

DURHAM YORK ENERGY CENTRE

2015 GROUNDWATER AND SURFACE WATER MONITORING REPORT

Regional Municipality of Durham

Project No. 111-26648-00-100-0414016

April 2016

Distribution:

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April 29, 2016

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**Subject: Durham York Energy Centre
2015 Groundwater and Surface Water Monitoring Report
Project No. 111-26648-00-100-0414016**

Dear Mr. Anello:

We are pleased to forward the 2015 Water Monitoring Report for the Durham York Energy Centre. This hydrogeological report presents an assessment of the natural (baseline) groundwater characteristics of the site prior to, and during, the construction phase, and the monitoring results during the recent operation of the facility. Comments provided by the Regions have been incorporated into the report.

The groundwater monitoring program was completed in accordance with the program described in the *Durham York Energy Centre Groundwater and Surface Water Monitoring Plan*, prepared by Stantec Consulting Ltd, dated September 14, 2011. Our report includes groundwater elevation and chemical data collected during the monitoring events between December 2011 and November 2015. Findings are summarized in the conclusions and recommendations section, and technical information is appended.

In general, the existing groundwater characteristics are reflective of natural groundwater conditions site, and the operation of the facility has not adversely affected the on-site groundwater quality. The groundwater monitoring program outlined in the Groundwater and Surface Water Monitoring Plan should be continued into 2016.

The surface water sondes program should be suspended for up to three (3) years, until the construction activities associated with the 401/407 interchange have been completed.

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Thank you for the opportunity to work on this study. If there are any questions, please contact us.

Yours truly,
WSP Canada Inc.

A handwritten signature in blue ink, appearing to read "S. Taziar", written over a faint, light blue circular stamp.

Stephen J. Taziar, P.Eng.
Senior Project Engineer

BMH:nah

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1 INTRODUCTION

1.1 BACKGROUND

The Durham York Energy Centre is an energy from municipal solid waste facility constructed in the Municipality of Clarington, Ontario. The site property is located on the west side of Osborne Road, southeast of the Courtice Road and Highway 401 interchange, and north of the Courtice Water Pollution Control Plant and the CN Railway, as shown in Figure 1-1. The facility is owned by The Regional Municipality of Durham and The Regional Municipality of York, and is operated by Covanta.

The water monitoring programs for the site were outlined in the *Durham York Energy Centre Groundwater and Surface Water Monitoring Plan*, prepared by Stantec Consulting Ltd, dated September 14, 2011, in accordance with Condition 20 of the Environmental Assessment (EA) for the site. To date, the groundwater monitoring component has been carried out by WSP Canada Inc. (formerly GENIVAR); and the surface water monitoring component was carried out by Golder Associates during the Construction Phase of the monitoring plan, and by WSP during the Operations Phase. The Durham York Energy Centre is located upon approximately 12.1 hectares of rural land. The site layout is shown in the Site Plan, Figure 1-2.

1.2 OBJECTIVE AND SCOPE

The principal objectives of the 2015 annual water monitoring program are as follows.

- To assess and compare on-site groundwater characteristics to baseline results, as part of the operational phase.
- To assess the compliance of the groundwater quality with Ontario Drinking Water Quality Standards.
- To assess surface water quality along Tooley Creek.
- To assess the need for remedial measures.
- To determine if changes are required for the 2016 monitoring program.

The 2015 water monitoring program involves a data collection component and an analysis and interpretation component.

1.3 METHODOLOGY

1.3.1 GROUNDWATER MONITOR INSTALLATIONS

Six groundwater monitors at four Borehole Locations were installed on the subject site between December 19 and 21, 2011, in accordance with the Durham York Energy Centre Groundwater and Surface Water Monitoring Plan. Drilling of the boreholes was undertaken by a soils drilling rig, and installation of the groundwater monitors was supervised in the field by WSP personnel. Single monitors were installed at Borehole Locations MW1 and MW4, and nests of two groundwater monitors were installed at Borehole Locations MW2 and MW3. During the soils drilling, split spoon samples were obtained and standard penetration tests were completed. This information was recorded in a project dedicated field book by the supervising field technician. Each groundwater monitor consists of 50 mm, Schedule 40, PVC and a 100 mm x 100 mm steel, lockable, protective casing.

Once the groundwater monitors were completed, dedicated high density polyethylene (HDPE) tubing, connected to inertial-lift sampling systems, were installed within each monitor. The monitors were subsequently purged to remove any water that may have been added during the drilling process, remove any fine-grained material within the monitor, and to establish a hydraulic connection with the surrounding in-situ soils.

During 2013, the riser for Monitor MW4 was shortened in response to the construction of the East Stormwater Management Pond. The monitor shortening involved the removal of 2.6 metres of riser and re-installation of the steel protective casing, in accordance with O. Reg. 903. Approximately 1.5 metres of the total riser were removed in June and the additional 1.1 metres of riser were removed in July 2013. The height adjustment of the monitor will not have an influence on the monitoring objectives for this location.

Monitors MW3A and MW3B were decommissioned in September 2013 due to infrastructure construction activities in the local area. These monitors were replaced in March 2014 by monitors designated as MW3A-R and MW3B-R, which were screened at the same approximate depths as the original monitors at MW3. Two additional groundwater monitors, designated MW5A and MW5B, were also installed within the central portion of the property in March 2014. Monitors MW5A/5B were installed in accordance with the Durham York Energy Centre Groundwater and Surface Water Monitoring Plan, and were incorporated into the routine groundwater monitoring program. Monitors MW5A and MW5B were drilled to a depth of approximately 9 m and 6 m below grade, in accordance with the Monitoring Plan.

1.3.2 SLUG TESTS HYDRAULIC RESPONSE TESTING

Following the installation and development of the six groundwater monitors, hydraulic response testing was undertaken to provide estimates of the horizontal hydraulic conductivity of the formation material surrounding the screened interval. Rising head tests (removing water and monitoring the change in water level) were conducted at each monitoring location. An assessment of the test results provided the following hydraulic conductivities:

- MW1: 1.8×10^{-7} m/s
- MW2A: 9.0×10^{-7} m/s
- MW2B: 5.8×10^{-8} m/s
- MW3A: 1.6×10^{-8} m/s
- MW3B: 3.4×10^{-7} m/s
- MW4: 8.0×10^{-7} m/s

These hydraulic conductivities are consistent with silt and till soils, and will be used for future assessments associated with groundwater flow velocities.

1.3.3 GROUNDWATER MONITORING

The established groundwater monitoring program for the site, as outlined in the Durham York Energy Centre Groundwater and Surface Water Monitoring Plan requires the collection of groundwater samples from the on-site monitors three times per year, in the spring, summer, and fall. The measurement of

groundwater levels at the monitoring locations was completed in conjunction with the groundwater sampling events on the following dates:

- April 16, 2015
- Aug 10, 2015
- November 9, 2015

Prior to sampling, monitors were purged of at least three volumes of standing water, or were purged dry, using the dedicated inertial lift pump in accordance with established sampling protocols for this site and with industry standards. Samples were collected directly in bottles provided by the laboratory and submitted to AGAT Laboratories in Mississauga for analysis of the inorganic and metal parameters listed below, in accordance with the Durham York Energy Centre Groundwater and Surface Water Monitoring Plan.

- | | | |
|---------------|-------------|-----------|
| → Carbonate | → Magnesium | → Cadmium |
| → Bicarbonate | → Potassium | → Cobalt |
| → Chloride | → Sodium | → Lead |
| → Sulphate | → Boron | → Mercury |
| → Calcium | | |

Samples intended for metals analysis were filtered in the field using 0.45 micron in-line disposable filters. Groundwater samples were analysed in the field for pH, conductivity, temperature, and oxidation reduction potential.

AGAT Laboratories is accredited by the Canadian Association for Laboratory Accreditation (CALA) and the Standards Council of Canada (SCC).

1.3.4 SURFACE WATER SONDES

As a condition of the MOECC approved Groundwater and Surface Water Monitoring Plan, two surface water sondes were installed along Tooley Creek in May 2015, and removed in December 2015. The locations of these sondes are shown in Figure 1-3. Sonde 1 (upstream) was installed north of the CN rail line, and Sonde 2 (downstream) was installed south of the CN rail line and the discharge channel from the DYEC, in accordance with Groundwater and Surface Water Monitoring Plan. These surface water monitoring locations were selected to assess potential DYEC influences on surface water quality within Tooley Creek. The sondes are designed to monitor the following surface water parameters on an hourly basis:

- | | |
|----------------|-------------|
| → Temperature | → pH |
| → Conductivity | → Turbidity |

Monitoring data for the surface water sondes was downloaded by WSP staff on a regular interval; generally 15 to 18 days between events. Sonde 2, located downstream of the discharge channel, failed to download in November 2015 and was not functional for the remainder of the year. Once the damaged unit was returned to the supplier, it was determined that a seal in the housing had failed, resulting in water entering the unit. The sonde unit could not be restored or repaired before the end of the monitoring period.

1.3.5 INTERPRETATION AND REPORTING

Following collation of the database, a detailed analysis and interpretation of the data was completed. This component included the following items.

- Preparation of time-concentration graphs
- Statistical assessment
- Interpretation of short-term surface water quality patterns and trends
- Groundwater quality compliance with Ontario Drinking Water Quality Standards
- Surface water quality comparison with Provincial Water Quality Objectives and Canadian Water Quality Guidelines.
- Consideration of future monitoring

Results of the 2015 groundwater and stream monitoring program with conclusions and recommendations are presented in this report.

2 PHYSICAL SETTING

The geologic setting has previously been described in previous reports, including the Durham York Energy Centre Groundwater and Surface Water Monitoring Plan, prepared by Stantec Consulting Ltd. The Durham York Energy Centre is situated in the physiographic region of the Iroquois Plain, as described by Chapman & Putnam (1984). In the vicinity of the subject site, this region is comprised of silty lacustrine deposits and tills. The Stantec report indicates that the Durham York Energy Centre is underlain by Newmarket Till, which is a dense till comprised of clayey silt and sand till. The layer is estimated to be between 25 and 30 m deep, according to various references in the Stantec report.

The surficial soils on-site, as described in the borehole logs, Item A-3, Appendix A, are comparable to the soils described above. As shown in the borehole logs, the shallow soils on-site, to a depth of approximately 10 metres, include layers of sandy silt till, silt till, clayey silt, and silty sand. The varying thicknesses of the units generally range between 0.2 m and 4.5 m within the boreholes drilled in December 2011.

An interpretation of shallow groundwater flow direction is presented in Figure 1-2, based on the November 2015 water level elevations. As shown in the figure, shallow groundwater flow is in a general southwest direction.

It is noted that the groundwater elevations within the southeast portion of the site decreased during the November 2012 monitoring event, compared to the March 2012 event, in response to the construction of the East Stormwater Management Pond. Water level elevations within Monitor MW4 since the November 2012 event are similar to, but slightly higher than, the base elevation of the East Stormwater Management Pond. The decrease in water levels adjacent to the stormwater management ponds in 2012 is not unexpected, as this aspect was predicted in Section 2.2 of the Durham York Energy Centre Groundwater and Surface Water Monitoring Plan. It is noted, however, that the localized influence of the stormwater management ponds on the shallow groundwater flow regime will not have an adverse influence on the shallow groundwater flow patterns for the areas around the site.

As shown in Figure A-1, Appendix A, the groundwater elevations noticeably decreased at monitor MW1 during the November 2013 and April 2014 sampling events. The decrease in water level elevations is attributed to excavation activities to the west of the subject property for the installation of trunk sewer infrastructure. The approximate location and configuration of the trunk sewer is shown in Figure 1-2. Based on the 2015 monitoring results, the water level within Monitor MW1 is slowly recovering from the relative lows in 2014.

Groundwater levels within monitoring nests MW2 and MW3R, as shown in Figures A-2 and A-3, indicate that the slight vertical hydraulic gradients are generally downwards, on-site.

3 MONITORING RESULTS

3.1 QUALITY ASSURANCE/QUALITY CONTROL

Duplicate groundwater samples were collected during the sampling events in 2015 as part of the QA/QC program. A summary of the results for the duplicate samples obtained during the April and October events is provided in Table B-3, Appendix B, along with the relative percent differences (RPD). It is considered that the results of samples for which the relative percent differences (RPD) are less than 20%, applied to parameter concentrations that are at least 5 times the Limit of Quantitation (LOQ), can generally be interpreted with confidence. As shown in the table, the RPD values were less than the 20% guideline for the duplicate samples. These results indicate that the laboratory values can be interpreted with confidence.

3.2 GROUNDWATER QUALITY

Based on the configuration of the groundwater flow system, Borehole Locations MW1 and MW2 are considered to be upgradient of the on-site buildings, and represent the background water quality for the site. Borehole Locations MW3, MW4 and MW5 are downgradient or cross-gradient from the facility buildings within the property boundary, and provide monitoring locations for assessment of potential future influences from on-site activities.

3.2.1 FIELD CHEMICAL RESULTS

A comparison of field and laboratory values indicates that the field pH and conductivity measurements were generally similar to the laboratory results. Any differences between field and laboratory values are attributed primarily to differences in the testing environment and analytical equipment.

3.2.2 CONCENTRATION TRENDS

The groundwater laboratory analytical results are summarized in Table B-2, Appendix B. The time-concentration graphs for chloride, sulphate, calcium, magnesium, potassium, boron, and bicarbonate are provided in Figures B-1 to B-8, Appendix B. As shown in these figures, parameter concentrations for the groundwater monitors are generally constant over the short term, between December 2011 and November 2015, although the following patterns are noted.

- Within the nested monitors at Borehole Location MW2, concentrations for chloride, sulphate, calcium, magnesium, potassium and bicarbonate are generally higher within the shallow monitor, MW2B, compared to the deeper monitor MW2A; whereas boron concentrations were slightly higher at the deeper monitor compared to the shallow monitor, at this location.

- Concentrations for chloride at monitor MW2B were relatively stable through 2012 and 2013, but the concentrations noticeably increased in 2014 and early 2015. The chloride concentrations appear to have stabilized over the short term, for the remainder of 2015. Based on the close proximity to Osborne Road and the recent development in the area, the increased chloride concentrations are likely attributed to road salt effects. Continued monitoring will permit an assessment of the recent increases over the long term.
- Within the nested monitors at Borehole Location MW3, concentrations for sodium and boron are higher within the deeper monitor, MW3A, compared to the shallow monitor MW3B; whereas chloride, sulphate, calcium, magnesium, potassium, and bicarbonate concentrations were higher within the shallow monitor compared to the deeper monitor, at this location. Concentrations for the analysed parameters at the replacement monitors, MW3A-R and MW3B-R are generally similar to the values within the original locations, although chloride and sodium concentrations within monitor MW3A-R are slightly lower compared to the original monitor.
- Concentrations for chloride, magnesium, potassium, and bicarbonate vary over a larger range at Monitor MW4, compared to the other groundwater monitors installed on-site.

The variations in the groundwater chemistry between the groundwater monitoring locations, and at the two nested monitoring locations, is attributed to various factors including soil type that the monitors are screened in, off-site (upgradient) influences, and previous land uses at the site. Since groundwater movement through the various silty till soils will be relative slow, compared to a sandy soil, historical influences on the local groundwater quality from previous land uses on-site, and upgradient of the site, will be reflected in the groundwater quality that has been assessed, to date.

The chemical data collected between December 2011 and November 2015 will provide a baseline for future comparison of possible groundwater variances. The patterns listed above only provide an initial summary of early noticeable patterns at the specific sampling locations and do not indicate an adverse influence on the local shallow groundwater quality. It is noted that groundwater characteristics will vary between sampling events, and the short term trends listed above are not an indication or a prediction of the future trend for parameter concentrations at this site.

3.2.3 WATER QUALITY COMPLIANCE/REGULATORY CRITERIA

The groundwater quality data indicate that concentrations satisfy the Ontario Drinking Water Quality Standards, as part of Ontario Regulation 169/03. These Standards are associated with health related parameters and are not associated with aesthetic objectives or operational guidelines.

As shown in Figure B-2, sodium concentrations generally ranged between 8 mg/L and 32 mg/L at the groundwater monitoring locations, although sodium concentrations at monitors MW3A and MW4 ranged between 30 mg/L and 50 mg/L. These sodium concentrations satisfy the aesthetic objective for drinking water of 200 mg/L. As indicated in the Technical Support Document for the Ontario Drinking Water Standards, Objectives, and Guidelines, although the local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L, so that information can be communicated to local physicians for their use with patients on sodium restricted diets, the actual aesthetic objective for sodium is 200 mg/L. It is noted that there are no groundwater users downgradient of the Durham York Energy Centre.

The parameter concentrations exhibited at the on-site groundwater monitors are considered to be representative of natural water quality conditions, or are associated with upgradient land uses, in place prior to the construction activities, and are not attributed to the on-site activities or operations.

3.2.4 CONTINGENCY MEASURES

In accordance with Condition 17 of the Environmental Assessment Notice of Approval, a Spill Contingency and Emergency Response Plan has been developed for the site. The plan outlines the actions to be taken if on-site spills require groundwater sampling and established communications protocol between the Ministry, the Owners, and their consultants.

3.3 SURFACE WATER SONDES

3.3.1 MONITORING RESULTS

During the download and routine maintenance events for the sondes, field measurements for temperature, pH, conductivity, and turbidity were obtained within the stream. A comparison of field and sonde values indicates that the field temperature, conductivity, and turbidity measurements were generally similar to the sonde results, although there was some variance for the pH results.

The surface water sonde parameters for the two sondes are compared against each other in time-concentration graphs for temperature, conductivity, pH, and turbidity are provided in Figures C-1 to C-4, Appendix C. As shown in these figures, parameter concentrations for the two surface water sondes are generally comparable, between May and December 2015, with the following patterns noted:

- The temperatures are similar at Sonde 1 (upstream) and Sonde 2 (downstream), during the respective monitoring intervals.
- Conductivity values at upstream Sonde 1 are generally higher compared to the results at downstream Sonde 2.
- The pH results at the two sondes are generally similar, although there are periods when the values at Sonde 1 are slightly higher or slightly lower than the pH measurements at Sonde 2.
- The turbidity results at the two sondes are generally similar, although the values at upstream Sonde 1 are periodically higher compared to the turbidity measurements at downstream Sonde 2.

As shown in Figure C-4, the turbidity values at the downstream sonde were higher than the values at the upstream sonde for an extended period, between July 1 and July 21. This occurrence, and other similar ones, may be attributed to discharge received in Tooley Creek from the tributary located on the west side of the creek, and/or to differences in the stream flow characteristics at the two locations. The stream configuration at the downstream sonde generally has a slower velocity, compared to the upstream location, which may permit the settlement of suspended materials. The difference for conductivity between the two locations for the monitoring in 2015 is also likely influenced by discharge from the adjacent tributary and the change in sediment content at the downstream station.

The results of the surface water sondes indicate that the DYEC has no measureable influence on water quality within Tooley Creek.

The drainage channel located upstream of Sonde 2 captures discharged water from the DYEC on-site ponds, along with runoff from nearby industrial sources such as the Ontario Power Generation (OPG) lands and the CN rail line. Surface water quality within Tooley Creek is potentially influenced by many factors, including the DYEC site, OPG lands, CN rail line, agricultural areas west of the creek, discharge from a tributary on the west side of Tooley Creek, and land uses located between Tooley Creek and the DYEC property. Due to these potential alternate influences, the source of potential future water quality variations within Tooley Creek cannot be solely attributed to DYEC operations.

It is noted that construction activities associated with the new 401/407 link at Courtice Road were initiated in October 2015, which provided an additional influence on surface water quality within Tooley Creek. Due to the scale and proximity of the 401/407 link construction, the influences from these activities will likely mask other off-site influences on surface water quality within Tooley Creek; therefore, at the very least, it is recommended that the sonde monitoring program be suspended for up to three (3) years, until the construction activities have been completed.

3.3.2 WATER QUALITY COMPLIANCE

As part of the Groundwater and Surface Water Monitoring Plan, the monitoring data obtained from the sondes along Tooley Creek were compared to the applicable Provincial Water Quality Objectives (PWQO) and the Canadian Water Quality Guidelines (CWQG). For the established monitoring program along Tooley Creek, pH and turbidity are the two parameters which have applicable PWQO/CWQG criteria, which are as follows.

- pH: PWQO = 6.5 to 8.5; CWQG = 6.5 to 9.0
- Turbidity: The CWQG indicates a maximum increase of 8 NTU above background levels, for background levels less than 80 NTU, and a maximum increase of 10% above background levels when background levels are greater than 80 NTU

As shown in Figure C-3, pH values at both of the sondes remained within the stricter PWQO range of 6.5 to 8.5 during the monitoring period in 2015.

Turbidity values fluctuated at the sonde locations in 2015, with turbidity values at the upstream location being higher compared to the downstream location during some time frames, and the turbidity values at the downstream station being higher compared to the upstream station during other time frames. A comparison of the downstream sonde turbidity values to the CWQG is shown in Figures C-5 and C-6, Appendix C, with the second figure presented in a larger scale to better present the differences during periods of low turbidity values. During several periods in 2015, when the turbidity values at the downstream location were higher compared to the upstream station, the turbidity levels at the downstream sonde were greater than the range specified by the CWQG, however, the variability of the turbidity values between the locations is attributed to other adjacent off-site sources that are not related to the DYEC.

It is noted that a majority of the elevated turbidity concentrations at the upstream sonde (compared to the downstream sonde) and the downstream sonde (compared to the CWQG) occurred during the monitoring program in 2015 prior to the 401/407 construction activities. This pattern indicates that the sonde data obtained in 2015 reflects the “typical” water quality variability within Tooley Creek.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

The following conclusions are based on the findings presented in this report.

- The local shallow groundwater flow is in a southwesterly direction, towards Lake Ontario.
- Shallow groundwater elevations within the northwest portion of the site have lowered due to the construction of the Courtice Trunk Sanitary Sewer, but the shallow groundwater flow remains in a

general southwesterly direction. The local influence from the sewer construction is not expected to have an adverse influence on the shallow groundwater flow patterns in the areas surrounding the site.

- Groundwater quality at each monitoring location is influenced by various factors including the soil type that the monitor is screened in, upgradient sources, and historical land uses at the site.
- Groundwater quality within the groundwater monitors satisfies the Ontario Drinking Water Quality Standards for the parameters analysed.
- The operation of the facility has not had an adverse influence on the local shallow groundwater quality.
- The surface water sondes indicate that there is no measureable influence on surface water quality within Tooley Creek from the DYEC operations.
- Surface water quality within Tooley Creek will be influenced by several alternative sources, which are not related to the DYEC, including OPG lands, CN rail line, agricultural areas west of the creek, tributary discharging on western side of Tooley Creek, land uses located between Tooley Creek and the DYEC property, and the construction of the new 401/407 link at Courtice Road.

4.2 RECOMMENDATIONS

We respectfully submit the following recommendations based on the study findings for your consideration.

- Pursuant to the Durham York Energy Centre Groundwater and Surface Water Monitoring Plan, the current groundwater monitoring program should be continued into 2015.
- No remedial measures, attributed to groundwater or surface water quality, are required at the present time.
- The sondes monitoring along Tooley Creek should be suspended for up to three (3) years, until the construction activities associated with the 401/407 interchange have been completed.

Report Respectfully Submitted
WSP Canada Inc.

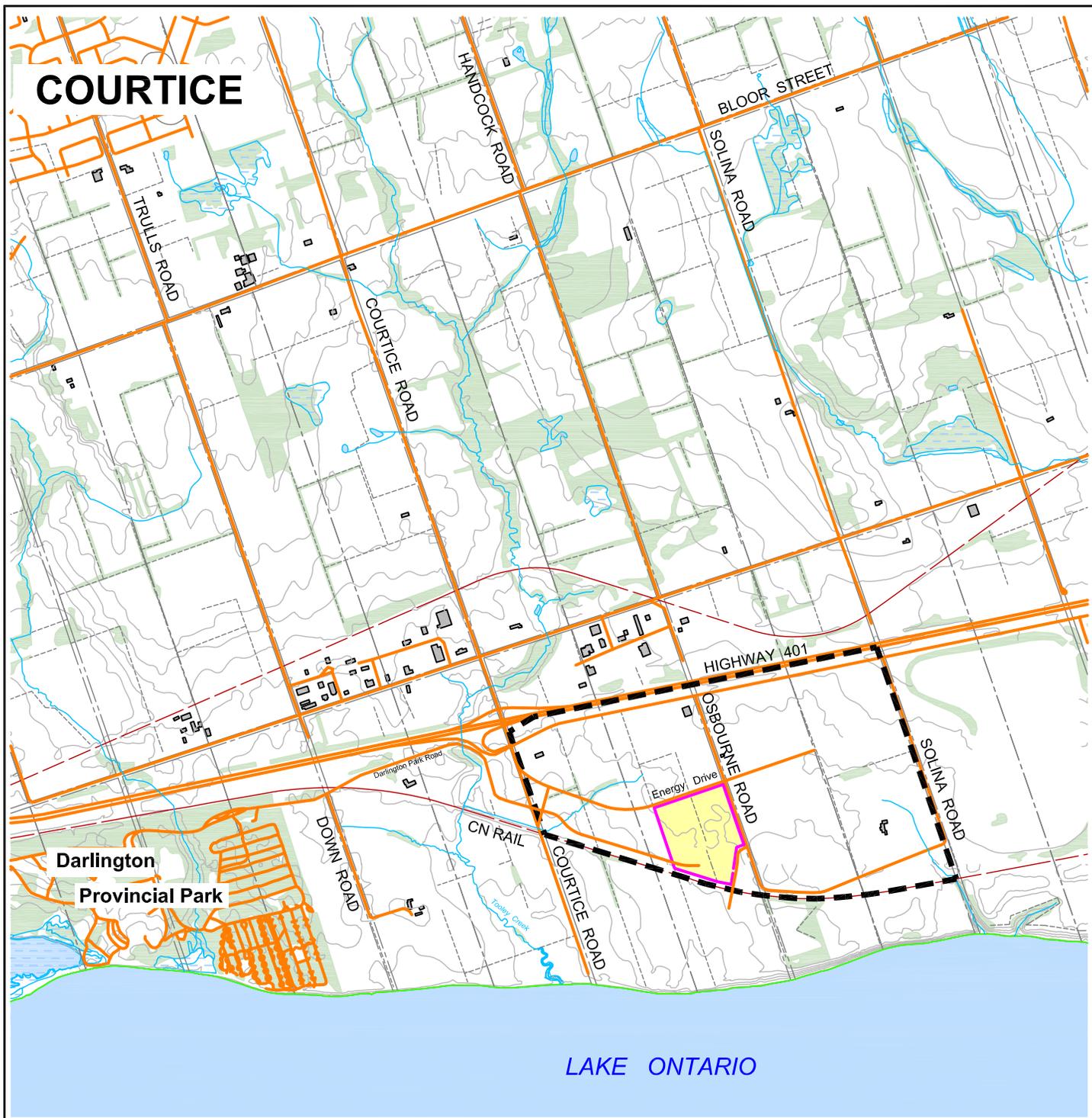


Brian M. Holden, M.Sc., P.Geo.
 Hydrogeologist



Stephen J. Taziar, P.Eng.
 Senior Project Engineer

Figures



LEGEND

-  DURHAM YORK ENERGY CENTRE
-  CLARINGTON ENERGY PARK



MAP SOURCE:
OBM 1:10000 BASE MAPPING, NAD 84, ZONE 17 DATUM.

LOCATION MAP

2015 GROUNDWATER MONITORING PROGRAM
DURHAM YORK ENERGY CENTRE
For Regional Municipalities of Durham and York

DATE: APRIL 2016

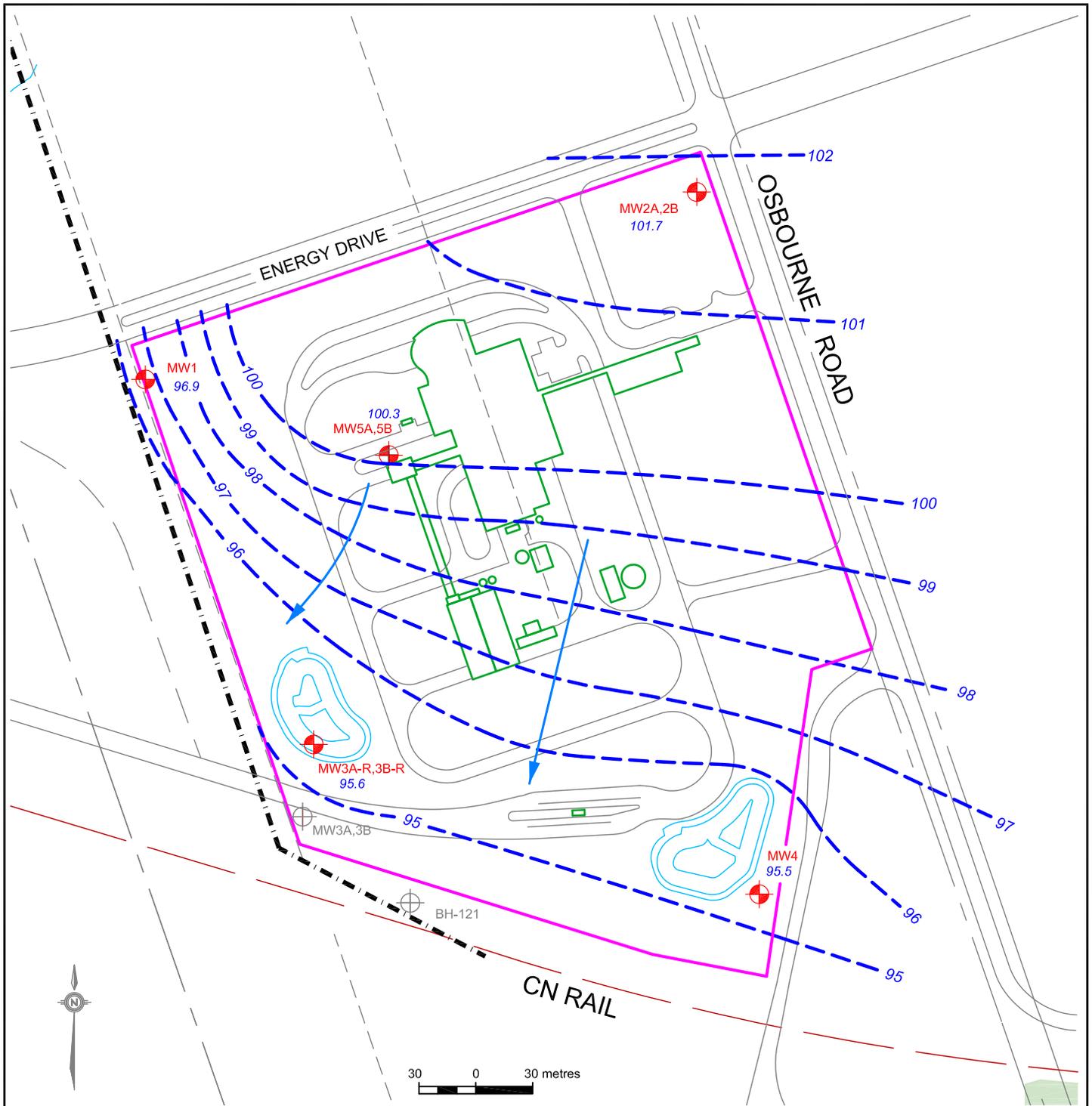
SCALE: 1:25000

PROJECT: 111-26648-00 100

REF. NO.: 111-26648-00 100-6 F1_1-LM



FIGURE **1-1**



LEGEND

- DURHAM YORK ENERGY CENTRE
- ⊕ MW4
95.5 GROUNDWATER MONITORING LOCATION, DESIGNATION AND SHALLOW WATER ELEVATION, NOVEMBER 2015 (m assumed site datum)
- 95 --- SHALLOW GROUND WATER CONTOURS (m assumed site datum)
- ← INTERPRETED GROUNDWATER FLOW DIRECTION
- ⊕ BH-121 PREVIOUS GROUNDWATER MONITORING LOCATION AND DESIGNATION
- APPROXIMATE TRUNK SEWER LOCATION (PHASE 1, STAGE 2)

MAP SOURCE: OBM 1:10000 BASE MAPPING, NAD 84, ZONE 17 DATUM.

SITE PLAN

2015 GROUNDWATER MONITORING PROGRAM
 DURHAM YORK ENERGY CENTRE
 For Regional Municipalities of Durham and York

DATE: APRIL 2016

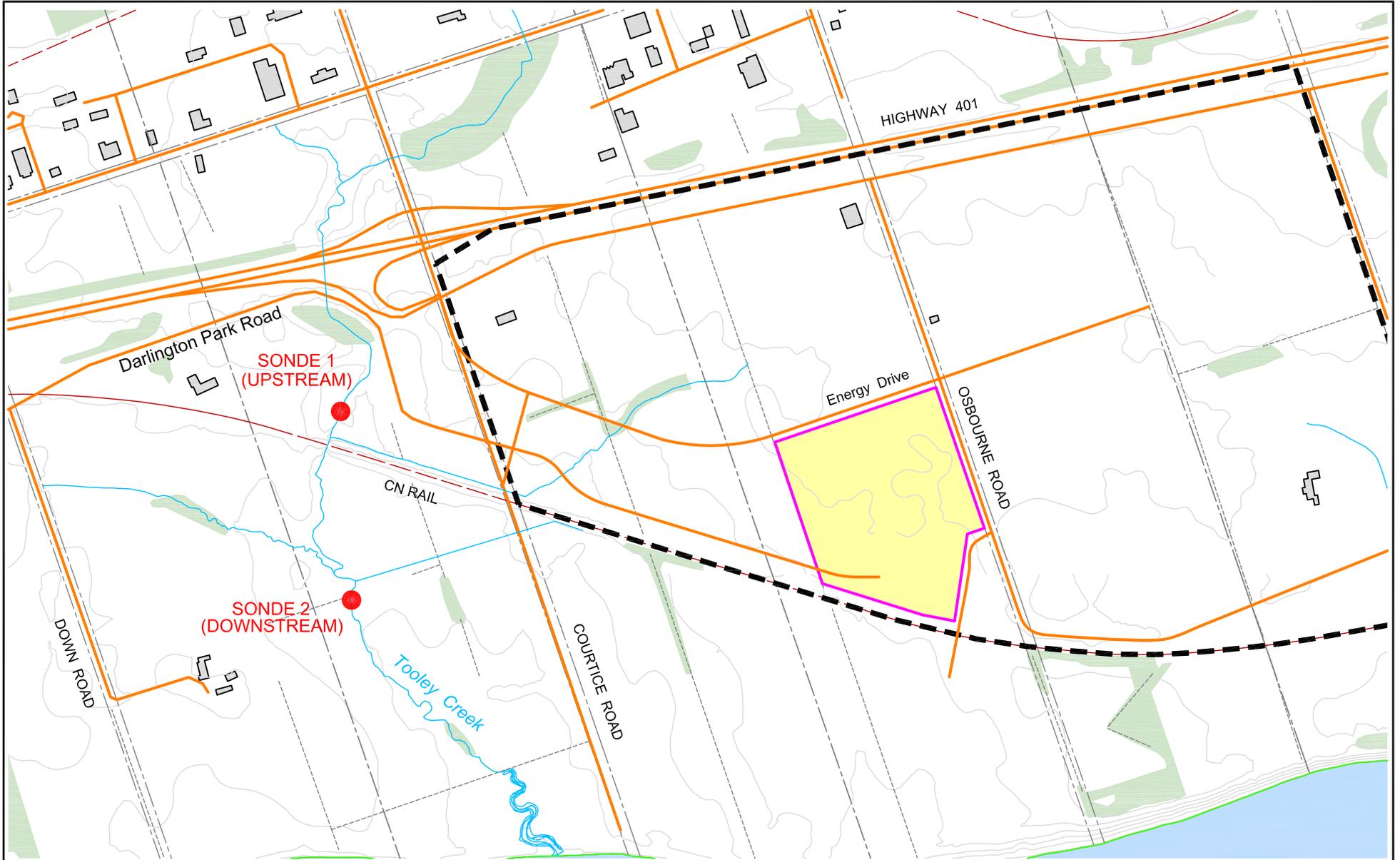
SCALE: 1:3000

PROJECT: 111-26648-00 100

REF. NO.: 111-26648-00 100-6 F1_2-SP



FIGURE **1-2**



LEGEND

- DURHAM YORK ENERGY CENTRE
- CLARINGTON ENERGY PARK
- SONDE 1**
SURFACE WATER SONDE LOCATION AND DESIGNATION

MAP SOURCE:
OBM 1:10000 BASE MAPPING, NAD 84, ZONE 17 DATUM.



SCALE: 1:10000

REF. NO.: 111-26648-00 100-6 F1-3

DATE: APRIL 2016

PROJECT: 111-26648-00 100



SURFACE WATER SONDES MONITORING LOCATIONS

2015 GROUNDWATER MONITORING PROGRAM
DURHAM YORK ENERGY CENTRE
For Regional Municipalities of Durham and York

FIGURE

1-3

Appendices

Appendix A

GROUNDWATER REGIME

**TABLE A-1
GROUNDWATER MONITOR DETAILS
DURHAM YORK ENERGY CENTRE - 2015 MONITORING PROGRAM**

MONITOR				T.O.P.	GROUND	SCREENED	FILTER	BENTONITE SEAL	SURFACE
LOCATION	DESIGNATION	TYPE	DIAMETER (mm)	ELEVATION (mSD)	ELEVATION (mSD)	INTERVAL (mSD)	PACK (mSD)	(mSD)	SEAL (mSD)
MW1	1	S	51	102.32	101.29	95.19 - 93.67	95.50 - 93.67	101.29 - 95.50	
MW2	2B	S	51	103.08	102.01	97.46 - 95.94	97.77 - 95.94	102.01 - 97.77	
	2A	P	51	103.03	102.01	94.39 - 92.87	94.69 - 92.82	102.01 - 94.69	
MW3	3B	S	51	96.31	95.28	90.76 - 89.23	91.06 - 89.23	95.28 - 91.06	
	3A	P	51	96.22	95.17	87.63 - 86.10	87.93 - 86.10	93.95 - 87.93	95.17 - 93.95
	3B-r	S	51	99.16	98.31	93.81 - 91.86	94.06 - 91.86	98.31 - 94.06	
	3A-r	P	51	99.11	98.36	90.74 - 89.22	91.35 - 89.22	98.36 - 91.35	
MW4	4	S	51	98.27	97.17	95.25 - 93.72	95.55 - 93.72	97.17 - 95.55	
MW5	5B	S	51	102.75	101.97	97.47 - 95.97	97.77 - 95.87	101.97 - 97.77	
	5A	P	51	102.79	101.96	94.81 - 93.36	95.16 - 93.36	101.96 - 95.16	

- NOTES: 1) mSD - metres Site Datum
2) T.O.P. - Top Of Pipe - used as the measuring point for water levels.
3) P - Piezometer
S - Standpipe
3) Top of Pipe Elevation for Monitor MW4 reflects elevation as of March 2013.

**TABLE A-2
GROUNDWATER ELEVATIONS
DURHAM YORK ENERGY CENTRE - 2015 MONITORING PROGRAM**

DATE	MW1	MW2A	MW2B	MW3A	MW3B	MW3A-R	MW3B-R	MW4	MW5A	MW5B
T.O.P. Elev. -->	102.32	103.03	103.08	96.22	96.31	99.16	99.11	98.27	102.75	102.79
28-Dec-11	100.62	100.18	99.98	* 89.20	94.50			97.17		
14-Mar-12	100.58	100.53	100.75	94.34	94.51			97.18		
21-Jun-12	99.76	100.06	100.22	94.26	94.11			96.51		
05-Nov-12	100.47	100.24	101.00	94.56	94.91			95.39		
22-Mar-13	100.50	100.22	100.79	94.50	94.59			95.44		
12-Jul-13	100.01	100.07	100.42	94.94	94.14			95.32		
09-Sep-13				94.33	94.22					
26-Nov-13	97.72	100.01	100.41					95.30		
09-Apr-14	94.34	100.22	101.46			93.52	92.40	95.26	100.18	100.58
18-Jun-14						95.07	95.34		100.27	100.26
11-Aug-14	95.96	99.98	100.64			94.98	95.04	94.83	100.13	100.12
29-Oct-14	96.09	99.99	100.56			95.12	95.31	95.19	100.10	100.08
16-Apr-15	96.96	100.17	101.24			95.12	95.79	95.72	100.17	100.36
10-Aug-15	95.84	100.05	101.74			95.06	95.45	94.89	100.16	100.16
09-Nov-15	96.93	100.11	100.91			95.15	95.57	95.50	100.25	100.25

- NOTES: 1) All elevations are in mASD (metres above Site Datum).
2) T.O.P. - Top Of Pipe
3) * - Indicates water level elevation is not representative of groundwater characteristics and is excluded from interpretation.

FIGURE A-1
GROUND WATER HYDROGRAPH
UPGRADIENT MONITORS : Borehole 1

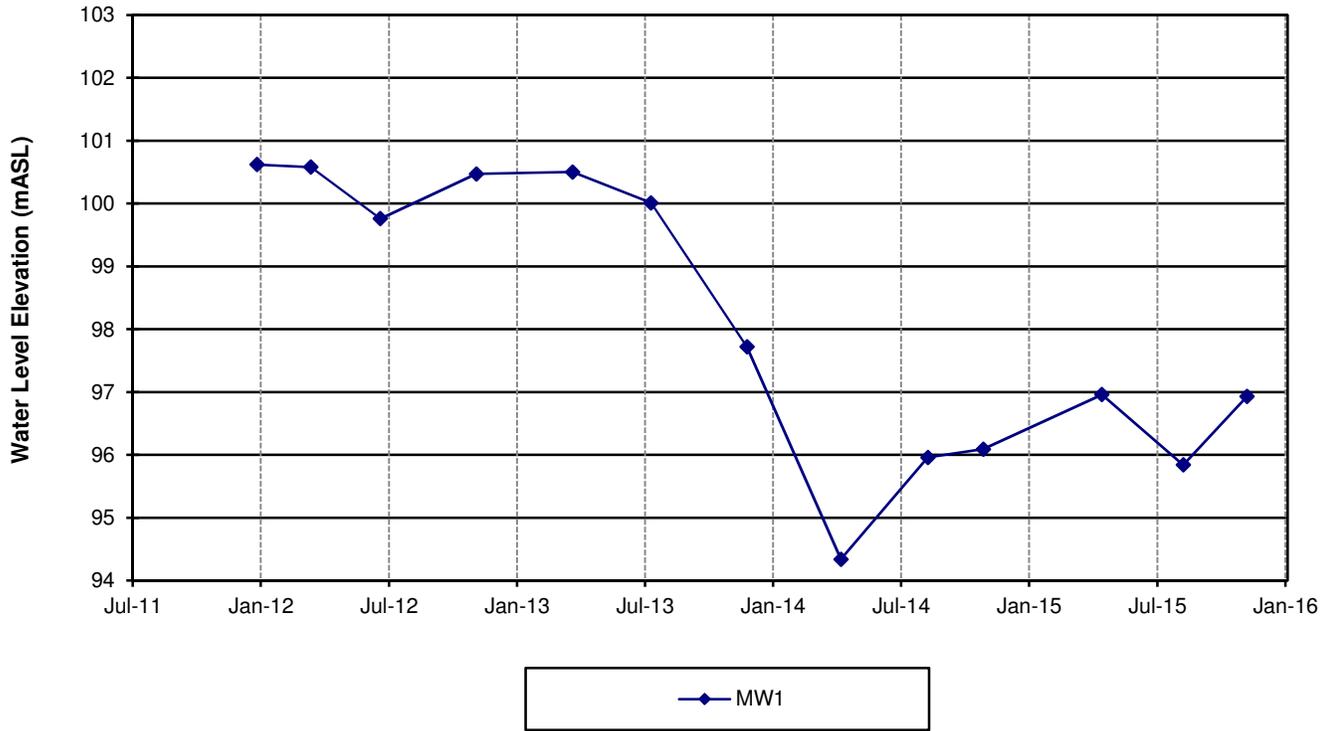


FIGURE A-2
GROUND WATER HYDROGRAPH
UPGRADIENT MONITORS : Borehole 2

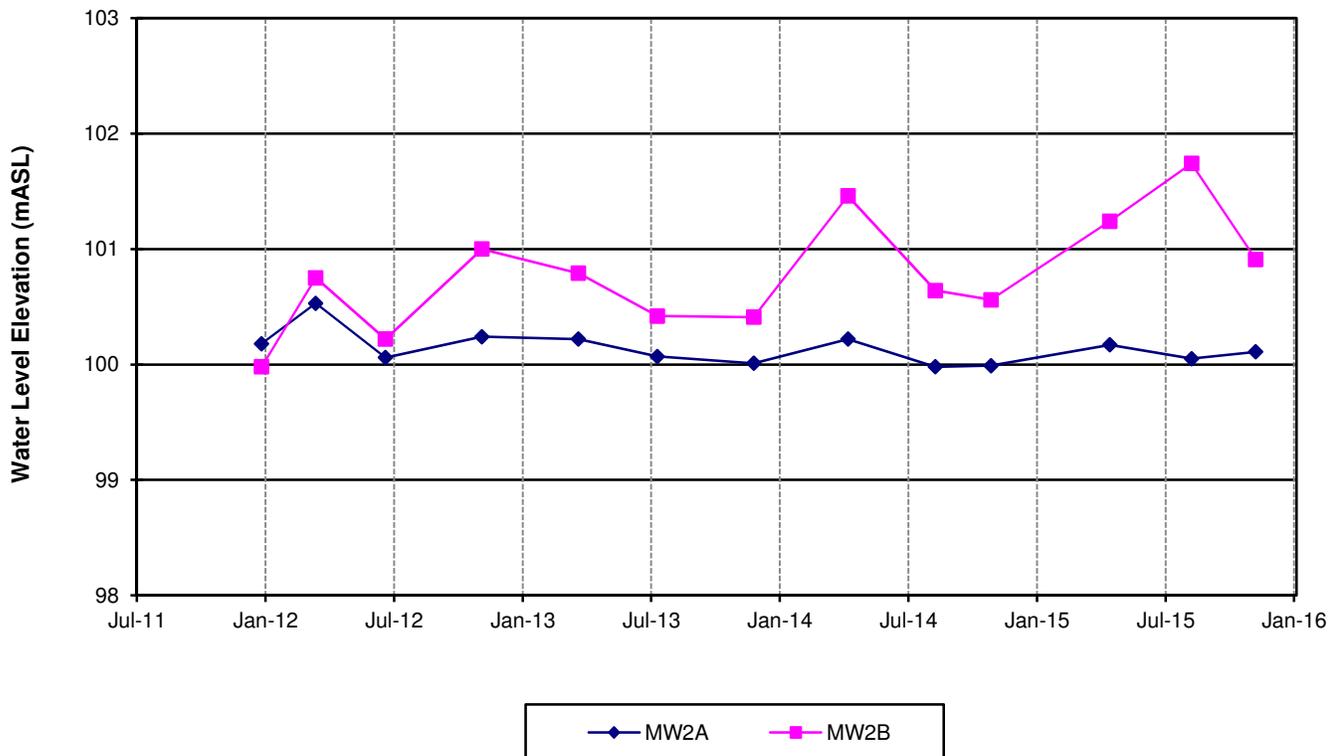


FIGURE A-3
GROUND WATER HYDROGRAPH
DOWNGRADIENT MONITORS : Borehole 3

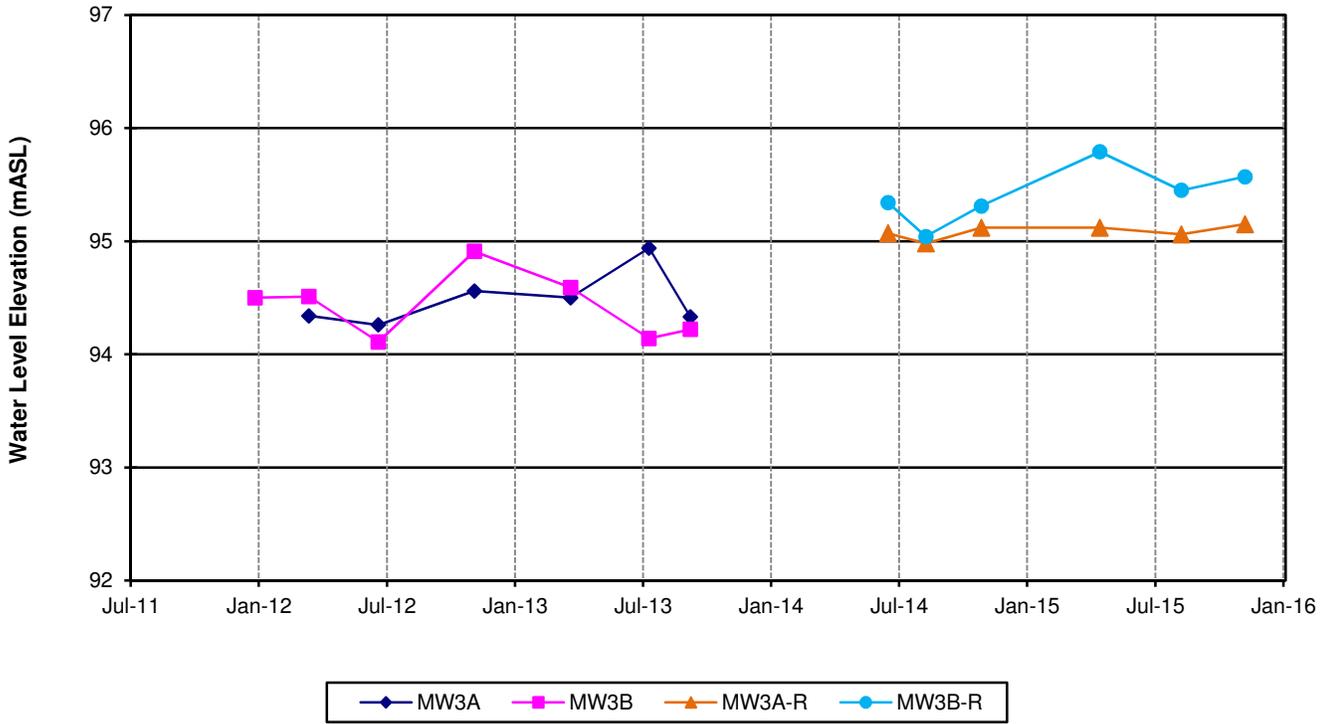


FIGURE A-4
GROUND WATER HYDROGRAPH
DOWNGRADIENT MONITORS : Borehole 4

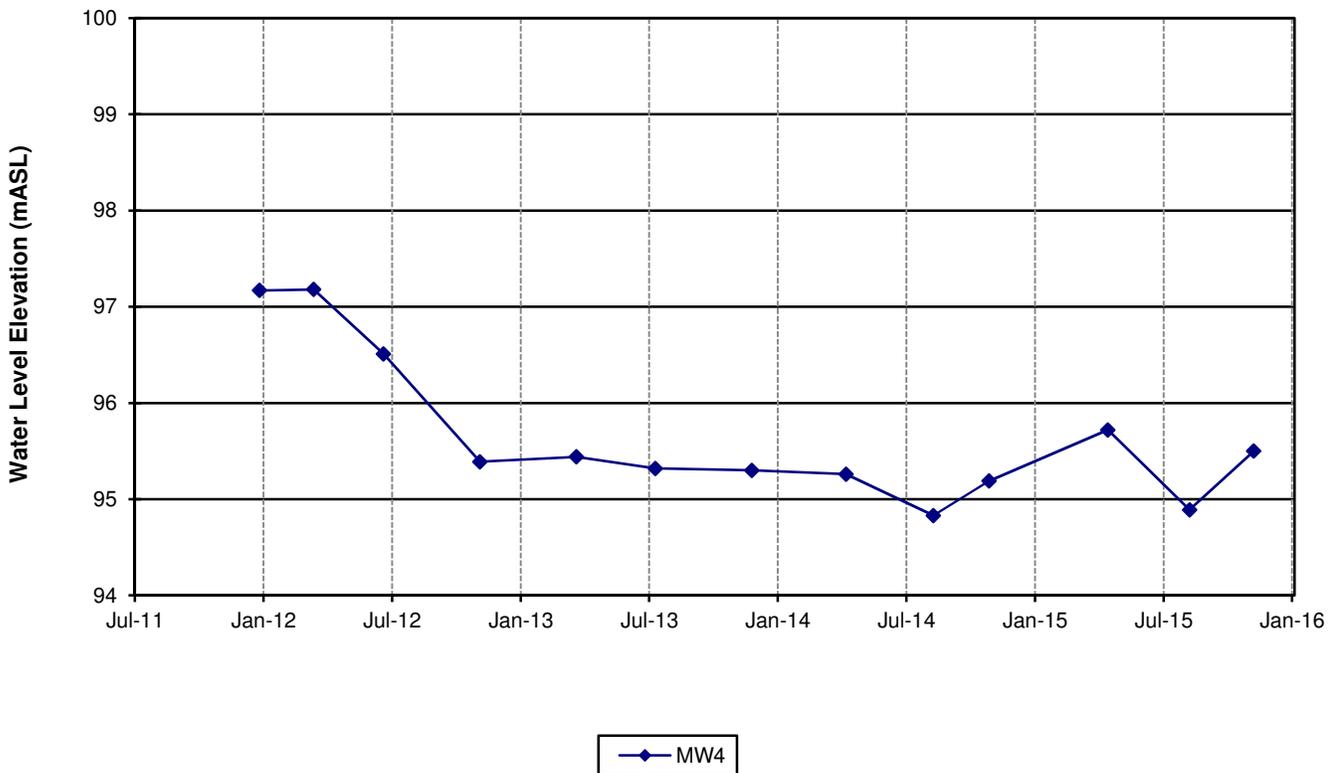
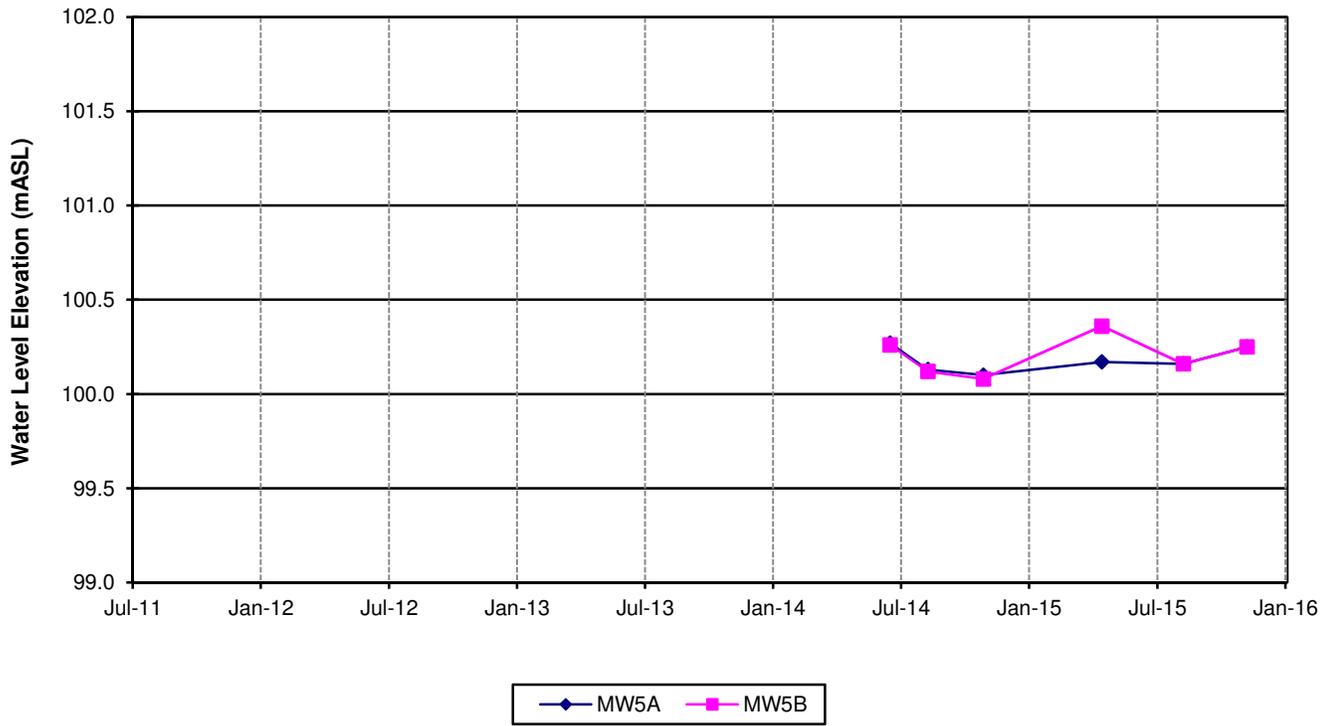


FIGURE A-5
GROUND WATER HYDROGRAPH
DOWNGRADIENT MONITORS : Borehole 5



Appendix B

GROUNDWATER CHEMISTRY

**TABLE B-1
GROUNDWATER FIELD CHEMICAL RESULTS
DURHAM YORK ENERGY CENTRE - 2015 MONITORING PROGRAM**

MONITORING LOCATION	EVENT	Temperature (°C)	pH (as units)	Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)
MW1	Apr-15	8.4	7.6	675	331	-
	Aug-15	11.5	7.8	709	5	-
	Nov-15	11.1	6.6	680	282	131
MW2A	Apr-15	8.8	7.9	405	177	-
	Aug-15	11.3	8.4	420	773	-
	Nov-15	11.3	7.9	381	142	172
MW2B	Apr-15	8.0	7.6	704	192	-
	Aug-15	12.2	7.9	785	130	-
	Nov-15	12.1	7.7	721	67	162
MW3A-R	Apr-15	9.2	7.9	317	198	-
	Aug-15	13.0	8.3	330	85	-
	Nov-15	10.4	8.1	305	53	111
MW3B-R	Apr-15	8.2	7.9	535	64	-
	Aug-15	13.0	8.0	566	70	-
	Nov-15	12.2	7.7	536	44	140
MW4	Apr-15	7.0	7.7	451	807	-
	Aug-15	14.6	7.8	981	475	-
	Nov-15	12.7	7.5	980	>1000	141
MW5A	Apr-15	7.9	7.8	362	289	-
	Aug-15	12.1	8.4	375	282	-
	Nov-15	11.7	8.0	352	350	152
MW5B	Apr-15	6.2	7.9	573	225	-
	Aug-15	13.2	8.1	633	479	-
	Nov-15	12.2	7.9	600	122	153

NOTES: 1) ORP - Oxidation Reduction Potential
2) Blank indicates measurement not obtained

**TABLE B-2
GROUNDWATER CHEMICAL RESULTS
DURHAM YORK ENERGY CENTRE - 2015 MONITORING PROGRAM**

PARAMETER	UNIT	ODWQS ¹	MW1												
			Dec-11	Mar-12	Jun-12	Nov-12	Mar-13	Jul-13	Nov-13	Apr-14	Aug-14	Oct-14	Apr-15	Aug-15	Nov-15
Bicarbonate	mg/L		240	244	243	214	226	228	241	223	262	244	229	238	243
Carbonate	mg/L		<5	<5	<5	6	<5	<5	<5	<5	<5	<5	<5	<5	8
Chloride	mg/L	250	14.9	15.0	13.5	15.3	14.8	14.6	13.4	13.5	15.0	15.3	19.9	20.5	19.0
Sulphate	mg/L	500	152	153	131	147	127	129	132	227	151	150	158	143	139
Calcium	mg/L		83.0	68.8	67.7	73.9	73.8	65.3	65.5	90.7	70.4	69.1	68.0	68.3	69.2
Magnesium	mg/L		46.2	44.4	45.5	50.1	53.2	46.0	43.6	62.2	50.1	47.8	46.4	46.0	48.4
Potassium	mg/L		2.99	2.99	3.10	3.55	3.28	2.71	2.98	4.32	3.80	3.74	3.24	2.94	3.20
Sodium	mg/L	200	10.3	8.3	8.1	8.5	10.2	8.6	10.0	9.6	13.4	13.0	21.1	20.2	17.0
Boron	mg/L	5 *	0.019	0.015	0.014	0.016	0.012	0.023	0.015	0.014	0.012	0.015	0.014	0.015	0.015
Cadmium	mg/L	0.005 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.001
Cobalt	mg/L		0.002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.01 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	mg/L	0.001 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standards, Objectives, and Guidelines (2006).

2) * - Indicates health related drinking water standard.

**TABLE B-2
GROUNDWATER CHEMICAL RESULTS
DURHAM YORK ENERGY CENTRE - 2015 MONITORING PROGRAM**

PARAMETER	UNIT	ODWQS ¹	MW2A												
			Dec-11	Mar-12	Jun-12	Nov-12	Mar-13	Jul-13	Nov-13	Apr-14	Aug-14	Oct-14	Apr-15	Aug-15	Nov-15
Bicarbonate	mg/L		221	215	195	168	188	190	206	185	180	188	198	194	202
Carbonate	mg/L		<5	<5	<5	7	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloride	mg/L	250	4.7	3.2	1.8	4.0	1.9	2.7	2.5	3.3	4.5	4.5	6.1	5.1	4.0
Sulphate	mg/L	500	72.9	45.7	21.2	28.8	15.6	18.9	21.8	25.1	27.5	26.3	33.8	26.5	22.7
Calcium	mg/L		48.3	27.3	18.4	19.5	17.9	15.4	16.5	15.8	16.6	15.1	18.3	17.2	14.6
Magnesium	mg/L		32.0	31.3	32.2	35.5	37.5	32.3	30.6	33.6	30.0	30.6	31.8	32.4	33.3
Potassium	mg/L		2.31	2.20	1.62	1.80	1.75	1.34	1.51	1.52	1.42	1.30	1.50	1.62	1.26
Sodium	mg/L	200	23.5	16.8	14.6	17.3	17.6	15.2	18.7	24.7	25.9	25.2	29.5	28.1	28.2
Boron	mg/L	5 *	0.088	0.081	0.090	0.097	0.096	0.106	0.104	0.106	0.108	0.117	0.111	0.113	0.098
Cadmium	mg/L	0.005 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.001
Cobalt	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.01 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	mg/L	0.001 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standards, Objectives, and Guidelines (2006).

2) * - Indicates health related drinking water standard.

**TABLE B-2
GROUNDWATER CHEMICAL RESULTS
DURHAM YORK ENERGY CENTRE - 2015 MONITORING PROGRAM**

PARAMETER	UNIT	ODWQS ¹	MW2B												
			Dec-11	Mar-12	Jun-12	Nov-12	Mar-13	Jul-13	Nov-13	Apr-14	Aug-14	Oct-14	Apr-15	Aug-15	Nov-15
Bicarbonate	mg/L		235	244	252	220	242	241	248	224	236	238	240	225	258
Carbonate	mg/L		<5	<5	<5	8	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloride	mg/L	250	13.5	11.7	11.8	12.6	14.2	15.2	14.3	22.6	45.4	59.9	71.3	66.3	67.0
Sulphate	mg/L	500	98.8	120	93.6	99.4	84.9	82.2	77.3	84.0	78.1	80.2	96.2	80.4	74.6
Calcium	mg/L		58.7	49.7	45.6	48.1	46.2	40.8	39.4	43.6	44.7	45.8	48.6	48.3	47.9
Magnesium	mg/L		34.8	42.3	44.2	49.5	54.5	46.8	44.2	52.2	52.3	53.2	54.8	55.0	56.5
Potassium	mg/L		1.09	1.67	1.81	2.20	2.23	1.82	2.03	2.02	2.04	2.00	1.98	2.04	2.11
Sodium	mg/L	200	29.1	24.0	20.7	20.4	21.9	18.5	19.3	22.5	22.5	24.5	26.5	27.7	30.9
Boron	mg/L	5 *	0.076	0.077	0.078	0.087	0.082	0.086	0.083	0.076	0.077	0.080	0.074	0.069	0.068
Cadmium	mg/L	0.005 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.001
Cobalt	mg/L		0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.01 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	mg/L	0.001 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standards, Objectives, and Guidelines (2006).

2) * - Indicates health related drinking water standard.

**TABLE B-2
GROUNDWATER CHEMICAL RESULTS
DURHAM YORK ENERGY CENTRE - 2015 MONITORING PROGRAM**

PARAMETER	UNIT	ODWQS ¹	MW3A							MW3A-R					
			Dec-11	Mar-12	Jun-12	Nov-12	Mar-13	Jul-13	Sep-13	Jun-14	Aug-14	Oct-14	Apr-15	Aug-15	Nov-15
Bicarbonate	mg/L		181	153	147	130	124	121	151	134	120	123	147	126	137
Carbonate	mg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloride	mg/L	250	22.7	24.6	24.4	26.3	25.1	23.8	26.2	7.5	6.5	6.2	7.7	6.5	6.2
Sulphate	mg/L	500	125	78.7	50.7	44.0	29.3	23.0	20.3	27.4	20.7	21.4	26.8	25.7	21.7
Calcium	mg/L		76.9	43.8	34.3	27.9	26.4	22.5	24.4	22.0	19.4	16.0	18.3	21.2	17.7
Magnesium	mg/L		11.5	9.92	9.13	8.95	8.76	6.68	6.91	9.27	8.73	8.74	11.10	11.60	10.40
Potassium	mg/L		1.79	1.79	1.33	1.86	1.25	1.09	2.94	2.34	2.09	1.41	1.51	1.74	1.41
Sodium	mg/L	200	47.5	45.3	43.0	46.0	49.6	40.8	44.7	35.1	35.7	34.5	39.2	37.9	40.0
Boron	mg/L	5 *	0.129	0.164	0.171	0.182	0.175	0.172	0.169	0.132	0.139	0.155	0.148	0.141	0.123
Cadmium	mg/L	0.005 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.001
Cobalt	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.01 *	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	mg/L	0.001 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standards, Objectives, and Guidelines (2006).

2) * - Indicates health related drinking water standard.

**TABLE B-2
GROUNDWATER CHEMICAL RESULTS
DURHAM YORK ENERGY CENTRE - 2015 MONITORING PROGRAM**

PARAMETER	UNIT	ODWQS ¹	MW3B							MW3B-R					
			Dec-11	Mar-12	Jun-12	Nov-12	Mar-13	Jul-13	Sep-13	Jun-14	Aug-14	Oct-14	Apr-15	Aug-15	Nov-15
Bicarbonate	mg/L		247	212	211	186	213	202	235	198	209	203	215	200	235
Carbonate	mg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloride	mg/L	250	10.8	10.2	10.7	12.5	15.6	13.9	18.8	15.4	12.3	10.7	11.6	10.3	9.2
Sulphate	mg/L	500	102	58.6	52.4	45.8	33.9	39.9	43.4	103.0	88.7	85.7	95.5	82.9	78.8
Calcium	mg/L		78.4	49.7	47.9	49.3	55.5	46.8	61.4	58.3	46.8	47.7	51.5	52.4	51.2
Magnesium	mg/L		22.4	19.9	20.2	21.7	26.4	21.2	25.1	31.4	29.2	29.3	31.4	31.7	32.0
Potassium	mg/L		2.00	1.42	1.55	1.99	1.59	1.38	2.39	5.92	4.62	4.04	3.43	3.23	3.27
Sodium	mg/L	200	35.5	25.5	25.7	26.2	26.4	24.1	27.1	25.1	23.8	23.9	25.7	26.6	28.9
Boron	mg/L	5 *	0.071	0.079	0.088	0.092	0.073	0.095	0.082	0.118	0.095	0.115	0.096	0.090	0.082
Cadmium	mg/L	0.005 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.001
Cobalt	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.01 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	mg/L	0.001 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standards, Objectives, and Guidelines (2006).

2) * - Indicates health related drinking water standard.

**TABLE B-2
GROUNDWATER CHEMICAL RESULTS
DURHAM YORK ENERGY CENTRE - 2015 MONITORING PROGRAM**

PARAMETER	UNIT	ODWQS ¹	MW4												
			Dec-11	Mar-12	Jun-12	Nov-12	Mar-13	Jul-13	Nov-13	Apr-14	Aug-14	Oct-14	Apr-15	Aug-15	Nov-15
Bicarbonate	mg/L		300	430	506	346	330	448	496	301	353	300	539	482	574
Carbonate	mg/L		<5	<5	<5	8	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloride	mg/L	250	12.3	14.5	7.1	12.0	8.2	7.5	6.8	8.6	8.5	12.2	7.0	7.6	8.7
Sulphate	mg/L	500	50.8	47.5	47.8	60.8	38.5	62.6	62.6	23.8	31.8	32.1	78.1	58.9	72.0
Calcium	mg/L		42.7	36.4	43.1	45.9	42.2	44.7	39.0	29.0	31.9	31.3	38.5	46.0	43.9
Magnesium	mg/L		51.5	72.8	88.2	68.2	68.8	83.6	83.9	54.9	62.0	53.8	103.0	102.0	106.0
Potassium	mg/L		4.39	2.45	2.70	6.08	2.81	3.55	3.61	2.30	2.73	2.63	2.68	3.43	3.70
Sodium	mg/L	200	22.0	25.5	28.0	23.1	23.7	28.6	35.8	22.2	25.5	22.0	40.0	36.6	47.6
Boron	mg/L	5 *	0.057	0.061	0.066	0.057	0.038	0.064	0.066	0.040	0.051	0.051	0.069	0.065	0.075
Cadmium	mg/L	0.005 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.001
Cobalt	mg/L		0.002	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.01 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	mg/L	0.001 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standards, Objectives, and Guidelines (2006).

2) * - Indicates health related drinking water standard.

**TABLE B-2
GROUNDWATER CHEMICAL RESULTS
DURHAM YORK ENERGY CENTRE - 2015 MONITORING PROGRAM**

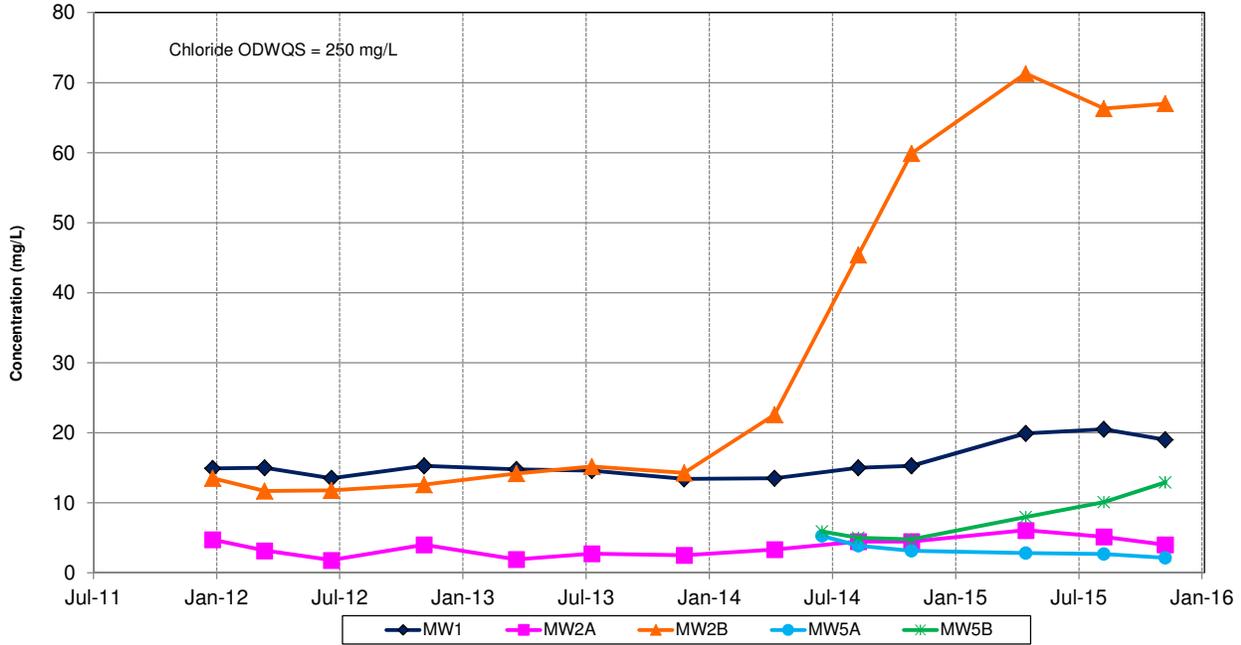
PARAMETER	UNIT	ODWQS ¹	MW5A						MW5B					
			Jun-14	Aug-14	Oct-14	Apr-15	Aug-15	Nov-15	Jun-14	Aug-14	Oct-14	Apr-15	Aug-15	Nov-15
Bicarbonate	mg/L		207	199	183	200	198	215	240	247	234	247	229	274
Carbonate	mg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloride	mg/L	250	5.3	3.9	3.2	2.8	2.7	2.2	5.9	5.0	4.8	8.0	10.1	12.9
Sulphate	mg/L	500	16.9	11.0	5.6	9.4	7.6	6.9	96.4	91.4	95.9	107.0	103.0	98.7
Calcium	mg/L		25.2	19.4	17.4	19.5	20.7	17.1	41.2	34.4	36.2	39.1	46.9	38.7
Magnesium	mg/L		34.9	31.7	31.0	33.3	35.1	35.0	56.7	52.3	52.6	55.1	60.1	59.1
Potassium	mg/L		3.83	2.89	2.82	2.53	2.44	2.38	4.37	3.76	3.51	2.95	3.31	3.25
Sodium	mg/L	200	12.2	11.2	11.4	11.9	11.7	12.9	10.2	10.1	10.2	12.2	13.0	16.6
Boron	mg/L	5 *	0.054	0.045	0.049	0.041	0.036	0.033	0.045	0.048	0.053	0.040	0.042	0.037
Cadmium	mg/L	0.005 *	<0.002	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.002	<0.002	<0.001	<0.002	<0.001
Cobalt	mg/L		<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.01 *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	mg/L	0.001 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standards, Objectives, and Guidelines (2006).

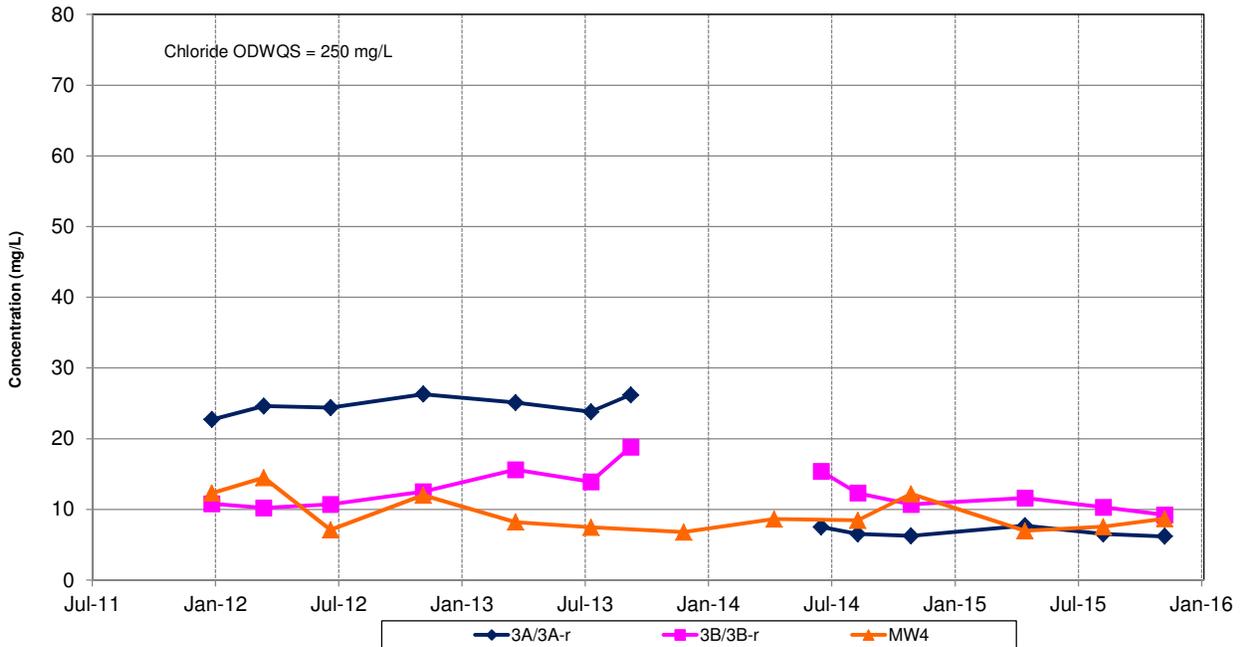
2) * - Indicates health related drinking water standard.

FIGURE B-1 GROUNDWATER TIME CONCENTRATION GRAPHS - CHLORIDE

UPGRADIENT AND ADJACENT MONITORS - Boreholes 1, 2 & 5

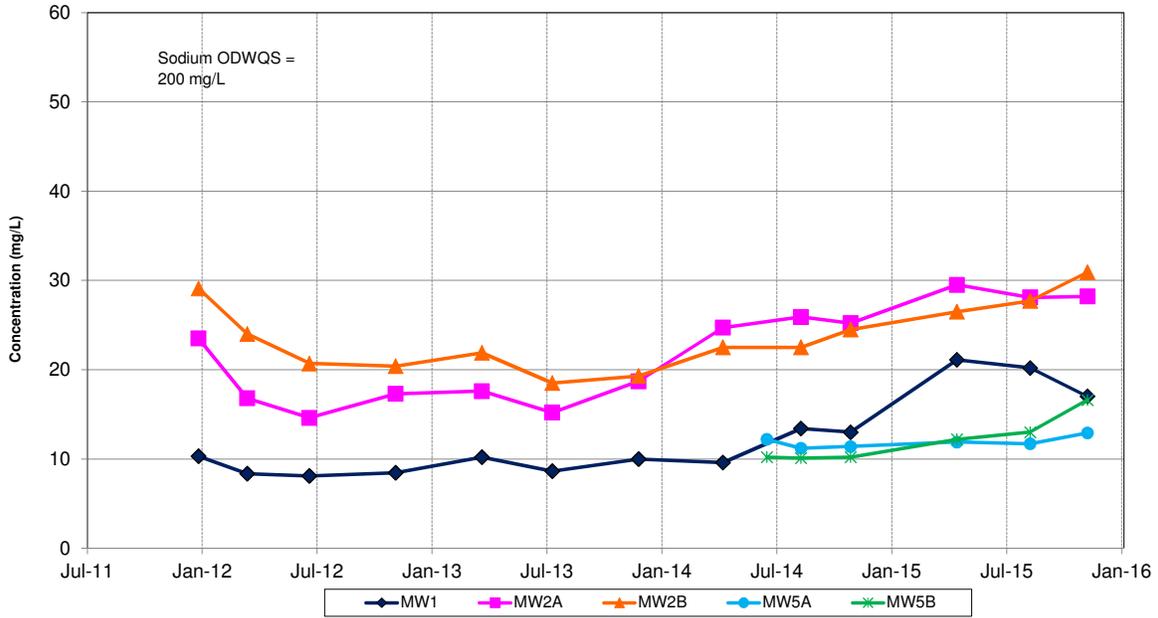


DOWNGRAIDENT MONITORS - Boreholes 3 & 4

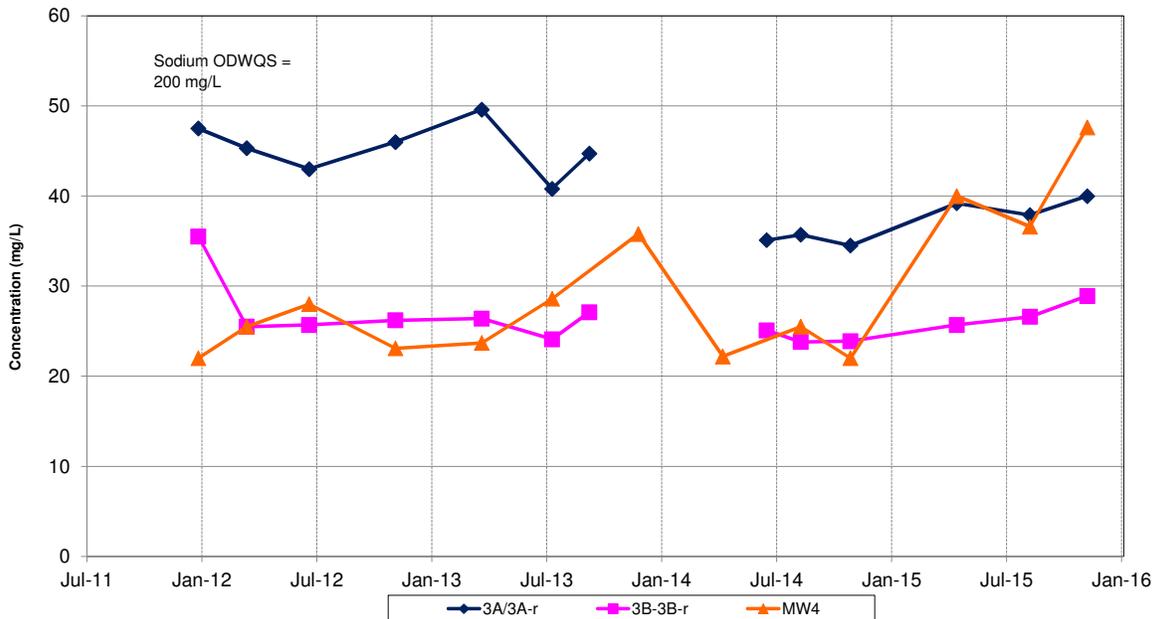


**FIGURE B-2
GROUNDWATER TIME CONCENTRATION GRAPHS - SODIUM**

UPGRADIENT AND ADJACENT MONITORS - Boreholes 1, 2 & 5

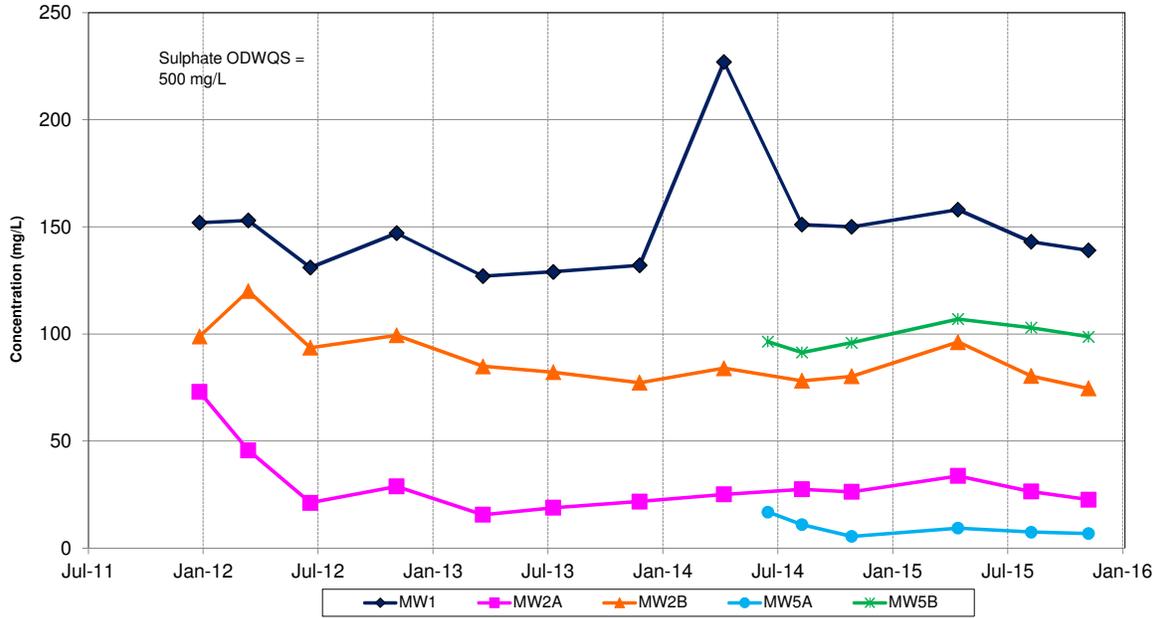


DOWNGRADIENT MONITORS - Boreholes 3 & 4

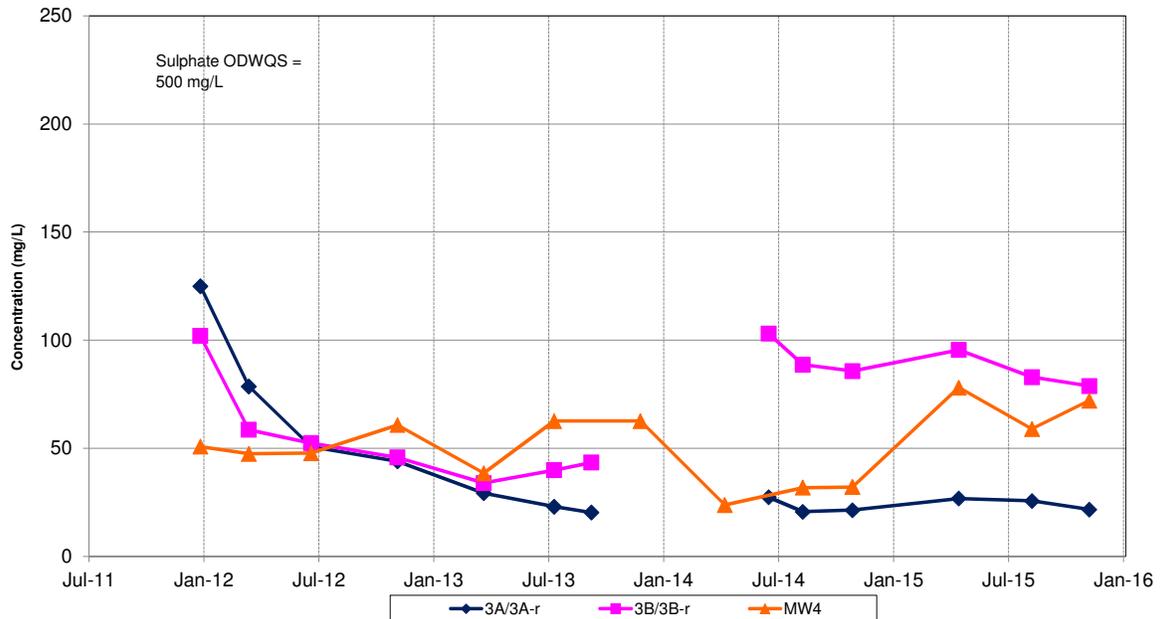


**FIGURE B-3
GROUNDWATER TIME CONCENTRATION GRAPHS - SULPHATE**

UPGRADIENT AND ADJACENT MONITORS - Boreholes 1, 2 & 5

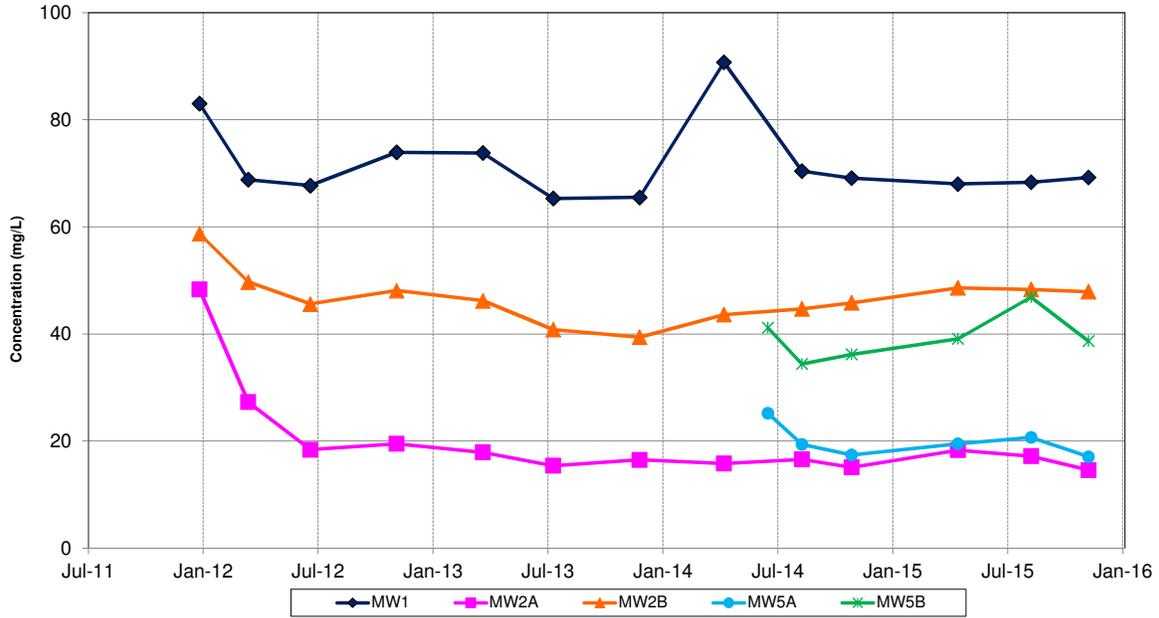


DOWNGRADIENT MONITORS - Boreholes 3 & 4

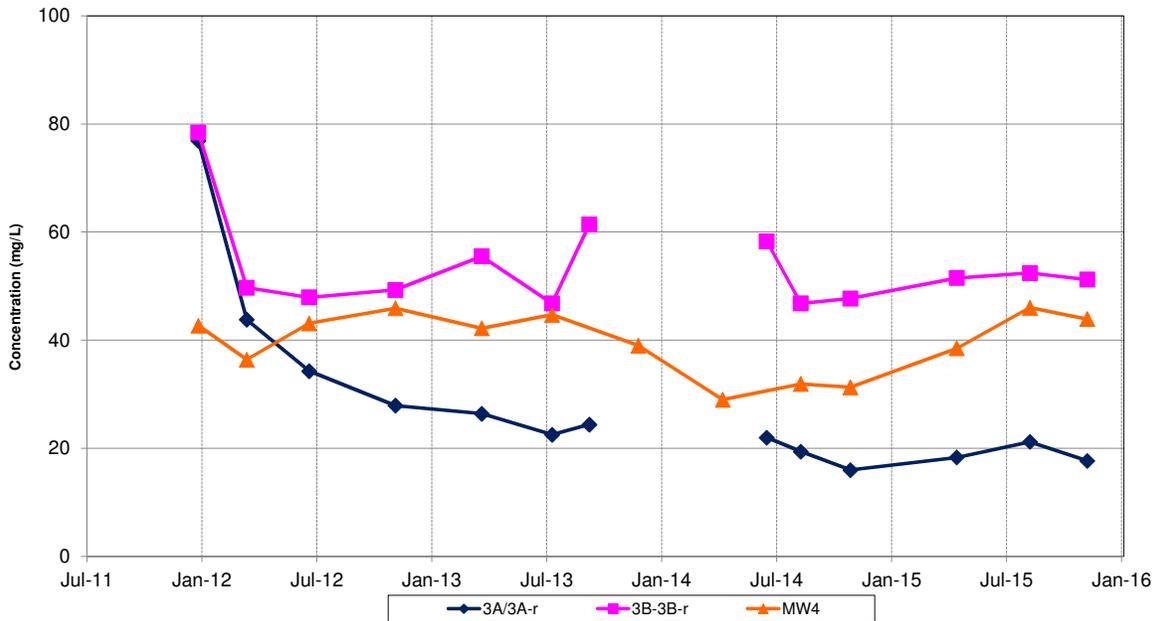


**FIGURE B-4
GROUNDWATER TIME CONCENTRATION GRAPHS - CALCIUM**

UPGRADIENT AND ADJACENT MONITORS - Boreholes 1, 2 & 5

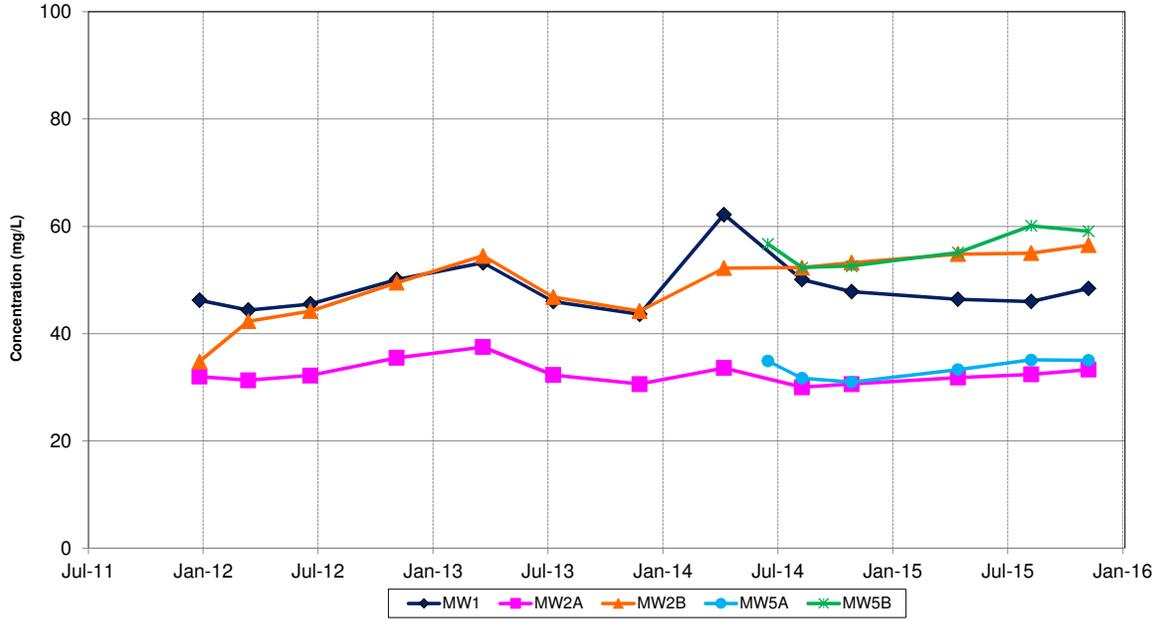


DOWNGRADIENT MONITORS - Boreholes 3 & 4



**FIGURE B-5
GROUNDWATER TIME CONCENTRATION GRAPHS - MAGNESIUM**

UPGRADIENT AND ADJACENT MONITORS - Boreholes 1, 2 & 5



DOWNGRAIDENT MONITORS - Boreholes 3 & 4

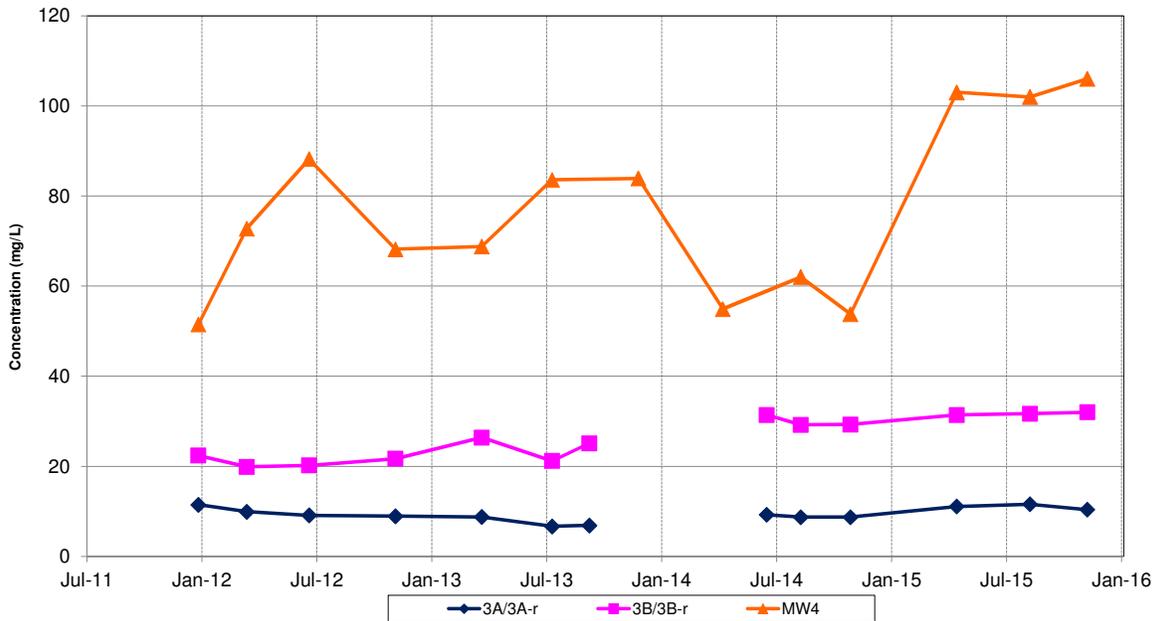
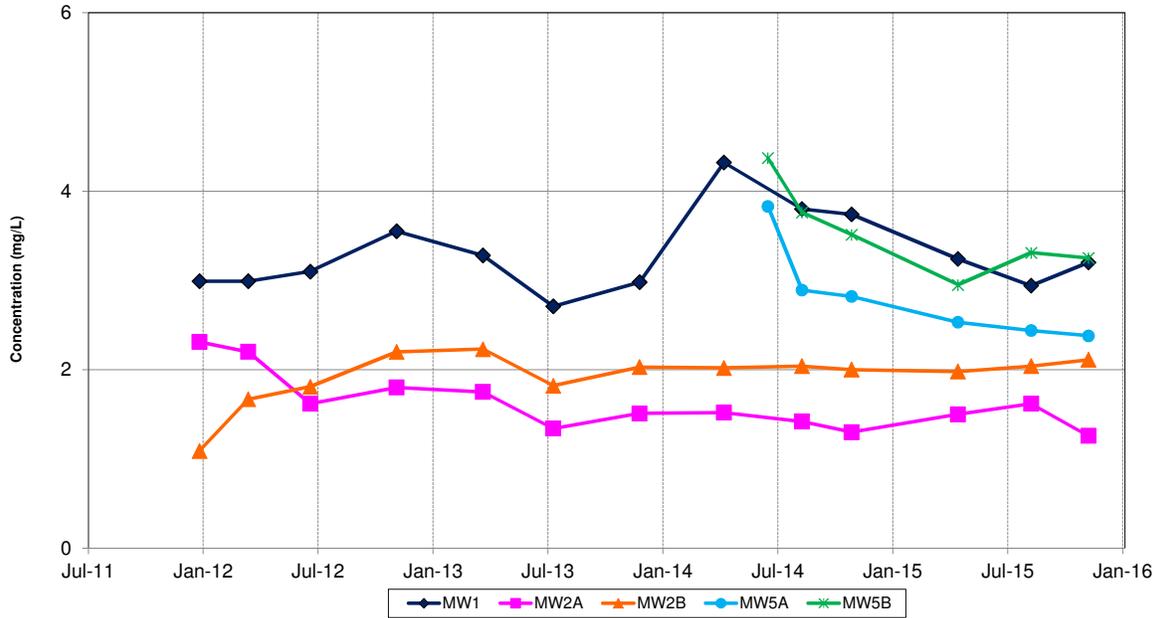


FIGURE B-6
GROUNDWATER TIME CONCENTRATION GRAPHS - POTASSIUM

UPGRADIENT AND ADJACENT MONITORS - Boreholes 1, 2 & 5



DOWNGRADIENT MONITORS - Boreholes 3 & 4

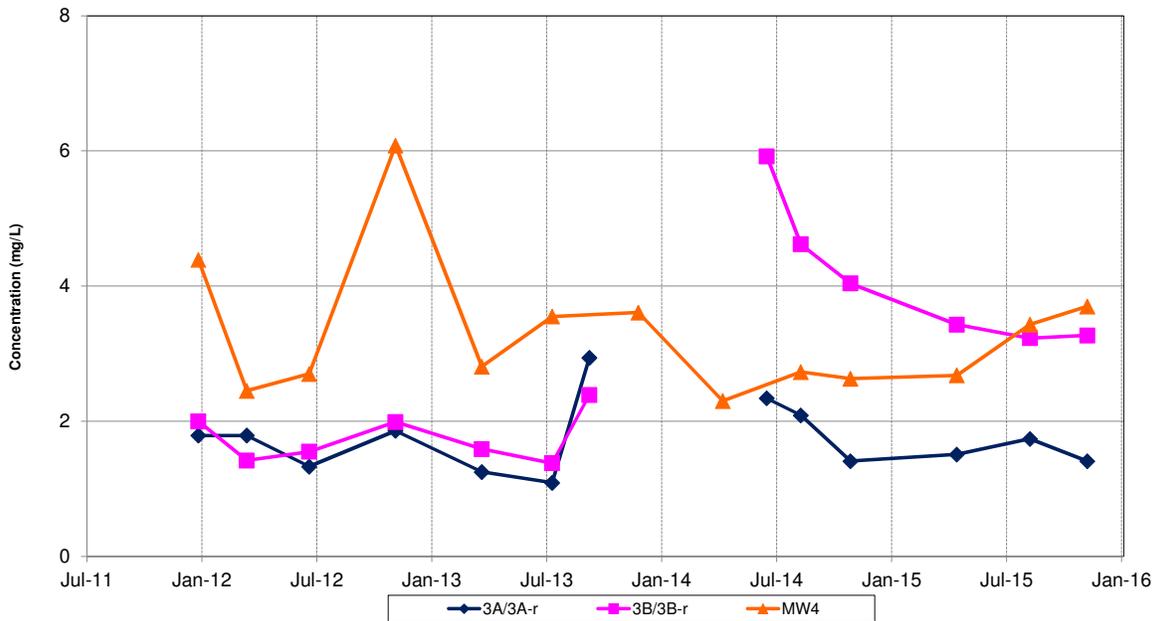
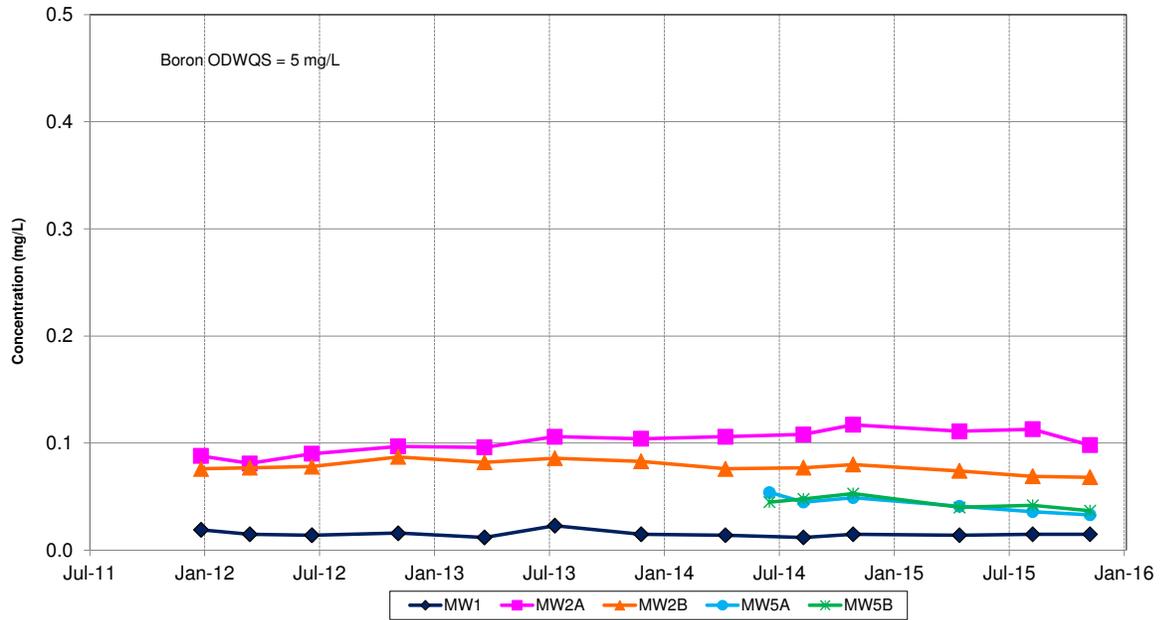
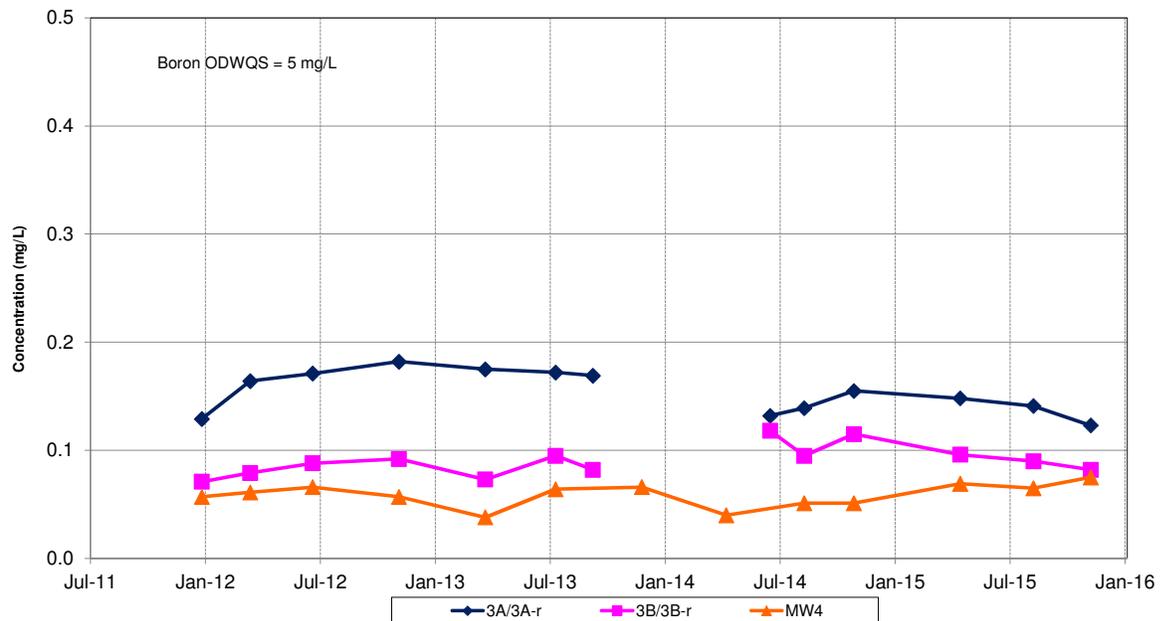


FIGURE B-7 GROUNDWATER TIME CONCENTRATION GRAPHS - BORON

UPGRADIENT AND ADJACENT MONITORS - Boreholes 1, 2 & 5

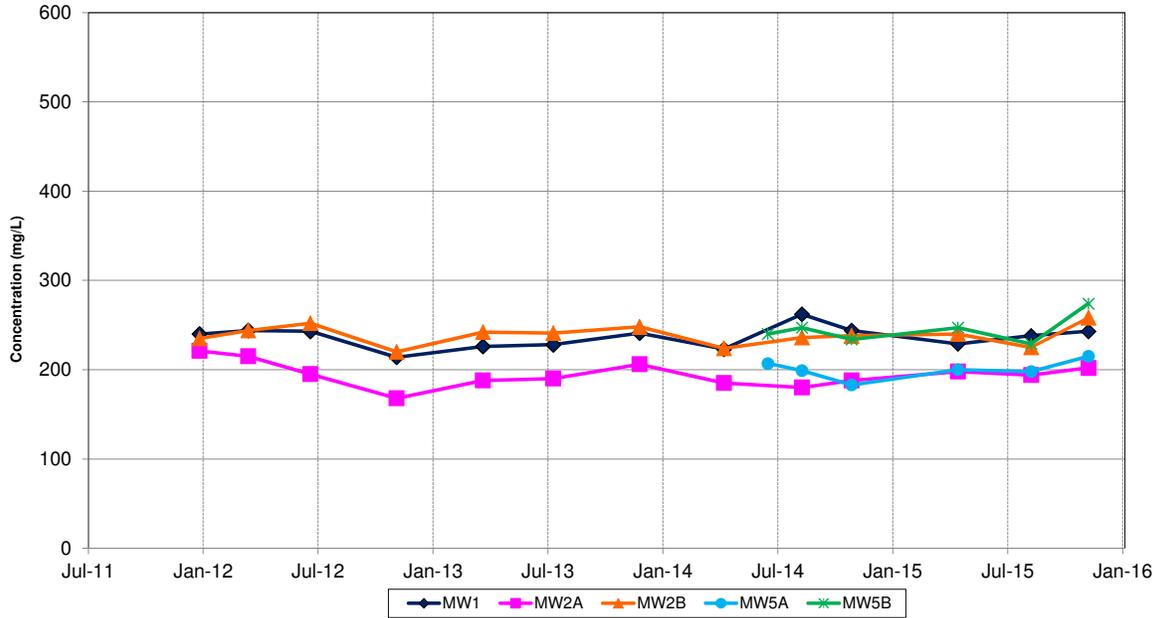


DOWNGRADEMENT MONITORS - Boreholes 3 & 4



**FIGURE B-8
GROUNDWATER TIME CONCENTRATION GRAPHS - BICARBONATE**

UPGRADIENT AND ADJACENT MONITORS - Boreholes 1, 2 & 5



DOWNGRADIENT MONITORS - Boreholes 3 & 4

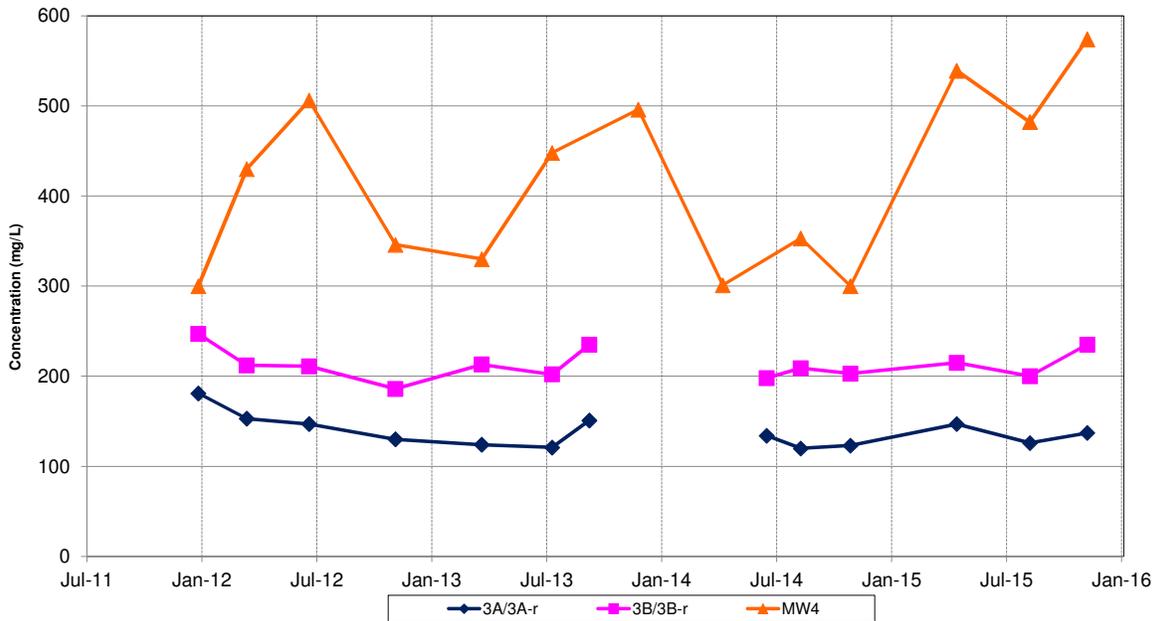


TABLE B-3

FIELD DUPLICATE SAMPLES - Relative Percent Differences

DURHAM YORK ENERGY CENTRE - 2015 MONITORING PROGRAM

PARAMETER	UNITS	MW3A			MW5B			MW5A		
		April 2015			August 2015			November 2015		
		Original	Duplicate	RPD (%)	Original	Duplicate	RPD (%)	Original	Duplicate	RPD (%)
Bicarbonate (as CaCO3)	mg/L	147	139	6	229	252	10	215	214	0
Boron	mg/L	0.148	0.146	1	0.042	0.041	2	0.033	0.033	0
Cadmium	mg/L	<0.001	<0.001		<0.002	<0.002		<0.001	<0.001	
Calcium	mg/L	18.3	19.1	4	46.9	42.4	10	17.1	17.4	2
Carbonate (as CaCO3)	mg/L	<5	<5		<5	<5		<5	<5	
Chloride	mg/L	7.7	7.7	0	10.1	9.84	3	2.15	2.100	2
Cobalt	mg/L	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	
Lead	mg/L	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	
Magnesium	mg/L	11.1	11.3	2	60.1	60.8	1	35.0	34.5	1
Mercury	mg/L	<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001	
Potassium	mg/L	1.51	1.57	4	3.31	3.03	9	2.38	2.26	5
Sodium	mg/L	39.2	39.2	0	13.0	12.7	2	12.9	12.2	6
Sulphate	mg/L	26.8	27.3	2	103	103	0	6.9	7.18	4

NOTES: 1) Blank indicates parameter not analysed.

2) RPD = Relative Percent Difference $RPD = \frac{X1-X2}{X_{avg}} \times 100$



Certificate of Analysis

AGAT WORK ORDER: 15T964190

PROJECT: 111-26648-00

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: WSP CANADA INC.

SAMPLING SITE: Courtice

ATTENTION TO: Steve Taziar

SAMPLED BY: Eric Taylor

Groundwater - Group F - Parameters

DATE RECEIVED: 2015-04-17

DATE REPORTED: 2015-04-28

Parameter	Unit	SAMPLE DESCRIPTION:		MW1	MW2A	MW2B	RDL	MW3Ar	RDL	MW3Br
		SAMPLE TYPE:		Water	Water	Water		Water		Water
		DATE SAMPLED:		4/16/2015	4/16/2015	4/16/2015		4/16/2015		4/16/2015
		G / S	RDL	6459907	6459911	6459915		6459919		6459923
Bicarbonate (as CaCO ₃)	mg/L		5	229	198	240	5	147	5	215
Carbonate (as CaCO ₃)	mg/L		5	<5	<5	<5	5	<5	5	<5
Chloride	mg/L		0.50	19.9	6.08	71.3	0.10	7.70	0.50	11.6
Sulphate	mg/L		0.50	158	33.8	96.2	0.10	26.8	0.50	95.5
Calcium	mg/L		0.05	68.0	18.3	48.6	0.05	18.3	0.05	51.5
Magnesium	mg/L		0.05	46.4	31.8	54.8	0.05	11.1	0.05	31.4
Sodium	mg/L		0.05	21.1	29.5	26.5	0.05	39.2	0.05	25.7
Potassium	mg/L		0.05	3.24	1.50	1.98	0.05	1.51	0.05	3.43
Boron	mg/L		0.010	0.014	0.111	0.074	0.010	0.148	0.010	0.096
Cadmium	mg/L		0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Cobalt	mg/L		0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Lead	mg/L		0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Mercury	mg/L		0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 15T964190

PROJECT: 111-26648-00

5835 COOPERS AVENUE
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FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: WSP CANADA INC.

SAMPLING SITE: Courtice

ATTENTION TO: Steve Taziar

SAMPLED BY: Eric Taylor

Groundwater - Group F - Parameters

DATE RECEIVED: 2015-04-17

DATE REPORTED: 2015-04-28

Parameter	Unit	SAMPLE DESCRIPTION:		MW4		MW5A		MW5B		Duplicate
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		4/16/2015		4/16/2015		4/16/2015		4/16/2015
		G / S	RDL	6459927	RDL	6459931	RDL	6459935	RDL	6459941
Bicarbonate (as CaCO ₃)	mg/L		5	539	5	200	5	247	5	139
Carbonate (as CaCO ₃)	mg/L		5	<5	5	<5	5	<5	5	<5
Chloride	mg/L		0.50	6.98	0.10	2.83	0.50	7.97	0.10	7.70
Sulphate	mg/L		0.50	78.1	0.10	9.37	0.50	107	0.10	27.3
Calcium	mg/L		0.10	38.5	0.05	19.5	0.05	39.1	0.05	19.1
Magnesium	mg/L		0.10	103	0.05	33.3	0.05	55.1	0.05	11.3
Sodium	mg/L		0.10	40.0	0.05	11.9	0.05	12.2	0.05	39.2
Potassium	mg/L		0.10	2.68	0.05	2.53	0.05	2.95	0.05	1.57
Boron	mg/L		0.010	0.069	0.010	0.041	0.010	0.040	0.010	0.146
Cadmium	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Cobalt	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Lead	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Mercury	mg/L		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6459907-6459923 Samples required dilution prior to analysis for Anions in order to keep the analytes within the calibration range of the instruments and/or to minimize any matrix interferences; the RDLs were adjusted to reflect the dilution.

6459927 Samples required dilution prior to analysis for Anions & Cations in order to keep the analytes within the calibration range of the instruments and/or to minimize any matrix interferences; the RDLs were adjusted to reflect the dilution.

6459931-6459941 Samples required dilution prior to analysis for Anions in order to keep the analytes within the calibration range of the instruments and/or to minimize any matrix interferences; the RDLs were adjusted to reflect the dilution.

Certified By:





Certificate of Analysis

AGAT WORK ORDER: 15T005991

PROJECT: 111-26648-00

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: WSP CANADA INC.

SAMPLING SITE: Durham EFW

ATTENTION TO: Steve Taziar

SAMPLED BY: Eric Taylor

Durham - Groundwater - Group F Parameters

DATE RECEIVED: 2015-08-11

DATE REPORTED: 2015-08-19

Parameter	Unit	SAMPLE DESCRIPTION:		MW1	MW2A	MW2B	MW3Ar
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		8/10/2015	8/10/2015	8/10/2015	8/10/2015
		G / S	RDL	RDL	RDL	RDL	RDL
Bicarbonate (as CaCO3)	mg/L	5	238	5	194	5	126
Carbonate (as CaCO3)	mg/L	5	<5	5	<5	5	<5
Chloride	mg/L	0.20	20.5	0.10	5.14	0.50	66.3
Sulphate	mg/L	0.20	143	0.10	26.5	0.50	80.4
Calcium	mg/L	0.05	68.3	0.05	17.2	0.05	48.3
Magnesium	mg/L	0.05	46.0	0.05	32.4	0.05	55.0
Sodium	mg/L	0.05	20.2	0.05	28.1	0.05	27.7
Potassium	mg/L	0.05	2.94	0.05	1.62	0.05	2.04
Boron	mg/L	0.010	0.015	0.010	0.113	0.010	0.069
Cadmium	mg/L	0.002	<0.002	0.002	<0.002	0.002	<0.002
Cobalt	mg/L	0.001	<0.001	0.001	<0.001	0.001	<0.001
Lead	mg/L	0.002	<0.002	0.002	<0.002	0.002	<0.002
Mercury	mg/L	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001

Certified By:





Certificate of Analysis

AGAT WORK ORDER: 15T005991

PROJECT: 111-26648-00

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: WSP CANADA INC.

SAMPLING SITE: Durham EFW

ATTENTION TO: Steve Taziar

SAMPLED BY: Eric Taylor

Durham - Groundwater - Group F Parameters

DATE RECEIVED: 2015-08-11

DATE REPORTED: 2015-08-19

Parameter	Unit	SAMPLE DESCRIPTION: MW3Br		MW4		MW5A		MW5B		GW Duplicate	
		SAMPLE TYPE: Water		Water		Water		Water		Water	
		DATE SAMPLED: 8/10/2015		8/10/2015		8/10/2015		8/10/2015		8/10/2015	
		G / S	RDL	6843234	RDL	6843238	RDL	6843242	RDL	6843246	6843250
Bicarbonate (as CaCO3)	mg/L		5	200	5	482	5	198	5	229	252
Carbonate (as CaCO3)	mg/L		5	<5	5	<5	5	<5	5	<5	<5
Chloride	mg/L		0.50	10.3	0.50	7.55	0.10	2.70	0.20	10.1	9.84
Sulphate	mg/L		0.50	82.9	0.50	58.9	0.10	7.56	0.20	103	103
Calcium	mg/L		0.05	52.4	0.10	46.0	0.05	20.7	0.05	46.9	42.4
Magnesium	mg/L		0.05	31.7	0.10	102	0.05	35.1	0.05	60.1	60.8
Sodium	mg/L		0.05	26.6	0.10	36.6	0.05	11.7	0.05	13.0	12.7
Potassium	mg/L		0.05	3.23	0.10	3.43	0.05	2.44	0.05	3.31	3.03
Boron	mg/L		0.010	0.090	0.010	0.065	0.010	0.036	0.010	0.042	0.041
Cadmium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Cobalt	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001
Lead	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Mercury	mg/L		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6843211-6843234 Samples required dilution prior to analysis for Anions in order to keep the analytes within the calibration range of the instrument and/or to minimize any matrix interferences; the RDLs were adjusted to reflect the dilution.

6843238 Sample required dilution prior to analysis for Anions & Cations in order to keep the analytes within the calibration range of the instruments and/or to minimize any matrix interferences; the RDLs were adjusted to reflect the dilution.

6843242-6843250 Samples required dilution prior to analysis for Anions in order to keep the analytes within the calibration range of the instrument and/or to minimize any matrix interferences; the RDLs were adjusted to reflect the dilution.

Certified By: _____





Certificate of Analysis

AGAT WORK ORDER: 15T040785

PROJECT: 111-26648-00

5835 COOPERS AVENUE
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<http://www.agatlabs.com>

CLIENT NAME: WSP CANADA INC.

SAMPLING SITE: Courtice, ON

ATTENTION TO: Steve Taziar

SAMPLED BY: Eric Taylor

Durham - Groundwater - Group F Parameters

DATE RECEIVED: 2015-11-10

DATE REPORTED: 2015-11-19

Parameter	Unit	SAMPLE DESCRIPTION:		MW1	MW2A	MW2B	MW3A			
		SAMPLE TYPE:		Water	Water	Water	Water			
		DATE SAMPLED:		11/9/2015	11/9/2015	11/9/2015	11/9/2015			
		G / S	RDL	7186158	RDL	7186159	RDL	7186163	RDL	7186167
Bicarbonate (as CaCO3)	mg/L		5	243	5	202	5	258	5	137
Carbonate (as CaCO3)	mg/L		5	8	5	<5	5	<5	5	<5
Chloride	mg/L		0.20	19.0	0.10	4.02	0.50	67.0	0.10	6.19
Sulphate	mg/L		0.20	139	0.10	22.7	0.50	74.6	0.10	21.7
Calcium	mg/L		0.05	69.2	0.05	14.6	0.05	47.9	0.05	17.7
Magnesium	mg/L		0.05	48.4	0.05	33.3	0.05	56.5	0.05	10.4
Sodium	mg/L		0.05	17.0	0.05	28.2	0.05	30.9	0.05	40.0
Potassium	mg/L		0.05	3.20	0.05	1.26	0.05	2.11	0.05	1.41
Boron	mg/L		0.010	0.015	0.010	0.098	0.010	0.068	0.010	0.123
Cadmium	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Cobalt	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Lead	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Mercury	mg/L		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001

Certified By:

Elizabeth Potokowska



Certificate of Analysis

AGAT WORK ORDER: 15T040785

PROJECT: 111-26648-00

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: WSP CANADA INC.

SAMPLING SITE: Courtice, ON

ATTENTION TO: Steve Taziar

SAMPLED BY: Eric Taylor

Durham - Groundwater - Group F Parameters

DATE RECEIVED: 2015-11-10

DATE REPORTED: 2015-11-19

Parameter	Unit	SAMPLE DESCRIPTION: MW3B		MW4		MW5A		MW5B		
		SAMPLE TYPE: Water		Water		Water		Water		
		DATE SAMPLED: 11/9/2015		11/9/2015		11/9/2015		11/9/2015		
		G / S	RDL	RDL	RDL	RDL	RDL	RDL	RDL	
Bicarbonate (as CaCO3)	mg/L		5	235	5	574	5	215	5	274
Carbonate (as CaCO3)	mg/L		5	<5	5	<5	5	<5	5	<5
Chloride	mg/L	0.20	9.23	0.50	8.69	0.10	2.15	0.20	12.9	
Sulphate	mg/L	0.20	78.8	0.50	72.0	0.10	6.90	0.20	98.7	
Calcium	mg/L	0.05	51.2	0.05	43.9	0.05	17.1	0.05	38.7	
Magnesium	mg/L	0.05	32.0	0.05	106	0.05	35.0	0.05	59.1	
Sodium	mg/L	0.05	28.9	0.05	47.6	0.05	12.9	0.05	16.6	
Potassium	mg/L	0.05	3.27	0.05	3.70	0.05	2.38	0.05	3.25	
Boron	mg/L	0.010	0.082	0.010	0.075	0.010	0.033	0.010	0.037	
Cadmium	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Cobalt	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Lead	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Mercury	mg/L		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001

Certified By:

Elizabeth Potokowska



Certificate of Analysis

AGAT WORK ORDER: 15T040785

PROJECT: 111-26648-00

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CLIENT NAME: WSP CANADA INC.

SAMPLING SITE: Courtice, ON

ATTENTION TO: Steve Taziar

SAMPLED BY: Eric Taylor

Durham - Groundwater - Group F Parameters

DATE RECEIVED: 2015-11-10

DATE REPORTED: 2015-11-19

Parameter	Unit	SAMPLE DESCRIPTION: Duplicate	
		G / S	RDL
Bicarbonate (as CaCO ₃)	mg/L	5	214
Carbonate (as CaCO ₃)	mg/L	5	<5
Chloride	mg/L	0.10	2.10
Sulphate	mg/L	0.10	7.18
Calcium	mg/L	0.05	17.4
Magnesium	mg/L	0.05	34.5
Sodium	mg/L	0.05	12.2
Potassium	mg/L	0.05	2.26
Boron	mg/L	0.010	0.033
Cadmium	mg/L	0.001	<0.001
Cobalt	mg/L	0.001	<0.001
Lead	mg/L	0.002	<0.002
Mercury	mg/L	0.0001	<0.0001

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7186158-7186187 Samples were diluted prior to analysis for anions in order to minimize matrix interference and to keep the analytes within a valid calibration range of the instrument; the RDLs were adjusted accordingly to reflect the dilution.

Certified By:

Appendix C

SURFACE WATER SONDE DATA

FIGURE C-1
PARAMETER CONCENTRATION COMPARISON - Temperature

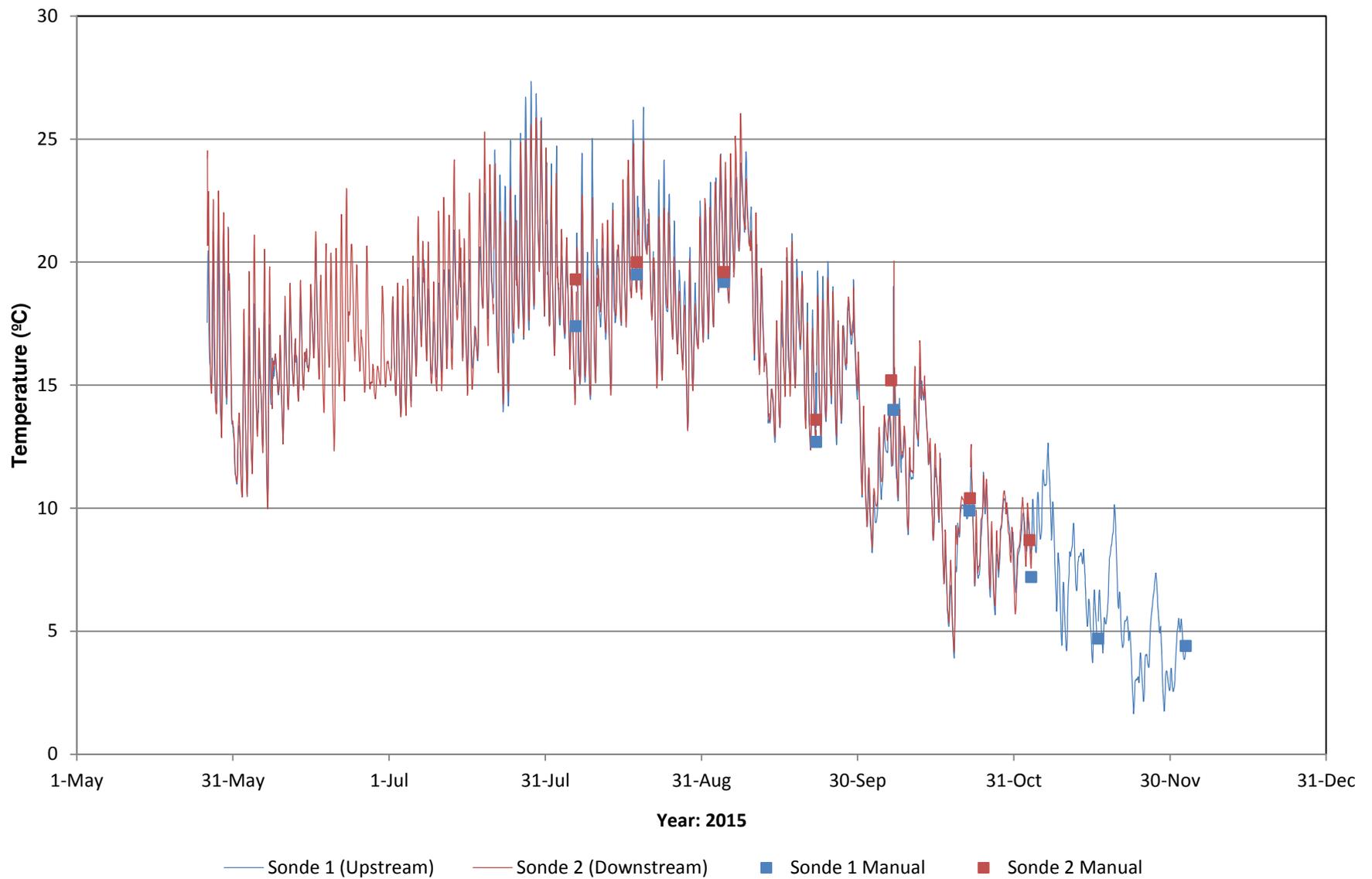


FIGURE C-2
PARAMETER CONCENTRATION COMPARISON - Conductivity

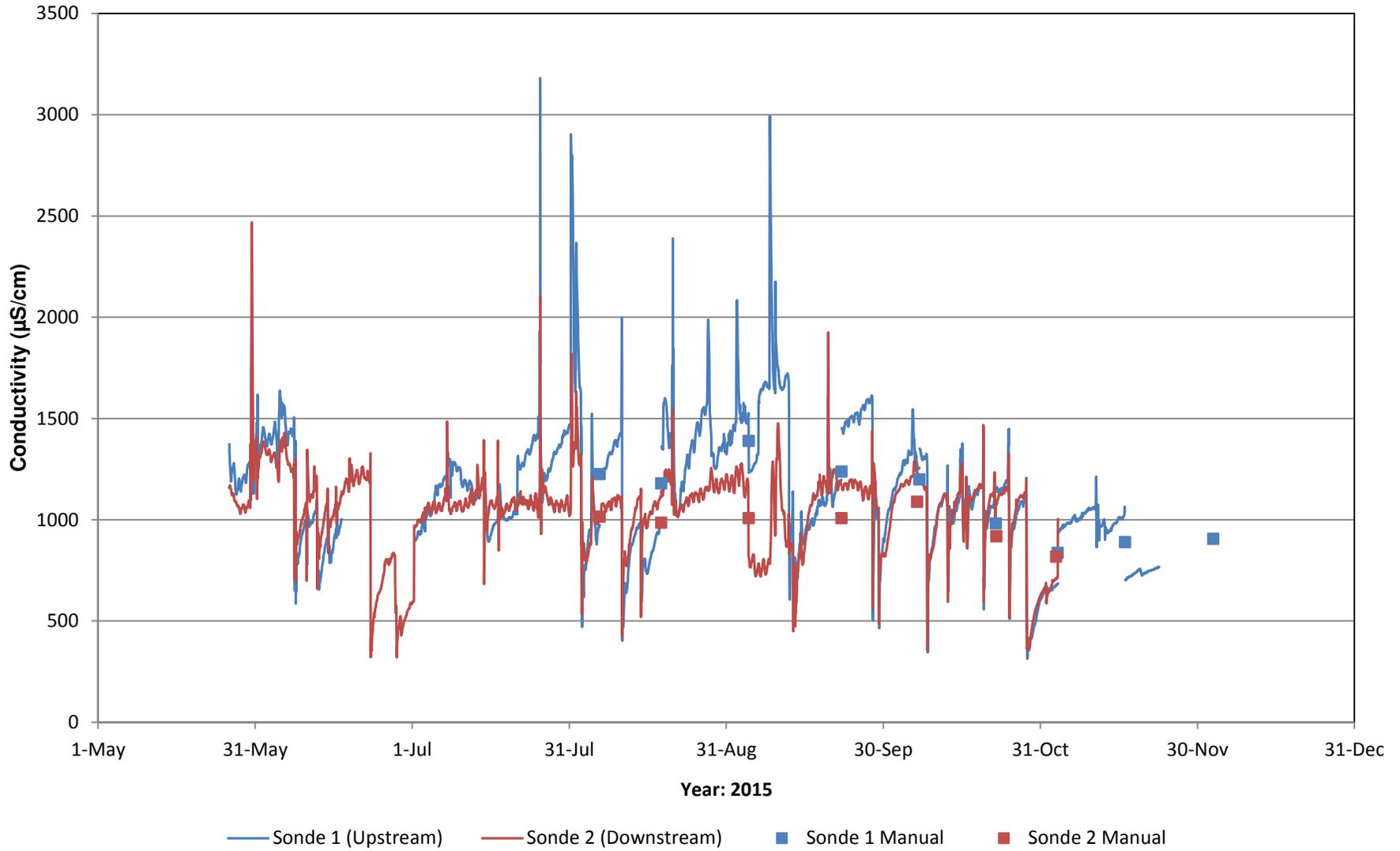


FIGURE C-3
PARAMETER CONCENTRATION COMPARISON - pH

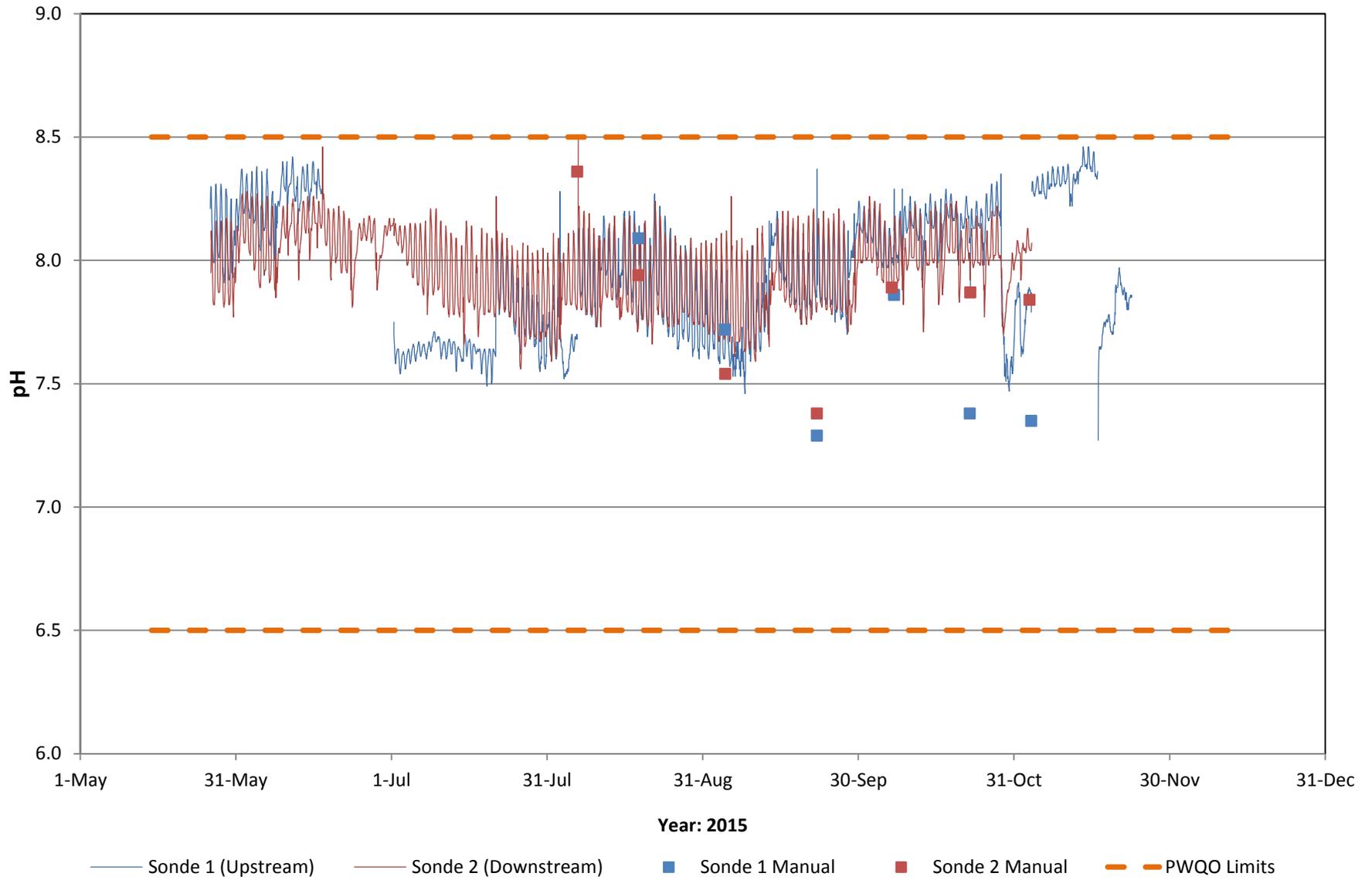


FIGURE C-4
PARAMETER CONCENTRATION COMPARISON - Turbidity

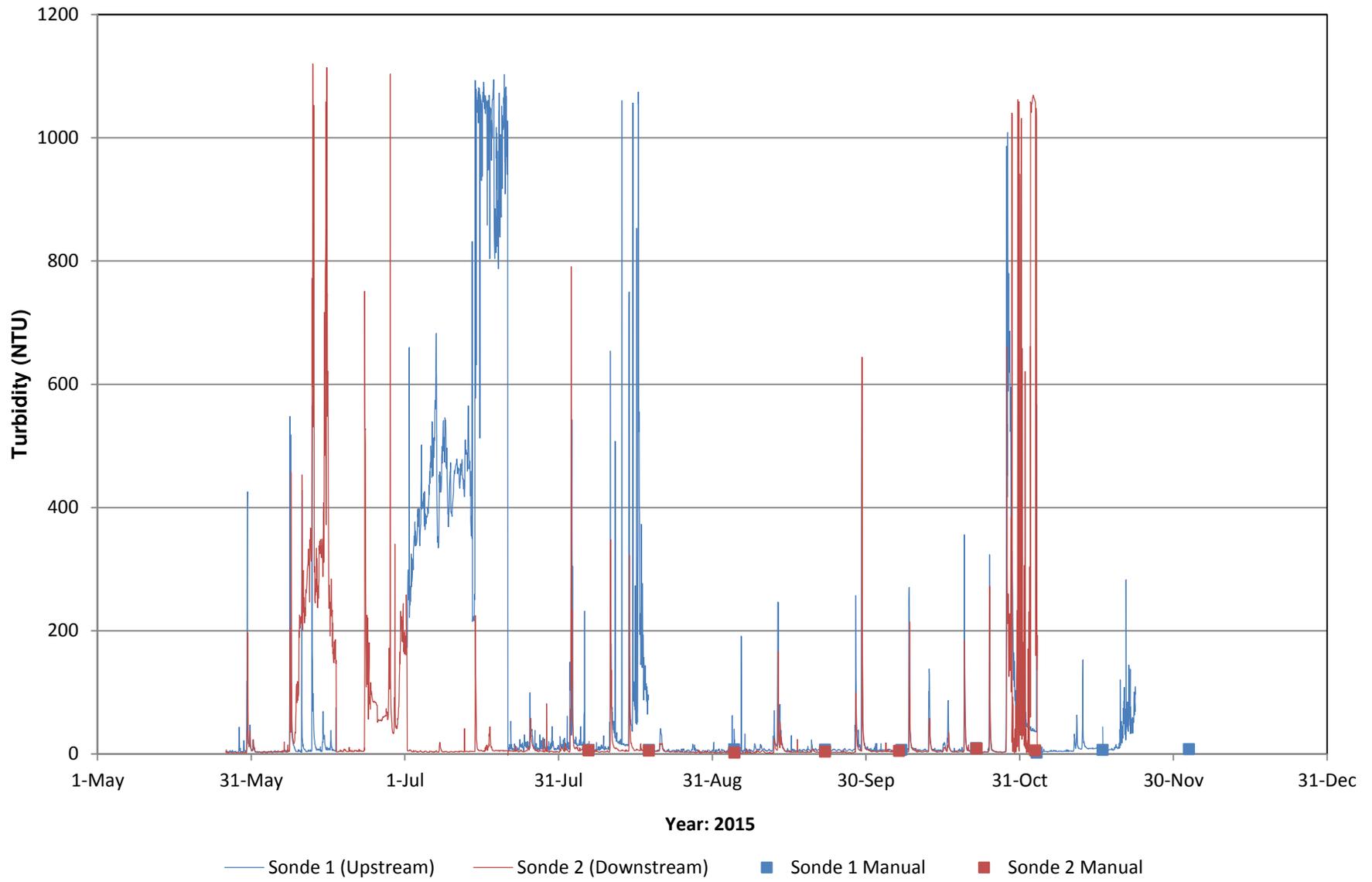


FIGURE C-5
PARAMETER CONCENTRATION COMPARISON - Turbidity with CWQG

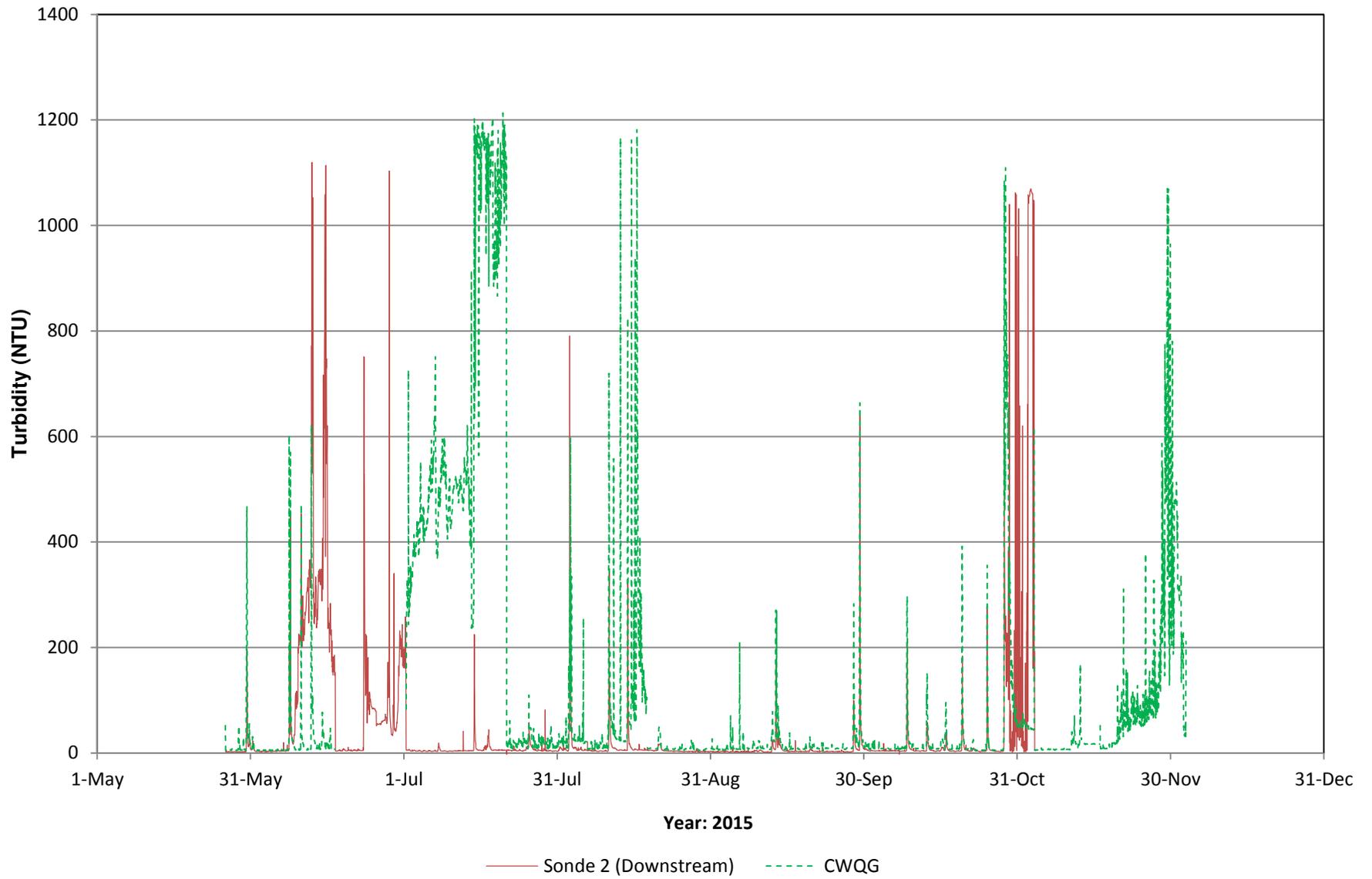
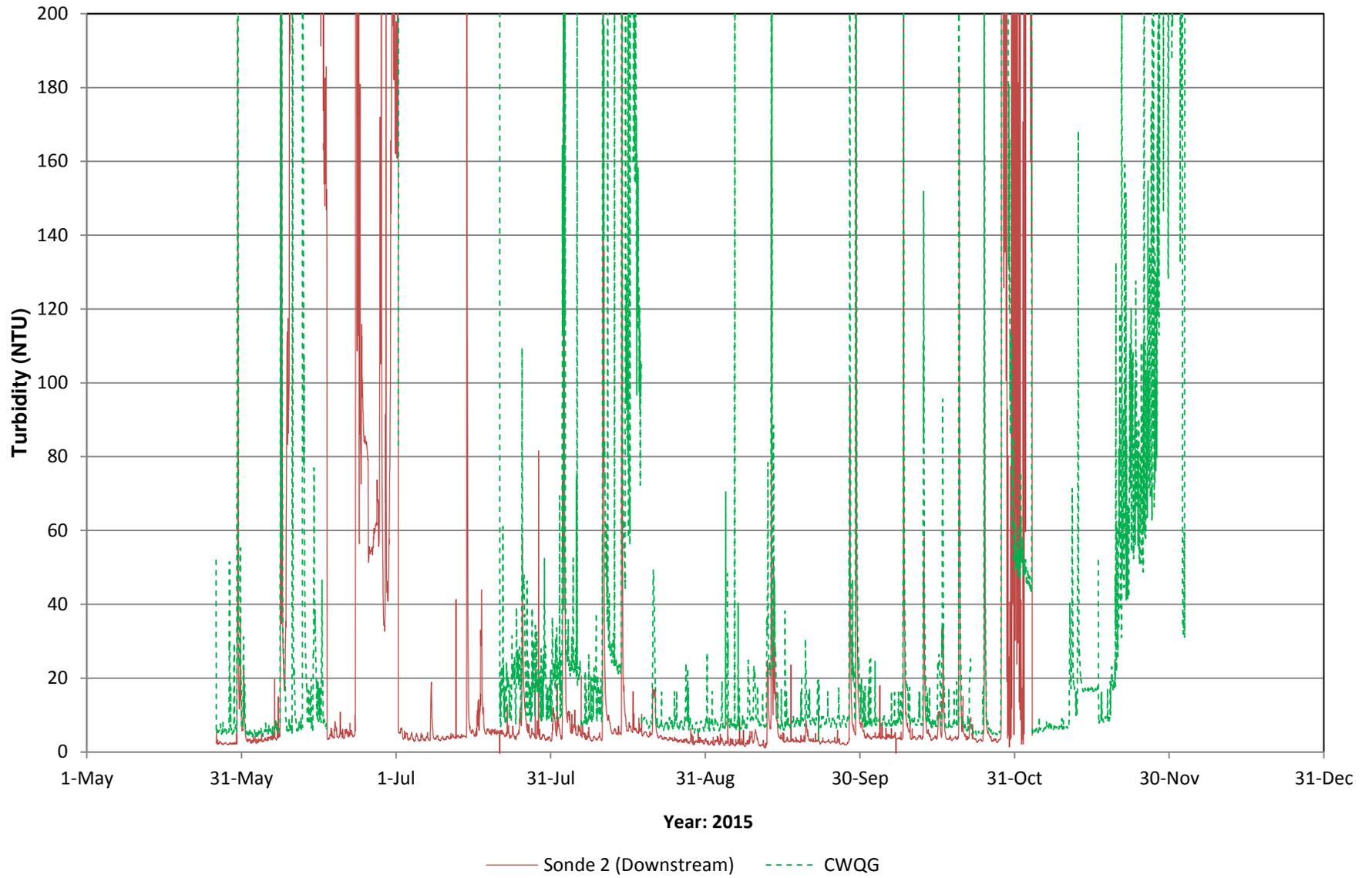


FIGURE C-6
PARAMETER CONCENTRATION COMPARISON - Turbidity with CWQG



Appendix D

MOE CHECKLIST

Appendix D-Monitoring and Screening Checklist General Information and Instructions

General Information: The checklist is to be completed, and submitted with the Monitoring Report.

Instructions: A complete checklist consists of:

- (a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
- (b) completed contact information for the Competent Environmental Practitioner (CEP)
- (c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

Definition of Groundwater CEP:

For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:

- (a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
- (b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..

Definition of Surface water CEP:

A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

Monitoring Report and Site Information	
Waste Disposal Site Name	Durham York Energy Centre
Location (e.g. street address, lot, concession)	Osborne Road, south of South Service Road, southeast of Courtice Rd / Highway 401
GPS Location (taken within the property boundary at front gate/ front entry)	680660, 4860506, Zone 17, NAD 83
Municipality	Municipality of Clarington, in the Regional Municipality of Durham
Client and/or Site Owner	Regional Municipalities of Durham and York
Monitoring Period (Year)	2015
This Monitoring Report is being submitted under the following:	
Certificate of Approval No.:	7306-8FDKNX
Director's Order No.:	
Provincial Officer's Order No.:	
Other:	

Report Submission Frequency	<input checked="" type="radio"/> Annual <input type="radio"/> Other	
The site is:	<input checked="" type="radio"/> Active <input type="radio"/> Inactive <input type="radio"/> Closed	
If closed, specify C of A, control or authorizing document closure date:		N/A
Has the nature of the operations at the site changed during this monitoring period?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
If yes, provide details:	Site is in the construction phase.	
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i.e. exceeded the LEL for methane)	<input type="radio"/> Yes <input checked="" type="radio"/> No	

Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

<p>1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>If no, list exceptions (Type Here):</p>
<p>2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document(s):</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable</p>	<p>If no, list exceptions below or attach information.</p>

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.		<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Applicable
b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:		<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable
Groundwater Sampling Location		Date
Description/Explanation for change (change in name or location, additions, deletions)		
		Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):		<input checked="" type="radio"/> Yes <input type="radio"/> No If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

<p>5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	
<p>6) The site meets compliance and assessment criteria.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	
<p>7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>If no, list exceptions and explain reason for increase/change (Type Here):</p>
<p>1) Is one or more of the following risk reduction practices in place at the site: (a) There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or (b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or (c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation): <i>i.</i> The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and <i>ii.</i> Seasonal and annual water levels and water quality fluctuations are well understood.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Note which practice(s):</p> <p><input type="checkbox"/> (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/> (c)</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Applicable</p>	

Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories*, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

29-Apr-2016

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

No changes to the monitoring program are recommended

The following change(s) to the monitoring program is/are recommended:

No Changes to site design and operation are recommended

The following change(s) to the site design and operation is/are recommended:

Type Here

Name:	Stephen J. Taziar, P.Eng		
Seal:	Add Image 		
Signature:		Date:	29-Apr-2016
CEP Contact Information:	Type Here		
Company:	WSP Canada Inc.		
Address:	126 Don Hillock Drive, Suite 2, Aurora, ON, L4G 0G9		
Telephone No.:	(905) 750-3080	Fax No. :	(905) 727-0463
E-mail Address:	stephen.taziar@wspgroup.com		
Co-signers for additional expertise provided:			
Signature:		Date:	Select Date
Signature:		Date:	Select Date