
August 26, 2011	562.86	560.58	556.99	565.16	563.09	565.20	565.07	564.97	561.64	562.06	565.19	564.99	565.31
September 27, 2011	562.86	560.49	557.00	564.98	563.02	565.03	564.87	564.80	561.66	562.12	564.97	564.80	565.18
October 28, 2011	563.16	560.12	557.17	565.20	563.21	564.93	(1)	564.84	561.76	562.36	565.00	564.70	565.09
November 30, 2011	562.86	560.99	556.78	565.06	562.99	564.61	(1)	564.54	561.37	562.06	564.82	564.27	564.81
December 29, 2011	563.69	561.38	557.65	565.05	563.81	564.69	(1)	564.77	562.06	562.45	564.90	564.30	564.86
January 26, 2012	563.77	560.53	557.74	564.93	563.88	564.53	(1)	564.69	562.07	562.41	564.88	564.35	564.70
February 28, 2012	563.72	560.12	557.56	564.96	563.81	564.58	(1)	564.69	561.98	562.30	564.86	564.26	564.74
March 29, 2012	563.36	560.20	557.14	564.63	563.53	564.59	(1)	564.52	561.59	561.94	564.69	564.28	564.97
April 26, 2012	563.56	560.58	557.42	565.19	563.51	564.76	(1)	564.74	561.81	562.09	564.96	564.46	564.90
May 30, 2012	563.97	560.57	557.91	564.86	564.12	564.90	(1)	564.78	562.36	562.46	565.05	564.86	565.07
June 27, 2012	563.35	561.29	557.84	564.62	563.97	563.90	564.77	564.51	562.22	562.31	564.69	564.59	564.85
July 31, 2012	564.51	561.19	559.08	564.70	564.64	564.80	(1)	564.55	563.85	564.69	564.79	564.72	564.93
August 27, 2012	564.34	561.22	558.34	564.66	564.61	564.78	564.72	564.44	562.99	563.35	564.75	564.60	564.90
September 24, 212	563.36	561.20	557.36	564.84	563.60	564.82	564.67	564.65	561.94	562.29	564.79	564.60	564.98
October 26, 2012	563.39	559.91	557.40	564.54	563.54	564.31	(1)	564.32	561.94	562.34	564.49	564.04	564.49
November 26, 2012	563.50	561.25	557.20	564.09	563.57	563.99	(1)	564.01	561.66	561.94	564.17	563.71	564.11
December 26, 2012	563.64	561.19	557.37	564.00	563.66	563.39	(1)	563.94	561.75	562.21	564.04	(1)	563.71
January 30, 2013	564.00	560.19	557.80	564.27	564.12	564.16	(1)	563.96	562.33	562.45	564.26	563.03	564.35
February 27, 2013	563.96	560.71	557.86	564.27	563.92	563.86	(1)	563.87	562.79	562.38	564.77	563.18	563.98
March 27, 2013	536.97	560.29	557.45	564.13	563.98	564.13	(1)	563.97	561.94	562.05	564.06	563.86	564.21
April 24, 2013	564.33	560.57	557.97	564.69	564.58	564.64	(1)	564.54	562.49	562.57	564.65	564.31	564.75
May 24, 2013	564.09	560.85	557.81	564.44	563.18	564.39	(1)	564.36	562.41	562.40	564.54	564.16	564.49
June 27, 2013	564.37	559.69	557.96	564.70	564.59	564.78	564.23	564.57	562.69	562.86	564.78	564.58	564.89
July 24, 2013	564.38	560.60	558.10	565.22	564.52	565.11	565.11	566.04	562.93	563.28	565.25	564.95	565.28
August 22, 2013	564.18	560.40	557.71	565.02	564.24	565.10	565.02	564.93	562.41	562.46	565.05	564.95	565.25
September 30, 2013	564.17	560.68	557.72	564.88	564.28	564.98	564.87	564.76	564.40	562.48	564.97	564.74	565.11
October 30, 2013	564.47	560.63	558.05	564.81	564.64	564.57	(1)	564.53	562.79	562.98	564.76	564.30	564.69
November 27, 2013	564.44	560.33	557.69	564.44	564.52	564.14	(1)	564.24	562.35	562.40	564.43	563.63	564.29
December 31, 2013	564.41	561.39	558.11	564.64	564.74	564.41	(1)	564.33	562.86	563.09	564.45	564.43	564.56
January 30, 2014	564.13	559.88	557.64	565.03	564.14	564.90	564.80	564.87	562.41	562.40	565.09	(2)	565.07
February 26, 2014	567.53	570.48	558.01	564.44	565.29	564.32	(1)	564.20	562.81	562.78	564.44	563.98	564.45
March 28, 2014	564.10	559.36	557.62	564.26	564.01	564.09	564.96	564.13	562.21	562.01	564.29	564.39	564.21
April 25, 2014	564.42	560.21	558.36	564.81	564.74	564.50	(1)	564.44	563.03	562.95	564.67	564.28	564.63
May 29, 2014	564.46	559.12	558.41	564.92	564.71	564.57	(1)	564.70	563.20	563.21	564.91	564.60	564.88
June 25, 2014	564.38	560.62	558.14	564.88	564.46	564.93	564.80	564.87	562.88	562.94	565.08	564.67	565.13
July 29, 2014	564.24	560.42	557.93	565.04	564.28	564.96	(1)	564.81	562.72	562.84	565.11	564.78	565.10
August 26, 2014	564.26	561.12	557.84	564.80	564.26	564.91	564.91	564.69	562.58	562.49	564.90	564.77	565.08
September 30, 2014	564.01	560.65	557.82	564.63	564.07	564.65	564.67	564.50	562.51	562.36	564.70	564.54	564.78
October 29, 2014	564.06	559.77	557.82	564.73	564.09	564.83	564.81	564.63	562.54	562.35	564.77	564.65	565.00
November 25, 2014	563.88	560.70	557.44	565.39	563.89	565.64	565.41	564.96	562.09	561.92	565.13	NM	565.71
December 30, 2014	567.26	571.05	557.71	564.58	564.53	564.29	(1)	564.33	562.31	562.20	564.40	563.90	564.45

Table 2.2

Water Levels (FT AMSL)
Gratwick-Riverside Park Site
North Tonawanda, New York

Date	MH2	MH3	MH6	OGC-1	MW-6	OGC-5	River North	OGC-6	MH8	MW-7	OGC-2	River Middle	OGC-7
RIM Elevation	573.28	573.81	572.03						572.37				
TOC Elevation (ft amsl)				575.01	575.40	573.82	566.80	576.65		575.57	574.08	566.48	572.49
January 28, 2015	565.60	565.06	559.07	564.59	564.82	564.91	564.85	564.46	563.96	564.72	564.55	564.78	564.98
February 24, 2015	565.75	565.39	559.45	564.37	565.18	564.55	(2)	564.21	(2)	565.17	564.62	(2)	564.66
March 25, 2015	564.69	560.93	558.97	564.50	565.07	564.04	(1)	564.16	563.76	564.14	564.36	563.63	564.21
April 23, 2015	565.70	560.48	559.94	565.13	565.89	565.03	564.82	564.93	564.85	565.34	565.03	564.60	565.17
May 29, 2015	564.77	561.40	558.47	564.74	564.58	564.70	564.78	564.70	563.26	563.59	564.93	564.65	564.95
June 24, 2015	564.80	560.99	558.20	565.15	564.62	565.20	565.15	565.07	562.96	563.10	565.23	565.07	565.28
July 28, 2015	564.79	559.51	557.84	565.31	564.53	565.40	565.27	565.25	562.60	562.76	565.41	565.16	565.53
August 27, 2015	564.62	559.38	557.71	565.23	564.29	565.30	565.13	565.14	562.46	562.41	565.36	565.06	565.45
September 25, 2015	564.70	559.57	557.81	564.99	564.47	565.06	565.01	564.92	562.53	562.55	565.07	564.91	565.23
October 30, 2015	564.69	560.63	557.51	565.76	564.31	565.06	564.71	566.07	562.24	562.34	565.42	564.49	565.41
November 30, 2015	564.59	560.10	557.23	564.35	564.23	564.12	(1)	564.16	561.85	561.80	564.42	563.83	564.23
December 30, 2015	564.50	560.89	557.26	565.32	564.18	564.57	(1)	564.33	561.94	562.35	564.75	564.18	564.88
January 28, 2016	564.77	560.05	557.42	564.79	564.48	564.60	(1)	564.56	562.05	561.98	564.68	564.15	564.76
February 23, 2016	564.86	560.75	558.15	564.81	564.69	564.19	(1)	564.29	562.94	563.51	564.46	563.48	564.38
March 31, 2016	565.66	560.53	559.61	565.28	565.97	564.83	(1)	564.84	564.43	564.91	565.01	564.20	565.03
April 28, 2016	566.56	561.19	560.20	565.22	566.08	564.91	564.76	564.89	565.05	565.69	565.20	564.55	565.05
May 26, 2016	566.95	559.81	560.61	565.10	566.38	564.96	564.82	564.97	565.45	566.20	565.38	564.64	565.10

Table 2.2

Water Levels (FT AMSL)
Gratwick-Riverside Park Site
North Tonawanda, New York

Date	MH9	OGC-3	MH11	MW-8	River South	MH12	OGC-8	OGC-4	MW-9	MH14	MH15	MH16
RIM Elevation			572.11			572.37				574.30	575.84	574.82
TOC Elevation (ft amsl)	572.55	573.35		574.37	568.46		574.01	574.66	576.23			
June 22, 2011		565.51	562.24	562.95	565.44	560.52	565.50	565.55	565.04	565.11	564.07	565.04
July 27, 2011		565.27	561.80	562.55	565.22	560.13	565.28	565.28	564.71	564.77	563.73	564.71
August 26, 2011		565.43	561.55	562.35	565.43	559.94	565.48	565.40	564.50	564.52	563.47	564.44
September 27, 2011		565.24	561.47	562.28	565.24	559.86	565.28	565.26	564.40	564.39	563.36	564.36
October 28, 2011		565.18	562.13	562.78	565.11	560.37	565.23	565.23	565.02	565.09	564.02	565.03
November 30, 2011		564.86	562.17	562.72	564.80	560.36	564.93	564.94	564.88	564.96	563.88	564.95
December 29, 2011		564.92	562.69	563.34	564.77	560.88	564.90	565.02	565.36	565.34	564.25	565.39
January 26, 2012		564.72	562.97	563.48	564.56	561.06	564.78	564.80	565.61	565.59	564.53	565.63
February 28, 2012		564.72	562.78	563.39	564.58	561.02	564.71	564.88	565.62	565.59	564.53	565.61
March 29, 2012		564.77	562.54	563.15	564.73	560.79	564.85	564.85	565.31	565.32	564.23	565.31
April 26, 2012		564.92	562.37	562.99	564.84	560.61	564.95	565.02	565.17	565.19	564.11	565.16
May 30, 2012		565.21	562.35	562.89	565.27	560.57	565.27	565.20	565.11	565.22	564.11	565.17
June 27, 2012		564.96	562.11	562.70	565.03	560.31	565.08	564.94	564.84	564.88	563.82	564.83
July 31, 2012		565.01	564.00	564.55	565.07	561.88	565.11	565.02	564.71	564.77	563.72	564.66
August 27, 2012		564.99	562.42	563.00	565.03	560.56	565.08	565.00	564.81	564.87	563.81	564.79
September 24, 212		565.03	562.05	562.64	565.00	560.22	565.08	565.04	564.52	564.58	563.52	564.50
October 26, 2012		564.48	561.96	562.55	564.43	560.09	564.53	564.55	564.49	564.57	563.51	564.47
November 26, 2012		564.17	562.29	562.96	564.15	560.58	564.20	564.23	564.91	565.02	563.96	564.97
December 26, 2012		563.73	562.52	563.09	(1)	560.75	563.63	563.77	565.17	565.22	564.15	565.14
January 30, 2013		564.36	563.02	563.84	564.36	561.37	564.42	564.37	565.67	565.63	564.58	565.66
February 27, 2013		564.13	563.08	563.61	564.16	561.48	564.17	564.12	565.70	565.68	564.62	565.72
March 27, 2013		564.26	563.17	563.54	564.24	561.41	564.35	564.35	565.59	565.66	564.61	565.61
April 24, 2013		564.82	563.22	563.78	564.74	561.66	564.87	564.83	565.85	565.89	564.82	566.60
May 24, 2013		562.59	562.86	563.38	564.60	561.27	564.72	564.66	565.31	565.39	564.32	565.34
June 27, 2013		562.02	563.08	563.61	565.00	561.50	565.08	564.99	565.66	565.68	564.63	565.69
July 24, 2013		565.36	563.04	563.56	565.37	561.40	565.42	565.30	565.47	565.40	564.27	565.44
August 22, 2013		565.37	562.87	563.37	565.37	561.17	565.38	565.29	565.19	565.16	564.08	565.18
September 30, 2013		565.17	563.73	563.25	565.15	561.03	565.24	565.15	565.05	565.06	564.01	565.03
October 30, 2013		564.73	562.96	563.53	564.74	561.35	564.83	564.73	565.50	565.48	564.45	565.54
November 27, 2013		564.33	563.08	563.58	564.30	561.39	564.39	564.38	565.47	565.53	564.52	565.35
December 31, 2013		564.72	563.53	564.06	564.87	561.78	564.89	564.63	565.76	565.78	564.71	565.86
January 30, 2014		565.14	563.40	563.95	565.63	561.65	565.20	565.17	565.52	565.51	564.51	565.61
February 26, 2014		564.55	563.28	563.83	564.55	561.48	564.65	564.59	565.46	565.57	564.51	565.55
March 28, 2014	560.87	564.24	563.58	564.10	564.38	561.78	564.40	564.26	565.93	565.98	564.88	565.97
April 25, 2014	559.42	564.72	563.90	564.44	564.70	562.08	564.77	564.73	566.12	566.22	565.18	566.24
May 29, 2014	561.05	564.99	564.01	564.37	564.92	562.06	564.98	564.88	565.77	566.07	565.00	566.07
June 25, 2014	561.27	565.14	563.53	564.03	565.11	561.68	565.84	565.21	565.60	565.69	564.62	565.64
July 29, 2014	560.93	565.18	563.41	563.75	565.15	561.37	565.25	565.14	565.21	565.30	564.23	565.14
August 26, 2014	560.63	565.18	563.11	563.61	565.15	561.25	565.28	565.11	565.20	565.28	564.16	565.20
September 30, 2014	559.52	564.92	562.89	563.31	564.96	560.97	565.01	564.89	564.89	565.04	563.92	564.96
October 29, 2014	560.59	565.14	562.78	563.23	565.15	560.87	565.18	565.14	564.77	564.91	563.80	564.81
November 25, 2014	561.55	565.76	562.71	563.18	565.56	560.85	565.80	565.89	564.76	564.92	563.85	564.79
December 30, 2014	560.91	564.52	562.98	563.43	564.45	561.15	564.59	564.62	565.13	565.22	564.15	565.16

Table 2.2

Water Levels (FT AMSL)
Gratwick-Riverside Park Site
North Tonawanda, New York

Date	MH9	OGC-3	MH11	MW-8	River South	MH12	OGC-8	OGC-4	MW-9	MH14	MH15	MH16
RIM Elevation			572.11			572.37				574.30	575.84	574.82
TOC Elevation (ft amsl)	572.55	573.35		574.37	568.46		574.01	574.66	576.23			
January 28, 2015	564.64	565.19	564.19	564.70	565.24	562.14	565.28	565.18	564.26	565.39	564.31	565.33
February 24, 2015	565.12	564.74	(2)	565.15	564.60	562.51	564.80	564.78	565.41	(2)	564.44	565.44
March 25, 2015	559.25	564.22	563.88	564.44	563.86	561.78	564.22	563.24	566.11	(2)	565.10	566.13
April 23, 2015	560.40	565.22	564.86	565.41	565.04	562.69	565.25	565.26	566.41	566.53	565.26	566.54
May 29, 2015	561.88	565.01	563.36	563.93	565.05	561.28	565.13	564.99	565.56	565.67	564.57	565.61
June 24, 2015	560.38	565.67	563.33	563.87	565.44	561.25	565.47	565.45	565.54	565.62	564.54	565.57
July 28, 2015	560.55	565.59	563.27	563.84	565.50	561.16	565.63	565.64	565.38	565.49	564.43	565.43
August 27, 2015	559.82	565.53	563.09	563.60	565.47	560.96	565.59	565.60	565.14	565.23	564.11	565.17
September 25, 2015	559.75	565.35	563.20	563.58	565.31	560.91	565.39	565.30	565.16	565.30	564.14	565.21
October 30, 2015	561.54	565.24	562.82	563.34	565.00	560.69	565.23	565.45	564.25	562.52	560.35	564.33
November 30, 2015	559.78	564.52	562.52	563.03	564.19	560.35	564.40	564.39	563.61	562.72	561.17	563.69
December 30, 2015	560.97	564.93	562.22	562.79	564.73	560.14	565.00	565.03	563.10	562.57	561.16	563.39
January 28, 2016	561.19	564.77	562.68	563.18	564.64	560.48	564.83	564.84	563.44	562.49	561.02	563.60
February 23, 2016	560.92	564.39	563.03	563.54	564.16	560.88	564.41	564.48	563.55	562.69	561.63	563.71
March 31, 2016	560.12	564.96	564.19	564.76	564.60	562.06	565.01	565.05	564.54	562.28	559.76	564.54
April 28, 2016	564.63	565.12	564.97	564.49	565.04	562.79	565.18	565.15	565.27	563.07	561.01	565.34
May 26, 2016	565.53	565.22	565.42	565.93	565.14	563.25	565.25	565.27	565.61	562.95	559.66	565.63

Notes:

(1) River level too low to obtain a measurement at the measuring location.
(2) Unable to access

Table 2.3

Summary of Horizontal Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

		6/22/2011		07/27/2011		08/26/2011		09/27/2011		10/28/2011		11/30/2011	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Monitoring Location													
Outer	River North	565.16	Inward	564.93	Inward	565.07	Outward	564.87	Inward	564.86 (1)	Inward	564.55 (1)	Inward
Inner	MH2	563.34		563.00		562.86		562.86		563.16		562.86	
Outer	River North	565.16	Inward	564.93	Inward	562.07	Inward	564.87	Inward	564.86 (1)	Inward	564.55 (1)	Inward
Inner	MH6	557.45		557.11		556.99		557.00		557.17		556.78	
Outer	River Middle	565.06	Inward	564.86	Outward	564.99	Inward	564.80	Inward	564.70	Inward	564.27	Inward
Inner	MH8	562.04		561.73		561.64		561.66		561.76		561.37	
Outer	River South	565.44	Inward	565.22	Inward	565.43	Inward	565.24	Inward	565.11	Inward	564.80	Inward
Inner	MH12	560.52		560.13		559.94		559.86		560.37		560.36	

		12/29/2011		01/26/2012		02/28/2012		03/29/2012		04/26/2012		05/30/2012	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Monitoring Location													
Outer	River North	564.52 (1)	Inward	564.31 (1)	Inward	564.33 (1)	Inward	564.48 (1)	Inward	564.59 (1)	Inward	565.02 (1)	Inward
Inner	MH2	563.69		563.77		563.72		563.36		563.56		563.97	
Outer	River North	564.52 (1)	Inward	564.31 (1)	Inward	564.33 (1)	Inward	564.48 (1)	Inward	564.59 (1)	Inward	565.02 (1)	Inward
Inner	MH6	557.65		557.74		557.56		557.14		557.42		557.91	
Outer	River Middle	564.30	Inward	564.35	Inward	564.26	Inward	564.28	Inward	564.46	Inward	564.86	Inward
Inner	MH8	562.06		562.07		561.98		561.59		561.81		562.36	
Outer	River South	564.77	Inward	564.56	Inward	564.58	Inward	564.73	Inward	564.84	Inward	565.27	Inward
Inner	MH12	560.88		561.06		561.02		560.79		560.61		560.57	

Table 2.3

Summary of Horizontal Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location		06/27/2012		07/31/2012		08/27/2012		09/24/2012		10/26/2012		11/26/2012	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Outer	River North	564.77	Inward	564.82 [2]	Inward	564.72	Inward	564.67	Inward	564.18 [2]	Inward	563.90 [2]	Inward
Inner	MH2	563.35		564.51		564.34		563.36		563.39		563.50	
Outer	River North	564.77	Inward	564.82 [2]	Inward	564.72 [1]	Inward	564.67	Inward	564.18 [2]	Inward	563.90 [2]	Inward
Inner	MH6	557.84		559.08		558.34		557.36		557.40		557.20	
Outer	River Middle	564.59	Inward	564.72	Inward	564.60	Inward	564.60	Inward	564.04	Inward	563.71	Inward
Inner	MH8	562.22		563.85		562.99		561.94		561.94		561.66	
Outer	River South	565.03	Inward	565.07	Inward	565.03	Inward	565.00	Inward	564.43	Inward	564.15	Inward
Inner	MH12	560.31		561.88		560.56		560.22		560.09		560.58	

Monitoring Location		12/26/2012		01/30/2013		02/27/2013		03/27/2013		04/24/2013		05/24/2013	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Outer	River North	563.67 [2]	Inward	564.11 [2]	Inward	563.91 [2]	Outward	563.99 [2]	Inward	564.49 [2]	Inward	564.35 [2]	Inward
Inner	MH2	563.64		564.00		563.96		563.97		564.33		564.09	
Outer	River North	563.67 [2]	Inward	564.11 [2]	Inward	563.91 [2]	Inward	563.99 [2]	Inward	564.49 [2]	Inward	564.35 [2]	Inward
Inner	MH6	557.37		557.80		557.86		557.45		557.97		557.81	
Outer	River Middle	563.79 [1]	Inward	563.83	Inward	563.18	Inward	563.86	Inward	564.31	Inward	564.16	Inward
Inner	MH8	561.75		562.33		562.79		561.94		562.57		562.41	
Outer	River South	563.92 [3]	Inward	564.36	Inward	564.16	Inward	564.24	Inward	564.74	Inward	564.60	Inward
Inner	MH12	560.75		561.37		561.48		561.41		561.66		561.27	

Table 2.3

Summary of Horizontal Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location		06/27/2013		07/24/2013		08/22/2013		09/30/2013		10/30/2013		11/27/2013	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Outer	River North	564.75	Inward	565.11 [2]	Inward	565.10	Inward	564.87	Inward	564.49 [2]	Inward	564.05 [2]	Inward
Inner	MH2	564.37		564.38		564.18		564.17		564.47		564.94	
Outer	River North	564.75	Inward	565.11 [2]	Inward	565.10 [1]	Inward	564.87	Inward	564.49 [2]	Inward	564.05 [2]	Inward
Inner	MH6	557.96		558.10		557.71		557.72		558.05		557.69	
Outer	River Middle	564.58	Inward	564.95	Inward	564.95	Inward	564.74	Inward	564.30	Inward	563.63	Inward
Inner	MH8	562.69		562.93		562.41		562.48		562.79		562.35	
Outer	River South	565.00	Inward	565.37	Inward	565.37	Inward	565.15	Inward	564.74	Inward	564.30	Inward
Inner	MH12	561.50		561.40		561.17		561.03		561.35		561.39	

Monitoring Location		12/31/2013		01/30/2014		2/26/2014		3/28/2014		4/25/2014		5/29/2014	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Outer	River North	564.62 [2]	Inward	564.80	Inward	564.30 [2]	Outward	564.96	Inward	564.45 [2]	Inward	564.67 [2]	Inward
Inner	MH2	564.41		564.13		567.53		564.10		564.42		564.46	
Outer	River North	564.62 [2]	Inward	564.80	Inward	564.30 [2]	Inward	564.96	Inward	564.45 [2]	Inward	564.67 [2]	Inward
Inner	MH6	558.11		557.64		558.01		557.62		558.36		558.41	
Outer	River Middle	564.93 [1]	Inward	565.50 [1]	Inward	563.98	Inward	564.39	Inward	564.28	Inward	564.60	Inward
Inner	MH8	562.86		562.41		562.81		562.21		563.03		563.20	
Outer	River South	564.87 [3]	Inward	565.63	Inward	564.55	Inward	564.38	Inward	564.70	Inward	564.92	Inward
Inner	MH12	561.78		561.65		561.48		561.78		562.08		562.06	

Table 2.3

Summary of Horizontal Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location		06/25/2014		07/29/2014		08/26/2014		09/30/2014		10/29/2014		11/25/2014	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Outer	River North	564.80	Inward	564.90 [2]	Inward	564.91	Inward	564.67	Inward	564.81	Inward	565.41	Inward
Inner	MH2	564.38		564.24		564.26		564.01		564.06		563.88	
Outer	River North	564.80	Inward	564.90 [2]	Inward	564.91 [1]	Inward	564.67	Inward	564.81	Inward	565.41	Inward
Inner	MH6	558.14		557.93		557.84		557.82		557.82		557.44	
Outer	River Middle	564.67	Inward	564.78	Inward	564.77	Inward	564.54	Inward	564.65	Inward	565.43 [1]	Inward
Inner	MH8	562.94		562.84		562.58		562.51		562.54		562.09	
Outer	River South	565.11	Inward	565.15	Inward	565.15	Inward	564.96	Inward	565.15	Inward	565.56	Inward
Inner	MH12	561.68		561.37		561.25		560.97		560.87		560.85	

Monitoring Location		12/30/2014		01/28/2015		02/24/2015		03/25/2015		04/23/2015		05/29/2015	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Outer	River North	564.20 [2]	Outward	564.85	Outward	564.35 [2]	Outward	563.61 [2]	Outward	564.82	Outward	564.78	Inward
Inner	MH2	567.26		565.50		565.75		564.69		565.70		564.77	
Outer	River North	564.20 [2]	Inward	564.85	Inward	564.35 [2]	Inward	563.61 [2]	Inward	564.82	Inward	564.78	Inward
Inner	MH6	557.71		559.07		559.45		558.97		559.94		558.47	
Outer	River Middle	563.90	Inward	564.78	Inward	564.47 [1]	NC	563.63	Outward	564.60	Outward	564.65	Inward
Inner	MH8	562.20		563.96		NM		563.76		564.85		563.26	
Outer	River South	564.45	Inward	565.24	Inward	564.80	Inward	563.86	Inward	565.04	Inward	565.05	Inward
Inner	MH12	561.15		562.14		562.51		561.78		562.69		561.28	

Table 2.3

Summary of Horizontal Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location		06/24/2015		07/28/2015		08/27/2015		09/25/2015		10/30/2015		11/25/2015	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Outer	River North	565.15	Inward	565.27	Inward	565.13	Inward	565.01	Inward	564.71	Inward	563.94 (2)	Outward
Inner	MH2	564.80		564.79		564.62		564.70		564.69		564.59	
Outer	River North	565.15	Inward	565.27	Inward	565.13	Inward	565.01	Inward	564.71	Inward	563.94 (2)	Inward
Inner	MH6	558.20		557.84		557.71		557.81		557.51		557.23	
Outer	River Middle	565.07	Inward	565.16	Inward	565.06	Inward	564.91	Inward	564.49	Inward	563.83	Inward
Inner	MH8	562.96		562.60		562.46		562.53		562.24		561.85	
Outer	River South	565.44	Inward	565.50	Inward	565.47	Inward	565.31	Inward	565.00	Inward	564.19	Inward
Inner	MH12	561.25		561.16		560.96		560.91		560.69		560.35	

Monitoring Location		12/30/2014		01/28/2015		02/24/2015		03/25/2015		04/23/2015		05/29/2015	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Outer	River North	564.48 (2)	Outward	564.39 (2)	Outward	563.91 (2)	Outward	564.35 (2)	Outward	564.76	Outward	564.82	Outward
Inner	MH2	564.50		564.77		564.86		565.66		566.56		566.95	
Outer	River North	564.48 (2)	Inward	564.39 (2)	Inward	563.91 (2)	Inward	564.35 (2)	Inward	564.76	Inward	564.82	Inward
Inner	MH6	557.26		557.42		558.15		559.61		560.20		560.61	
Outer	River Middle	564.18	Inward	564.15	Inward	563.48	Inward	564.20	Outward	564.55	Outward	564.64	Outward
Inner	MH8	561.94		562.05		562.94		564.43		565.05		565.45	
Outer	River South	564.73	Inward	564.64	Inward	564.16	Inward	564.60	Inward	565.04	Inward	565.14	Inward
Inner	MH12	560.14		560.48		560.88		562.06		562.79		563.25	

Notes:

(1) River level too low to obtain a measurement. Water level shown is River Middle water level minus 0.13 feet.
(2) River level too low to obtain a measurement. Water level shown is River South Water level minus 0.25 feet.
(3) River level too low to obtain a measurement. Lowest recorded level (i.e., 563.92) since start of system operation used
NM - Not Measured
NC - Not Calculated

Table 2.4

Summary of Vertical Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Location	Location	06/22/2011		07/27/2011		08/26/2011		09/27/2011		10/28/2011		11/30/2011	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	560.50	Upward	560.69	Upward	560.58	Upward	560.49	Upward	560.12	Upward	560.99	Upward
Lower	MW-6	563.59		563.29		563.09		563.02		563.21		562.99	
Upper	MH8	562.04	Upward	561.73	Upward	561.64	Upward	561.66	Upward	561.76	Upward	561.37	Upward
Lower	MW-7	562.39		562.15		562.06		562.12		562.36		562.06	
Upper	MH11	562.24	Upward	561.80	Upward	561.55	Upward	561.47	Upward	562.13	Upward	562.17	Upward
Lower	MW-8	562.95		562.55		562.35		562.28		562.78		562.72	
Average [1]		564.76	Upward	564.42	Upward	564.17	Upward	564.05	Upward	564.73	Upward	564.60	Upward
Lower	MW-9	565.04		564.71		564.50		564.40		565.02		564.88	

Location	Location	12/29/2011		01/26/2012		02/28/2012		03/29/2012		04/26/2012		05/30/2012	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	561.38	Upward	560.53	Upward	560.12	Upward	560.20	Upward	560.58	Upward	560.57	Upward
Lower	MW-6	563.81		563.88		563.81		563.53		563.51		564.12	
Upper	MH8	562.06	Upward	562.07	Upward	561.98	Upward	561.59	Upward	561.81	Upward	562.36	Upward
Lower	MW-7	562.45		562.41		562.30		561.94		562.09		562.46	
Upper	MH11	562.69	Upward	562.97	Upward	562.78	Upward	562.54	Upward	562.37	Upward	562.35	Upward
Lower	MW-8	563.34		563.48		563.39		563.15		562.99		562.89	
Average [1]		564.98	Upward	565.24	Upward	565.24	Upward	564.96	Upward	564.83	Upward	564.85	Upward
Lower	MW-9	565.36		565.61		565.62		565.31		565.17		565.11	

Table 2.4

Summary of Vertical Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Location	Location	06/27/2012		07/31/2012		08/27/2012		09/24/2012		10/26/2012		11/26/2012	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	561.29	Upward	561.19	Upward	561.22	Upward	561.20	Upward	559.91	Upward	561.25	Upward
Lower	MW-6	563.97		564.64		564.61		563.60		563.54		563.57	
Upper	MH8	562.22	Upward	563.85	Upward	562.99	Upward	561.94	Upward	561.94	Upward	561.66	Upward
Lower	MW-7	562.31		564.69		563.35		562.29		562.34		561.94	
Upper	MH11	562.11	Upward	564.00	Upward	562.42	Upward	562.05	Upward	561.96	Upward	562.29	Upward
Lower	MW-8	562.70		564.55		563.00		562.64		562.55		562.96	
Average [1]		564.53	Upward	564.42	Upward	564.52	Upward	564.23	Upward	564.22	Upward	564.67	Upward
Lower	MW-9	564.84		564.71		564.81		564.52		564.49		564.91	

Location	Location	12/26/2012		01/30/2013		02/27/2013		3/27/2013		4/24/2013		5/24/2013	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	560.19	Upward	560.19	Upward	560.71	Upward	560.29	Upward	560.57	Upward	560.85	Upward
Lower	MW-6	563.66		564.12		563.92		563.98		564.58		564.18	
Upper	MH8	561.75	Upward	562.33	Upward	562.79	Downward	561.94	Upward	562.49	Upward	562.41	Downward
Lower	MW-7	562.21		562.45		562.38		562.05		562.57		562.40	
Upper	MH11	562.52	Upward	563.02	Upward	563.08	Upward	563.17	Upward	563.22	Upward	562.86	Upward
Lower	MW-8	563.09		563.84		563.61		563.54		563.78		563.38	
Average [1]		564.86	Upward	565.28	Upward	565.33	Upward	565.31	Upward	565.53	Upward	565.03	Upward
Lower	MW-9	565.17		565.67		565.70		565.59		565.85		565.31	

Table 2.4

Summary of Vertical Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location		06/27/2013		07/24/2013		08/22/2013		09/30/2013		10/30/2013		11/27/2013	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	559.69	Upward	560.60	Upward	560.40	Upward	560.68	Upward	560.63	Upward	560.33	Upward
Lower	MW-6	564.59		564.52		564.24		564.28		564.64		564.52	
Upper	MH8	562.69	Upward	562.95	Upward	562.41	Upward	562.40	Upward	562.79	Upward	562.35	Upward
Lower	MW-7	562.86		563.28		562.46		562.48		562.98		562.40	
Upper	MH11	563.08	Upward	563.04	Upward	562.87	Upward	562.73	Upward	561.96	Upward	563.08	Upward
Lower	MW-8	563.61		563.56		563.37		563.23		563.53		563.58	
Average [1]		565.33	Upward	565.06	Upward	564.80	Upward	564.71	Upward	565.14	Upward	565.19	Upward
Lower	MW-9	565.66		565.47		565.19		565.05		565.50		565.47	

Monitoring Location		12/31/2013		01/30/2014		2/26/2014		3/28/2014		4/25/2014		5/29/2014	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	561.39	Upward	559.88	Upward	570.48	Downward	559.36	Upward	560.21	Upward	559.12	Upward
Lower	MW-6	564.74		564.14		565.29		564.01		564.74		564.71	
Upper	MH8	562.86	Upward	562.41	Downward	562.81	Downward	562.21	Downward	563.03	Downward	563.20	Upward
Lower	MW-7	563.09		562.40		562.78		562.01		562.95		563.21	
Upper	MH11	563.53	Upward	563.40	Upward	563.28	Upward	563.58	Upward	563.90	Upward	564.01	Upward
Lower	MW-8	564.06		563.95		563.83		564.10		564.44		564.37	
Average [1]		565.42	Upward	565.18	Upward	565.22	Upward	565.61	Upward	565.87	Upward	565.71	Upward
Lower	MW-9	565.76		565.52		565.46		565.93		566.12		565.77	

Table 2.4

Summary of Vertical Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location		06/25/2014		07/29/2014		08/26/2014		09/30/2014		10/29/2014		11/25/2014	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	560.62	Upward	560.42	Upward	561.12	Upward	560.65	Upward	559.77	Upward	560.70	Upward
Lower	MW-6	564.46		564.28		564.26		564.07		564.09		563.89	
Upper	MH8	562.88	Upward	562.72	Upward	562.58	Downward	562.51	Downward	562.54	Downward	562.09	Downward
Lower	MW-7	562.94		562.84		562.49		562.36		562.35		561.92	
Upper	MH11	563.53	Upward	563.41	Upward	563.11	Upward	562.89	Upward	562.78	Upward	562.71	Upward
Lower	MW-8	564.03		563.75		563.61		563.31		563.23		563.18	
Average [1]		565.33	Upward	564.94	Upward	564.91	Upward	564.67	Upward	564.54	Upward	564.56	Upward
Lower	MW-9	565.60		565.21		565.20		564.89		564.77		564.76	

Monitoring Location		12/30/2014		01/28/2015		2/24/2015		3/25/2015		4/23/2015		5/29/2015	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	571.05	Downward	565.06	Downward	565.39	Downward	560.93	Upward	560.48	Upward	561.40	Upward
Lower	MW-6	564.53		564.82		565.18		565.07		565.89		564.58	
Upper	MH8	562.31	Downward	563.96	Upward	NM	NA	563.76	Upward	564.85	Upward	563.26	Upward
Lower	MW-7	562.20		564.72		565.17		564.14		565.34		563.59	
Upper	MH11	562.98	Upward	564.19	Upward	NM	NA	563.88	Upward	564.86	Upward	563.36	Upward
Lower	MW-8	563.43		564.70		565.15		564.44		565.41		563.93	
Average [1]		564.86	Upward	565.03	Downward	NM	NA	NM	NA	566.11	Upward	565.30	Upward
Lower	MW-9	565.13		564.26		565.41		566.11		566.41		565.56	

Table 2.4

Summary of Vertical Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location		06/24/2015		07/28/2015		08/28/2015		09/25/2015		10/30/2015		11/30/2015	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	560.99	Upward	559.51	Upward	559.38	Upward	559.57	Upward	560.63	Upward	560.10	Upward
Lower	MW-6	564.62		564.53		564.29		564.47		564.31		564.23	
Upper	MH8	562.96	Upward	562.60	Upward	562.46	Downward	562.53	Upward	562.24	Upward	561.85	Downward
Lower	MW-7	563.10		562.76		562.41		562.55		562.34		561.80	
Upper	MH11	563.33	Upward	563.27	Upward	563.09	Upward	563.20	Upward	562.82	Upward	562.52	Upward
Lower	MW-8	563.87		563.84		563.60		563.58		563.34		563.03	
Average [1]		565.26	Upward	565.14	Upward	564.86	Upward	564.91	Upward	563.80	Upward	562.20	Upward
Lower	MW-9	565.54		565.38		565.14		565.16		564.25		563.61	

Monitoring Location		12/30/2015		01/28/2016		2/23/2016		3/31/2016		4/28/2016		5/26/2016	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	560.89	Upward	560.05	Upward	560.75	Upward	560.53	Upward	561.19	Upward	559.81	Upward
Lower	MW-6	564.18		564.48		564.69		565.97		566.08		566.38	
Upper	MH8	561.94	Upward	562.05	Downward	562.94	Upward	564.43	Upward	565.05	Upward	565.45	Upward
Lower	MW-7	562.35		561.98		563.51		564.91		565.69		566.20	
Upper	MH11	562.22	Upward	562.68	Upward	563.03	Upward	564.19	Upward	564.97	Downward	565.42	Downward
Lower	MW-8	562.79		563.18		563.54		564.76		564.49		565.14	
Average [1]		562.10	Upward	562.00	Upward	562.34	Upward	561.44	Upward	562.38	Upward	561.85	Upward
Lower	MW-9	563.10		563.44		563.55		564.54		565.27		565.61	

Notes:

NA - Not Applicable.
NM - Not monitored.
(1) - Distance weighted for MH14 (two thirds) and MH15 (one third).
(2) - Buried with snow.
(3) - Not Monitored - MH14 was buried with snow and could not be accessed.

Table 2.5

Groundwater Sampling Summary
Operation and Maintenance Manual
Gratwick-Riverside Park Site
North Tonawanda, New York

LOCATIONS

OGC1	MW-6
OGC2	MW-7
OGC3	MW-8
OGC4	MW-9
OGC5	OGC6
OGC7	OGC8

FREQUENCY

- quarterly for 2 years following GWS startup.
- semi-annually for Year 3 except for OGC-4 (quarterly for SVOCs) and OGC-6 (quarterly for VOCs).
- annually for Years 4 through 7 (until May 2008).

SAMPLING PROGRAM (MAY 2009 THROUGH MAY 2012)

Annual	***Once Every 2 Years (2010 and 2012)***
MW-8	MW-6
MW-9	MW-7
OGC-3	OGC-1
OGC-4	OGC-2
OGC-6	OGC-5
OGC-7	
OGC-8	

SAMPLING PROGRAM (MAY 2013 THROUGH MAY 2017)

Annual	***Once Every 2 Years (2014 and 2016)***
MW-8	MW-6
MW-9	MW-7
OGC-3	OGC-1
OGC-6	OGC-2
OGC-7	OGC-4
	OGC-5
	OGC-8

PARAMETERS

Volatiles

Acetone	Methylene Chloride
Benzene	Tetrachloroethene
2-Butanone	Toluene
Chlorobenzene	Trichloroethene
1,1-Dichloroethane	Vinyl Chloride
trans-1,2-Dichloroethene	Xylenes (Total)
Ethylbenzene	

Semi-Volatiles

1,2-Dichlorobenzene	4-Methylphenol
1,4-Dichlorobenzene	Naphthalene
2,4-Dimethylphenol	Di-n-octylphthalate
2-Methylphenol	Phenol

Table 2.6

Summary of Detected Compunds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		MW-9												
Date		**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/30/06**
Volatiles (µg/L)	**Class GA Level**													
Acetone	50	9.4J	4.3J	7.3J/6.7J		4.2J	7.0/7.2			13/12			17	17
Benzene	1		0.24J	0.39J/0.35J		0.44J	0.29J/0.30J	0.29J/0.29J		0.40J/ND0.70				0.54J
2-Butanone	50													2.6J
Chlorobenzene	5		0.50J	0.86J/0.85J		1.3		1.0/1.1		0.91J/0.87J		1.1	1.7	1.5
trans-1,2-Dichloroethene	5			0.22J/ND		0.31J	0.24J/0.24J	0.22J/0.20J						0.42J
Ethylbenzene	5		0.30J	0.46J/0.42J		0.73J	0.44J/0.42J	0.46J/0.46J		0.40J/0.38J				0.83J
Methylene Chloride	5		0.34J	0.33J/ND	4.0J	0.53J						7.2	1.6	
Tetrachloroethene	5	1.6J	1.1J	1.0J/0.92J		1.6	0.92J/0.80J	0.77J/0.74J		0.67J/0.71J				0.57J
Toluene	5		1.6J	3.0J/2.5J	2.8J	2.7	2.1/2.0	2.7/2.7	2.0	2.0/1.9	4.6	3.2	2.6	
Trichloroethene	5	2.2J	1.8J	2.4J/2.2J	3.0J	4.4	2.0/2.0	2.2/2.3		1.8/1.8	9.5	4.9	3.0	1.8
Vinyl Chloride	2									1.7/1.7			3.6	4.0
Total Xylenes	5		1.0J	1.5J/1.5J		2.5J	1.3J/1.3J	1.4J/1.4J		0.98J/1.0J	3.0			2.0J
Semi-Volatiles (µg/L)														
1,2-Dichlorobenzene	3*				0.6J									
1,4-Dichlorobenzene	3*												2J	
2,4-Dimethylphenol	50	12	12	18/17	38		20/22	30/34	30	35/36	36	42	50	58
2-Methylphenol	NL	1J	3J	3J/3J	7J		4J/4J	6J/6J	6J	6J/6J	6J	5J	8J	8J
4-Methylphenol	NL	69	110	97/92	230		100/110	190/230	150	130/130	160	190	260	190
Naphthalene	10													
Di-n-octyl phthalate	50													
Phenol	1	3J	34	28/22	24		38/41	34/35	42	46/46	180	30	27	49

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compunds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		MW-9									
Date		**05/25/07**	**05/29/08**	**05/27/09**	**05/26/10**	**05/26/11**	**05/30/12**	**05/24/13**	**05/29/14**	**05/29/15**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**										
Acetone	50		5.7	4.8J	5.9	4.3J			6.2		15J
Benzene	1			0.76		0.53J	0.44J	0.62J	0.57J		
2-Butanone	50										
Chlorobenzene	5	2.8	1.4	5.3	2.5	2.4	2.3	2.5	3.1		
trans-1,2-Dichloroethene	5		0.55J	0.74J							
Ethylbenzene	5			1.2	0.82J	1.1	0.74J	1.0	0.97J		
Methylene Chloride	5										
Tetrachloroethene	5			0.82J	0.57J	0.66J	0.54J		0.66J		
Toluene	5	3.1	2.4	3.8	3.8	4.3	3.5	4.4	4.6	5.3J	4.4J
Trichloroethene	5	2.9	1.7	4.7	2.6	2.7	2.3	3.0	3		2.6J
Vinyl Chloride	2			4.2		1.4					
Total Xylenes	5			3.3	2.2J	2.7	1.5J	2.7	2.6		
Semi-Volatiles (µg/L)											
1,2-Dichlorobenzene	3*	0.9J	0.7J		1.4J	1.0J	1.1J	0.98J	1.6J	1.2J	1.5J
1,4-Dichlorobenzene	3*	3J	1J	2.3J	1.7J	1.6J	1.8J	0.87J	2.3J	0.48J	2.6J
2,4-Dimethylphenol	50	46	31	110	41	43	47	82J	76J	62J	130J
2-Methylphenol	NL	6	6	12	9.9J	11	11	12	13J	13	16
4-Methylphenol	NL	170	96	300	180	230	230	280	0.75J	200	340
Naphthalene	10	0.2J	0.5J								1.2J
Di-n-octyl phthalate	50										
Phenol	1	11	13	20	20	17	9.3J	16	26	16	26

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compunds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-4														
Date		**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**3/04/04**	**05/14/04**	**11/23/04**	**05/27/05**	**05/30/06**
Volatiles (µg/L)	**Class GA Level**											NA		NA		
Acetone	50			7.9J			4.0J									
Benzene	1		0.21J	0.2J												
2-Butanone	50															
Chlorobenzene	5		0.49J	0.66J		0.83J/0.79J		0.46J		0.83J						
trans-1,2-Dichloroethene	5			0.22J												
Ethylbenzene	5		0.41J	0.39J		0.54J/0.53J	0.48J	0.39J		0.77J						0.44J
Methylene Chloride	5				5.1J/4.9J								4.6		2.0	
Tetrachloroethene	5	1.0J	1.2J	0.87J		0.86J/0.84J	1.1	0.78J		0.77J						
Toluene	5			1.0J		1.0/0.98J	1.4	0.72J		1.2						
Trichloroethene	5	1.6J	1.4J	1.5J		1.5/1.4	1.7	0.96J		1.5						0.53J
Vinyl Chloride	2															
Total Xylenes	5		1.0J	0.94J		0.84J/0.82J	1.1J			0.95J						
Semi-Volatiles (µg/L)																
1,2-Dichlorobenzene	3*															
1,4-Dichlorobenzene	3*															
2,4-Dimethylphenol	50	8J	12	6J	8J/6J	7J/7J	8J		7J/7J	8J	4J	6J		4J		
2-Methylphenol	NL	0.9J	2J	35	2J/ND	1J/2J	2J			3J		3J		2J		
4-Methylphenol	NL	64	86	40	58/55	61/67	68		69/68	73	32	55		31	14	15
Naphthalene	10															
Di-n-octyl phthalate	50															
Phenol	1	310	560	400	420/460	710/1100	1100	1100	2400/2300	1800	1600		2400	1500	850	510

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compunds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-4							
Date		**05/25/07**	**05/29/08**	**05/27/09**	**05/26/10**	**05/26/11**	**05/30/12**	**05/29/14**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**								
Acetone	50			1.6J					3.6J
Benzene	1								
2-Butanone	50								
Chlorobenzene	5								
trans-1,2-Dichloroethene	5								
Ethylbenzene	5								
Methylene Chloride	5								
Tetrachloroethene	5								
Toluene	5								
Trichloroethene	5								
Vinyl Chloride	2								
Total Xylenes	5								
Semi-Volatiles (µg/L)									
1,2-Dichlorobenzene	3*								
1,4-Dichlorobenzene	3*								
2,4-Dimethylphenol	50		0.9J		0.51J/ND				
2-Methylphenol	NL		0.5J	2.7J					
4-Methylphenol	NL	3J	6				2.8J	0.87J	
Naphthalene	10		0.5J		3.4J/3.4J				
Di-n-octyl phthalate	50								
Phenol	1	84	66	25	15/15	5.5	0.97J	0.68J	0.43J

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compunds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-8												
Date		**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**05/08/03**	**05/14/04**	**05/27/05**	**05/30/06**
Volatiles (µg/L)	**Class GA Level**													
Acetone	50	78	31/29	19J		4.7J	3.6J				6.2	5.8	4.7J	
Benzene	1	11	14/14	14		2.6	5.3	3.3	3.6	3.1	1.8	1.2	1.1	0.92
2-Butanone	50	4.0J												
Chlorobenzene	5	3.7J	4.1J/4.1J	4.0J		0.87J	1.7	1.1		1.1	0.65J	0.48J	0.43J	0.44J
trans-1,2-Dichloroethene	5	4.3J	3.2J/3.1J	4.0J		0.76J	1.5	0.88J		1.0	0.50J	0.41J	1.0	
Ethylbenzene	5	13	16/16	15	1.6J	2.8	5.8	3.1	3.9	3.1	1.8	1.2		0.99J
Methylene Chloride	5		0.52J/0.48J	0.62J	1.8J									
Tetrachloroethene	5	40	51/52	59	7.7J	9.9	22	12	14	11	7.0	5.0	3.8	4.0
Toluene	5	140	140/140	110	17J	21	53	28	38	27	16	11	8.1	8.3
Trichloroethene	5	120	110/110	110	20J	22	53	27	35	27	17		7.7	7.6
Vinyl Chloride	2	3.7J	3.4/3.6	3.1	1.1J		1.4	0.70J		0.78J				
Total Xylenes	5	43	55/54	46	4.8J	8.3	18	9.5	11	9.9	5.4	3.7	3.0	3.2
Semi-Volatiles (µg/L)														
1,2-Dichlorobenzene	3*													
1,4-Dichlorobenzene	3*													
2,4-Dimethylphenol	50	2J	4J/2J	4J	0.8J	0.8J	3J	1J						
2-Methylphenol	NL	18	30/25	16	4J	5J	13	7J	11	7J	4J	2J	2J	3J
4-Methylphenol	NL	30	51/45	28	8J	10	26	14	20	14J	9	5J	6J	8J
Naphthalene	10	1J	3J/25	1J			0.9J							
Di-n-octyl phthalate	50		0.1J/ND											
Phenol	1	30	49/44	31	5J	8J	11	10		4J	6J	2J		

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compunds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-8							
Date		**05/24/07**	**05/29/08**	**05/27/09**	**05/26/10**	**05/26/11**	**05/30/12**	**05/29/14**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**								
Acetone	50		9.9	1.5J					
Benzene	1	0.54J	0.84	0.58J				0.50J	0.47J
2-Butanone	50								
Chlorobenzene	5								
trans-1,2-Dichloroethene	5								
Ethylbenzene	5	0.53J	0.84J	0.50J					
Methylene Chloride	5								
Tetrachloroethene	5	2.0	2.3	1.6		0.94J	1.3	0.91J	1.0
Toluene	5	4.0	6.4	3.7		2.4	2.6	2.8	3.3
Trichloroethene	5	4.0	6.5	4.0		2.4	2.7	3.1	3.9
Vinyl Chloride	2								
Total Xylenes	5	1.1J	2.5J	1.5J		0.82J	0.86J	0.78J	1.0J
Semi-Volatiles (µg/L)									
1,2-Dichlorobenzene	3*								
1,4-Dichlorobenzene	3*		0.2J						
2,4-Dimethylphenol	50		1J		0.73J		0.52J	1.1J	0.86
2-Methylphenol	NL	2J	2J		2.2J	1.5J	2.0J	2.6J	1.9J
4-Methylphenol	NL	6	8	5.7	6.5J	5.3J	6.2J		
Naphthalene	10								
Di-n-octyl phthalate	50								
Phenol	1								

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compunds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		River South														
Date		**05/18/01**	**09/17/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/30/06**	**05/24/07**	**05/29/08**
Volatiles (µg/L)	**Class GA Level**															
Acetone	50						3.0J						3.2J			12
Benzene	1										0.42J					
2-Butanone	50												3.9J			3.1J
Chlorobenzene	5															
trans-1,2-Dichloroethene	5															
Ethylbenzene	5															
Methylene Chloride	5															
Tetrachloroethene	5						0.30J									
Toluene	5			0.29J			0.72J	0.35J			1.8					
Trichloroethene	5						0.44J									
Vinyl Chloride	2						0.27J									
Total Xylenes	5										1.8J					
Semi-Volatiles (µg/L)																
1,2-Dichlorobenzene	3*															
1,4-Dichlorobenzene	3*															
2,4-Dimethylphenol	50															
2-Methylphenol	NL															
4-Methylphenol	NL															
Naphthalene	10															
Di-n-octyl phthalate	50															
Phenol	1															

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compunds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		MW-8												
Date		**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/30/06**
Volatiles (µg/L)	**Class GA Level**													
Acetone	50	52	12J	11J	75J	67	20			73		28/33	26	16
Benzene	1	6.5	4.3	4.1		8.6	12	12	8.1	12	23/24	10/12	4.2	4.4
2-Butanone	50													
Chlorobenzene	5	1.8J	1.0J	1.0J		3.2	4.9	4.4	3.6	6.2	6.0/6.4	2.7/3.3	2.4	2.4
trans-1,2-Dichloroethene	5	2.2J	1.8J	2.9J	4.8J	7.3	11	16	12	13	10/12	7.3/9.4	7.4	5.3
Ethylbenzene	5	5.7	3.7J	4.4J	8.2J	12	18	18	15	23	30/32	20/24	4.6	5.8
Methylene Chloride	5	1.1J	0.58J	0.66J	4.4J	1.2	1.4	1.6		1.3	2.2/2.2	7.3/9.2	1.7	0.64J
Tetrachloroethene	5	21	12	9.8	23J	32	61	58	54	80	91/100	120/130	62	71
Toluene	5	75	36	31	80	100	140	160	100	120	240/240	97/120	30	33
Trichloroethene	5	82	40	35	110	180	320	280	210	320	460/460	380/390	180	150
Vinyl Chloride	2	5.2	1.6J	3.3	23	12	18	14	12	18	21/21	13/16	5.8	5.1
Total Xylenes	5	22	13	16	30J	40	68	69	58	93	120/120	92/110	32	25
Semi-Volatiles (µg/L)														
1,2-Dichlorobenzene	3*				2J	2J		2J		4J	3J/3J			
1,4-Dichlorobenzene	3*			0.6J	2J	1J	1J	2J		4J	3J/3J	19U/2J	4J	5J
2,4-Dimethylphenol	50	1J	11	16	19	18	15	27	20	27	37/38	15J/14	7J	6J
2-Methylphenol	NL	33	55	41	48	44	38	56	37	35	45/46	18J/18	18J	16
4-Methylphenol	NL	10	32	34	55	60	59	83	64	75	130/130	34/31		
Naphthalene	10				0.7J	0.8J	0.8J	1J			2J/2J			
Di-n-octyl phthalate	50													
Phenol	1	43	130	140	85	110	91	110	140	78	80/80	28/28	11J	4J

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compunds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		MW-8									
Date		**05/24/07**	**05/29/08**	**05/29/09**	**05/26/10**	**05/26/11**	**05/30/12**	**05/24/13**	**05/29/14**	**05/29/15**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**										
Acetone	50	6.6/7.5	23	2.6J		3.1J					
Benzene	1	1.6/1.5	1.5	2.7		2.7	2.1	2.5	3.5	2.8J/2.9J	
2-Butanone	50		4.4J								
Chlorobenzene	5	0.84J/0.82J	0.54J	0.99J		3.8	3.4	3.4	7.0	4.6J/4.8J	
trans-1,2-Dichloroethene	5	4.4/3.9	3.6	6.8		3.5	3.4	3.4	6.5	5.3/6.1	
Ethylbenzene	5	2.5/2.2	1.8	4.2		5.2	4.4	4.4	6.2	3.9J/3.9J	
Methylene Chloride	5										
Tetrachloroethene	5	16/14	9.5	12		12	7.7	5.3	3.5	2.9J/2.8J	
Toluene	5	12/11	10	26		18	6.5	6.5	4.9	4.0J/4.1J	
Trichloroethene	5	40/36	29	68		34	22	21	22	17/17	15
Vinyl Chloride	2					3.0					
Total Xylenes	5	9.8/9.1	6.7	19		22	16	12	11	5.4J/5.0J	
Semi-Volatiles (µg/L)											
1,2-Dichlorobenzene	3*		0.4J		1.5J	1.2J	1.3J	0.87J	1.7J	1.2J/0.91J	1.4
1,4-Dichlorobenzene	3*	0.5J/0.4J	0.5J		2.1J	3.3J	6.9J	7.1J	21	12/11	17
2,4-Dimethylphenol	50	0.8J/0.6J	14	14	13	14	16	17	19	18/16	20
2-Methylphenol	NL	7/7	26	32	22	16	20	16	23	21/19	29
4-Methylphenol	NL	18/16	31	29	38	41J	30	25	1.0J	27/24	28
Naphthalene	10	22/22	1J								0.98J
Di-n-octyl phthalate	50										
Phenol	1	20/21	32	15	13	3.4J	4.0J	2.5J	4.5J	3.3J/2.7J	6.5J

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-3												
Date		**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/30/06**
Volatiles (µg/L)	**Class GA Level**													
Acetone	50	13J / 19J	3.8J	15J		7.1	6.7			5.6			10/8.4	2.8J
Benzene	1	1.6J / 1.6J	1.6	1.8		1.8	1.2	1.5		1.6	1.4		1.2/1.1	0.93J
2-Butanone	50													
Chlorobenzene	5		0.24J	0.28J		0.28J		0.22J						
trans-1,2-Dichloroethene	5	1.6J / 1.6J	1.0J	1.4J	1.1J	1.1	0.98J	0.44J		1.0				
Ethylbenzene	5	1.6J / 1.5J	2.0J	2.3J	1.5J	2.4	1.7	1.8		2.0			1.4/1.3	1.1
Methylene Chloride	5				1.9J							6.3	1.2/1.0	
Tetrachloroethene	5	2.4J / 2.2J	3.0J	2.2J	1.7J	2.2	1.8	1.8		1.5			0.71J/0.63J	0.61J
Toluene	5	5.7 / 5.1	5.9	5.3		5.1	3.7	4.6	4.0	4.3	3.6	2.6	2.6/2.4	
Trichloroethene	5	20 / 20	18	19	14J	17	14	13	12	14	9.8	7.7	6.4/6.1	5.6
Vinyl Chloride	2	ND / 1.0J	0.4	0.72						0.62J				
Total Xylenes	5	5.6J / 5.4J	7.5	8.7	4.8J	7.8	5.8	5.8	5.0	6.6	3.9		3.3/3.0	2.9J
Semi-Volatiles (µg/L)														
1,2-Dichlorobenzene	3*				1J									
1,4-Dichlorobenzene	3*				0.7J		0.5J							
2,4-Dimethylphenol	50	5J / 5J	9	8J	11	11	7J	8J	11	12	10	9J	8J/4J	6J
2-Methylphenol	NL	98 / 96	120	87	160	140	100	100	120	140	150	110	83/73	64
4-Methylphenol	NL	13 / 13	21	17	28	23	14	15	22	23	20	17	14/12	13
Naphthalene	10													
Di-n-octyl phthalate	50													
Phenol	1	120 / 110	140	130J	210	140	85	92	110	120	120	90	78/74	75

Notes:

* Applies to sum of compounds
NL - Not listed
[ ] Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-3									
Date		**05/24/07**	**05/29/08**	**05/27/09**	**05/26/10**	**05/26/11**	**05/30/12**	**05/24/13**	**05/29/14**	**05/29/15**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**										
Acetone	50	0.76	6.0	2.9J/2.6J		3.7J			3.1J		3.3J
Benzene	1		0.93	0.75/0.78		0.67J	0.45J	0.64J/0.71	5.3J		0.62J
2-Butanone	50										
Chlorobenzene	5										
trans-1,2-Dichloroethene	5										
Ethylbenzene	5	0.85J	0.92J	0.69J/0.73J		0.75J					
Methylene Chloride	5										
Tetrachloroethene	5	0.56J									
Toluene	5	1.7	1.8	1.4/1.4		1.2	0.88J	1.2/1.3	1.2J		0.95J
Trichloroethene	5	4.3	4.9	3.3/3.5		2.5	0.87J	2.6/2.5	0.48J		1.6
Vinyl Chloride	2								62J		
Total Xylenes	5	2.1J	2.3J	1.7J/1.7J		1.0J	0.71J	0.81J/0.77J	13		
									200		
Semi-Volatiles (µg/L)											
1,2-Dichlorobenzene	3*	0.6J	0.7J		0.86J	0.40J	0.61J	0.46J/0.49J	16	0.47J	0.52J
1,4-Dichlorobenzene	3*		0.6J		0.58J						
2,4-Dimethylphenol	50		6	6.2/5.9	4.3J	3.7J	5.8J	4.8J/4.8J	4.8J	4.1J	4.9J
2-Methylphenol	NL	47	45	44/43	36	33	35	31/32	34	23	24
4-Methylphenol	NL	10	11	11/11	9.9	10	11	9.1J/9.5J	0.91J	7.6J	9.6
Naphthalene	10		0.8J								
Di-n-octyl phthalate	50										
Phenol	1	60	65	60/57	50	48	53	58/57	52	44J	43

Blank = Non-Detect

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		GW-5S		OGC-7												
Date		**12/17/87**	**08/12/88**	**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/30/06**
Volatiles (µg/L)	**Class GA Level**															
Acetone	50	293		21J	0.25J	8.2J			3.6J							
Benzene	1	2				0.30J		0.28J	0.20J	0.26J				0.34J	0.34J	
2-Butanone	50	27														
Chlorobenzene	5															
trans-1,2-Dichloroethene	5	180	89	6.3	3.1J	5.4	4.9J	4.8J	4.2	4.7	4.0	5.4	5.0	5.9	4.9	5.8
Ethylbenzene	5	9	7J	1.1J	0.80J	1.0J		1.3	0.84J	0.91J		1.4	0.93J	1.5	1.4	1.3
Methylene Chloride	5	1														
Tetrachloroethene	5	11	7J	4.3J	3.6J	3.4J	2.9J	4.0	3.4	2.7	2.8	4.1	2.2	4.1	2.9	2.8
Toluene	5	75	49	12	5.8	6.7	5.7J	6.9	5.2	6.0	6.7	8.6	5.8	9.3	8.3	8.6
Trichloroethene	5	287	220	70	40	48	45	68	44	38	50	56	38	56	37J	37
Vinyl Chloride	2	7	4J	2.6J	0.84	1.7J	3.5J	2.2	1.8	1.8		2.3	2	2.9	3.0	2.9
Total Xylenes	5	54	37	6.0J	4.8J	6.5	3.9J	7.6	5.3	5.3	5.5	8.7	5.4	10	8.6	8.2
Semi-Volatiles (µg/L)																
1,2-Dichlorobenzene	3*		2J													
1,4-Dichlorobenzene	3*															
2,4-Dimethylphenol	50	10	11		2J											
2-Methylphenol	NL	24	24	3J	2J	1.0J	0.8J	1J								
4-Methylphenol	NL	38				0.9J	0.7J	1J								
Naphthalene	10															
Di-n-octyl phthalate	50						0.6J									
Phenol	1	61	92	4J	0.7J											

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-7								
Date		05/24/07	05/27/09	05/26/10	05/26/11	05/30/12	05/24/13	05/29/14	05/29/15	05/26/16
Volatiles (µg/L)	**Class GA Level**									
Acetone	50									
Benzene	1									
2-Butanone	50									
Chlorobenzene	5									
trans-1,2-Dichloroethene	5	3.8		2.7	2.7	2.0	2.0	1.7		0.95J
Ethylbenzene	5	0.87J	0.84J	0.62J						
Methylene Chloride	5									
Tetrachloroethene	5	1.7	1.2J	0.80J	0.72J	0.69J	0.43J	0.50J	0.38J	
Toluene	5	5.0	4.9J	3.3	3.4	2.4	2.6	2.5	1.9	1.6
Trichloroethene	5	22	21J	14	12	7.7	9.7	8.5	5.1	4.9
Vinyl Chloride	2		2.6J		2.4	1.6		1.7	0.94J	
Total Xylenes	5	5.3	5.0J	3.6	4.0	2.8	2.9	2.8	0.95J	1.9J
Semi-Volatiles (µg/L)										
1,2-Dichlorobenzene	3*								0.43J	
1,4-Dichlorobenzene	3*									
2,4-Dimethylphenol	50									
2-Methylphenol	NL	0.6J	0.5J		0.45J		0.38J	0.52J		
4-Methylphenol	NL	0.6J	0.4J					1.1J		
Naphthalene	10									
Di-n-octyl phthalate	50									
Phenol	1									

Blank = Non-Detect

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		River Middle														
Date		**05/18/01**	**09/17/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/31/06**	**05/24/07**	**05/29/08**
Volatiles (µg/L)	**Class GA Level**															
Acetone	50						3.1J									2.8J
Benzene	1															
2-Butanone	50															
Chlorobenzene	5															
trans-1,2-Dichloroethene	5															
Ethylbenzene	5															
Methylene Chloride	5															
Tetrachloroethene	5														1.3	
Toluene	5															
Trichloroethene	5							0.21J								
Vinyl Chloride	2															
Total Xylenes	5															
Semi-Volatiles (µg/L)																
1,2-Dichlorobenzene	3*															
1,4-Dichlorobenzene	3*															
2,4-Dimethylphenol	50															
2-Methylphenol	NL															
4-Methylphenol	NL															
Naphthalene	10															
Di-n-octyl phthalate	50				0.7J											
Phenol	1															

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		MW-7															
Date		**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/31/06**	**05/24/07**	**05/29/08**	**05/26/10**
Volatiles (µg/L)	**Class GA Level**																
Acetone	50	5.7J		6.5J		4.3J	5.4			4.8			4.3J	3.0J	3.9J	3.3J/3.4J	
Benzene	1		1.9	2.0		2.0	1.3	1.8		0.90			0.58J				
2-Butanone	50																
Chlorobenzene	5																
trans-1,2-Dichloroethene	5		0.82J	1.1J		0.98J	0.89J	1					0.36J				
Ethylbenzene	5		0.85J	0.81J		1.0	0.61J	0.75J					0.32J				
Methylene Chloride	5				1.6J												
Tetrachloroethene	5			0.27J													
Toluene	5		3.5J	3.6J		3.3	1.9	3		1.1	2.8		0.93J				
Trichloroethene	5		0.55J	0.63J		0.43J	0.45J	0.36J									
Vinyl Chloride	2		1.6J	2.0	3.8J	2.9	1.7	2.2		1.3			0.80J			0.64J/0.61J	
Total Xylenes	5		2.1J	2.1J		2.7J	1.5J	1.9J		0.76J							
Semi-Volatiles (µg/L)																	
1,2-Dichlorobenzene	3*																
1,4-Dichlorobenzene	3*																
2,4-Dimethylphenol	50			2J	2J	3J	0.7J	2J									
2-Methylphenol	NL		3J	2J	4J	6J	1J	2J			2J					0.4J/0.5J	
4-Methylphenol	NL		3J	2J	4J	6J	1J	2J			1J				0.3J	0.5J/0.6J	
Naphthalene	10																
Di-n-octyl phthalate	50				0.6J												
Phenol	1		24	7J	10	26	2J	6J		5J	2J		1J				

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		MW-7		
Date		05/30/12	05/29/14	05/26/16
Volatiles (µg/L)	**Class GA Level**			
Acetone	50			
Benzene	1			
2-Butanone	50			
Chlorobenzene	5			
trans-1,2-Dichloroethene	5			
Ethylbenzene	5			
Methylene Chloride	5			
Tetrachloroethene	5			
Toluene	5			
Trichloroethene	5			
Vinyl Chloride	2			
Total Xylenes	5			
Semi-Volatiles (µg/L)				
1,2-Dichlorobenzene	3*			
1,4-Dichlorobenzene	3*			
2,4-Dimethylphenol	50			
2-Methylphenol	NL			5.7J/6.1J
4-Methylphenol	NL		0.65J	
Naphthalene	10			
Di-n-octyl phthalate	50			
Phenol	1			

Blank = Non-Detect

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-2															
Date		**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/30/06**	**05/25/07**	**05/29/08**	**05/26/10**
Volatiles (µg/L)	**Class GA Level**																
Acetone	50			11J			3.0J					4.5J	3.1				
Benzene	1																
2-Butanone	50																
Chlorobenzene	5																
trans-1,2-Dichloroethene	5																
Ethylbenzene	5																
Methylene Chloride	5				1.7J												
Tetrachloroethene	5																
Toluene	5										0.37J						
Trichloroethene	5		0.39J														
Vinyl Chloride	2			0.26J		0.25J	0.26J										
Total Xylenes	5																
Semi-Volatiles (µg/L)																	
1,2-Dichlorobenzene	3*																
1,4-Dichlorobenzene	3*																
2,4-Dimethylphenol	50																
2-Methylphenol	NL																
4-Methylphenol	NL																
Naphthalene	10																
Di-n-octyl phthalate	50																
Phenol	1																

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		**OGC-2**		
Date		**05/30/12**	**05/29/14**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**			
Acetone	50			
Benzene	1			
2-Butanone	50			
Chlorobenzene	5			
trans-1,2-Dichloroethene	5			
Ethylbenzene	5			
Methylene Chloride	5			
Tetrachloroethene	5			
Toluene	5			
Trichloroethene	5			
Vinyl Chloride	2			
Total Xylenes	5			
Semi-Volatiles (µg/L)				
1,2-Dichlorobenzene	3*			
1,4-Dichlorobenzene	3*			
2,4-Dimethylphenol	50			
2-Methylphenol	NL			
4-Methylphenol	NL		0.79J	
Naphthalene	10			
Di-n-octyl phthalate	50			
Phenol	1			

Blank = Non-Detect

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-6													
Date		**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**03/04/04**	**05/14/04**	**11/23/04**	**05/27/05**	**05/31/06**
Volatiles (µg/L)	**Class GA Level**															
Acetone	50			6.6J			5.0			3.7J						8.6/8.7
Benzene	1									0.71	0.87	1.4		2.5	5.2	12/12
2-Butanone	50															
Chlorobenzene	5															
trans-1,2-Dichloroethene	5			0.23J	0.23J	0.37J	0.45J	0.55J		1.4	2.0	2.1		3.6	5.3	11/12
Ethylbenzene	5					0.31J				0.85J	1.1	2.0	3.3	3.1	7.4	20/20
Methylene Chloride	5				2.1J								4.4	2.5	2.2	
Tetrachloroethene	5		1.4J	0.73J		6.6	7.4	5	12	49	51	230	300	260	550	2000/2100
Toluene	5			0.55J		2.0	1.6	1.5	2.4	9.3	12	27	40	35	72	240/260
Trichloroethene	5	3.0J	4.7J	3.1J	5.9	16	19	13	26	95	120	330	530	330	610	1800/1800
Vinyl Chloride	2					0.22J	0.25J			0.45J						2.9/2.8
Total Xylenes	5		0.22J	0.53J	0.26J	1.7J	1.2J	1.0J		4.1	4.7	8.6	13	12	28	79/76
Semi-Volatiles (µg/L)												NA		NA		
1,2-Dichlorobenzene	3*															
1,4-Dichlorobenzene	3*															
2,4-Dimethylphenol	50							1J								
2-Methylphenol	NL		2J	2J	32	11	8J	9J	13	22	27		63		85	89/110
4-Methylphenol	NL			1J	0.02J	10							1J		2J	84/100
Naphthalene	10															1J/2J
Di-n-octyl phthalate	50															
Phenol	1		7J	2J	4J	5J	3J	2J		5J	3J		9J		8J	13/16

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-6									
Date		**05/24/07**	**05/29/08**	**05/27/09**	**05/26/10**	**05/26/11**	**05/30/12**	**05/24/13**	**05/29/14**	**05/29/15**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**										
Acetone	50			1.6J							
Benzene	1	7.2		3.2	3.6	1.8	1.9	4.7	1.3/1.4		
2-Butanone	50										
Chlorobenzene	5										
trans-1,2-Dichloroethene	5	7.1		4.4	8.2	7.6	4.8	7.3	4.5/4.6		
Ethylbenzene	5	12		4.8	5.2	2.4	2.0	4.8	1.2/1.2		
Methylene Chloride	5										
Tetrachloroethene	5	1400	34	400	640	220	100	1100	190/190	180	71
Toluene	5	97	2.9	34	38	14	16	57	10/10	8.1J	4.0J
Trichloroethene	5	1100	31	320	410	180	92	460	100/110	99	60
Vinyl Chloride	2	1.5			1.2						
Total Xylenes	5	46		18	20	9.1	8.9	21	5.1/5.1		
Semi-Volatiles (µg/L)											
1,2-Dichlorobenzene	3*										
1,4-Dichlorobenzene	3*										
2,4-Dimethylphenol	50		0.9J						0.54J/0.59J		
2-Methylphenol	NL	76	76	32	32	15	16	23	9.4J/9.3	4.8J	3.6J
4-Methylphenol	NL	2J	70	1.1J	1.4J	1.2J	1.1J	1.1J		0.88J	
Naphthalene	10	2J	2J	1.2J	1.4J	1.1J	1.1J	1.2J	1.1J/1.1J	0.89J	0.97J
Di-n-octyl phthalate	50										
Phenol	1	8	8				1.5J	57	1.2J/1.2J	0.71J	

Blank = Non-Detect

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		River North													
Date		**05/18/01**	**09/17/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/30/06**	**05/31/07**
Volatiles (µg/L)	**Class GA Level**														
Acetone	50						2.4J		NS			3.6J	3.6J		
Benzene	1					0.21J					2.0	0.39J			
2-Butanone	50														
Chlorobenzene	5					1.3						3.2			
trans-1,2-Dichloroethene	5					0.25J						1.0			
Ethylbenzene	5					20						40		2.9	
Methylene Chloride	5				1.6J										
Tetrachloroethene	5					3.8						7.7		1.3	
Toluene	5			0.39J		63				0.96J		130	2.2	14	
Trichloroethene	5			0.35J		4.5						6.4		0.59J	
Vinyl Chloride	2					3.7						9.3			
Total Xylenes	5					80				0.96J		210	3.7	23	
Semi-Volatiles (µg/L)															
1,2-Dichlorobenzene	3*														
1,4-Dichlorobenzene	3*														
2,4-Dimethylphenol	50							1J							
2-Methylphenol	NL														
4-Methylphenol	NL														
Naphthalene	10														
Di-n-octyl phthalate	50														
Phenol	1														

Notes:

* Applies to sum of compounds
NL - Not listed
[ ] Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-5												
Date		**05/20/01**	**08/21/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/30/06**
Volatiles (µg/L)	**Class GA Level**													
Acetone	50	38J		11J			6.4			4.9J		0.61J		3.0J
Benzene	1		1.5	1.4		0.87	0.92	0.87		0.77				0.67J
2-Butanone	50													
Chlorobenzene	5													
trans-1,2-Dichloroethene	5		0.65J	0.76J		0.42J	0.57J	0.52J				0.34J		
Ethylbenzene	5		0.21J	0.23J										
Methylene Chloride	5				3.4J								2.4	
Tetrachloroethene	5		0.38J	0.27J										
Toluene	5		2.5J	2.2J		0.99J	0.87J	1.2		0.80J		0.80J		
Trichloroethene	5		0.87J	0.66J		0.36J	0.41J	0.40J				0.28J		
Vinyl Chloride	2		1.6J	1.2J		1.1	1.5	1.2		1.1		1.4		1.2
Total Xylenes	5		1.0J	1.0J		0.67J	0.37J	0.40J				1.0J		
Semi-Volatiles (µg/L)														
1,2-Dichlorobenzene	3*													
1,4-Dichlorobenzene	3*													
2,4-Dimethylphenol	50		8J	6J	5J		1J	6J						
2-Methylphenol	NL		1J	1J	1J									
4-Methylphenol	NL		2J	5J	4J			2J						
Naphthalene	10		1J	1J			0.5J	1J						
Di-n-octyl phthalate	50			1J	0.8J									
Phenol	1		0.9J											

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-5					
Date		**05/24/07**	**05/29/08**	**05/26/10**	**05/30/12**	**05/29/14**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**						
Acetone	50		3.5J				
Benzene	1	0.54J	0.69J		0.58J	1.1	1.4
2-Butanone	50						
Chlorobenzene	5						
trans-1,2-Dichloroethene	5						
Ethylbenzene	5						
Methylene Chloride	5						
Tetrachloroethene	5						
Toluene	5						
Trichloroethene	5						0.70J
Vinyl Chloride	2	0.95J	1.4				1.1J
Total Xylenes	5						
Semi-Volatiles (µg/L)							
1,2-Dichlorobenzene	3*						
1,4-Dichlorobenzene	3*						
2,4-Dimethylphenol	50						
2-Methylphenol	NL	0.5J	0.3J				
4-Methylphenol	NL	0.9J	0.4J			0.66J	
Naphthalene	10	2J	0.5J	1.6J	0.85J	1.1J	2.3J
Di-n-octyl phthalate	50						
Phenol	1						

Blank = Non-Detect

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		GW-6S		MW-6												
Date		**12/15/1987**	**08/10/88**	**05/18/01**	**08/21/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/30/06**
Volatiles (µg/L)	**Class GA Level**															
Acetone	50	684	4.9J						4.4J			44		6.7	13	31
Benzene	1	3			0.64J			0.65J	0.59J	0.56J		0.57J				
2-Butanone	50															
Chlorobenzene	5		3.3J		1.5J	1.3J		0.65J		0.54J		0.81J		0.37J		
trans-1,2-Dichloroethene	5	58	4.4J		1.1J			0.37J	0.32J	0.34J		1.4		0.52J		
Ethylbenzene	5	2			0.21J											
Methylene Chloride	5						1.8J								2.1	
Tetrachloroethene	5	43			0.44J							0.67J		0.25J		
Toluene	5	16	3.0J		2.2J	0.29J		1.3	0.91J	1.1		2.1	3.6	0.92J		
Trichloroethene	5	62	5.1J		2.0J		1.2J		1.1	1.5	3.2	14	12	3.7	1.5	1.2
Vinyl Chloride	2	11	1.7J					0.29J	0.24J	0.22J		0.52J				
Total Xylenes	5	7			0.90J	0.44J		0.36J	0.27J							
Semi-Volatiles (µg/L)																
1,2-Dichlorobenzene	3*															
1,4-Dichlorobenzene	3*			1J		0.7J	2J						2J			
2,4-Dimethylphenol	50	5		5J	5J	3J	2J	1J	0.9J	9J			6J			
2-Methylphenol	NL	3		5J	6J	2J	2J	2J	1J	0.9J			5J			
4-Methylphenol	NL	4		15	13	5J	4J	3J	2J	2J			12			1J
Naphthalene	10			67	69		1J		14	13			76		5J	
Di-n-octyl phthalate	50						2J									
Phenol	1	3		14	4J	2J	0.8J						250			2J

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		MW-6						
Date		**05/24/07**	**05/29/08**	**05/26/10**	**05/30/12**	**05/29/14**	**05/26/16**	**05/27/16**
Volatiles (µg/L)	**Class GA Level**							
Acetone	50							
Benzene	1							
2-Butanone	50							
Chlorobenzene	5							
trans-1,2-Dichloroethene	5							
Ethylbenzene	5							
Methylene Chloride	5							
Tetrachloroethene	5			0.55J				
Toluene	5			0.73J				
Trichloroethene	5	0.97J		2.3J	0.66J	1.0		
Vinyl Chloride	2							
Total Xylenes	5							
Semi-Volatiles (µg/L)								
1,2-Dichlorobenzene	3*			0.66J				
1,4-Dichlorobenzene	3*	0.8J	0.6J	4.2J	2.9J	2.9J		1.5J
2,4-Dimethylphenol	50			1.4J	1.4J	1.0J		0.87J
2-Methylphenol	NL	0.5J	0.3J	1.8J	0.71J	1.1J		0.47J
4-Methylphenol	NL	1J		2.5J	1.3J	1.0J		
Naphthalene	10	2J	1J	7.8J	3.9J			2.0J
Di-n-octyl phthalate	50							
Phenol	1	0.6J	0.4J	1.9J		4.4J		

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-1												
Date		**05/18/01**	**05/25/07**	**8/21/2001**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**	**05/31/06**
Volatiles (µg/L)	**Class GA Level**														
Acetone	50	20J			11J			4.8J							
Benzene	1			0.64J	0.55J				0.26J						
2-Butanone	50	1.1J													
Chlorobenzene	5	2.2J	2.8	2.0J	1.7J		0.24J		0.78J		0.91J				
trans-1,2-Dichloroethene	5	5.6		3.7J	4.6J	1.8J	0.48J	0.58J	2.7		2.8	0.85J			0.55J
Ethylbenzene	5			0.52J	0.43J				0.21J						
Methylene Chloride	5					1.6J								1.8	
Tetrachloroethene	5			0.78J	0.54J		0.42J	0.53J	0.30J			0.29J			
Toluene	5	5.2	3.1	5.4	4.2J		0.48J	0.43J	1.9	1.7	2.6	0.59J			
Trichloroethene	5	15	2.9	16	11	4.5J	2.2	2.7	6.1	5.1	8.4	2.2	0.47J	1.2	1.9
Vinyl Chloride	2	1.3J		0.51J	0.72J				0.42J		0.64J				
Total Xylenes	5			2.1J	1.6J				0.49J		0.86J				
Semi-Volatiles (µg/L)															
1,2-Dichlorobenzene	3*		0.9J												
1,4-Dichlorobenzene	3*	1J	3J	3J	2J	1J			1J						
2,4-Dimethylphenol	50	9J	46	16	8J	3J		0.6J	9J		4J				
2-Methylphenol	NL	6J	6	12	5J	2J			2J		3J				
4-Methylphenol	NL	20	170	35	15J	5J		1J	5J	6J	8J				2J
Naphthalene	10	71	0.2J	130		21		7J	18		25	3J			
Di-n-octyl phthalate	50														
Phenol	1	150	11	290	57	15	1J	8J	4J		19				

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		OGC-1					
Date		**05/24/07**	**05/29/08**	**05/26/10**	**05/30/12**	**05/29/14**	**05/27/16**
Volatiles (µg/L)	**Class GA Level**						
Acetone	50						
Benzene	1						
2-Butanone	50						
Chlorobenzene	5						
trans-1,2-Dichloroethene	5						
Ethylbenzene	5						
Methylene Chloride	5						
Tetrachloroethene	5						
Toluene	5						
Trichloroethene	5	0.53J	4.2				
Vinyl Chloride	2						
Total Xylenes	5						
Semi-Volatiles (µg/L)							
1,2-Dichlorobenzene	3*						
1,4-Dichlorobenzene	3*						
2,4-Dimethylphenol	50						
2-Methylphenol	NL						
4-Methylphenol	NL		0.4J		0.46J		
Naphthalene	10		0.5J				
Di-n-octyl phthalate	50						
Phenol	1						
					0.97J		0.43J

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	MH2	MH3	MW-6	OGC-1	OGC-5	MH6	OGC-6	MW-7	MH8	OGC-2
Date										
01/31/11	11.01	10.24	10.53	10.37	9.20	8.72	10.49	10.37	9.80	10.47
02/28/11	9.45	9.33	9.87	9.95	9.56	9.59	10.75	10.11	9.76	10.13
03/30/11	8.72	8.40	10.40	8.65	9.42	8.98	10.56	9.46	9.23	9.51
04/21/11	8.86	8.80	10.80	9.34	9.17	9.80	11.32	10.13	9.40	9.86
05/26/11	8.59	8.50	10.49	9.22	8.95	9.49	11.11	9.80	8.84	9.91
06/22/11	8.91	9.63	10.63	9.07	8.92	9.42	11.21	9.68	9.10	9.00
07/27/11	8.87	9.56	10.94	10.21	8.85	9.32	10.97	10.22	9.08	9.84
08/26/11	8.84	9.51	11.16	10.20	8.87	9.45	11.01	10.34	9.21	9.89
09/27/11	8.61	9.22	10.47	9.74	8.86	9.37	10.60	9.26	9.10	9.51
10/28/11	9.21	9.65	10.60	10.25	9.33	9.77	10.70	9.71	9.33	9.87
11/30/11	9.25	9.93	10.00	9.34	8.24	9.82	10.84	10.46	9.26	9.57
12/29/11	9.24	9.28	10.82	9.80	9.38	9.66	10.91	9.86	9.31	10.02
01/26/12	9.21	8.93	10.84	9.46	9.13	9.36	10.99	10.02	9.06	10.47
02/28/12	9.49	9.33	10.69	9.74	9.51	9.60	11.22	10.49	9.10	10.73
03/29/12	9.75	9.69	10.05	9.97	9.57	9.63	9.93	9.98	9.62	10.13
04/26/12	10.05	11.29	11.22	9.92	9.58	9.59	11.85	10.05	9.14	10.26
05/30/12	10.20	11.54	11.54	10.91	6.33	9.84	11.87	10.24	9.49	9.30
06/27/12	10.20	10.53	10.18	10.23	9.62	9.91	10.55	10.08	9.86	10.19
07/31/12	9.80	11.00	11.34	10.74	9.22	9.42	11.15	11.84	9.56	10.48
08/27/12	9.55	10.69	11.55	10.77	8.56	9.44	10.94	11.89	8.98	10.54
09/24/12	9.50	9.67	10.42	9.89	9.31	9.82	10.31	10.27	9.71	10.29
10/26/12	9.56	9.97	10.14	9.41	9.32	9.90	10.11	10.37	9.77	10.17
11/26/12	9.43	9.59	10.02	9.79	8.87	9.64	10.18	9.63	9.48	9.49
12/26/12	9.79	9.69	10.62	8.78	8.71	9.37	10.05	9.50	9.31	9.42
01/30/13	9.91	8.85	8.45	8.52	8.53	9.07	9.46	8.76	8.76	8.94
02/27/13	9.14	9.20	9.26	9.30	8.46	8.39	9.97	9.09	8.87	8.91
03/27/13	10.65	9.01	9.82	8.54	8.30	8.57	9.73	9.01	8.74	8.90
04/24/13	10.20	8.75	9.32	9.09	8.63	9.06	9.78	9.36	9.74	9.16
05/24/13	9.44	9.29	10.02	8.49	8.39	8.70	10.49	9.00	8.85	8.94
06/27/13	8.49	8.74	9.89	8.39	8.63	9.55	10.75	8.66	8.84	9.16
07/24/13	8.02	8.59	9.75	9.16	8.13	8.73	10.82	9.68	8.43	8.80
08/22/13	8.99	9.07	10.08	8.83	8.32	8.84	10.58	9.25	8.53	9.26
09/30/13	8.45	9.48	9.17	8.46	8.20	8.95	10.52	9.24	8.17	9.00
10/30/13	8.45	10.00	9.68	8.24	8.09	8.83	10.13	8.77	8.05	8.77
11/27/13	8.70	10.06	10.01	7.99	8.04	8.62	10.38	8.89	8.29	8.90
12/31/13	9.10	7.45	10.07	8.63	8.23	7.62	10.14	9.52	8.51	9.17

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	MH2	MH3	MW-6	OGC-1	OGC-5	MH6	OGC-6	MW-7	MH8	OGC-2	MH9
Date											
01/30/14	8.98	8.56	9.97	9.06	8.17	8.52	10.44	9.45	8.89	9.26	
02/26/14	10.35	10.21	10.46	9.12	8.60	9.33	10.34	9.41	8.95	9.24	
03/28/14	8.97	8.54	10.15	9.24	8.43	8.61	10.37	9.24	8.63	9.06	10.33
04/25/14	8.68	8.29	10.19	8.24	8.43	8.68	10.52	8.94	8.57	9.04	10.36
05/29/14	8.81	8.42	10.74	8.76	8.57	9.34	11.23	9.88	9.04	9.81	11.01
06/25/14	8.91	9.25	10.32	8.63	8.62	9.39	10.96	9.52	9.30	9.33	10.99
07/29/14	8.51	8.59	8.75	8.26	7.99	8.35	10.34	9.37	8.18	9.25	10.39
08/26/14	8.27	8.69	8.77	8.64	7.95	8.65	10.35	8.56	8.04	8.94	10.56
09/30/14	8.43	9.64	8.94	8.39	8.26	8.70	10.34	9.22	8.15	9.05	10.66
10/29/14	8.12	9.66	9.80	8.83	8.16	8.87	10.22	9.11	8.29	8.94	10.42
11/25/14	9.11	10.59	9.72	9.19	8.44	8.90	10.84	9.25	8.60	8.80	10.74
12/30/14	10.84	10.75	10.55	9.17	8.83	9.13	10.60	9.69	8.88	9.51	10.98
01/28/15	9.25	7.51	10.18	9.01	8.40	8.65	10.33	9.11	8.63	8.94	5.97
02/24/15	9.28	9.08	10.49	9.63	8.90	9.14	9.93	9.08	NM	9.12	8.14
03/25/15	8.34	8.26	10.59	8.19	8.31	8.70	10.38	9.65	7.63	9.20	9.46
04/23/15	7.87	8.63	8.29	8.46	8.59	8.67	8.11	7.74	7.88	7.69	8.09
05/29/15	7.94	8.01	10.73	8.75	8.10	8.57	10.54	9.24	7.63	9.36	11.11
06/24/15	8.47	8.56	10.48	9.47	8.29	9.32	10.88	9.15	8.51	9.29	10.83
07/28/15	8.49	8.75	9.47	8.42	8.19	8.73	10.92	9.33	8.35	9.27	10.58
08/27/15	8.75	9.37	9.83	8.71	8.42	8.41	10.32	NM	9.30	9.58	10.53
09/25/15	8.40	10.02	9.57	8.86	8.41	9.13	10.83	9.72	8.26	9.38	10.79
10/30/15	8.24	9.60	9.50	9.42	8.65	9.43	11.08	9.49	8.35	9.38	10.81
11/30/15	9.11	10.58	9.18	8.92	8.51	9.16	9.96	9.70	8.68	9.62	11.05
12/30/15	9.17	10.26	10.32	8.63	8.77	9.53	10.34	10.00	9.02	9.57	11.28
01/28/16	9.24	10.55	9.76	9.09	8.59	8.99	10.66	9.68	8.68	9.37	10.95
02/23/16	7.85	9.87	10.36	8.65	8.75	8.67	11.03	9.98	8.63	9.56	9.55
03/31/16	9.05	9.49	10.49	8.74	8.44	8.96	10.88	9.49	8.50	9.39	9.56
04/28/16	7.72	7.71	10.43	8.12	8.44	8.53	10.84	9.39	8.41	9.49	8.97
05/26/16	8.30	8.17	10.55	8.52	8.10	9.02	10.59	8.95	7.93	9.39	9.48

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	OGC-7	MH11	MW-8	OGC-3	MH12	OGC-8	MH14	MW-9	OGC-4	MH15	MH16
Date											
01/31/11	11.75	11.52	11.27	11.08	9.68	12.36	9.80	11.03	11.53	8.47	10.08
02/28/11	11.68	10.82	11.88	11.96	10.00	12.23	11.12	11.30	11.51	7.93	8.05
03/30/11	11.03	10.46	11.21	11.59	9.71	11.13	9.62	11.00	11.50	8.32	8.11
04/27/11	11.69	9.99	11.78	12.17	9.05	12.09	9.59	11.40	11.78	8.39	8.84
05/26/11	11.48	10.08	11.58	11.97	9.55	11.25	9.27	11.26	11.32	7.62	8.26
06/22/11	11.62	10.75	11.83	12.00	9.55	11.43	9.09	11.12	11.29	7.73	8.27
07/27/11	11.58	10.51	11.88	11.92	9.85	11.34	8.91	11.11	11.12	7.71	8.45
08/26/11	11.78	10.56	12.16	12.30	9.56	11.59	9.31	11.39	11.05	7.39	8.12
09/27/11	11.54	10.07	11.83	11.99	9.51	11.30	8.85	11.06	11.00	7.28	7.66
10/28/11	11.35	9.57	11.50	11.72	9.82	11.12	9.78	10.91	11.19	8.48	8.52
11/30/11	11.46	10.49	11.87	12.06	9.60	10.92	9.51	11.20	10.53	7.84	8.19
12/29/11	11.57	9.74	11.94	11.98	9.99	11.50	9.39	11.00	11.62	8.48	8.92
01/26/12	11.61	10.44	11.73	12.43	10.21	11.71	9.51	11.19	11.81	7.99	8.45
02/28/12	11.74	10.55	11.79	12.23	9.90	11.66	9.73	11.44	11.89	8.16	8.94
03/29/12	11.23	10.41	11.38	11.29	10.09	11.22	9.64	10.51	11.17	8.49	9.13
04/26/12	12.20	10.52	12.31	12.87	9.51	12.47	9.72	11.74	12.29	8.08	8.95
05/30/12	12.52	10.88	12.42	12.84	10.17	12.65	10.14	11.95	12.48	8.42	9.68
06/27/12	11.33	11.02	11.03	11.32	10.20	11.23	10.27	10.80	11.32	8.88	9.65
07/31/12	11.73	10.93	12.12	12.07	9.73	11.84	9.78	11.60	11.39	8.12	8.74
08/27/12	12.23	10.51	12.44	12.48	9.63	12.06	9.57	11.98	11.61	7.46	8.07
09/24/12	11.41	10.96	11.40	11.41	9.91	11.37	9.83	11.07	11.21	9.15	9.14
10/26/12	11.13	10.92	11.26	11.85	9.97	11.32	10.04	10.17	11.21	8.32	8.23
11/26/12	11.46	10.82	11.48	11.94	9.92	10.87	9.92	11.50	11.59	8.51	8.63
12/26/12	11.45	10.26	11.60	12.05	9.92	11.43	8.92	11.33	10.34	8.65	8.03
01/30/13	10.95	9.36	10.67	11.42	9.44	10.37	8.38	11.04	11.28	7.60	7.56
02/27/13	10.80	9.53	11.20	11.45	9.58	11.25	8.80	10.95	11.26	8.80	8.27
03/27/13	10.93	9.59	11.14	11.20	9.47	11.12	8.77	10.99	11.19	7.95	8.14
04/24/13	11.01	10.00	11.21	10.89	9.57	10.16	8.94	10.65	10.74	8.06	8.22
05/24/13	11.01	9.19	11.25	11.47	9.37	11.36	8.33	11.01	11.20	8.10	8.08
06/27/13	10.27	10.61	10.48	10.86	8.78	8.69	8.82	11.25	11.25	9.05	9.07
07/24/13	10.96	8.54	11.17	11.30	8.70	10.60	8.10	10.62	10.54	8.71	8.94
08/22/13	11.26	8.63	11.37	11.66	9.01	11.16	8.41	11.23	11.16	7.51	7.56
09/30/13	10.97	8.81	11.10	11.39	8.87	11.00	8.25	10.95	10.98	7.54	7.42
10/30/13	10.71	8.62	10.83	11.08	8.66	10.47	8.25	10.57	10.46	7.18	6.85
11/27/13	10.91	8.97	11.05	11.31	8.88	10.21	8.02	10.65	10.80	6.83	6.34
12/31/13	11.07	9.11	11.27	11.58	7.60	11.15	8.55	11.08	11.32	7.11	6.39

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	OGC-7	MH11	MW-8	OGC-3	MH12	OGC-8	MH14	MW-9	OGC-4	MH15	MH16
Date											
01/30/14	11.06	9.14	11.37	11.53	9.24	11.37	9.15	11.14	11.47	7.56	7.83
02/26/14	10.94	9.22	11.37	11.48	9.39	11.09	9.41	10.93	11.27	8.04	7.84
03/28/14	10.90	9.41	11.16	11.40	9.15	11.11	8.48	11.09	11.18	8.07	8.43
04/25/14	10.89	8.75	10.97	11.43	9.38	11.18	8.18	11.02	10.80	7.54	7.47
05/29/14	11.55	8.88	11.97	12.18	8.54	11.90	8.72	11.73	11.10	8.46	8.65
06/25/14	11.25	7.62	11.52	11.90	9.94	11.68	9.38	11.45	11.14	8.50	8.97
07/29/14	10.83	8.51	11.10	11.43	8.65	11.05	8.71	10.94	10.51	7.09	7.75
08/26/14	10.82	8.16	11.12	11.39	8.63	10.87	8.25	10.99	10.58	6.52	6.41
09/30/14	11.07	8.53	11.35	11.53	8.90	11.04	8.41	11.02	11.16	7.54	7.60
10/29/14	10.85	8.32	11.01	11.25	8.94	10.80	8.18	10.68	10.65	7.66	7.40
11/25/14	11.05	8.92	11.27	11.55	9.22	11.03	8.63	10.87	11.36	7.73	7.46
12/30/14	11.49	9.67	11.83	12.01	9.47	11.51	8.47	11.34	11.71	8.25	8.11
01/28/15	10.85	8.87	11.08	11.36	8.92	11.09	8.27	10.93	11.12	6.55	7.25
02/24/15	10.86	NM	10.85	11.00	8.57	10.88	NM	11.56	11.72	7.63	7.22
03/25/15	9.92	9.53	6.27	5.96	6.15	8.66	NM	8.97	8.96	8.99	8.89
04/23/15	8.46	8.33	8.05	8.73	9.36	8.99	9.26	11.26	11.26	8.38	8.21
05/29/15	11.49	8.35	11.58	11.95	8.77	11.92	9.32	11.54	11.40	8.21	7.51
06/24/15	11.35	7.78	11.73	11.93	9.60	11.82	8.85	11.57	11.22	7.91	8.03
07/28/15	11.09	9.33	11.57	11.69	8.54	11.20	8.37	11.08	10.91	8.05	8.12
08/27/15	11.35	9.75	11.75	11.76	10.18	11.50	9.32	11.39	10.98	7.50	7.79
09/25/15	11.37	8.35	11.55	11.94	9.05	11.44	8.63	11.41	10.93	7.97	7.77
10/30/15	11.48	8.79	11.71	12.03	9.55	11.51	11.34	11.02	11.49	10.46	7.80
11/30/15	11.26	8.82	11.63	11.93	9.52	11.36	11.52	11.10	11.45	11.16	7.98
12/30/15	11.62	9.71	11.85	12.19	9.33	11.68	11.76	11.27	11.92	11.46	8.04
01/28/16	11.36	8.77	11.62	11.86	9.37	11.75	11.42	11.09	11.62	11.01	8.08
02/23/16	11.65	9.57	11.90	12.26	9.46	11.94	11.46	11.27	11.76	10.93	8.51
03/31/16	11.43	8.72	11.69	11.99	9.20	11.77	10.02	10.95	11.40	9.09	7.81
04/28/16	11.52	8.81	11.77	12.08	9.20	11.95	10.16	11.61	11.60	9.74	7.63
05/26/16	11.60	8.72	11.69	12.02	8.90	11.94	10.10	11.53	11.49	9.74	8.41

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	City MH1	City MH2	City MH3
Date			
01/31/11	11.66	10.34	10.45
02/28/11	9.62	8.82	8.57
03/30/11	10.22	10.05	10.03
04/27/11	10.54	9.86	9.60
05/26/11	10.42	10.01	9.79
06/22/11	10.90	9.42	9.69
07/27/11	10.72	10.51	10.13
08/26/11	10.38	9.81	9.27
09/27/11	10.35	8.48	8.46
10/28/11	10.50	9.52	9.40
11/30/11	10.63	9.69	8.71
12/29/11	10.78	10.27	10.02
01/26/12	10.07	10.02	9.73
02/28/12	11.21	10.15	9.48
03/29/12	10.80	9.90	9.86
04/26/12	11.16	10.52	10.52
05/30/12	11.28	10.85	10.52
06/27/12	10.99	10.92	10.83
07/31/12	9.83	8.60	7.98
08/27/12	10.19	10.21	9.81
09/24/12	11.10	9.86	10.01
10/26/12	9.41	9.13	9.10
11/26/12	10.02	9.75	9.47
12/26/12	8.89	9.17	8.08
01/30/13	6.20	6.49	8.05
02/27/13	9.84	9.69	9.34
03/27/13	10.15	8.91	8.64
04/24/13	9.06	9.10	9.04
05/24/13	10.21	8.97	9.02
06/27/13	9.55	9.05	9.34
07/24/13	6.49	6.99	7.03
08/22/13	8.09	7.96	7.92
09/30/13	8.74	7.75	7.57
10/30/13	8.88	7.48	7.30
11/27/13	NM	NM	NM
12/31/13	NM	NM	NM

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	City MH1	City MH2	City MH3
Date			
01/30/14	10.87	8.86	7.57
02/26/14	8.59	7.91	7.70
03/28/14	9.61	8.79	9.06
04/25/14	8.70	8.57	8.76
05/29/14	10.66	9.69	9.53
06/25/14	10.42	10.05	9.84
07/29/14	9.78	9.01	8.80
08/26/14	10.04	9.26	8.83
09/30/14	10.09	9.44	8.96
10/29/14	10.05	9.63	9.29
11/25/14	10.46	8.21	8.41
12/30/14	10.62	8.82	9.02
01/28/15	7.50	6.75	6.28
02/24/15	6.17	6.61	6.22
03/25/15	7.61	7.49	7.73
04/23/15	8.63	8.46	8.30
05/29/15	10.46	9.80	8.98
06/24/15	9.36	8.99	8.82
07/28/15	6.86	6.84	7.30
08/27/15	9.49	8.85	9.08
09/25/15	10.13	9.50	9.24
10/30/15	10.00	8.96	8.98
11/30/15	10.71	9.79	9.29
12/30/15	10.66	9.25	9.22
01/28/16	10.72	9.90	9.43
02/23/16	6.78	6.90	6.96
03/31/16	8.48	8.39	8.25
04/28/16	8.16	7.96	7.69
05/26/16	8.49	7.94	7.10

Note:

NM - Not Measured due to Unsafe Road Conditions or Inaccessible due to Snow Cover.

Table 2.8

Effluent Sampling Summary
Subsequent to February 2007
Gratwick-Riverside Park Site
North Tonawanda, New York

LOCATIONS

Effluent monitoring station at Site discharge point

FREQUENCY

Semi-Annual (Spring and Fall as dictated by the City of North Tonawanda Industrial Wastewater Discharge Permit dated March 1, 2016)

PARAMETERS

Volatiles

Acetone
Benzene
2-Butanone
Chlorobenzene
1,1-Dichloroethane
1,2-Dichloroethane
trans-1,2-Dichloroethene
Ethylbenzene
Methylene Chloride
Styrene
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
Trichloroethene
Vinyl Chloride
Xylenes (Total)

Semi-Volatiles

1,4-Dichlorobenzene
1,2-Dichlorobenzene
2,4-Dimethylphenol
2-Methylphenol
4-Methylphenol
Naphthalene
Di-n-octylphthalate
Phenols (4AAP)

Wet Chemistry

Chloride
Cyanide
NH3
NO3
Phosphorous
Sulfate
Sulfide

Table 2.9

Analytical Results Summary
Site Effluent
Gratwick-Riverside Park Site

Sample ID:													
Sample Date:		**03/07/11**	**09/15/11**	**03/08/12**	**09/13/12**	**03/14/13**	**09/12/13**	**04/16/14**	**10/07/14**	**04/16/15**	**10/8/15**	**04/14/16**	**Surface Water Standard** (1)
Parameter	**Unit**												
Volatiles													
1,1,1-Trichloroethane	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5
1,1-Dichloroethane	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5
1,2-Dichloroethane	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	0.6
2-Butanone	µg/L	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	50
Acetone	µg/L	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	50
Benzene	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	1
Chlorobenzene	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.1	5.0U	5.0U	5.0U	5
Ethylbenzene	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5
Methylene chloride	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5
Styrene	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5
Tetrachloroethene	µg/L	5.0U	5.0U	5.0U	6.3	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	0.7 (2)
Toluene	µg/L	12	11	15	27	16	13	14	13	5.0U	12	5.0U	5
trans-1,2-Dichloroethene	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.4	5.0U	5.1	5.0U	5
Trichloroethene	µg/L	30	20	43	50	45	34	38	26	5.0	23	12	5
Vinyl chloride	µg/L	5.0U	5.0U	5.0U	5.3	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	0.3 (2)
Xylene (total)	µg/L	10U	10U	17	18	18	10U	10U	10U	10U	10U	10U	5
Semi-Volatiles													
1,2-Dichlorobenzene	µg/L	0.15U	0.15U	0.84	0.68	1.2	6.2	0.92	4.8U	4.8U	4.7U	4.7U	3 (7)
1,4-Dichlorobenzene	µg/L	0.090U	1.7	3.6	3.6	7.7	5.7	6.4	9.4	7.0	9.2	4.7U	3 (7)
2,4-Dimethylphenol	µg/L	0.13U	2.5	7.4	5.5	7.3	6.5	10	7.8J	13	5.0	5.9	50 (2)
2-Methylphenol	µg/L	0.22U	0.22U	0.91	0.62	3.4	0.22U	0.44	5.3	6.2	4.9	2.7	NL
4-Methylphenol	µg/L	0.62U	0.62U	3.1	3.0	6.7	1.3	0.62	7.4	59	3.7	8.5	NL
Di-n-octyl phthalate	µg/L	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	50 (2)
Naphthalene	µg/L	0.080U	0.080U	0.57	1.4	0.53	0.080U	0.47	0.82U	0.97	0.81U	0.81U	10
Phenol	µg/L	0.12U	0.12U	0.12U	0.12U	5.5	0.12U	0.12U	22	4.0	3.0	0.33U	1

Table 2.9

Analytical Results Summary
Site Effluent
Gratwick-Riverside Park Site

Sample ID: / Sample Date: / Parameter	Unit	03/07/11	09/15/11	03/08/12	09/13/12	03/14/13	09/12/13	04/16/14	10/07/14	04/16/15	10/8/15	04/14/16	Surface Water Standard	
Metals														
Aluminum	mg/L	0.45	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.67	NL	
Antimony	mg/L	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.003	
Arsenic	mg/L	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.015U	0.050	
Barium	mg/L	0.086	0.063	0.083	0.068	0.085	0.064	0.096	0.067	0.092	0.068	0.096	1.0	
Beryllium	mg/L	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	1.1	(6)
Cadmium	mg/L	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0020U	0.005	
Chromium	mg/L	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.050	
Copper	mg/L	0.023	0.010U	0.010U	0.013	0.050	0.013	0.010U	0.014	0.010U	0.010U	0.010U	0.023	(3)
Iron	mg/L	0.39	0.050U	0.050U	0.050U	0.050U	0.050U	0.40	0.050U	0.17	0.050U	0.18	0.30	
Lead	mg/L	0.0050U	0.0050U	0.0050U	0.0067	0.0050U	0.0050U	0.0050U	0.0050U	0.0050U	0.0050U	0.010U	0.012	
Magnesium	mg/L	3.5	1.6	2.2	0.99	2.9	0.78	5.5	1.1	6.5	1.4	15.2	35	
Manganese	mg/L	0.012	0.030U	0.0030U	0.0030U	0.0030U	0.0030U	0.010	0.0030U	0.018	0.0030U	0.26	0.30	
Mercury	mg/L	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	2.6E-06	(4)
Nickel	mg/L	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.10	
Selenium	mg/L	0.015U	0.015U	0.015U	0.015U	0.015U	0.015U	0.015U	0.015U	0.015U	0.015U	0.025U	0.0046	(4)
Silver	mg/L	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0060U	0.050	
Sodium	mg/L	372	267	380	238	353	206	359	233	361	245	351	NL	
Zinc	mg/L	0.010	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	2.0	(2)

Table 2.9

Analytical Results Summary
Site Effluent
Gratwick-Riverside Park Site

Sample ID:													
Sample Date:		**03/07/11**	**09/15/11**	**03/08/12**	**09/13/12**	**03/14/13**	**09/12/13**	**04/16/14**	**10/07/14**	**04/16/15**	**10/8/15**	**04/14/16**	**Surface Water Standard** (1)
Parameter	**Unit**												
General Chemistry													
pH	S.U.	9.95	9.75	10.51	10.82	10.32	10.38	10.22	9.90	9.20	10.21	8.86	NL
Hardness	mg/L	235	244	268	176	250	192	252	180	340	192	332	NL
Total Dissolved Solids (TDS)	mg/L	1450	1030	1280	911	1170	823	1360	872	1430	977	1450	NL
Total Suspended Solids (TSS	mg/L	6	3	4	4	7	12	8	2	16	12	14	NL
Chloride	mg/L	655	425	551	326	398	333	633	386	662	409	648	250
BOD	mg/L	16	22	21	45	16	18	10.3	20	13.3	13.7	13.3	NL
COD	mg/L	37	28	33	70	37	21	17	75	5.0U	50U	25U	NL
Oil and Grease	mg/L	0.10U	0.10U	0.20	0.10U	0.2	0.10U	0.10U	0.10U	0.10U	0.10U	0.001	NL
Organic Carbon	mg/L	8.1	7.2	6.9	8.2	8.0	7.6	6.6	13.4	5.0U	5.5	6.1	NL
Alkalinity, Total (As CaCO3)	mg/L	57	30.5	32.0	44.6	48.9	47.2	29	47.3	40.0	43.5	75.3	NL
Bicarbonate (as CaCO3)	mg/L	11.1	5.0	8.0	5.0U	5.0U	5.0U	21	5.0U	40.0	5.0U	38.2	NL
Ammonia	mg/L	1.12	1.12	1.68	2.52	2.52	0.84	1.1	1.12	0.84	1.40	1.12	2.0
Nitrate (as N)	mg/L	0.050U	0.050U	0.050U	0.050U	0.050U	0.050U	0.050U	0.050U	0.050U	0.050U	0.15	10
TKN	mg/L	2.24	1.68	2.24	4.48	3.08	1.12	1.68	1.68	1.12	2.24	1.68	NL
Sulfate	mg/L	135	150	191	159	118	166	183	136	216	127	237	250
Sulfide	mg/L	2.0	4.8	4.0	3.0	4.4	3.6	3.2	3.6	2.0	3.6	1.6	0.002
Phenol	mg/L	0.008U	0.009U	0.009	0.008U	0.012U	0.011U	0.009U	0.011U	0.085U	0.11U	0.10U	0.001
Phosphorous	mg/L	0.13	0.17	0.09	0.15	0.12	0.16	0.16	0.17	0.10	0.10U	0.10U	0.020 (2)
Cyanide	mg/L	0.005	0.005U	0.005	0.005U	0.005U	0.005U	0.005U	0.005U	0.005U	0.005	0.005U	0.0052

Notes:

U - Non-detect at associated value
- - Not Analyzed
J - Estimated
NL - Not Listed
SL - Sample Lost
(1) - Lowest Standard/Guidance Value shown
(2) - Guidance Value
(3) - Calculated using a hardness of 300 ppm
(4) - Applies to dissolved form
(5) - TOC analyzer malfunction prevented analysis of this compound
(6) - Hardness >75 mg/L
(7) - Sum of isomers <5 µg/L

Table 2.10

Groundwater Volumes Discharged
to North Tonawanda POTW
Gratwick-Riverside Park Site
North Tonawanda, New York

Month	Volumes (gallons)	
	Monthly	Total
May 2001	2,900,000	2,900,000
June 2001	2,353,800	5,253,800
July 2001	1,488,500	6,742,300
August 2001	712,800	7,455,100
September 2001	473,100	7,928,200
October 2001	1,213,100	9,141,300
November 2001	1,281,100	10,422,400
December 2001	231,700 (1)	10,654,100
January 2002	1,383,200 (2)	12,037,300
February 2002	1,186,000	13,223,300
March 2002	233,600	13,456,900
April 2002	736,000	14,192,900
May 2002	348,200	14,541,100
June 2002	1,137,200	15,678,300
July 2002	869,300	16,547,600
August 2002	1,060,800	17,608,400
September 2002	707,000	18,315,400
October 2002	679,800	18,995,100
November 2002	489,500	19,484,700
December 2002	743,500	20,228,200
January 2003	1,150,700	21,378,900
February 2003	483,300	21,862,200
March 2003	402,300	22,264,500
April 2003	531,900	22,796,400
May 2003	655,600	23,452,000
June 2003	682,100	24,134,000
July 2003	942,000	25,076,100
August 2003	627,500	25,703,600
September 2003	349,600	26,053,200
October 2003	966,500	27,019,700
November 2003	442,200	27,461,900
December 2003	463,900	27,925,800
January 2004	443,900	28,369,700
February 2004	253,700	28,623,400
March 2004	403,700	29,027,100
April 2004	433,600	29,460,700
May 2004	377,400	29,838,100
June 2004	395,000	30,233,100
July 2004	384,300	30,617,400
August 2004	479,700	31,097,100
September 2004	413,900	31,511,000
October 2004	319,400	31,902,400
November 2004	249,200	32,151,600
December 2004	209,900	32,361,500

Table 2.10

Groundwater Volumes Discharged
to North Tonawanda POTW
Gratwick-Riverside Park Site
North Tonawanda, New York

Month	Volumes (gallons) Monthly	Total
January 2005	310,100	32,671,600
February 2005	301,100	32,972,700
March 2005	250,200	33,222,900
April 2005	378,400	33,601,300
May 2005	458,800	34,060,100
June 2005	455,900	34,516,000
July 2005	270,200	34,786,200
August 2005	285,100	35,071,300
September 2005	395,600	35,466,900
October 2005	333,200	35,800,100
November 2005	360,200	36,160,300
December 2005	395,300	36,555,600
January 2006	297,500	36,853,100
February 2006	508,300	37,361,400
March 2006	244,700	37,606,100
April 2006	224,400	37,830,500
May 2006	153,300	37,983,800
June 2006	262,300	38,246,100
July 2006	212,900	38,459,000
August 2006	357,500	38,816,500
September 2006	777,000	39,593,500
October 2006	254,700	39,848,200
November 2006	778,700	40,626,900
December 2006	496,600	41,123,500
January 2007	410,500	41,534,000
February 2007	494,600	42,028,600
March, April & May 2007	1,489,200[3]	43,517,800
June 2007	334,300	43,852,100
July 2007	258,600	44,110,700
August 2007	239,000	44,349,700
September 2007	59,500[4]	44,409,200
October 2007 through January 2008	50,600[4]	44,459,800
February 2008	23,800[4]	44,483,600
March 2008	1,238,300	45,721,900
April 2008	2,126,700	47,848,600
May 2008	1,771,100	49,619,700
June 2008	618,000	50,237,700
July 2008	1,559,200	51,796,900
August 2008	1,365,900	53,162,800
September 2008	1,998,000	55,160,800
October 2008	2,511,100	57,671,900
November 2008	1,151,600	58,823,500
December 2008	572,700	59,396,200

Table 2.10

Groundwater Volumes Discharged
to North Tonawanda POTW
Gratwick-Riverside Park Site
North Tonawanda, New York

Month	Volumes (gallons)	
	Monthly	Total
January 2009	1,021,700	60,417,900
February 2009	2,661,400	63,079,300
March 2009	4,239,300	67,318,600
April 2009	1,189,900	68,508,500
May 2009	1,362,500	69,871,000
June 2009	1,035,200	70,906,200
July 2009	1,010,100	71,916,300
August 2009	1,058,000	72,974,400
September 2009	947,000	73,921,400
October 2009	690,800	74,612,200
November 2009	697,500	75,309,700
December 2009	1,100,900	76,410,600
January 2010	767,100	77,177,700
February 2010	398,600	77,576,300
March 2010	1,094,500	78,670,800
April 2010	761,000	79,431,800
May 2010	354,700	79,786,500
June 2010	170,300	79,956,800
July 2010	323,600	80,280,400
August 2010	1,292,400	81,572,800
September 2010	672,800	82,245,600
October 2010	972,800	83,218,400
November 2010	433,500	83,651,900
December 2010	483,900	84,135,800
January 2011	420,300	84,556,100
February 2011	257,000	84,813,100
March 2011	1,136,700	85,949,800
April 2011	875,300	86,825,100
May 2011	727,500	87,552,600
June 2011	489,500	88,042,100
July 2011	459,300	88,501,400
August 2011	296,900	88,798,300
September 2011	390,300	89,188,600
October 2011	414,800	89,603,400
November 2011	393,100	89,996,500
December 2011	583,300	90,579,800
January 2012	651,800	91,231,600
February 2012	276,900	91,508,500
March 2012	586,600	92,095,100
April 2012	400,600	92,495,700
May 2012	458,800	92,954,500
June 2012	369,300	93,323,800
July 2012	15,600[5]	93,339,400
August 2012	399,400	93,738,800
September 2012	513,500	94,252,300

Table 2.10

Groundwater Volumes Discharged
to North Tonawanda POTW
Gratwick-Riverside Park Site
North Tonawanda, New York

Month	Volumes (gallons)	
	Monthly	Total
October 2012	344,500	94,596,800
November 2012	336,600	94,933,400
December 2012	286,800	95,220,200
January 2013	329,800	95,550,000
February 2013	217,400	95,767,400
March 2013	260,200	96,027,600
April 2013	249,900	96,277,500
May 2013	200,500	96,478,000
June 2013	211,300	96,689,300
July 2013	245,600	96,934,900
August 2013	165,100	97,100,000
September 2013	216,500	97,316,500
October 2013	118,600	97,435,100
November 2013	203,800	97,638,900
December 2013	117,400	97,756,300
January 2014	111,700	97,868,000
February 2014 [6]	66,700	97,934,700
March 2014 [6]	5,800	97,940,500
April 2014 [6]	5,000	97,945,500
May 2014 [6]	8,600	97,954,100
June 2014 [6]	8,500	97,962,600
July 2014 [6]	15,400	97,978,000
August 2014	1,385,800	99,363,800
September 2014	869,700	100,233,500
October 2014	1,426,200	101,659,700
November 2014	638,400	102,298,100
December 2014	753,200	103,051,300
January 2015 [7]	126,600	103,177,900
February 2015 [7]	43,200	103,221,100
March 2015	2,115,700	105,336,800
April 2015	2,113,500	107,450,300
May 2015	1,939,200	109,389,500
June 2015	1,808,100	111,197,600
July 2015	1,625,600	112,823,200
August 2015	1,557,900	114,381,100
September 2015	586,800	114,967,900
October 2015	2,094,300	117,062,200
November 2015	1,153,700	118,159,900
December 2015	884,000	119,099,900
January 2016	1,293,500	120,393,400
February 2016	834,800	121,228,200
March 2016	1,589,500	122,817,700
April 2016	1,144,200	123,961,900
May 2016	601,200	124,563,100

Table 2.10

Groundwater Volumes Discharged
to North Tonawanda POTW
Gratwick-Riverside Park Site
North Tonawanda, New York

Month	Volumes (gallons) Monthly	Total

Notes:

(1) To December 7, 2001.

(2) From December 8, 2001.

(3) Plotted as 496,400 gallons on Figure 2.18 for each of March, April, and May 2007.

(4) Flow Meter malfunctioned due to tar-like material buildup inside meter. Meter was cleaned on March 14, 2008. Volumes not plotted on Figure 2.18 as volumes are not representative of actual volume removed.

(5) Flow low due to pump failure. Two pumps replaced.

(6) Flow meter malfunctioning. Cleaned and repaired on August 8, 2014. Volumes not plotted on Figure 2.18.

(7) PS#1, PS#2 and PS#3 not operational as of January 28, 2015.
PS#1 operational on March 2, 2015.
PS#2 operational on March 17, 2015.

Table 2.11

Summary of Operation and Maintenance Activities
June 2015 to May 2016
Gratwick-Riverside Park, North Tonawanda, NY

Date	Description
October 2015	Forcemain from P.S.#3 to the "T" junction was exposed by excavation. The T junction was replaced and the forcemain from the pump to the T junction was cleaned. Pump was operational on October 14.
October 26, 2015	High amp draw on P.S.#3, cleaned with acid bath
November 10, 2015	High amp draw on P.S.#3, cleaned with acid bath
November 23, 2015	High amp draw on P.S.#3, cleaned with acid bath
January 22, 2016	High amp draw on P.S.#3, cleaned with acid bath
February 23, 2016	High amp draw on P.S.#2, cleaned with acid bath
March 2, 2016	High amp draw on P.S.#2, cleaned with acid bath
March 7, 2016	P.S. # 2 & #3 cleaned with acid bath
March 14, 2016	P.S. #2 cleaned with acid bath
March 21, 2016	High amp draw on P.S.#2, cleaned with acid bath
March 28, 2016	High amp draw on P.S.#2, cleaned with acid bath
April 4, 2016	High amp draw on P.S.#2, cleaned with acid bath
April 12, 2016	High amp draw on P.S.#2, cleaned with acid bath
April 19, 2016	High amp draw on P.S.#2, cleaned with acid bath
May 3, 2016	P.S. #2 high amps and trips
May 24, 2016	P.S. #3 stops operating.

Appendices

Appendix A
City Of North Tonawanda Industrial Wastewater Discharge Permit

CITY OF NORTH TONAWANDA
INDUSTRIAL WASTEWATER DISCHARGE PERMIT

Permit Number: 2628011

In accordance with the provisions of the Clean Water Act as amended, all terms and conditions set forth in this permit, the City of North Tonawanda Local Sewer Use Ordinance and any applicable Federal, State or local laws or regulations, authorization is hereby granted to: City of North Tonawanda
830 River Road
North Tonawanda, New York 14120

Site: **Gratwick Riverside Park**
River Road
North Tonawanda, New York 14120

Classified by S.I.C. Number(s): N/A

for the discharge of remedial action ground water into the City of North Tonawanda Sewerage System.

This permit is granted in accordance with an application filed on 05/01/96 in the offices of the Wastewater Treatment Plant Superintendent located at 830 River Road, and in conformity with specifications and other required data submitted in support of the above named application, all of which are filed with and considered part of this permit. This permit is also granted in accordance with discharge limitations and requirements, monitoring and reporting requirements, and all other conditions set forth in Parts I and II hereof.

Effective this 1st day of March, 2016

To expire the 28th day of February, 2019

William M. Davignon

William M. Davignon, Water Works Superintendent

Signed this 11th day of March, 2016

PART I. SPECIFIC CONDITIONS

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning the effective date of this permit and lasting until the expiration date, discharge from the permitted facility outfall(s) shall be limited and monitored by the permittee as specified below (Refer to attached map for sampling and monitoring sites).

Sample Point	Parameter	Discharge Limitations mg/l except pH Daily Max.	Sampling Period	Sampling Type
001	Total Flow		1 Sampling Day Monthly	continuous
	pH	Monitor Only	1 Sampling Day Monthly	grab
	Vinyl Chloride	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Acetone	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Methylene Chloride	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	1,1,1-Trichloroethane	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	1,1-Dichloroethane	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	1,2-Dichloroethane (total)	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	2-Butanone	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Trichlorethene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Benzene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.

Sample Point	Parameter	Discharge Limitations mg/l except pH Daily Max. Monthly Avg.	Sampling Period	Sampling Type
001	Tetrachloroethene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Toluene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Chlorobenzene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Ethylbenzene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Styrene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Xylenes (total)	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Phenol (4AAP)	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	trans-1,2-Dichloroethene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	1,4-Dichlorobenzene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	1,2-Dichlorobenzene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	2-Methylephenol	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	4-Methylephenol	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	2,4-Dimethylphenol	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Di-n-octylphthalate	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Napthalene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Cyanide	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	NH3	Monitor Only	1 Sampling Day semi-annual	grab
	Chloride	Monitor Only	1 Sampling Day semi-annual	24 hr comp.

Sample Point	Parameter	Discharge Limitations mg/l except pH Daily Max. Monthly Avg.	Sampling Period	Sampling Type
001	NO3	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Phosphorous	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Sulfate	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Sulfide	Monitor Only	1 Sampling Day semi-annual	24 hr comp.

*/- See Special requirements page for sub-note requirements.

PART I. SPECIFIC CONDITIONS
DISCHARGE MONITORING AND REPORTING REQUIREMENTS

During the period beginning the effective date of this permit and lasting until the expiration date, discharge monitoring results shall be summarized and reported by the permittee no later than the days specified below.

Sample Point	Parameter	Initial Monitoring Report	Subsequent Monitoring Reports
001	Vinyl Chloride	January 31, 2007	Semi-annual for all
	Acetone	January 31, 2007	
	Carbon Disulfide	January 31, 2007	
	1,1-Dichloroethene	January 31, 2007	
	1,1-Dichloroethane	January 31, 2007	
	1,2-Dichloroethane (total)	January 31, 2007	
	2-Butanone	January 31, 2007	
	Trichlorethene	January 31, 2007	
	Benzene	January 31, 2007	
	Tetrachloroethene	January 31, 2007	
	Toluene	January 31, 2007	
	Chlorobenzene	January 31, 2007	
	Ethylbenzene	January 31, 2007	
	Styrene	January 31, 2007	
	Xylenes (total)	January 31, 2007	

Sample Point	Parameter	Initial Monitoring Report	Subsequent Monitoring Reports
001	Phenol	January 31, 2007	Semi-annual for all
	1,3-Dichlorobenzene	January 31, 2007	
	1,4-Dichlorobenzene	January 31, 2007	
	1,2-Dichlorobenzene	January 31, 2007	
	2-Methylephenol	January 31, 2007	
	4-Methylephenol	January 31, 2007	
	2,4-Dimethylphenol	January 31, 2007	
	1,2,4-Trichlorobenzene	January 31, 2007	
	Napthalene	January 31, 2007	
	2-Methylnaphthalene	January 31, 2007	
	n-Nitrosodidiphenylamine	January 31, 2007	
	Di-n-butylphthalate	January 31, 2007	

PART I. SPECIFIC CONDITIONS

C. SPECIAL REQUIREMENTS

1) This permit is written for a duration of three (3) years. Upon renewal of this permit, all parameters will be re-evaluated to develop a parameter list based on chemical concentrations present in the extracted groundwater.

2) Fequency of monitoring is to be re-evaluated after each year. Sampling to be done semi-annual (Spring – Fall).

3) All monitoring reports (initial and subsequent), are to be received by the Superintendent, no later than thirty (30) days after receipt of validated data.

4) It is required that the Permittee have a Site Operations Manual available at all times. All emergency phone numbers must be listed in an appropriate place for easy access by operations personnel. All pumping operations shall be accomplished under no-bypass conditions. The Permittee is required to cease all pumping operations upon verbal request of the North Tonawanda Water/Wastewater Superintendent or his designee. Pumping operations shall not recommence until approval by the North Tonawanda Water/Wastewater Superintendent or his designee.

5) Analysts are required to use GC/MS method detection limits for most organics (if GC/MS is appropriate); GC/ECD for PCB's/Pesticides and GF method detection limits for metals (where GF is appropriate), as contained in attachment 5 of the NYSDEC TOGs 1.3.8 – New Discharges to Publicly Owned Treatment Works – dated 10/26/94.

Appendix B
Monthly Inspection Logs (June 2015 to May 2016)

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 6/24/15
Crew: D. Tyran
Water Level #: NF06117
pH Meter#: YSI NF07602

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	1040	9.25	8.03	574.82	565.57				
MH-15	1044	11.30	7.91	575.84	564.54	564.51	561.51	559.17	0.01
OGC-4	1056	9.21	11.22	574.66	565.45				
MW-9	1100	10.69	11.57	576.23	565.54				
MH-14	1104	8.68	8.85	574.3	565.62				
OGC-8	1111	8.54	11.82	574.01	565.47				
MH-12	1117	11.12	9.60	572.37	561.25				0.01
River South	1123	3.02	x	568.46	565.44				
MW-8	1130	10.50	11.73	574.37	563.87				
OGC-3	1128	7.88	11.93	573.35	565.47				
MH-11	1141	8.78	7.78	572.11	563.33				
OGC-7	1157	7.21	11.35	572.49	565.28				
River Middle	1211	1.41	x	566.48	565.07				
OGC-2	1208	8.85	9.29	574.08	565.23				
MW-7	1206	12.47	9.15	575.57	563.10				
MH-8	1203	9.41	8.51	572.37	562.96				
OGC-6	1223	11.58	10.88	576.65	565.07				
MH-6	1230	13.83	9.32	572.03	558.20				
River North	1233	1.65	x	566.80	565.15				
OGC-5	1238	8.62	8.29	573.82	565.20				
MW-6	1245	10.78	10.48	575.40	564.62				
OGC-1	1249	9.86	9.47	575.01	565.15				
MH-3	1255	12.82	8.56	573.31	560.49	562.48	560.81	558.14	
MH-2	1302	8.48	8.47	573.28	564.80				
Off Site									
MH-1	1033	x	9.36	x					
MH-4	1034	x	8.99	x					
MH-6	1036	x	8.82	x					
MH-9	1217	12.17	10.83	572.55	560.38				

Dave J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 06/24/15 (MM DD YY)

INSPECTOR(S): D Tyran

	Item	Inspect For	Action Required	Comments
1.	**Perimeter Collection System/Off-Site Forcemain**			
X	Manholes	- cover on securely	None	
X		- condition of cover		
X		- condition of inside of manhole		
X		- flow conditions		
X	Wet Wells	- cover on securely	w/l in MH 15 (pump chamber 3) high. Chamber was	
X		- condition of cover	dye tested 3 weeks ago. No dye was found in the	
X		- condition of inside of wet well	river or other MH's	
2.	**Landfill Cap**			
X	Vegetated Soil Cover	- erosion	None	
X		- bare areas		
X		- washouts		
X		- leachate seeps		
X		- length of vegetation		
X		- dead/dying vegetation		

FORM 17

CRA 7987 (24)

Dave J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 06/24/15 (MM DD YY)

INSPECTOR(S): D Tyran

	Item	*Inspect For*	*Action Required*	*Comments*
	2. Landfill Cap (continued)			
X	Access Roads	- bare areas, dead/dying veg.	None	
X		- erosion	↓	
X		- potholes or puddles		
X		- obstruction		
	3. Wetlands (Area "F")	- dead/dying vegetation	None	
		- change in water budget	↓	
		- general condition of wetlands		
	4. Other Site Systems			
	Perimeter Fence	- integrity of fence	N/A	
		- integrity of gates	↓	
		- integrity of locks		
		- placement and condition of signs		

FORM 17

CRA 7987 (24)

Dave J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 06/24/15 (MM DD YY)

INSPECTOR(S): D. Tyran

	Item	*Inspect For*	*Action Required*	*Comments*
4.	**Other Site Systems (continued)**			
X	Drainage Ditches/ Swale Outlets	- sediment build-up	None	
X		- erosion	↓	
X		- condition of erosion protection		
X		- flow obstructions	Large tree trunk blocking River North Outfall	
X		- dead/dying vegetation	None	
X		- cable concrete/gabion mats and riprap		
X	Culverts	- sediment build-up		
X		- erosion		
X		- condition of erosion protection		
X		- flow obstructions		
X	Gas Vents	- intact / damage		
X	Wells	- locks secure		
X	Shoreline Stabilization	- condition of gabion mats and riprap	Gabion Mats exposed @ various points along Shoreline	

FORM 17

CRA 7987 (24)

David J Tyran

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 7/28/15
Crew: SG/DO
Water Level #: NFOb118
pH Meter#: YSI # NFO7b02

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	0925	9.39	8.12	574.82					
MH-15	0928	11.41	8.05	575.84		564.51	561.51	559.17	0.0
OGC-4	0938	9.02	10.91	574.66					
MW-9	0934	10.85	11.08	576.23					
MH-14	0944	8.81	8.37	574.3					
OGC-8	0952	8.38	11.20	574.01					
MH-12	1000	11.21	8.54	572.37					0.0
River South	1011	2.96	X	568.46					
MW-8	1009	10.53	11.57	574.37					
OGC-3	1006	7.76	11.69	573.35					
MH-11	1017	8.84	8.56	572.11					0.15
OGC-7	1025	6.96	11.09	572.49					
River Middle	1047	1.32	X	566.48					
OGC-2	1040	8.67	9.27	574.08					
MW-7	1043	12.81	9.33	575.57					
MH-8	1045	9.77	8.35	572.37					
OGC-6	1051	11.40	10.92	576.65					
MH-6	1057	14.19	8.73	572.03					
River North	1101	1.53	X	566.80					
OGC-5	1111	8.42	8.19	573.82					
MW-6	1117	10.87	9.47	575.40					
OGC-1	1114	9.70	8.42	575.01					
MH-3	1120	14.30	8.75	573.31		562.48	560.81	558.14	0.02
MH-2	1127	8.49	8.49	573.28					
Off Site									
MH-1	0847	X	6.86	X					
MH-4	0851	X	6.84	X					
MH-6	0854	X	7.30	X					
MH-9	1033	12.00	10.58	572.55					0.0

Shaun Haidner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 10/7/28/15T (MM DD YY)

INSPECTOR(S): S GARDNER, D. OSCAR

Item	Inspect For	Action Required	Comments
1. **Perimeter Collection System/Off-Site Forcemain**			
Manholes	- cover on securely	NONE	
	- condition of cover		
	- condition of inside of manhole		
	- flow conditions		
Wet Wells	- cover on securely	W/L IN MH15 (PUMP CHAMBER 3) IS HIGH, PUMP IS SITING ON GRATING OUT OF WATER	
	- condition of cover		
	- condition of inside of wet well		
2. **Landfill Cap**			
Vegetated Soil Cover	- erosion	NONE	
	- bare areas		
	- washouts		
	- leachate seeps		
	- length of vegetation		
	- dead/dying vegetation		

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 07/28/15 (MM DD YY)

INSPECTOR(S): S GARDNER, D OSCAR

Item	*Inspect For*	*Action Required*	*Comments*
2. **Landfill Cap (continued)**			
Access Roads	- bare areas, dead/dying veg.	NONE	
	- erosion		
	- potholes or puddles		
	- obstruction		
3. **Wetlands (Area "F")**	- dead/dying vegetation		
	- change in water budget		
	- general condition of wetlands		
4. **Other Site Systems**			
Perimeter Fence	- integrity of fence	NA	
	- integrity of gates		
	- integrity of locks		
	- placement and condition of signs		

FORM 17

CRA 7987 (24)

Shayne Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 01/28/15 (MM DD YY)

INSPECTOR(S): S GARDNER D. OSCAR

Item	Inspect For	Action Required	Comments
4. Other Site Systems (continued)			
Drainage Ditches/ Swale Outlets	- sediment build-up	NONE	
	- erosion		
	- condition of erosion protection		
	- flow obstructions	VERY LARGE TREE INFRONT OF RIVER NORTH OUTFALL	
	- dead/dying vegetation		
	- cable concrete/gabion mats and riprap	NONE	
Culverts	- sediment build-up		
	- erosion		
	- condition of erosion protection		
	- flow obstructions		
Gas Vents	- intact / damage		
Wells	- locks secure		
Shoreline Stabilization	- condition of gabion mats and riprap	GABION MATS EXPOSED ALONG VARIOUS POINTS ALONG THE SHORE LINE	

FORM 17

Shawn Gardner

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 8/27/15
Crew: DJT
Water Level #: NF06117
pH Meter#: NF07184

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	0927	9.65	7.79	574.82	565.17				
MH-15	0930	11.73	7.50	575.84	564.11	564.51	561.51	559.17	0.01
OGC-4	0939	9.16	10.98	574.66	565.50				
MW-9	0942	11.09	11.39	576.23	565.14				
MH-14	0949	9.07	9.32	574.3	565.23				
OGC-8	0954	8.42	11.50	574.01	565.59				
MH-12	0958	11.41	10.18	572.37	560.96				0.00
River South	1002	2.99	X	568.46	565.47				
MW-8	1009	10.77	11.75	574.37	563.60				
OGC-3	1006	7.82	11.76	573.35	565.53				
MH-11	1016	9.02	9.75	572.11	563.09				0.35
OGC-7	1022	7.04	11.35	572.49	565.45				
River Middle	1036	1.42	X	566.48	565.06				
OGC-2	1035	8.72	9.58	574.08	565.36				
MW-7	1033	13.16	NM	575.57	562.41				
MH-8	1030	9.91	9.30	572.37	562.46				
OGC-6	1045	11.51	10.32	576.65	565.14				
MH-6	1051	14.32	8.41	572.03	557.71				
River North	1055	1.67	X	566.80	565.13				
OGC-5	1059	8.52	8.42	573.82	565.30				
MW-6	1108	11.11	9.83	575.40	564.29				
OGC-1	1106	9.78	8.71	575.01	565.23				
MH-3	1114	14.43	9.37	573.31	558.88	562.48	560.81	558.14	0.05
MH-2	1122	8.66	8.75	573.28	564.62				
Off Site									
MH-1	0920	X	9.49	X					
MH-4	0921	X	8.85	X					
MH-6	0922	X	9.08	X					
MH-9	1128	12.73	10.53	572.55	559.82				0.01

Dave J Tyra

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 08/27/15 (MM DD YY)

INSPECTOR(S): D. Tyran

	Item	Inspect For	Action Required	Comments
1.	**Perimeter Collection System/Off-Site Forcemain**			
X	Manholes	- cover on securely	None	
X		- condition of cover		
X		- condition of inside of manhole		
X		- flow conditions		
X	Wet Wells	- cover on securely	W/L in MH 15 (pump chamber 3) is still high	
X		- condition of cover		
X		- condition of inside of wet well		
2.	**Landfill Cap**			
X	Vegetated Soil Cover	- erosion	None	
X		- bare areas		
X		- washouts		
X		- leachate seeps		
X		- length of vegetation		
X		- dead/dying vegetation		

FORM 17

CRA 7987 (24)

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 08/27/15 (MM DD YY)

INSPECTOR(S): D. Tyran

Item	Inspect For	Action Required	Comments
2. Landfill Cap (continued)			
[X] Access Roads	- bare areas, dead/dying veg.	None	
[X]	- erosion		
[X]	- potholes or puddles		
[X]	- obstruction		
3. Wetlands (Area "F")	- dead/dying vegetation	None	
	- change in water budget	River level is high	
	- general condition of wetlands	None	
4. Other Site Systems			
[ ] Perimeter Fence	- integrity of fence	NA	
[ ]	- integrity of gates		
[ ]	- integrity of locks		
[ ]	- placement and condition of signs		

FORM 17

CRA 7987 (24)

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 08/27/15 (MM DD YY)

INSPECTOR(S): D Tyran

	Item	Inspect For	Action Required	Comments
4.	Other Site Systems (continued)			
✓	Drainage Ditches/ Swale Outlets	- sediment build-up	None	
X		- erosion		
X		- condition of erosion protection		
X		- flow obstructions	Large tree trunk blocking River outfall North	
X		- dead/dying vegetation	none	
X		- cable concrete/gabion mats and riprap		
✓	Culverts	- sediment build-up		
X		- erosion		
X		- condition of erosion protection		
X		- flow obstructions		
✓	Gas Vents	- intact / damage		
X	Wells	- locks secure	MW-7 is bent over bailer will not fit down crimped Riser	
X	Shoreline Stabilization	- condition of gabion mats and riprap	Gabion mats exposed @ various locations along shoreline	

FORM 17

CRA 7987 (24)

Dave J Tyran

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 9/25/15
Crew: SG/DJT
Water Level #: NFO6117
pH Meter#: NFO7184

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	1122	9.61	7.77	574.82					
MH-15	1128	11.70	7.97	575.84		564.51	561.51	559.17	0.0
OGC-4	1137	9.36	10.93	574.66					
MW-9	1141	11.07	11.41	576.23					
MH-14	1147	9.00	8.63	574.3					
OGC-8	1155	8.62	11.44	574.01					
MH-12	1202	11.46	9.05	572.37					0.0
River South	1205	3.15	x	568.46					
MW-8	1212	10.79	11.55	574.37					
OGC-3	1216	8.00	11.94	573.35					
MH-11	1223	8.91	8.35	572.11					0.0
OGC-7	1237	7.26	11.37	572.49					
River Middle	1257	1.57	x	566.48					
OGC-2	1256	9.01	9.38	574.08					
MW-7	1254	13.02	9.72	575.57					
MH-8	1249	9.84	8.26	572.37					
OGC-6	1303	11.73	10.83	576.65					
MH-6	1311	14.22	9.13	572.03					
River North	1314	1.79	x	566.80					
OGC-5	1320	8.76	8.41	573.82					
MW-6	1324	10.93	9.57	575.40					
OGC-1	1327	10.02	8.86	575.01					
MH-3	1331	14.24	10.02	573.31		562.48	560.81	558.14	0.03
MH-2	1338	8.58	8.40	573.28					
Off Site									
MH-1	1100	x	10.13	x					
MH-4	1103	x	9.50	x					
MH-6	1105	x	9.24	x					
MH-9	1242	12.80	10.79	572.55					0.01

Shawn Haldeman

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 09/25/15 (MM DD YY)

INSPECTOR(S): DTYRAN S GARDNER

Item	Inspect For	Action Required	Comments
1. **Perimeter Collection System/Off-Site Forcemain**			
Manholes	- cover on securely	NONE	
	- condition of cover		
	- condition of inside of manhole		
	- flow conditions		
Wet Wells	- cover on securely	WATER LEVEL IN MH IS (CHAMBER 3) IS STILL HIGH	
	- condition of cover		
	- condition of inside of wet well		
2. **Landfill Cap**			
Vegetated Soil Cover	- erosion	NONE	
	- bare areas		
	- washouts		
	- leachate seeps		
	- length of vegetation		
	- dead/dying vegetation		

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 09/25/15 (MM DD YY)

INSPECTOR(S): D TYRAN S GARDNER

Item	*Inspect For*	*Action Required*	*Comments*
2. **Landfill Cap (continued)**			
Access Roads	- bare areas, dead/dying veg.	NONE	
	- erosion		
	- potholes or puddles		
	- obstruction		
3. **Wetlands (Area "F")**	- dead/dying vegetation	NONE	
	- change in water budget		
	- general condition of wetlands		
4. **Other Site Systems**			
Perimeter Fence	- integrity of fence	NONE NA	
	- integrity of gates		
	- integrity of locks		
	- placement and condition of signs		

FORM 17

Shawn Gardner

CRA 7987 (24)

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 09/25/15 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

Item	Inspect For	Action Required	Comments
4. Other Site Systems (continued)			
Drainage Ditches/ Swale Outlets	- sediment build-up	NONE	
	- erosion		
	- condition of erosion protection		
	- flow obstructions	HUGE PIECE OF DRIFT WOOD BLOCKING OPENING OF RIVER NORTH OUTFALL	
	- dead/dying vegetation		
	- cable concrete/gabion mats and riprap		
Culverts	- sediment build-up		
	- erosion		
	- condition of erosion protection		
	- flow obstructions		
Gas Vents	- intact / damage		
Wells	- locks secure	MW-7 IS BENT OVER BAILER WILL NOT FILL DOWN (NEEDS REPAIR)	
Shoreline Stabilization	- condition of gabion mats and riprap	GABION MATS EXPOSED AT VARIOUS LOCATIONS ALONG SHORELINE	

FORM 17

Shawn Gardner

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 10/30/15
Crew: DJT/SG
Water Level #: NFO10117
pH Meter#: NFO7184

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	1009	10.49	7.80	574.82					
MH-15	1013	15.49	10.46	575.84	560.35	564.51	561.51	559.17	0.0
OGC-4	1018	9.21	11.49	574.66					
MW-9	1021	11.98	11.02	576.23					
MH-14	1024	11.78	11.34	574.3					
OGC-8	1031	8.78	11.51	574.01					
MH-12	1035	11.68	9.55	572.37					0.01
River South	1037	3.46	x	568.46					
MW-8	1042	11.03	11.71	574.37					
OGC-3	1040	8.11	12.03	573.35					
MH-11	1047	9.29	8.79	572.11					0.40
OGC-7	1053	7.08	11.48	572.49					
River Middle	1107	1.99	x	566.48					
OGC-2	1108	8.62	9.38	574.08					
MW-7	1106	13.23	9.49	575.57					
MH-8	1103	10.13	8.35	572.37					
OGC-6	1113	10.58	11.08	576.65					
MH-6	1118	14.52	9.43	572.03					
River North	1120	2.09	x	566.80					
OGC-5	1126	8.76	8.65	573.82					
MW-6	1130	11.09	9.50	575.40					
OGC-1	1132	9.25	9.42	575.01					
MH-3	1135	13.18	9.60	573.31	560.13	562.48	560.81	558.14	0.05
MH-2	1142	8.59	8.24	573.28					
Off Site									
MH-1	0953	x	10.00	x					
MH-4	0955	x	8.96	x					
MH-6	0958	x	8.98	x					
MH-9	1057	11.01	10.81	572.55					0.0

CRA 007987-Gratwick-Table-6-17-14

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 10/30/07 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
1.	**Perimeter Collection System/Off-Site Forcemain**			
X	Manholes	- cover on securely	None	
X		- condition of cover		
X		- condition of inside of manhole		
X		- flow conditions		
X	Wet Wells	- cover on securely		
X		- condition of cover		
X		- condition of inside of wet well		
2.	**Landfill Cap**			
X	Vegetated Soil Cover	- erosion		
X		- bare areas		
X		- washouts		
X		- leachate seeps		
X		- length of vegetation		
X		- dead/dying vegetation		

FORM 17

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 10/30/15 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
2.	**Landfill Cap (continued)**			
X	Access Roads	- bare areas, dead/dying veg.	None	
X		- erosion		
X		- potholes or puddles		
X		- obstruction		
3.	**Wetlands (Area "F")**	- dead/dying vegetation		
X		- change in water budget		
X		- general condition of wetlands		
X				
4.	**Other Site Systems**			
	Perimeter Fence	- integrity of fence	NA	
		- integrity of gates		
		- integrity of locks		
		- placement and condition of signs		

FORM 17

CRA 7987 (24)

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 1/0/3/0/1/5 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	Inspect For	Action Required	Comments
4.	**Other Site Systems (continued)**			
X	Drainage Ditches/ Swale Outlets	- sediment build-up	None	
X		- erosion		
X		- condition of erosion protection		
X		- flow obstructions	Large tree (40 ft Long) blocking River- North outfall	
X		- dead/dying vegetation	None	
X		- cable concrete/gabion mats and riprap		
X	Culverts	- sediment build-up		
X		- erosion		
X		- condition of erosion protection		
X		- flow obstructions		
X	Gas Vents	- intact / damage	MW-7 well riser & PID-casing bent. Install 3/4" Ø Back to grab pH Sample. Need to fix before next Sampling Round	
X	Wells	- locks secure		
X	Shoreline Stabilization	- condition of gabion mats and riprap	Gabion mats exposed @ various locations along Shoreline	

FORM 17

CRA 7987 (24)

David J Tyran

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 11/30/15
Crew: SG/DO
Water Level #: NFOL0118
pH Meter#: NFO7184

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	1229	11.13	7.98	574.82					
MH-15	1240	14.67	11.16	575.84		564.51	561.51	559.17	0.05
OGC-4	1253	10.27	11.45	574.66					
MW-9	1249	12.62	11.10	576.23					
MH-14	1257	11.58	11.52	574.3					
OGC-8	1303	9.61	11.36	574.01					
MH-12	1309	12.02	9.52	572.37					0.00
River South	1319	4.27	X	568.46					
MW-8	1316	11.34	11.63	574.37					
OGC-3	1313	9.03	11.93	573.35					
MH-11	1327	9.59	8.82	572.11					0.40
OGC-7	1332	8.26	11.26	572.49					
River Middle	1347	2.65	X	566.48					
OGC-2	1346	9.66	9.62	574.08					
MW-7	1344	13.77	9.70	575.57					
MH-8	1350	10.52	8.68	572.37					
OGC-6	1355	12.49	9.96	576.65					
MH-6	1404	14.80	9.16	572.03					
River North	1406	DRY	X	566.80					
OGC-5	1412	9.70	8.51	573.82					
MW-6	1417	11.17	9.18	575.40					
OGC-1	1419	10.66	8.92	575.01					
MH-3	1425	13.71	10.58	573.31		562.48	560.81	558.14	0.14
MH-2	1433	8.69	9.11	573.28					
Off Site									
MH-1	1211	X	10.71	X					
MH-4	1213	X	9.79	X					
MH-6	1216	X	9.29	X					
MH-9	1338	12.77	11.05	572.55					0.01

Sharon Mariner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 11/30/15 (MM DD YY)

INSPECTOR(S): S GARDNER, D OSCAR

Item	Inspect For	Action Required	Comments
1. Perimeter Collection System/Off-Site Forcemain			
Manholes	- cover on securely	NONE	
	- condition of cover		
	- condition of inside of manhole		
	- flow conditions		
Wet Wells	- cover on securely		
	- condition of cover		
	- condition of inside of wet well		
2. Landfill Cap			
Vegetated Soil Cover	- erosion	NONE	
	- bare areas		
	- washouts		
	- leachate seeps		
	- length of vegetation		
	- dead/dying vegetation		

FORM 17

CRA 7987 (24)

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 11/30/ST (MM DD YY)

INSPECTOR(S): S GARDNER D OSCAR

Item	*Inspect For*	*Action Required*	*Comments*
2. **Landfill Cap (continued)**			
Access Roads	- bare areas, dead/dying veg.	NONE.	
	- erosion		
	- potholes or puddles		
	- obstruction		
3. **Wetlands (Area "F")**	- dead/dying vegetation		
	- change in water budget		
	- general condition of wetlands		
4. **Other Site Systems**			
Perimeter Fence	- integrity of fence	NA	
	- integrity of gates		
	- integrity of locks		
	- placement and condition of signs		

FORM 17

CRA 7987 (24)

Sharon Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 1 1 3 0 1 5 (MM DD YY)

INSPECTOR(S): S GARDNER, D OSCAR

	Item	Inspect For	Action Required	Comments
4.	**Other Site Systems (continued)**			
☒	Drainage Ditches/ Swale Outlets	- sediment build-up	NONE	
		- erosion		
		- condition of erosion protection		
		- flow obstructions	VERY LARGE TREE 40+' LONG BLOCKING RIVER NORTH OUTFALL	
		- dead/dying vegetation		
		- cable concrete/gabion mats and riprap	NONE	
☒	Culverts	- sediment build-up		
		- erosion		
		- condition of erosion protection		
		- flow obstructions		
☒	Gas Vents	- intact / damage	MW-7 WELL RISER AND PROCASING BENT, NEEDS TO BE REPAIRED BEFORE NEXT ROUND OF SAMPLING	
	Wells	- locks secure		
	Shoreline Stabilization	- condition of gabion mats and riprap	GABION MATS EXPOSED ALONG VARIOUS LOCATIONS ON SHORELINE	

FORM 17

CRA 7987 (24)

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 12/30/15
Crew: DJT/SG
Water Level #: NF01117
pH Meter#: NF07184

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	0845	11.43	8.04	574.82					
MH-15	0855	14.68	11.46	575.84		564.51	561.51	559.17	0.01
OGC-4	0900	9.63	11.92	574.66					
MW-9	0902	13.13	11.27	576.23					
MH-14	0906	11.73	11.76	574.3					
OGC-8	0913	9.01	11.68	574.01					
MH-12	0918	12.23	9.33	572.37					0.01
River South	0920	3.73	X	568.46					
MW-8	0928	11.58	11.85	574.37					
OGC-3	0926	8.42	12.19	573.35					
MH-11	0933	9.89	9.71	572.11					0.45
OGC-7	0939	7.61	11.62	572.49					
River Middle	0958	2.30	X	566.48					
OGC-2	1000	9.33	9.57	574.08					
MW-7	0956	13.22	10.00	575.57					
MH-8	0954	10.43	9.02	572.37					
OGC-6	1005	12.32	10.34	576.65					
MH-6	1018	14.77	9.53	572.03					
River North	1019	DRY	X	566.80					
OGC-5	1025	9.25	8.77	573.82					
MW-6	1031	11.22	10.32	575.40					
OGC-1	1029	9.69	8.63	575.01					
MH-3	1035	12.92	10.26	573.31		562.48	560.81	558.14	0.03
MH-2	1042	8.78	9.17	573.28					
Off Site									
MH-1	0833	X	10.66	X					
MH-4	0835	X	9.25	X					
MH-6	0838	X	9.22	X					
MH-9	0948	11.58	11.28	572.55					0.02

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 1 2 3 0 1 5 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

Item	*Inspect For*	*Action Required*	*Comments*
1. **Perimeter Collection System/Off-Site Forcemain**			
Manholes	- cover on securely	NONE	
	- condition of cover		
	- condition of inside of manhole		
	- flow conditions		
Wet Wells	- cover on securely		
	- condition of cover		
	- condition of inside of wet well		
2. **Landfill Cap**			
Vegetated Soil Cover	- erosion	NONE	
	- bare areas		
	- washouts		
	- leachate seeps		
	- length of vegetation		
	- dead/dying vegetation		

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 11/23/01/15 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

Item	*Inspect For*	*Action Required*	*Comments*
2. **Landfill Cap (continued)**			
Access Roads	- bare areas, dead/dying veg.	NONE	
	- erosion		
	- potholes or puddles		
	- obstruction		
3. **Wetlands (Area "F")**	- dead/dying vegetation		
	- change in water budget		
	- general condition of wetlands		
4. **Other Site Systems**			
Perimeter Fence	- integrity of fence	NA	
	- integrity of gates		
	- integrity of locks		
	- placement and condition of signs		

FORM 17

CRA 7987 (24)

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 1 2 3 0 1 5T (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

Item	Inspect For	Action Required	Comments
4. Other Site Systems (continued)			
Drainage Ditches/ Swale Outlets	- sediment build-up	NONE	
	- erosion		
	- condition of erosion protection	RIVER SOUTH OUTFALL - SOME ERROSION WHERE PIPE	
	- flow obstructions	MEETS EMBANKMENT	
	- dead/dying vegetation		
	- cable concrete/ gabion mats and riprap		
Culverts	- sediment build-up	NONE	
	- erosion		
	- condition of erosion protection		
	- flow obstructions		
Gas Vents	- intact / damage	MW-7 WELL RISER AND PROCASING BENT, NEEDS TO BE	
Wells	- locks secure	REPAIRED	
Shoreline Stabilization	- condition of gabion mats and riprap	GABION MATS EXPOSED ALONG VARIOUS LOCATIONS ON SHORELINE	

FORM 17

Shawn Gardner

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 1/28/16
Crew: DJT/SG
Water Level #: NF-0011 7
pH Meter#: NF07184

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	1216	11.22	8.08	574.82					
MH-15	1222	14.82	11.01	575.84	561.02	564.51	561.51	559.17	0.0
OGC-4	1227	9.82	11.62	574.66					
MW-9	1230	12.79	11.09	576.23					
MH-14	1233	11.81	11.42	574.3					
OGC-8	1237	9.18	11.75	574.01					
MH-12	1242	11.89	9.37	572.37					0.01
River South	1243	3.82	X	568.46					
MW-8	1248	11.19	11.62	574.37					
OGC-3	1246	8.58	11.86	573.35					
MH-11	1255	9.43	8.77	572.11					0.20
OGC-7	1259	7.73	11.36	572.49					
River Middle	1316	2.33	X	566.48					
OGC-2	1315	9.40	9.37	574.08					
MW-7	1313	13.59	9.68	575.57					
MH-8	1311	10.32	8.68	572.37					
OGC-6	1320	12.09	10.66	576.65					
MH-6	1325	14.61	8.99	572.03					
River North	1326	DRY	X	566.80					
OGC-5	1333	9.22	8.59	573.82					
MW-6	1338	10.92	9.76	575.40					
OGC-1	1340	10.22	9.09	575.01					
MH-3	1344	13.76	10.55	573.31	559.55	562.48	560.81	558.14	0.03
MH-2	1348	8.51	9.24	573.28					
Off Site									
MH-1	1202	X	10.72	X					
MH-4	1204	X	9.90	X					
MH-6	1207	X	9.43	X					
MH-9	1304	11.36	10.95	572.55					0.02

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 01/28/16 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
1.	**Perimeter Collection System/Off-Site Forcemain**			
X	Manholes	- cover on securely	None	
X		- condition of cover		
X		- condition of inside of manhole		
X		- flow conditions		
X	Wet Wells	- cover on securely		
X		- condition of cover		
X		- condition of inside of wet well		
2.	**Landfill Cap**			
X	Vegetated Soil Cover	- erosion		
X		- bare areas		
X		- washouts		
X		- leachate seeps		
X		- length of vegetation		
X		- dead/dying vegetation		

FORM 17

CRA 7987 (24)

Dave Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 01/28/16 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
2.	**Landfill Cap (continued)**			
X	Access Roads	- bare areas, dead/dying veg.	None	
X		- erosion		
X		- potholes or puddles		
X		- obstruction		
3.	**Wetlands (Area "F")**	- dead/dying vegetation		
X		- change in water budget		
X		- general condition of wetlands		
4.	**Other Site Systems**			
	Perimeter Fence	- integrity of fence	NA	
		- integrity of gates		
		- integrity of locks		
		- placement and condition of signs		

FORM 17

CRA 7987 (24)

Dave J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 01/28/16 (MM DD YY)

INSPECTOR(S): D Tyran S. Gardner

	Item	Inspect For	Action Required	Comments
4.	**Other Site Systems (continued)**			
X	Drainage Ditches/ Swale Outlets	- sediment build-up		
X		- erosion		
X		- condition of erosion protection	River South Outfall - Some errosion where pipe meets the embankment	
X		- flow obstructions		
X		- dead/dying vegetation		
X		- cable concrete/gabion mats and riprap		
X	Culverts	- sediment build-up		
X		- erosion		
X		- condition of erosion protection		
X		- flow obstructions		
X	Gas Vents	- intact / damage	MW-7 Well riser & procasing bent. Needs to be repaired	
X	Wells	- locks secure		
X	Shoreline Stabilization	- condition of gabion mats and riprap	Gabion mats exposed @ various locations along shoreline	

FORM 17

CRA 7987 (24)

Dave D Tyran

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 2/23/16
Crew: DJT/SG
Water Level #: NF062117
pH Meter#: NF07184

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	1439	11.11	8.51	574.82					
MH-15	1431	14.21	10.93	575.84	561.63	564.51	561.51	559.17	NM
OGC-4	1427	10.18	11.76	574.66					
MW-9	1424	12.68	11.27	576.23					
MH-14	1419	11.61	11.46	574.3					
OGC-8	1415	9.60	11.94	574.01					
MH-12	1408	11.49	9.46	572.37					NM
River South	1410	4.30	X	568.46					
MW-8	1402	10.83	11.90	574.37					
OGC-3	1404	8.96	12.26	573.35					
MH-11	1358	9.08	9.57	572.11					0.25
OGC-7	1352	8.11	11.65	572.49					
River Middle	1341	3.00	X	566.48					
OGC-2	1343	9.62	9.56	574.08					
MW-7	1340	12.06	9.98	575.57					
MH-8	1337	9.43	8.63	572.37					
OGC-6	1332	12.36	11.03	576.65					
MH-6	1327	13.88	8.67	572.03					
River North	1329	DRY	X	566.80					
OGC-5	1323	9.63	8.75	573.82					
MW-6	1319	10.71	10.36	575.40					
OGC-1	1316	10.20	8.65	575.01					
MH-3	1312	13.06	9.87	573.31	560.25	562.48	560.81	558.14	0.03
MH-2	1307	8.42	7.85	573.28					
Off Site									
MH-1	1247	X	6.78	X					
MH-4	1250	X	6.90	X					
MH-6	1252	X	6.96	X					
MH-9	1347	11.63	9.55	572.55	560.92				0.01

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 10/23/16 (MM DD YY)

INSPECTOR(S): D Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
1.	**Perimeter Collection System/Off-Site Forcemain**			
Y	Manholes	- cover on securely	None	
X		- condition of cover		
X		- condition of inside of manhole		
X		- flow conditions		
X	Wet Wells	- cover on securely		
X		- condition of cover		
X		- condition of inside of wet well		
2.	**Landfill Cap**			
X	Vegetated Soil Cover	- erosion		
X		- bare areas		
X		- washouts		
X		- leachate seeps		
X		- length of vegetation		
X		- dead/dying vegetation		

FORM 17

Dave J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 02/23/16 (MM DD YY)

INSPECTOR(S): S. Gardner D. Tyran

	Item	*Inspect For*	*Action Required*	*Comments*
2.	**Landfill Cap (continued)**			
X	Access Roads	- bare areas, dead/dying veg.	None	
X		- erosion		
X		- potholes or puddles		
X		- obstruction		
3.	**Wetlands (Area "F")**			
X		- dead/dying vegetation		
X		- change in water budget		
X		- general condition of wetlands		
4.	**Other Site Systems**			
	Perimeter Fence	- integrity of fence	NA	
		- integrity of gates		
		- integrity of locks		
		- placement and condition of signs		

FORM 17

CRA 7987 (24)

D. J. Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 10/2/2/3/1/6 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	Inspect For	Action Required	Comments
4.	**Other Site Systems (continued)**			
X	Drainage Ditches/ Swale Outlets	- sediment build-up		
X		- erosion	River South Outfall - Some erosion where pipe meets the embankment	
X		- condition of erosion protection		
X		- flow obstructions		
X		- dead/dying vegetation		
X		- cable concrete/gabion mats and riprap		
X	Culverts	- sediment build-up		
X		- erosion		
X		- condition of erosion protection		
X		- flow obstructions		
X	Gas Vents	- intact / damage	MW-7 Well riser & procasing bent. Needs to be repaired	
X	Wells	- locks secure		
X	Shoreline Stabilization	- condition of gabion mats and riprap	Gabion mats exposed @ various locations along Shoreline	

FORM 17

Dan J Tyran

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 3/31/16
Crew: SB/DJT
Water Level #: NF06117
pH Meter#: NF07184

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	0944	10.28	7.81	574.82					
MH-15	0953	10.08	9.09	575.84		564.51	561.51	559.17	0.04
OGC-4	1005	9.61	11.40	574.66					
MW-9	1002	11.69	10.95	576.23					
MH-14	1008	12.02	10.02	574.3					
OGC-8	1011	9.00	11.77	574.01					
MH-12	1016	10.31	9.20	572.37					0.01
River South	1017	3.86	X	568.46					
MW-8	1020	9.61	11.69	574.37					
OGC-3	1022	8.39	11.99	573.35					
MH-11	1038	7.92	8.72	572.11					0.25
OGC-7	1043	7.46	11.43	572.49					
River Middle	1100	2.28	X	566.48					
OGC-2	1102	9.07	9.39	574.08					
MW-7	1059	10.06	9.49	575.57					
MH-8	1056	7.94	8.50	572.37					
OGC-6	1106	11.81	10.88	576.65					
MH-6	1114	12.42	8.96	572.03					
River North	1112	DRY	X	566.80					
OGC-5	1120	8.99	8.44	573.82					
MW-6	1123	9.43	~~9.13~~	575.40	PH. 10.49				
OGC-1	1127	9.13	8.74	575.01					
MH-3	1132	13.28	9.49	573.31		562.48	560.81	558.14	0.02
MH-2	1136	7.62	9.05	573.28					
Off Site									
MH-1	0932	X	8.48	X					
MH-4	0935	X	8.39	X					
MH-6	0937	X	8.25	X					
MH-9	1049	12.43	9.51	572.55					0.01

Shawn Haidner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 03/31/16 (MM DD YY)

INSPECTOR(S): D. Tyran S Gardner

	Item	Inspect For	Action Required	Comments
1.	**Perimeter Collection System/Off-Site Forcemain**			
X	Manholes	- cover on securely	None	
X		- condition of cover		
X		- condition of inside of manhole		
X		- flow conditions		
X	Wet Wells	- cover on securely	Pump chamber 3 Temporary discharge hose kinked at top of chamber. NT maint is aware of the problem. Pump chamber 2 has a plastic pail floating below the surface of the water	
X		- condition of cover		
X		- condition of inside of wet well		
2.	**Landfill Cap**			
X	Vegetated Soil Cover	- erosion	None	
X		- bare areas		
X		- washouts		
X		- leachate seeps		
X		- length of vegetation		
X		- dead/dying vegetation		

FORM 17

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 03/31/16 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
2.	**Landfill Cap (continued)**			
X	Access Roads	- bare areas, dead/dying veg.	None	
X		- erosion		
X		- potholes or puddles		
X		- obstruction		
3.	**Wetlands (Area "F")**	- dead/dying vegetation		
X		- change in water budget		
X		- general condition of wetlands		
4.	**Other Site Systems**			
	Perimeter Fence	- integrity of fence	N/A	
		- integrity of gates		
		- integrity of locks		
		- placement and condition of signs		

FORM 17

CRA 7987 (24)

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 03/31/16 (MM DD YY)

INSPECTOR(S): D Tyran S Gardner

	Item	Inspect For	Action Required	Comments
4.	**Other Site Systems (continued)**			
X	Drainage Ditches/ Swale Outlets	- sediment build-up		
X		- erosion	River South Outfall - Some erosion where pipe meets the embankment	
X		- condition of erosion protection		
X		- flow obstructions		
X		- dead/dying vegetation		
X		- cable concrete/gabion mats and riprap		
X	Culverts	- sediment build-up		
X		- erosion		
X		- condition of erosion protection		
X		- flow obstructions		
X	Gas Vents	- intact / damage	MW-7 Well riser & procasing bent. Needs to be repaired	
X	Wells	- locks secure		
X	Shoreline Stabilization	- condition of gabion mats and riprap	Gabion Mats exposed @ various locations along Shoreline	

FORM 17

CRA 7987 (24)

Dave J Tyran

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 4/28/16
Crew: DJT / SG
Water Level #: NF06117
pH Meter#: NF07184

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	0845	9.48	7.63	574.82					
MH-15	1030	14.83	9.74	575.84	561.01	564.51	561.51	559.17	0.02
OGC-4	1025	9.51	11.60	574.66					
MW-9	1023	10.96	11.61	576.23					
MH-14	1019	11.23	10.16	574.3					
OGC-8	1015	8.83	11.95	574.01					
MH-12	1008	9.58	9.20	572.37					0.01
River South	1010	3.42	X	568.46					
MW-8	1002	8.88	11.77	574.37					
OGC-3	1004	8.23	12.08	573.35					
MH-11	0953	7.14	8.81	572.11					0.35
OGC-7	0944	7.44	11.52	572.49					
River Middle	0932	1.93	X	566.48					
OGC-2	0933	8.88	9.49	574.08					
MW-7	0931	9.88	9.39	575.57					
MH-8	0929	7.32	8.41	572.37					
OGC-6	0922	11.76	10.84	576.65					
MH-6	0914	11.83	8.53	572.03					
River North	0916	2.04	X	566.80					
OGC-5	0910	8.91	8.44	573.82					
MW-6	0903	9.32	10.43	575.40					
OGC-1	0901	9.79	8.12	575.01					
MH-3	0858	12.62	7.71	573.31	560.69	562.48	560.81	558.14	0.02
MH-2	0852	6.72	7.72	573.28					
Off Site									
MH-1	0830	X	8.16	X					
MH-4	0832	X	7.96	X					
MH-6	0835	X	7.69	X					
MH-9	0939	7.92	8.97	572.55					0.01

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 04/28/16 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
1.	**Perimeter Collection System/Off-Site Forcemain**			
X	Manholes	- cover on securely	None	
X		- condition of cover		
X		- condition of inside of manhole		
X		- flow conditions		
X	Wet Wells	- cover on securely	Pump chamber 3 - Hose still Kinked and	
X		- condition of cover	Spraying water back into the chamber	
X		- condition of inside of wet well		
2.	**Landfill Cap**			
X	Vegetated Soil Cover	- erosion	None	
X		- bare areas		
X		- washouts		
X		- leachate seeps		
X		- length of vegetation		
X		- dead/dying vegetation		

FORM 17

CRA 7987 (24)

Dave J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 04/28/16 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

Item	Inspect For	Action Required	Comments
2. Landfill Cap (continued)			
☒ Access Roads	- bare areas, dead/dying veg.	None	
☒	- erosion		
☒	- potholes or puddles		
☒	- obstruction		
3. Wetlands (Area "F")	- dead/dying vegetation		
☒	- change in water budget	River is high	
☒	- general condition of wetlands		
4. Other Site Systems			
☐ Perimeter Fence	- integrity of fence	NA	
☐	- integrity of gates		
☐	- integrity of locks		
☐	- placement and condition of signs		

FORM 17

Dave Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 04/28/16 (MM DD YY)

INSPECTOR(S): D Tyran S Gardner

	Item	Inspect For	Action Required	Comments
4.	**Other Site Systems (continued)**			
X	Drainage Ditches/ Swale Outlets	- sediment build-up	River South Outfall -	Some erosion
X		- erosion	where pipe meets the embankment	
X		- condition of erosion protection	None	
X		- flow obstructions		
X		- dead/dying vegetation		
X		- cable concrete/gabion mats and riprap		
X	Culverts	- sediment build-up		
X		- erosion		
X		- condition of erosion protection		
X		- flow obstructions		
X	Gas Vents	- intact / damage	MW-7 well riser & pre casing bent	Needs to be repaired
X	Wells	- locks secure		
X	Shoreline Stabilization	- condition of gabion mats and riprap	Gabion Mats exposed @ various locations along	Shoreline

FORM 17

CRA 7987 (24)

Dave Tyran

GRATWICK RIVERSIDE PARK
MONTHLY WATER LEVELS AND pH MONITORING

Date: 5/26/16
Crew: DJT/SG
Water Level #: NF06117
pH Meter#: NF07184

Well ID	Time	Water Level	pH	TOC Elev.	Water Level Elev.	High Water Elev.	Pump on Elev.	Pump off Elev.	Sediment Depth
MH-16	1113	9.19	8.41	574.82					
MH-15	1108	16.18	9.74	575.84	559.66	564.51	561.51	559.17	0.01
OGC-4	1104	9.39	11.49	574.66					
MW-9	1102	10.62	11.53	576.23					
MH-14	1058	11.35	10.10	574.3					
OGC-8	1054	8.76	11.94	574.01					
MH-12	1049	9.12	8.90	572.37					0.01
River South	1154	3.32	X	568.46					
MW-8	1042	8.44	11.69	574.37					
OGC-3	1044	8.13	12.02	573.35					
MH-11	1037	6.69	8.72	572.11					0.45
OGC-7	1031	7.39	11.60	572.49					
River Middle	0918	1.84	X	566.48					
OGC-2	0912	8.70	9.39	574.08					
MW-7	0907	9.37	8.95	575.57					
MH-8	0916	6.92	7.93	572.37					
OGC-6	1022	11.68	10.59	576.65					
MH-6	1017	11.42	9.02	572.03					
River North	1018	1.98	X	566.80					
OGC-5	0940	8.86	8.10	573.82					
MW-6	1011	9.02	10.55	575.40					
OGC-1	1007	9.91	8.52	575.01					
MH-3	0958	14.00	8.17	573.31	559.31	562.48	560.81	558.14	0.05
MH-2	0954	6.33	8.30	573.28					
Off Site									
MH-1	0840	X	8.49	X					
MH-4	0844	X	7.94	X					
MH-6	0847	X	7.10	X					
MH-9	1027	7.02	9.48	572.55					0.01

Dave J Tyson

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 05/26/16 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	Inspect For	Action Required	Comments
1.	**Perimeter Collection System/Off-Site Forcemain**			
X	Manholes	- cover on securely	None	
X		- condition of cover		
X		- condition of inside of manhole		
X		- flow conditions		
X	Wet Wells	- cover on securely	Pump Chamber 1 (MH-3) Heavy Sheen on water level rod came up coated in oil.	Pump chamber 3 - Hose Kinked
X		- condition of cover		
X		- condition of inside of wet well		
2.	**Landfill Cap**			
X	Vegetated Soil Cover	- erosion	None	
X		- bare areas		
X		- washouts		
X		- leachate seeps		
X		- length of vegetation		
X		- dead/dying vegetation		

FORM 17

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 05/26/16 (MM DD YY)

INSPECTOR(S): D. Tynan S. Gardner

Item	Inspect For	Action Required	Comments
2. **Landfill Cap (continued)**			
[X] Access Roads	- bare areas, dead/dying veg.	None	
[X]	- erosion		
[X]	- potholes or puddles		
[X]	- obstruction		
3. **Wetlands (Area "F")**	- dead/dying vegetation		
[X]	- change in water budget		
[X]	- general condition of wetlands		
4. **Other Site Systems**			
[ ] Perimeter Fence	- integrity of fence	NA	
[ ]	- integrity of gates		
[ ]	- integrity of locks		
[ ]	- placement and condition of signs		

FORM 17

CRA 7987 (24)

David J Tynan

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 05/26/16 (MM DD YY)

INSPECTOR(S): D Tyran S. Goelner

	Item	Inspect For	Action Required	Comments
4.	**Other Site Systems (continued)**			
X	Drainage Ditches/ Swale Outlets	- sediment build-up	None DSP River South Outfall - some erosion	
X		- erosion	where pipe meets embankment	
X		- condition of erosion protection	None	
X		- flow obstructions		
X		- dead/dying vegetation		
X		- cable concrete/ gabion mats and riprap		
X	Culverts	- sediment build-up		
X		- erosion		
X		- condition of erosion protection		
X		- flow obstructions		
X	Gas Vents	- intact / damage	None	
X	Wells	- locks secure		
X	Shoreline Stabilization	- condition of gabion mats and riprap	Gabion Mats exposed @ various locations along shoreline	

FORM 17

CRA 7987 (24)

Dave Tyran

Appendix C
QA/QC Reviews and Data Usability Summary

Memorandum

To:	Klaus Schmidtke	Ref. No.:	007987
From:	Susan Scrocchi/mkd/21	Date: Revised	February 11, 2016 July 26, 2016

Re: Analytical Results and Reduced Validation
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
October 2015

1. Introduction

This document details a reduced validation of analytical results for one effluent sample collected in support of the semiannual monitoring program at the North Tonawanda Waste Water Treatment Plant during October 2015. Samples were submitted to TestAmerica Laboratories, Inc., located in Amherst, New York. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Standard GHD report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody form, finished report forms, method blank data, and recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spikes (MS).

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 3 and applicable guidance from the documents entitled:

i) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review", United States Environmental Protection Agency (USEPA) 540-R-10-011, January 2010

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-08-01, June 2008

These items will subsequently be referred to as the "Guidelines" in this Memorandum.

2. Sample Holding Time and Preservation

The sample holding time criteria for the analyses are summarized in Table 3. Sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

GHD Services Inc.
2055 Niagara Falls Boulevard Niagara Falls New York 14304 USA
T 716 297 6150 **F** 716 297 2265 **W** www.ghd.com

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

4. Surrogate Spike Recoveries - Organic Analyses

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for volatile and semi-volatile organic compound (SVOC) determinations were spiked with the appropriate number of surrogate compounds prior to sample extraction and/analysis.

Each individual surrogate compound is expected to meet the laboratory control limits with the exception of SVOC analyses. According to the "Guidelines" for SVOC analyses, up to one outlying surrogate in the base/neutral or acid fractions is acceptable as long as the recovery is at least 10 percent.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries met the above criteria.

5. Laboratory Control Sample Analyses

LCS and/or laboratory control sample duplicates (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision.

For this study, LCS were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch. Some LCS were prepared and analyzed in duplicate.

5.1 Organic Analyses

The LCS/LCSD contained all compounds of interest. All LCS recoveries and RPDs were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision (where applicable).

5.2 Inorganic Analyses

The LCS contained all analytes of interest. LCS recoveries were assessed per the "Guidelines". All LCS recoveries were within the control limits, demonstrating acceptable analytical accuracy.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the distillation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision. If the original sample concentration is significantly greater than the spike concentration, the recovery is not assessed.

No MS/MSD analyses were quested for this investigative sample.

7. Field QA/QC Samples

No field QA/QC samples were submitted for analysis.

8. Analyte Reporting

No positive analyte detections less than the reporting limit (RL) but greater than the method detection limit (MDL) were reported. Non-detect results were presented as non-detect at the RL in Table 2.

9. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable without qualification.

Table 1

Sample Collection and Analysis Summary
Waste Water Treatment Plant Sampling
Gratwick-Riverside Park
North Tonawanda, New York
October 2015

Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	Analysis/Parameters								
					TAL Metals	Chloride/Sulfate	Nitrate	Site-Specific VOCs	Site-Specific SVOCs	Alkalinity	Total Hardness	TDS	Sulfide
GRP	Effluent	Water	10/08/2015	8:00	X	X	X	X	X	X	X	X	X

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List
TDS - Total Dissolved Solids

Table 2

Analytical Results Summary
Waste Water Treatment Plant Sampling
Gratwick-Riverside Park
North Tonawanda, New York
October 2015

Sample Location:		**Effluent**
Sample ID:		**GRP**
Sample Date:		**10/8/2015**
Parameters	**Units**	
Volatile Organic Compounds		
1,1,1-Trichloroethane	µg/L	5.0 U
1,1-Dichloroethane	µg/L	5.0 U
1,2-Dichloroethane	µg/L	5.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	25 U
Acetone	µg/L	25 U
Benzene	µg/L	5.0 U
Chlorobenzene	µg/L	5.0 U
Ethylbenzene	µg/L	5.0 U
Methylene chloride	µg/L	5.0 U
Styrene	µg/L	5.0 U
Tetrachloroethene	µg/L	5.0 U
Toluene	µg/L	12
trans-1,2-Dichloroethene	µg/L	5.1
Trichloroethene	µg/L	23
Vinyl chloride	µg/L	5.0 U
Xylenes (total)	µg/L	10 U
Semi-volatile Organic Compounds		
1,2-Dichlorobenzene	µg/L	4.7 U
1,4-Dichlorobenzene	µg/L	9.2
2,4-Dimethylphenol	µg/L	5.0
2-Methylphenol	µg/L	4.9
4-Methylphenol	µg/L	3.7
Di-n-octyl phthalate (DnOP)	µg/L	4.6 U
Naphthalene	µg/L	0.81 U
Phenol	µg/L	3.0
Metals		
Aluminum	mg/L	0.20 U
Antimony	mg/L	0.020 U
Arsenic	mg/L	0.010 U
Barium	mg/L	0.068
Beryllium	mg/L	0.0020 U
Cadmium	mg/L	0.0010 U
Chromium	mg/L	0.0040 U
Copper	mg/L	0.010 U
Iron	mg/L	0.050 U
Lead	mg/L	0.0050 U
Magnesium	mg/L	1.4
Manganese	mg/L	0.0030 U
Mercury	mg/L	0.00020 U
Nickel	mg/L	0.010 U
Selenium	mg/L	0.015 U
Silver	mg/L	0.0030 U
Sodium	mg/L	245
Zinc	mg/L	0.010 U

Table 2

Analytical Results Summary
Waste Water Treatment Plant Sampling
Gratwick-Riverside Park
North Tonawanda, New York
October 2015

	Sample Location:	**Effluent**
	Sample ID:	**GRP**
	Sample Date:	**10/8/2015**
Parameters	**Units**	
Wet		
Alkalinity, bicarbonate	mg/L	5.0 U
Alkalinity, total (as CaCO3)	mg/L	43.5
Ammonia	mg/L	1.40
Biochemical oxygen demand (BOD)	mg/L	13.74
Chemical oxygen demand (COD)	mg/L	50 U
Chloride	mg/L	409
Cyanide (total)	mg/L	0.005
Hardness	mg/L	192
Nitrate (as N)	mg/L	0.050 U
Oil and grease	mg/L	0.10 U
pH (water)	s.u.	10.21
Phenolics (total)	mg/L	0.110 U
Phosphorus	mg/L	0.10 U
Sulfate	mg/L	127
Sulfide	mg/L	3.6
Total dissolved solids (TDS)	mg/L	977
Total kjeldahl nitrogen (TKN)	mg/L	2.24
Total organic carbon (TOC)	mg/L	5.463
Total suspended solids (TSS)	mg/L	12

Notes:

U - Not detected at the associated reporting limit

Table 3

Analytical Methods
Waste Water Treatment Plant Sampling
Gratwick-Riverside Park
North Tonawanda, New York
October 2015

Parameter	Method	Matrix	Holding Time	
			Collection to Extraction (Days)	Collection or Extraction to Analysis (Days)
Volatile Organic Compounds	EPA 624[1]	Water	-	14
Semi-Volatile Organic Compounds	EPA 625[1]	Water	7	40
Target Analyte List Metals	EPA 200.7[1]	Water	-	180
Mercury	EPA 245.1[1]	Water	-	28
Chloride/Sulfate	EPA 300.0[1]	Water	-	28
Nitrate	EPA 353.2[1]	Water	-	48 hours
Hardness	SM 2340[2]	Water	-	180
Alkalinity	SM2320B[2]	Water	-	14
Total Dissolved Solids	SM2540C[2]	Water	-	7
Sulfide	SM4500-S2-F[2]	Water	-	7

Notes:

Method References:

1 - "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, with subsequent revisions

2 - "Methods for Chemical Analysis of Water and Wastes", USEPA-600/4-79-020, March 1983, with subsequent revisions

\- - Not applicable

Memorandum

July 26, 2016

To:	Klaus Schmidtke	Ref. No.:	007987
From:	Susan Scrocchi/mkd/23-NF SCS	Tel:	716.297.6150

Subject: **Analytical Results and Reduced Validation**
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
April 2016

1. Introduction

This document details a reduced validation of analytical results for one effluent sample collected in support of the semi-annual monitoring program at the North Tonawanda Waste Water Treatment Plant during April 2016. Samples were submitted to TestAmerica Laboratories, located in Amherst, New York. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Standard GHD report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody form, finished report forms, method blank data, recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spikes (MS).

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 3 and applicable guidance from the documents entitled:

i) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review", USEPA 540-R-10-011, January 2010

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-08-01, June 2008

These items will subsequently be referred to as the "Guidelines" in this Memorandum.

2. Sample Holding Time and Preservation

The sample holding time criteria for the analyses are summarized in Table 3. Sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

4. Surrogate Spike Recoveries - Organic Analyses

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for volatile and semi-volatile determinations were spiked with the appropriate number of surrogate compounds prior to sample extraction and/analysis.

Each individual surrogate compound is expected to meet the laboratory control limits with the exception of semi-volatile organic compound (SVOC) analyses. According to the "Guidelines" for SVOC analyses, up to one outlying surrogate in the base/neutral or acid fractions is acceptable as long as the recovery is at least 10 percent.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries met the above criteria.

5. Laboratory Control Sample Analyses

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. For this study, LCS were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

Organic Analyses

The LCS contained all compounds of interest. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

Inorganic Analyses

The LCS contained all analytes of interest. LCS recoveries were assessed per the "Guidelines". All LCS recoveries were within the control limits, demonstrating acceptable analytical accuracy.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the distillation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The relative percent difference (RPD) between the MS and MSD is used to assess analytical precision.

MS/MSD analyses were performed for SVOC, chloride and sulfate.

Organic Analyses

The MS/MSD samples were spiked with all compounds of interest. All percent recoveries and RPD values were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

Inorganic Analyses

The MS/MSD samples were spiked with the analytes of interest, and the results were evaluated using the "Guidelines". All percent recoveries and RPD values were within the control limits, demonstrating acceptable analytical accuracy and precision.

7. Field QA/QC Samples

The field QA/QC consisted of one trip blank sample.

Trip Blank Sample Analysis

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank was submitted to the laboratory for volatile organic compound (VOC) analysis. All results were non-detect for the compounds of interest.

concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criteria is one or two times the RL value for water and soil samples, respectively.

All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision.

8. Analyte Reporting

The laboratory reported detected results down to the laboratory's method detection limit (MDL) for each analyte. Positive analyte detections less than the RL but greater than the MDL were qualified as estimated

(J) in Table 2 unless qualified otherwise in this memorandum. Non-detect results were presented as non-detect at the RL in Table 2.

9. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable without qualification.

Table 1

Sample Collection and Analysis Summary
Waste Water Treatment Plant Sampling
Gratwick-Riverside Park
North Tonawanda, New York
April 2016

Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	Analysis/Parameters								
					TAL Metals	Chloride/Sulfate	Nitrate	Site-Specific VOCs	Site-Specific SVOCs	Alkalinity	Total Hardness	TDS	Sulfide
GRP	Effluent	Water	04/14/2016	08:00	X	X	X	X	X	X	X	X	X

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List
TDS - Total Dissolved Solids

Table 2

Analytical Results Summary
Site Effluent
Gratwick Riverside Park
North Tonawanda, New York
April 2016

Location ID:	**Effluent**
Sample Name:	**GRATWICK RIVERSIDE**
Sample Date:	**04/14/2016**

Parameters	**Unit**	
Volatile Organic Compounds		
1,1,1-Trichloroethane	µg/L	5.0 U
1,1-Dichloroethane	µg/L	5.0 U
1,2-Dichloroethane	µg/L	5.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	25 U
Acetone	µg/L	25 U
Benzene	µg/L	5.0 U
Chlorobenzene	µg/L	5.0 U
Ethylbenzene	µg/L	5.0 U
Methylene chloride	µg/L	5.0 U
Styrene	µg/L	5.0 U
Tetrachloroethene	µg/L	5.0 U
Toluene	µg/L	5.0 U
trans-1,2-Dichloroethene	µg/L	5.0 U
Trichloroethene	µg/L	12
Vinyl chloride	µg/L	5.0 U
Xylenes (total)	µg/L	10 U
Semi-volatile Organic Compounds		
1,2-Dichlorobenzene	µg/L	4.7 U
1,4-Dichlorobenzene	µg/L	4.7 U
2,4-Dimethylphenol	µg/L	5.9
2-Methylphenol	µg/L	2.7
4-Methylphenol	µg/L	8.5
Di-n-octyl phthalate (DnOP)	µg/L	4.6 U
Naphthalene	µg/L	0.81 U
Phenol	µg/L	0.33 U
Metals		
Aluminum	mg/L	0.67
Antimony	mg/L	0.020 U
Arsenic	mg/L	0.015 U
Barium	mg/L	0.096
Beryllium	mg/L	0.0020 U
Cadmium	mg/L	0.0020 U
Chromium	mg/L	0.0040 U
Copper	mg/L	0.010 U
Iron	mg/L	0.18
Lead	mg/L	0.010 U
Magnesium	mg/L	15.2
Manganese	mg/L	0.26
Mercury	mg/L	0.00020 U
Nickel	mg/L	0.010 U
Selenium	mg/L	0.025 U
Silver	mg/L	0.0060 U
Sodium	mg/L	351
Zinc	mg/L	0.010 U

Table 2

Analytical Results Summary
Site Effluent
Gratwick Riverside Park
North Tonawanda, New York
April 2016

Location ID:	**Effluent**
Sample Name:	**GRATWICK RIVERSIDE**
Sample Date:	**04/14/2016**

Parameters	**Unit**	
General Chemistry		
Alkalinity, bicarbonate	mg/L	38.2
Alkalinity, total (as CaCO3)	mg/L	75.3
Ammonia	mg/L	1.12
Biochemical oxygen demand (BOD)	mg/L	13.34
Chemical oxygen demand (COD)	mg/L	25 U
Chloride	mg/L	648
Cyanide (total)	mg/L	0.005 U
Hardness	mg/L	332
Nitrate (as N)	mg/L	0.15
Oil and grease	mg/L	0.001
Phenolics (total)	mg/L	0.100 U
Phosphorus	mg/L	0.10 U
Sulfate	mg/L	237
Sulfide	mg/L	1.6
Total dissolved solids (TDS)	mg/L	1450
Total kjeldahl nitrogen (TKN)	mg/L	1.68
Total organic carbon (TOC)	mg/L	6.149
Total suspended solids (TSS)	mg/L	14
pH (water)	s.u.	8.86

Notes:

s.u - Standard units
U - Not detected at the associated reporting limit

Table 3

Analytical Methods
Waste Water Treatment Plant Sampling
Gratwick-Riverside Park
North Tonawanda, New York
April 2016

Parameter	Method	Matrix	Holding Time	
			Collection to Extraction (Days)	Collection or Extraction to Analysis (Days)
Volatile Organic Compounds	EPA 624[1]	Water	-	14
Semi-Volatile Organic Compounds	EPA 625[1]	Water	7	40
Target Analyte List Metals	EPA 200.7[1]	Water	-	180
Mercury	EPA 245.1[1]	Water	-	28
Chloride/Sulfate	EPA 300.0[1]	Water	-	28
Nitrate	EPA 353.2[1]	Water	-	48 hours
Hardness	SM 2340[2]	Water	-	180
Alkalinity	SM2320B[2]	Water	-	14
Total Dissolved Solids	SM2540C[2]	Water	-	7
Sulfide	SM4500-S2-F[2]	Water	-	7

Notes:

Method References:

1 - "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, with subsequent revisions

2 - "Methods for Chemical Analysis of Water and Wastes", USEPA-600/4-79-020, March 1983, with subsequent revisions

\- - Not applicable

Memorandum

July 26, 2016

To:	Klaus Schmidtke	Ref. No.:	007987
From:	Susan Scrocchi/mkd/22-NF SCS	Tel:	716 297 6150

Subject: **Analytical Results and Validation**
Annual Groundwater Monitoring
Gratwick-Riverside Park Site
North Tonawanda, New York
May 2016

1. Introduction

This Data Usability Summary Report (DUSR) has been prepared per the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation DER-10, Technical Guidance for the Site Investigation and Remediation, Appendix 2B-Guidance for the Data Deliverables and Development of Data Usability Summary Reports, May 2010.

The following document details a reduced validation of analytical results for groundwater samples collected in support of the Annual Monitoring Program at the Gratwick-Riverside Part Site during May 2016.

2. Analytical Methodologies and Data Validation

Samples were submitted to TestAmerica Laboratory (TA), located in Amherst, New York. Samples were analyzed for:

i) Selected Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method SW-846 8260

ii) Selected Semi-volatile Organic Compounds (SVOCs) by USEPA Method SW-846 8270

The quality assurance/quality control (QA/QC) criteria by which these data have been assessed are outlined in the analytical methods and the document entitled "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-08-01, June 2008.

The reduced validation included a review of completeness of all required deliverables to determine if the data are within acceptable QC limits and specification. These included reviews of holding times, instrument tunes, calibration summaries, blanks, spike recoveries, field duplicate analyses, and surrogate/internal standard recoveries. Evaluation of the data was based on information obtained from the chain of custody form, finished report forms, QC summary forms, and calibration summary forms.

A summary of qualified data is presented in Table 1.

3. Sample Holding Time and Preservation

The sample holding time criteria for the analyses are summarized in the methods. Sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

4. Gas Chromatography/Mass Spectrometer (GC/MS) – Tuning and Mass Calibration (Instrument Performance Check)

Prior to VOC and SVOC analysis, GC/MS instrumentation is tuned to ensure optimization over the mass range of interest. To evaluate instrument tuning, methods require the analysis of specific tuning compounds bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP), respectively. The resulting spectra must meet the criteria cited in the methods before analysis is initiated. Analysis of the tuning compound must then be repeated every 12 hours throughout sample analysis to ensure the continued optimization of the instrument.

Tuning compounds were analyzed at the required frequency throughout VOC and SVOC analysis periods. All tuning criteria were met indicating that proper optimization of the instrumentation was achieved.

5. Initial and Continuing Calibration

Initial and continuing calibration summary forms were reviewed for VOCs and SVOCs.

The proper calibration procedures were followed, and all compounds met the method criteria for sensitivity and linearity with one exception. Vinyl chloride exhibited some variability between the initial and continuing calibrations. The associated samples results were qualified as estimated to reflect this implied variability (see Table 2).

6. Laboratory Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation with the exception of 4-methylphenol detected in the SVOC method blank. All samples with results below the reporting limit were qualified as non-detect at the reporting limit (see Table 3).

7. Surrogate Spike Recoveries

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for VOC and SVOC determinations were spiked with the appropriate number of surrogate compounds prior to sample extraction and/or analysis.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries met the laboratory criteria.

8. Laboratory Control Sample Analyses

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects.

For this study, LCS were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

The LCS contained all compounds of interest. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

9. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the distillation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision.

MS/MSD analyses were performed using investigative sample OGC7.

The MS/MSD samples were spiked with all compounds of interest. All percent recoveries and RPD values were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

10. Field QA/QC Samples

The field QA/QC consisted of one trip blank sample and one field duplicate sample set.

10.1 Trip Blank Sample Analysis

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank was submitted to the laboratory for VOC analysis. All results were non-detect for the compounds of interest.

10.2 Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, one field duplicate sample was collected and submitted "blind" to the laboratory. The RPDs associated with these duplicate samples must be less than 50 percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criteria is one times the RL value for water samples.

All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision.

11. Analyte Reporting

The laboratory reported detected results down to the laboratory's MDL for each analyte. Positive analyte detections less than the PQL but greater than the MDL were qualified as estimated (J) in Table 1 unless qualified otherwise in this memorandum. Non-detect results were presented as non-detect at the RL in Table 1.

12. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 1 are acceptable with the qualifications noted herein.

Table 1

Analytical Results Summary
Annual Groundwater Monitoring
Gratwick-Riverside Park Site
North Tonawanda, New York
May 2016

Location ID:		MW6	MW7	MW7	MW8	MW9
Sample Name:		WG-7987-052716-SG-012	WG-7987-052616-SG-008	WG-7987-052616-SG-009	WG-7987-052616-SG-004	WG-7987-052616-SG-002
Sample Date:		05/27/2016	05/26/2016	05/26/2016 Duplicate	05/26/2016	05/26/2016
Parameters	**Unit**					
Volatile Organic Compounds						
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	5.0 U	5.0 U	5.0 U	50 U	25 U
Acetone	µg/L	5.0 U	5.0 U	5.0 U	50 U	15 J
Benzene	µg/L	0.70 U	0.70 U	0.70 U	7.0 U	3.5 U
Chlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	10 U	5.0 U
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	10 U	5.0 U
Methylene chloride	µg/L	1.0 U	1.0 U	1.0 U	10 U	5.0 U
Tetrachloroethene	µg/L	1.0 U	1.0 U	1.0 U	10 U	5.0 U
Toluene	µg/L	1.0 U	1.0 U	1.0 U	10 U	4.4 J
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	10 U	5.0 U
Trichloroethene	µg/L	1.0 U	1.0 U	1.0 U	15	2.6 J
Vinyl chloride	µg/L	1.0 U	1.0 UJ	1.0 UJ	10 UJ	5.0 UJ
Xylenes (total)	µg/L	2.0 U	2.0 U	2.0 U	20 U	10 U
Semivolatile Organic Compounds						
1,2-Dichlorobenzene	µg/L	9.8 U	9.3 U	9.3 U	1.4 J	1.5 J
1,4-Dichlorobenzene	µg/L	1.5 J	9.3 U	9.3 U	17	2.6 J
2,4-Dimethylphenol	µg/L	0.87 J	9.3 U	9.3 U	20	130 J
2-Methylphenol	µg/L	0.47 J	5.7 J	6.1 J	29	16
4-Methylphenol	µg/L	9.8 U	9.3 U	9.3 U	28	340
Di-n-octyl phthalate (DnOP)	µg/L	9.8 U	9.3 U	9.3 U	9.2 U	9.4 U
Naphthalene	µg/L	2.0 J	9.3 U	9.3 U	0.98 J	1.2 J
Phenol	µg/L	9.8 U	9.3 U	9.3 U	6.5 J	26

Table 1

Analytical Results Summary
Annual Groundwater Monitoring
Gratwick-Riverside Park Site
North Tonawanda, New York
May 2016

Location ID:		OGC1	OGC2	OGC3	OGC4	OGC5
Sample Name:		WG-7987-052716-SG-013	WG-7987-052616-SG-007	WG-7987-052616-SG-005	WG-7987-052616-SG-003	WG-7987-052616-SG-011
Sample Date:		05/27/2016	05/26/2016	05/26/2016	05/26/2016	05/26/2016
Parameters	**Unit**					
Volatile Organic Compounds						
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	µg/L	5.0 U	5.0 U	3.3 J	3.6 J	5.0 U
Benzene	µg/L	0.70 U	0.70 U	0.62 J	0.70 U	1.4
Chlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylene chloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	µg/L	1.0 U	1.0 U	0.95 J	1.0 U	0.70 J
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	1.0 U	1.0 U	1.6	1.0 U	1.0 U
Vinyl chloride	µg/L	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.1 J
Xylenes (total)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Semivolatile Organic Compounds						
1,2-Dichlorobenzene	µg/L	9.5 U	9.6 U	0.52 J	9.5 U	9.1 U
1,4-Dichlorobenzene	µg/L	9.5 U	9.6 U	9.2 U	9.5 U	9.1 U
2,4-Dimethylphenol	µg/L	9.5 U	9.6 U	4.9 J	9.5 U	9.1 U
2-Methylphenol	µg/L	9.5 U	9.6 U	24	9.5 U	9.1 U
4-Methylphenol	µg/L	9.5 U	9.6 U	9.6	9.5 U	9.1 U
Di-n-octyl phthalate (DnOP)	µg/L	9.5 U	9.6 U	9.2 U	9.5 U	9.1 U
Naphthalene	µg/L	9.5 U	9.6 U	9.2 U	9.5 U	2.3 J
Phenol	µg/L	9.5 U	9.6 U	43	0.43 J	9.1 U

Table 1

Analytical Results Summary
Annual Groundwater Monitoring
Gratwick-Riverside Park Site
North Tonawanda, New York
May 2016

Location ID:	**OGC6**	**OGC7**	**OGC8**
Sample Name:	**WG-7987-052616-SG-010**	**WG-7987-052616-SG-006**	**WG-7987-052616-SG-001**
Sample Date:	**05/26/2016**	**05/26/2016**	**05/26/2016**
Parameters	**Unit**		
Volatile Organic Compounds			
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	25 U	5.0 U	5.0 U
Acetone	µg/L	25 U	5.0 U	5.0 U
Benzene	µg/L	3.5 U	0.70 U	0.47 J
Chlorobenzene	µg/L	5.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	5.0 U	1.0 U	1.0 U
Methylene chloride	µg/L	5.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	71	1.0 U	1.0
Toluene	µg/L	4.0 J	1.6	3.3
trans-1,2-Dichloroethene	µg/L	5.0 U	0.95 J	1.0 U
Trichloroethene	µg/L	60	4.9	3.9
Vinyl chloride	µg/L	5.0 UJ	1.0 U	1.0 U
Xylenes (total)	µg/L	10 U	1.9 J	1.0 J
Semivolatile Organic Compounds			
1,2-Dichlorobenzene	µg/L	9.4 U	9.5 U	9.3 U
1,4-Dichlorobenzene	µg/L	9.4 U	9.5 U	9.3 U
2,4-Dimethylphenol	µg/L	9.4 U	9.5 U	0.86 J
2-Methylphenol	µg/L	3.6 J	9.5 U	1.9 J
4-Methylphenol	µg/L	9.4 U	9.5 U	9.3 U
Di-n-octyl phthalate (DnOP)	µg/L	9.4 U	9.5 U	9.3 U
Naphthalene	µg/L	0.97 J	9.5 U	9.3 U
Phenol	µg/L	9.4 U	9.5 U	9.3 U

Notes:

U - Not detected at associated reporting limit
J - Estimated concentration
UJ - Not detected, estimated reporting limit

Table 2

Qualified Sample Results Due to Outlying Continuing Calibration Results
Annual Groundwater Monitoring
Gratwick-Riverside Park Site
North Tonawanda, New York
May 2016

Parameter	Analyte	Calibration Date (mm/dd/yyyy)	RRF	%D	Associated Sample ID	Qualified Result	Units
VOCs	Vinyl chloride	05/29/2016	<0.05	27	WG-7987-052616-SG-010	5.0 UJ	ug/L
					WG-7987-052616-SG-011	1.1 J	ug/L
					WG-7987-052616-SG-002	5.0 UJ	ug/L
					WG-7987-052616-SG-004	10 UJ	ug/L
					WG-7987-052616-SG-005	1.0 UJ	ug/L
					WG-7987-052616-SG-007	1.0 UJ	ug/L
					WG-7987-052616-SG-008	1.0 UJ	ug/L
					WG-7987-052616-SG-009	1.0 UJ	ug/L

Notes:

-- - Not applicable
%D - Percent difference
RRF - Relative Response Factor
J - Estimated concentration
UJ - Not detected; associated reporting limit is estimated

Table 3

Qualified Sample Results Due to Analyte Concentrations in the Method Blanks
Annual Groundwater Monitoring
Gratwick-Riverside Park Site
North Tonawanda, New York
May 2016

Parameter	Analyte	Analysis Date (mm/dd/yyyy)	Blank Result *	Sample ID	Original Result	Qualified Result	Units
SVOCs	4-Methylphenol	5/31/2016	0.851J	WG-7987-052616-SG-001	6.4 J	9.3 U	ug/L
				WG-7987-052616-SG-010	0.84 J	9.4 U	ug/L
				WG-7987-052616-SG-011	0.47 J	9.1 U	ug/L
				WG-7987-052716-SG-012	0.90 J	9.8 U	ug/L
				WG-7987-052616-SG-003	0.52 J	9.5 U	ug/L

Notes:

* - Blank result adjusted for sample factors where applicable
U - Not detected at the associated reporting limit
J - Estimated concentration

Appendix D
Laboratory Deliverables
May 2016 Groundwater Sampling Event
(on CD)

Appendix E
NYSDEC Correspondence

7907

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 9
270 Michigan Avenue, Buffalo, NY 14203-2915
P: (716) 851-7220 I F: (716) 851-7226
www.dec.ny.gov

2015 DEC -7 PM 5:36

December 3, 2015

Dale Marshall, P.E.
City of North Tonawanda
City Hall
216 Payne Ave.
North Tonawanda, NY 14120-5493

Dear Mr. Marshall:

Site Management (SM) Periodic Review Report (PRR) Response Letter
Gratwick - Riverside Park, North Tonawanda
Niagara County
Site No.: 932060

The Department has reviewed your Periodic Review Report (PRR) and IC/EC Certification for following the period of June 1, 2014 to May 31, 2015.

The Department hereby accepts the PRR and associated Certification. However, we have several comments that need to be addressed. The comments are as follows:

1. In Section 1.0 Introduction, first sentence, states that the O&M Report is the 13th Annual. The two previous O&M Reports; June 2012 to May 2013 and June 2013 to May 2014 state that they are the 12th Annual. Please clarify.

2. In Section 1.0 Introduction, second sentence, states that the O&M Manual dated March 2002 was revised January 2004, May 2009 and June 2014. We do not have copies of the revised manuals. For the records, please provide electronic copies or excerpts of the revisions.

3. Section 2. Groundwater Withdrawal System (GWS) 2.1 Hydraulic Monitoring. This section describes monthly water elevations and the points to determine the vertical and horizontal gradients for the groundwater. Of importance is to maintain inward groundwater gradients toward the collection system at all times. This was not done from December 2014 through April 2015 at River North/MH2 and March and April 2015 in the area of River Middle/MH8. This was primarily due to pump failures. This section also goes into detail on the construction of the barrier wall, groundwater velocity and the calculations on how long it would take for the groundwater to migrate through the barrier wall. Though the calculations indicate that it would take 5 years for the groundwater to migrate though the barrier wall, it is not prudent for the pumps to be down for extended

periods of time. As to the cause of the pump failure(s), we recently learned that there appears be a cache of black viscous material (BVM) in and around Pump Station 3/Manhole 15 that fouled the bottom of the chamber and pump discharge piping. To abate this issue, North Tonawanda reported with the Department's previous advisement and concurrence, that North Tonawanda's DPW or contractor assign, will frequently perform inspections and treat BVM build up with muriatic acid solution, to dissolve the BVM and eliminate or minimize BVM build up/pipe restriction to keep the pumps operating. This also is to be done at Pump Station 1/Manhole 3 and Pump Station 2/Manhole 9 if BVM is suspected to be fouling operations.

4. Section 3.0 Site Inspections, sections i, ii, and iii review the higher water levels throughout the site in the southern, northern and middle portions of the GWS. In each, there is an explanation or activity to that particular area of the GWS. This is not the case however in iv; soil erosion and wire mesh exposed along portions of the shoreline. What corrective measures were done in these areas to abate the soil erosion and exposures of the wire mesh? If none. What abatements are planned or can consistently be implemented such as the installation of angular stone?

The frequency of Periodic Reviews for this site is 1 year, the next PRR is due on October 3, 2016. You will receive a reminder letter and updated certification form 75-days prior to the due date.

If you have any questions, please contact me at 716-851-7220 or e-mail: brian.sadowski@dec.ny.gov

Sincerely,

Brian Sadowski
Project Manager

BS:tm

ec: Gregory Sutton, RHWE, Buffalo
Matthew Forcucci, DOH, Buffalo

Schmidtke, Klaus

From: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Sent: Wednesday, April 27, 2016 10:13 AM
To: dalemar@northtonawanda.org
Cc: Schmidtke, Klaus; rowlesdpw@northtonawanda.org; Patty Brosius; rowlesdpw@northtonawanda.org; Amanda Reimer; David Maziarz
Subject: RE: DEC Response to 2015 Periodic Review Report

Thanks Dale,

Glad to see that there are plans to keep the pipes clear and the pumps operating. Same with the efforts to keep the recession of the shoreline in check.

Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Wednesday, April 27, 2016 9:39 AM
To: Sadowski, Brian (DEC)
Cc: Schmidtke, Klaus; rowlesdpw@northtonawanda.org; Patty Brosius; rowlesdpw@northtonawanda.org; Amanda Reimer; David Maziarz
Subject: RE: DEC Response to 2015 Periodic Review Report

Thank you Brian,

In regards to your questions, I'd kindly ask Klaus to comment on the first two.

In regards to the pump station and forcemain, we've devised a plan to acid wash the entire system this spring, hopefully in May. It will involve going into each of the three pump stations to make piping connections for venting and blowdown capture. Once we have the main cleaned, we'd like to replace the interior piping in each of the pump stations. This is confined space entry work that will involve the hiring of a qualified contractor.

As far as the shoreline, I've been working with the DPW and Parks Department in an effort to keep up with the erosion. Last fall DPW solved some of the problems but more stone is required. Hopefully the erosion comments will be gone by the time of our next submission to DEC.

Regards,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Wednesday, April 27, 2016 9:07 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: FW: DEC Response to 2015 Periodic Review Report

Hi Dale,

Hope all is well. Just a note that I pushed out the due date for the next PRR to 10/3/16. Albany wanted to get the reminder Notice Letter out yesterday. Typically the report is due 30 days after the reporting period. For Gratwick this would have been May 31st. However, I know that groundwater monitoring has to be done, so the push out will work. You should receive the reminder in mid-July.

In regards to the 2015 PRR comments (att.). Has there been any progress on determining/activity status, of:

1. Number of OM&M reports.
2. Revisions made to the O&M Plan and us getting excerpts of that.
3. Operations of Pump Stn. No. 3 and periodic dosing of muriatic acid to break down phenolic resin "BVM" to facilitate pumping. Same with Pump Stations 1&2.
4. Shoreline erosion control plan or work done to stop/slow soil subsidence through wire mesh.

Thanks,
Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Wednesday, December 09, 2015 9:34 AM
To: Sadowski, Brian (DEC)
Subject: RE: DEC Response to 2015 Periodic Review Report

Thanks Brian.

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Wednesday, December 09, 2015 9:32 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: Steve Pachla <pachladpw@northtonawanda.org>; Sutton, Gregory (DEC) <gregory.sutton@dec.ny.gov>; Schmidtke, Klaus <klaus.schmidtke@ghd.com>; Brad Rowles <rowlesdpw@northtonawanda.org>
Subject: RE: DEC Response to 2015 Periodic Review Report

Dear Dale,

Attached are NYSDOT specs. as guidance on erosion control. Other specifications may be useful for general construction projects in N.T.

Regards,

Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Tuesday, December 08, 2015 3:43 PM
To: Schmidtke, Klaus; rowlesdpw@northtonawanda.org

Cc: Steve Pachla; Mike Guidotti; David Maziarz; Sadowski, Brian (DEC); Sutton, Gregory (DEC); Amanda Reimer; Kay, Jim; Patty Brosius
Subject: DEC Response to 2015 Periodic Review Report

Dear Klaus,

Attached are DEC's comments to our 2015 PRR for Gratwick that we need to respond to. Their main concern has to do with the lack of a positive outward gradient due to pumping operations.

I agree with their suggestions of adding muriatic acid to each pump station on a regular basis to keep the system from clogging again. As we discussed last week, I'd like to set up a meeting with you and the city as a yearend review of the tasks set forth in our meeting last December and to plan the improvements for this year. How does your schedule look this December?

Finally, I think it's a good time for Parks and DPW to be addressing the erosion concerns while the weather is still favorable.

I look forward to your response.

Regards,

Dale

Schmidtke, Klaus

From: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Sent: Thursday, April 28, 2016 7:59 AM
To: Schmidtke, Klaus
Subject: RE: DEC Response to 2015 Periodic Review Report ~COR-007987~

Thanks Klaus.

From: Schmidtke, Klaus [mailto:Klaus.Schmidtke@ghd.com]
Sent: Wednesday, April 27, 2016 10:48 AM
To: Sadowski, Brian (DEC)
Cc: dalemar@northtonawanda.org; Project Email Filing
Subject: DEC Response to 2015 Periodic Review Report ~COR-007987~

Brian

Pursuant to Dale's request, responses to the NYSDEC comments 1 and 2 are provided below. The responses are numbered in accord with the NYSDEC comments.

1. The correct numbers for the annual O&M Reports are:
   - June 2012 to May 2013 12th annual report
   - June 2013 to May 2014 13th annual report
   - June 2014 to May 2015 14th annual report.

Revised pages for the 13th and 14th annual report are attached.

2a. January 2004 Revision

The original O&M Manual was submitted to the NYSDEC in March 2002. Revisions to address NYSDEC comments were made until January 2004 at which time a final O&M Manual was submitted to the NYSDEC. Unfortunately, the date on the cover pages was not updated to January 2004 for that submittal. The final O&M Manual was approved by the NYSDEC on April 20, 2005. Thus, the O&M Manual dated March 2002 contains all the revisions up to January 2004.

2b. May 2009 Revision

The May 2009 revisions were changes to the scope of sampling, which changes were described in Section 4.2 of the June 2007 to May 2008 O&M Report. These changes, to be effective May 2009, were approved by the NYSDEC letter dated February 23, 2009. No revisions were made to the O&M Manual to reflect these changes. Rather, the scope of sampling for future years was, and continues to be, described in the appropriate sections of each annual O&M Report.

2c. June 2014 Revision

The June 2014 revision was an Addendum describing sediment removal from the Groundwater Withdrawal System manholes. The Addendum, to be inserted into the O&M Manual, was provided as Appendix F in the June 2013 to May 2014 O&M Report.

Please contact me if you have any questions.

Regards,

Klaus Schmidtke Ph.D., P. Eng.

GHD
T: 1 519 884 0510 | F: 1 519 884 0525 | Email: klaus.schmidtke@ghd.com | www.ghd.com
Mailing address: 651 Colby Drive Waterloo Ontario N2V 1C2 Canada
Office address: 140 Bathurst Drive Waterloo Ontario N2V 1V7 Canada

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Section 1.0 Introduction

This report is the 13th annual Operation and Monitoring Report (O&M Report) for the remedial actions constructed at the Gratwick-Riverside Park Site (Site) located in North Tonawanda, New York. This report covers the period from June 2013 to May 2014 and was prepared pursuant to Section 7.0 of the report entitled "Operation and Maintenance Manual" (O&M Manual) dated March 2002 (revised January 2004 and May 2009). It is noted that New York State Department of Environmental Conservation (NYSDEC) approval for the O&M Manual was given on April 20, 2005. All O&M activities have been performed in accordance with the methods and frequencies specified in the O&M Manual and as modified in previous annual reports and approved by NYSDEC. In accordance with the approved monitoring changes, the groundwater is monitored annually in five wells and an additional seven wells are monitored once every two years as of and including May 2013. The surface water quality of the Niagara River adjacent to the Site is not impacted by the Site and is no longer monitored. The collected groundwater that is discharged from the Site is monitored semi-annually in accordance with the City of North Tonawanda Wastewater Discharge Permit (effective March 1, 2013). A copy of the permit is included in Appendix A.

Section 2.0 Groundwater Withdrawal System (GWS)

Full-time operation of the Groundwater Withdrawal System (GWS) at the Site started on May 4, 2001. The objectives of the GWS are to:

i) Achieve and maintain an inward gradient from the Niagara River toward the GWS

ii) Achieve and maintain an upward gradient from the fill alluvium layer beneath the GWS

In order to determine whether the objectives are being met, hydraulic and chemical monitoring programs have been developed. These programs include Site groundwater and GWS effluent monitoring. The wells, manholes, wet wells, and storm sewer outfalls that comprise the monitoring network are shown on Figure 2.1. The monitoring programs are described in the following subsections.

2.1 Hydraulic Monitoring

Hydraulic monitoring consists of the collection of water levels in monitoring wells and manholes, and River water levels at the storm sewer outfalls. These data are then used to determine the vertical and horizontal gradients for the groundwater.

1. Introduction

This report is the 14th annual Operation and Monitoring Report (O&M Report) for the remedial actions constructed at the Gratwick-Riverside Park Site (Site) located in North Tonawanda, New York. This report covers the period from June 2014 to May 2015 and was prepared pursuant to Section 7.0 of the report entitled "Operation and Maintenance Manual" (O&M Manual) dated March 2002 (revised January 2004, May 2009 and June 2014). It is noted that New York State Department of Environmental Conservation (NYSDEC) approval for the O&M Manual was given on April 20, 2005. All O&M activities have been performed in accordance with the methods and frequencies specified in the O&M Manual and as modified in previous annual reports and approved by NYSDEC. In accordance with the approved monitoring changes, the groundwater is monitored annually in five wells and an additional seven wells are monitored once every two years as of and including May 2013. The surface water quality of the Niagara River adjacent to the Site is not impacted by the Site and is no longer monitored. The collected groundwater that is discharged from the Site is monitored semi-annually in accordance with the City of North Tonawanda Wastewater Discharge Permit (effective March 1, 2013). A copy of the permit is included in Appendix A.

2. Groundwater Withdrawal System (GWS)

Full-time operation of the Groundwater Withdrawal System (GWS) at the Site started on May 4, 2001. The objectives of the GWS are to:

i) Achieve and maintain an inward gradient from the Niagara River toward the GWS.

ii) Achieve and maintain an upward gradient from the fill alluvium layer beneath the GWS.

In order to determine whether the objectives are being met, hydraulic and chemical monitoring programs have been developed. These programs include Site groundwater and GWS effluent monitoring. The wells, manholes, wet wells, and storm sewer outfalls that comprise the monitoring network are shown on Figure 2.1. The monitoring programs are described in the following subsections.

2.1 Hydraulic Monitoring

Hydraulic monitoring consists of the collection of water levels in monitoring wells and manholes, and River water levels at the storm sewer outfalls. These data are then used to determine the vertical and horizontal gradients for the groundwater.

The water levels in four GWS manholes and in the River were monitored to confirm that an inward gradient exists. The water levels in five GWS manholes and in four monitoring wells installed near the GWS alignment in the materials directly overlying the confining unit were monitored to confirm that an upward gradient exists. The specific manholes and monitoring wells used to determine the horizontal and vertical gradients are listed in Table 2.1.

Groundwater elevations are measured on a monthly basis. The measured water levels for the time period June 2011 through May 2015 are provided in Table 2.2. The horizontal and vertical gradients for this reporting period are provided in Tables 2.3 and 2.4, respectively. The water levels and

Schmidtke, Klaus

From: Dale Marshall <dalemar@northtonawanda.org>
Sent: Monday, July 11, 2016 2:51 PM
To: Sadowski, Brian (DEC)
Cc: May, Glenn (DEC); Forcucci, Matthew J (HEALTH); Brad Rowles; Bill Davignon; Schmidtke, Klaus; McGarvey, Paul GHD; David Maziarz; rszucs (rszucs@kandeycompany.com)
Subject: RE: Conference Call to Discuss Planned Scope of Work - Gratwick Forcemain Cleaning

Dear Brian,

We are in agreement with you that we need a good visual indication that our pipe cleaning was effective. The best way would be to do as you suggest. With the piolet program of cleaning the downstream most section of pipe first, the contractor is proposing to video inspect this section from the meter building to the outfall chamber.

Regards,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Monday, July 11, 2016 1:42 PM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>; Forcucci, Matthew J (HEALTH) <matthew.forcucci@health.ny.gov>
Subject: RE: Conference Call to Discuss Planned Scope of Work - Gratwick Forcemain Cleaning

Dale,

Thanks for submitted the Work Plan. We have done our review. It is thorough and straight forward. The only comment we have is on the inspection of the forcemain. Due to the length of the sections, we hope that N.T. strongly considers the insertion of a camera instead of relying on a visual at the installed "T". It seems that the camera would be the best way to determine the effectiveness of the procedures and whether or not to modify.

Regards,
Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Monday, July 11, 2016 8:45 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; Katherine Alexander <kalexander@northtonawanda.org>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>; McGarvey, Paul GHD <paul.mcgarvey@ghd.com>; Bill Davignon <wmd_ntwwtp@live.com>; David Maziarz <davidmaz@northtonawanda.org>; Amanda Reimer <amandarei@northtonawanda.org>
Subject: RE: Conference Call to Discuss Planned Scope of Work - Gratwick Forcemain Cleaning

Dear Brian,

I was off Friday and just got your email. GHD had finished up the work plan late last week and I didn't get a chance to send it to you.

Attached is the work plan for your review and comment.

Regards,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Friday, July 08, 2016 10:01 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: FW: Conference Call to Discuss Planned Scope of Work - Gratwick Forcemain Cleaning

Hi Dale,

We were wondering what the work plan status is of the GWS cleaning?

Thanks,
Brian

From: Sadowski, Brian (DEC)
Sent: Thursday, May 19, 2016 2:18 PM
To: 'Dale Marshall' <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>; 'Schmidtke, Klaus' <Klaus.Schmidtke@ghd.com>
Subject: FW: Conference Call to Discuss Planned Scope of Work - Gratwick Forcemain Cleaning

Dale,

Good phone conference with you, Klaus, Bill and Joe. Glenn and I will look for the detailed pdf Work Plan on or around the first or second week of June.

Brian

From: Sadowski, Brian (DEC)
Sent: Wednesday, May 18, 2016 9:59 AM
To: 'Schmidtke, Klaus' <Klaus.Schmidtke@ghd.com>
Cc: 'Dale Marshall' <dalemar@northtonawanda.org>; May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: RE: Conference Call to Discuss Planned Scope of Work - Gratwick Forcemain Cleaning

Ok. Thanks Klaus. Since were on this and I've been talking to my "Supers" these are some pre-meeting thoughts for us to discuss.

We will need a detailed Work Plan, (e.g., length of pipe, procedures on cleaning, equipment, jet points and vac points, disposal, work hours, estimated duration of project, handling of public access, control of possible odors/vapors, possible community air monitoring depending upon cleaning procedures and DOH requirements (park), handling of accidental release, oversite, handling of questions from the public.....

Regards,

Brian

From: Schmidtke, Klaus [mailto:Klaus.Schmidtke@ghd.com]
Sent: Wednesday, May 18, 2016 8:55 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: dalemar@northtonawanda.org
Subject: FW: Conference Call to Discuss Planned Scope of Work - Gratwick Forcemain Cleaning

Brian

The agenda for the call is:
1. Proposed plan to clean the Gratwick-Riverside Park groundwater withdrawal system force main
2. Type and level of documentation desired by the NYSDEC (e.g., conceptual plan, detailed design drawings, construction report).

The call in numbers are:
Phone No: 1-866-721-5495
Access No: 965997#

Regards,

Klaus Schmidtke Ph.D., P. Eng.

GHD
T: 1 519 884 0510 | F: 1 519 884 0525 | Email: klaus.schmidtke@ghd.com | www.ghd.com
Mailing address: 651 Colby Drive Waterloo Ontario N2V 1C2 Canada
Office address: 140 Bathurst Drive Waterloo Ontario N2V 1V7 Canada

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From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Friday, May 13, 2016 2:13 PM
To: Schmidtke, Klaus
Cc: dalemar@northtonawanda.org; May, Glenn (DEC)
Subject: RE: Conference Call to Discuss Planned Scope of Work - Gratwick Forcemain Cleaning

Klaus,

Do you have an agenda of what you want to discuss that you could forward to us?

Thanks,
Brian

From: Schmidtke, Klaus [mailto:Klaus.Schmidtke@ghd.com]
Sent: Thursday, May 12, 2016 3:40 PM
To: Sadowski, Brian (DEC)
Cc: dalemar@northtonawanda.org
Subject: Conference Call to Discuss Planned Scope of Work - Gratwick Forcemain Cleaning

Brian

Dale and I wish to have a brief conference call with you to discuss the proposed plan to clean the force main at Gratwick.
What times would you be available next Monday to Thursday?
Once a time is selected, I will provide call-in numbers.

Regards,

Klaus Schmidtke Ph.D., P. Eng.

GHD
T: 1 519 884 0510 | F: 1 519 884 0525 | Email: klaus.schmidtke@ghd.com | www.ghd.com
Mailing address: 651 Colby Drive Waterloo Ontario N2V 1C2 Canada
Office address: 140 Bathurst Drive Waterloo Ontario N2V 1V7 Canada

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