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REPORT ON

Post-Construction Monitoring Report Annual Report #3 (PR #51) MTO Contract 2010-4003 TDA Embankment, WP-385-01-01 Boundary Road, Cornwall, Ontario

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REPORT



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Table of Contents

1.0 INTRODUCTION.....	1
2.0 GEOLOGICAL CONDITIONS.....	4
3.0 POST-CONSTRUCTION MONITORING PROGRAM	5
3.1 Groundwater.....	6
3.1.1 Groundwater Compliance	7
3.2 Surface Water.....	8
3.2.1 Surface Water Compliance	9
3.3 Pan Lysimeter.....	5
3.3.1 Pan Lysimeter Compliance	6
4.0 SITE PHYSICAL HYDROGEOLOGICAL CONDITIONS.....	10
4.1 Groundwater Levels	10
4.2 Hydraulic Gradients and Flow Direction.....	10
4.3 Horizontal Hydraulic Conductivity	10
4.4 Groundwater Flux and Average Linear Velocity	11
5.0 GROUNDWATER QUALITY	14
5.1 Background Groundwater Quality.....	14
5.2 Groundwater Compliance Assessment.....	15
6.0 SURFACE WATER QUALITY	17
6.1 Background Surface Water Monitoring.....	17
6.2 Surface Water Compliance Assessment	17
7.0 PAN LYSIMETER WATER QUALITY	12
7.1 Background Pan Lysimeter Leachate Monitoring	12
7.2 Pan Lysimeter Leachate Quality Assessment	13
8.0 QUALITY ASSURANCE/QUALITY CONTROL	19
9.0 PROPOSED ADDITIONAL MONITORING PROGRAM.....	20
10.0 CONCLUSIONS.....	21
11.0 LIMITATIONS AND USE OF REPORT	22
12.0 CLOSURE	23
13.0 REFERENCES.....	24



TABLES

Table 1: Post-Construction Pan Lysimeter Monitoring Program

Table 2: Post-Construction Groundwater Monitoring Program

Table 3: Post-Construction Surface Water Monitoring Program

Table 4: Groundwater Elevation Data

Table 5: Interpretation of Pan Lysimeter Leachate Quality Data

Table 6: Interpretation of Groundwater Quality Data

Table 7: Surface Water Station Field Observations

Table 8: Interpretation of Surface Water Quality Data

FIGURES

Figure 1: Key Plan

Figure 2: Site Plan with Groundwater Elevation and Flow Direction

Figure 3: Photographs of Surface Water Stations October 2014 – Post-Construction I

Figure 4: Photographs of Surface Water Stations March 2015 – Post-Construction II

Figure 5: Photographs of Surface Water Stations June 2015 – Post-Construction III

Figure 6: Photographs of Surface Water Stations August 2015 – Post-Construction IV

Figure 7: Benzene Concentrations at MW 03, MW 04, PL2 and PL3 November 2010 to August 2015

Figure 8: Iron Concentrations at MW 03, MW 04, PL2 and PL3 November 2010 to August 2015

Figure 9: Manganese Concentrations at MW 03, MW 04, PL2 and PL3 November 2010 to August 2015

Figure 10: Sulphate Concentrations at MW 03, MW 04, PL2 and PL3 November 2010 to August 2015

Figure 11: Hardness Concentrations at MW 03, MW 04, PL2 and PL3 November 2010 to August 2015

Figure 12: Alkalinity Concentrations at MW 03, MW 04, PL2 and PL3 November 2010 to August 2015

APPENDICES

APPENDIX A

Provisional Certificate of Approval No. 5558-83WSFB and Comments from MOECC

APPENDIX B

Genivar Consultants Limited Partnership Borehole Logs

APPENDIX C

Results of Field and Laboratory Chemical and Physical Analyses

Appendix C-I – Pan Lysimeter Monitoring Locations

Appendix C-II – Groundwater Monitoring Locations

Appendix C-III – Surface Water Monitoring Locations

APPENDIX D

Reports of Analyses – Post-Construction Monitoring (Data CD)



1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) to conduct hydrogeological monitoring in relation to the pilot-scale application of Tire Derived Aggregate (TDA) as engineered fill for a bridge replacement project. McIntosh Perry was retained by the Ontario Ministry of Transportation (MTO) as Contract Administrator for this project. The location of the bridge re-construction (referred to as the 'Site') is situated at the interchange of Boundary Road and Highway 401 in Eastern Ontario, on the municipal boundary between the City of Cornwall (west side) and the Township of South Glengarry (east side) (See Key Plan, **Figure 1**).

The Site is classified as a non-hazardous waste disposal site and operates under the Environmental Compliance Approval No. 5558-83WSFB (ECA). The core of the approach embankments for the replacement bridge were constructed from TDA fill wrapped in geotextile and covered with low permeability soil. Pursuant to Condition 21 of the ECA, TDA fill was placed greater than 2 metres above the groundwater table; a minimum of 20 metres from any surface water feature and greater than 100 metres away from any potable groundwater well. Details pertaining to the design and specifications of the TDA are presented in the Tire Derived Aggregate Design Brief application to the Ministry of the Environment (MTO, 2009) and the Final Report (MTO, 2013) prepared in accordance with Condition 41 of the ECA. The licensed TDA fill area is 0.5 hectares within a total site area of 7.5 hectares. A Site Plan showing the location of the constructed TDA embankments is provided on **Figure 2**.

Emplacement of TDA occurred in mid-May 2012. Construction monitoring commenced on June 14, 2012, approximately one month following the first date of placement of TDA, as per condition 6.4.9.2 of the Addendum #1 of MTO Contract 2010-4003, dated June 22, 2010 (MTO Contract). The new bridge structure was open to public traffic in November 2012. It is Golder's understanding that construction of final slope grading of the north and south embankments was completed in July 2014.

The post-construction monitoring program was conducted one year following the completion of the construction program in accordance with Addendum No.1 of the MTO Contract 2010-4003. Note PAH sampling was removed from the monitoring requirements following technical review comments provided by the Ministry of the Environment in response to the first annual construction monitoring report prepared by Golder (Golder, 2014).

This report discusses the results of the post-construction monitoring program (October 2014 to August 2015) and provides recommendations for future groundwater, surface water and pan lysimeter leachate quality monitoring program.



2.0 COMMENTS FROM THE MOECC

The Ministry of the Environment and Climate Change (MOECC) provided technical comments in response to the review of the report entitled “Construction Monitoring Report, Annual Monitoring Report #2 (PR#44), MTO Contract 2010-4003, TDA Embankment, WP-385-01-01, Boundary Road, Cornwall, Ontario” in two letters dated March 13, 2015 and June 10, 2015 as summarized below and provided in Appendix A.

March 13, 2015 technical comments from MOECC Hydrogeologist Frank Crossley:

- “The pan lysimeter results provide a leachate characterization. The key leachate indicator parameters are iron, manganese, benzene, alkalinity, hardness and sulphates.”
- “The pan lysimeters outside (control) the TDA area are typically reported as “dry” whereas the pan lysimeters within the TDA area have liquids (historical overflow reported). This suggests that the materials covering the TDA are not low permeable material or are insufficient to reduce infiltration into the TDA area. This issue should be addressed.”
- The groundwater results show that the leachate is impacting MW 03 and possibly MW 04. The site is regulated (Environmental Compliance Approval), thus Guideline B-7 applies. The site is considered to be in compliance with Guideline B-7 as MW 03 is within the site boundary. Ongoing monitoring will determine if further action is required. The monitoring program is to be continued.”
- The Ministry of Transportation Ontario is requesting the exemption of TDA from Regulation 347 and Part V of the *Environmental Protection Act*. TDA is not inert and generates a leachate best characterized by iron; manganese, benzene; alkalinity; hardness and sulphates. Therefore it is recommended that TDA remain regulated and can be used in site specific cases where the leachate generation does not produce environmental impacts.”

June 10, 2015 technical comments from Senior Aquatic Specialist Victor Castro:

- “Pan lysimeters PL2 and PL3, which were installed directly in the TDA embankments above the water table, continue to show elevated levels of TDA leachate indicator parameters iron, manganese and benzene. Alkalinity, hardness and sulphates are also considered good leachate indicators for TDA.”
- “Sampling results for stations SW01, SW 02 and SW 07 show elevated levels of several TDA leachate indicator parameters: iron, manganese and zinc. The consultants do not attribute these elevated concentrations of indicator parameters to the TDA filled embankments, but instead they indicate there is limited evidence to suggest these stations are located downstream of the TDA area. The drainage patterns for the surface water stations is obviously an issue and needs to be confirmed in order to properly assess the surface water data. It may be quite possible for the elevated metals to be natural in origin, particularly in stagnant shallow surface water; however, there is a source of these contaminants in close proximity (i.e. TDA embankments) and therefore an understanding of drainage and flow patterns during wet periods is necessary to explain the elevated concentrations”
- “Pan lysimeters PL2 and PL3, which were installed directly in the TDA embankments above the water table, continue to show elevated levels of TDA leachate indicator parameters iron, manganese and benzene. Alkalinity, hardness and sulphates are also considered good leachate indicators for TDA.”
- “The consultants have recommended that surface water and groundwater monitoring continue at this site. I support this recommendation”



Iron, manganese and benzene have previously been identified as key leachate indicator parameters for TDA applications above the groundwater table (Humphrey & Swett, 2006). Golder is in agreement with the MOECC reviewers that concentrations of alkalinity, hardness and sulphates observed in the TDA leachate are elevated compared to baseline groundwater quality and background pan lysimeter leachate observed at PL4. However, literature review of the groundwater quality effects of TDA indicate concentrations of sulphate were not affected by TDA application above the water table (Humphrey, 1999; Humphrey & Katz, 2000), whereas Sengupta & Miller (2004) reported only low levels of sulphate leaching from the tires. Eldin et al. (1992) concluded leaching of sulphate, calcium and magnesium (hardness) from tire chips may be heavily masked or overwhelmed by leaching of other materials used in the embankment construction, while increases in concentrations of alkalinity may be related to an increase in hydroxides of metal ions that have leached from the tires (Humphrey et al., 1996). Chyi (2000) also concluded that elevated levels of cations (calcium, magnesium, sodium and potassium) and anions (sulphate) in groundwater observed in leachate may be attributed to water leaking into the tire fill. At the request of the MOECC, alkalinity, hardness and sulphate will be added to the list of TDA indicator parameters as part of the post-construction monitoring assessment; however, it is possible that elevated concentrations of these parameters are attributed to another source(s).

An investigation involving the collection and testing of soil samples from test pits was carried out by Golder in October 2015. The purpose of this activity was to investigate the source of impacts in the vicinity of the TDA embankments (TDA and/or the native fill materials). The findings of this investigation will be reported in a separate report in early 2016. The surface water drainage pattern will also be assessed in the investigation report.



3.0 GEOLOGICAL CONDITIONS

The following section provides a brief summary of the geological setting of the TDA embankment Site based on the pre-construction data available from the augerholes/boreholes that were drilled during the installation of groundwater monitors by Genivar Consultants Limited Partnership (Genivar) and from previous geotechnical investigations conducted at the Site by Coffey Geotechnics Inc. (Coffey). Borehole logs corresponding to the six groundwater monitors installed around the areas of the proposed TDA embankments were prepared by Genivar and are provided in **Appendix B**.

The site is located in the Glengarry Till Plain physiographic region of south-eastern Ontario (Chapman and Putman, 1973). The surficial geology of the site consists of fill materials (clayey topsoil or gravel structural fill) that extend to as much as 2.6 metres below ground surface, underlain by native soils, comprised of sandy silt till gravel (Fort Covington Till), to between 0.6 and 3.2 metres depth. A sand and gravel inter-glacial zone, with a thickness of up to 0.6 metres, and a silty sand till with gravel layer (Malone Till) was encountered between 3.1 and 6.1 metres depth. Bedrock is comprised of dark grey argillaceous limestone. The bedrock is exposed at ground surface north of the property and was encountered between 6.8 and 13.6 metres below ground surface at the site (Coffey, 2009).



4.0 POST-CONSTRUCTION MONITORING PROGRAM

The scope of the post-construction monitoring program is presented in the MTO Contract. It is Golder's understanding that construction of final slope grading of the north and south embankments was completed in July 2014. The results of the quarterly groundwater, surface water and pan lysimeter monitoring events conducted one year following completion of the construction are discussed in this report. The locations of the groundwater monitors, surface water sampling stations and pan lysimeters in the vicinity of the TDA placement are shown on **Figure 2**.

4.1 Pan Lysimeter

Pan lysimeter monitoring was conducted at locations PL1, PL2, PL3 and PL4 described in Table 7 of the MTO Contract. The locations of the pan lysimeters were selected in order to measure the water quality of the leachate produced from the TDA. The approximate locations of the four pan lysimeters are shown on **Figure 2**. Pan lysimeters PL2 and PL3 are situated within the north and south TDA fill areas, respectively.

Pan lysimeter leachate samples were collected using a whale pump and dedicated tubing. The pan lysimeters were purged approximately two weeks prior to the samples being collected. Pan lysimeter water quality samples were submitted for laboratory testing of the parameters outlined in Table 2 and Table 8 of Addendum No. 1 in the MTO Contract 2010-4003 (see **Table 1** of this report).

Pan lysimeter leachate quality monitoring was conducted on October 9, 2014 (Post-Construction I), March 24, 2015 (Post-Construction II), June 17, 2015 (Post-Construction III) and August 27, 2015 (Post-Construction IV). With the exception of the June 2012 monitoring event at PL4, background pan lysimeters locations PL1 and PL4 were consistently dry during the entire duration of the construction and post-construction monitoring period.

The temperature, pH, conductivity and turbidity of the pan lysimeter water samples were measured in the field at the time of sample collection. The meters used for measuring the pH and conductivity in the field were calibrated prior to use. All samples collected were entered on a Chain of Custody form and placed in coolers and maintained at or below 10°C for transport to Exova Accutest in Ottawa, Ontario.

Pan lysimeter samples were collected, prepared and preserved in the field as follows:

Analytical Parameters	Preparation and Preservation Protocols
alkalinity, bicarbonate, bromide, carbonate, colour, fluoride, nitrate, nitrite, sulphate, total suspended solids, turbidity, TSS	plastic bottle, unfiltered and unpreserved
ammonia (un-ionized), ammonium, total phosphorus, TOC	plastic bottle, unfiltered and preserved to pH<2 with sulphuric acid
aluminum, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, hardness, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, titanium, vanadium and zinc	plastic bottle, field filtered to 0.45 microns and preserved to pH<2 with nitric acid
F1-F4 PHCs	amber glass bottle, unfiltered and unpreserved
VOCs including BTEX	glass bottle containing zero headspace, unfiltered and unpreserved



4.1.1 Pan Lysimeter Compliance

For all regulated metals and organics, the toxicity characteristics leaching procedure (TCPL) testing for TDA are well below the TCPL regulatory limits (Zelabor, 1991; Ealding, 1992; Humphey et al., 1997); therefore, TDA are not classified as hazardous waste. The purpose of a pan lysimeter monitoring location is to record the water quality of the leachate generated results from the TDA. TDA Leachate Indicator parameters benzene, iron, manganese, toluene, xylenes, zinc, 1,1,1-trichloroethane, 1,1-dichloroethane and trichloroethene are used to assess potential impacts to downgradient monitoring locations. Alkalinity, hardness and sulphate are also considered TDA leachate indicator parameters at the request of the MOECC as discussed in Section 2.0. For the purpose of this Site evaluation, pan lysimeter leachate quality is compared to the relevant groundwater Ontario Drinking Water Quality Standards (ODWQS); although potential impact of drinking water is evaluated at the site boundaries.

4.2 Groundwater

The groundwater post-construction monitoring program was carried out at the Site in accordance with Table 2 of the MTO Contract. Groundwater levels were measured, and samples were collected by Golder personnel on a quarterly basis at monitoring locations MW 01, MW 02, MW 03, MW 04, MW 05 and MW 06 on October 9, 2014 (Post-Construction I), March 24, 2015 (Post-Construction II), June 17, 2015 (Post-Construction III) and August 27, 2015 (Post-Construction IV). Groundwater monitor MW 05 was frozen during the March 2015 event and dry in August 2015, while MW 06 was dry during the October 2014 and August 2015 monitoring sessions.

Prior to collecting groundwater samples, the monitoring wells were purged and developed through the removal of at least three standing volumes of water using dedicated inertial samplers. Sampling of groundwater was performed on the same day as the well purging. Groundwater samples were submitted for laboratory testing of the parameters outlined in Table 2 and Table 3 of the MTO Contract (see **Table 2** of this report).

The temperature, pH and conductivity and turbidity of the groundwater samples were measured in the field at the time of sample collection. The meters used for measuring the pH and conductivity measurements in the field were calibrated prior to use. All samples collected were entered on a Chain of Custody form, placed in coolers and maintained at or below 10°C for transport to the analytical laboratory (Exova Accutest) in Ottawa, Ontario. Groundwater samples were collected, prepared and preserved in the field as follows:

Analytical Parameters	Preparation and Preservation Protocols
alkalinity, bicarbonate, bromide, carbonate, colour, fluoride, nitrate, nitrite, sulphate, total suspended solids, turbidity, TSS	plastic bottle, unfiltered and unpreserved
ammonia (un-ionized), ammonium, total phosphorus, TOC	plastic bottle, unfiltered and preserved to pH<2 with sulphuric acid
aluminum, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, hardness, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, titanium, vanadium and zinc	plastic bottle, field filtered to 0.45 microns and preserved to pH<2 with nitric acid
F1-F4 total petroleum hydrocarbons (F1-F4 PHCs)	amber glass bottle, unfiltered and unpreserved
VOCs including BTEX	glass bottle containing zero headspace, unfiltered and unpreserved



4.2.1 Groundwater Compliance

The use of TDA materials as light fill for the construction of the bridge embankments required that the Site be designated as a non-hazardous waste disposal site. A provisional ECA was issued on May 14, 2010 (see **Appendix A**). The volume of TDA fill is less than 40,000 cubic metres; therefore, the general waste management Regulation 347 is applicable to the Site.

Groundwater compliance assessment parameters (TDA Leachate Indicator Parameters) have been identified by previous studies which investigated potential impacts to groundwater associated TDA (Humphrey and Swett, 2006; ASTM, 2008). According to the literature, the placement of TDA above the groundwater table has the potential to increase concentrations of select metals with drinking water aesthetic objectives (iron, manganese and zinc). Volatile organic compounds including benzene, xylene, toluene, 1,1,1-trichloroethane, 1,1 dichloroethane, and trichloroethene can also be released from the TDA into the groundwater system in trace amounts. As previously discussed, the MOECC has suggested that alkalinity, hardness and sulphate are also TDA leachate indicators.

Under MOE Guideline B-7 (MOE, 1994a), a change in the quality of groundwater on adjacent properties will only be acceptable if the water quality is not degraded in excess of fifty percent of the difference between background concentrations and established water quality criteria for aesthetic related parameters, and twenty-five percent of the difference between background conditions and established water quality criteria for health related parameters. It is Golder's understanding that the 7.5 ha TDA site boundary area is located well within MTO property limits.

For the purpose of this Site evaluation under MOE Guideline B-7, the Pre-Construction groundwater quality monitoring completed at all monitoring wells between November 2010 and May 2012 is assumed to be representative of background groundwater quality within the sand and gravel interglacial layer (MW 02, MW 05, MW 06), at the contact between the Fort Covington Till and Malone Till (MW 03 and MW 04) or within the top of the transition from sand and gravel unit to the Malone Till (MW 01), underlying the TDA. The sand and gravel interglacial zone and/or contact zone between the Fort Covington Till and Malone Till are interpreted to be the layers most likely to be impacted by leachate from the TDA on adjacent properties. The Ontario Drinking Water Quality Standards and Objectives (MOE, 2006) are used to represent the established water quality criteria.

Groundwater compliance of the TDA fill area is assessed by comparing groundwater concentrations, at compliance monitoring locations, each TDA Leachate Indicator Parameter to Reasonable Use Limits (RUL) determined by the following expression:

$$RUL = C_b + x(ODWQS - C_b) \quad (1)$$

Where:

C_b = Median background concentration;

ODWQS = Ontario Drinking Water Quality Standard; and,

x = 0.25 for health-related parameters, 0.5 for non-health related parameters



4.3 Surface Water

The post-construction surface water monitoring program is described in Table 6 of the MTO Contract. Surface water monitoring was conducted at the locations described in Table 5 the MTO Contract, with the exception of station SW 05. Surface water monitoring station SW 05 could not be established as the native soil in the vicinity of the monitor had been stripped and backfilled with granular material prior to Golder's initial Site visit on November 12, 2010. The approximate locations of the seven established surface water monitoring stations SW 01, SW 02, SW 03, SW 04, SW 06, SW 07 and SW 08 are shown on **Figure 2**.

Surface water quality monitoring carried out as part of the post-construction monitoring program was completed on October 9, 2014 (Post-Construction I), March 24, 2015 (Post-Construction II), June 17, 2015 (Post-Construction III) and August 27, 2015 (Post-Construction IV). All surface water monitoring stations were frozen or dry during the Post-Construction II and IV monitoring events; therefore, no surface water quality samples could be collected at that time.

Specific monitoring stations that were not sampled during each monitoring session are presented in the following table:

Date	Post-Construction Monitoring Session	Stations Not Sampled
October 9, 2014	I	SW 01 ¹ , SW 02 ¹ , SW 03 ¹ , SW 04 ¹ , SW 08 ¹
March 24, 2015	II	All locations frozen
June 17, 2015	III	None
August 27, 2015	IV	All locations dry

Notes: ¹ Station dry
² Station frozen

Surface water samples were submitted for laboratory testing of the parameters provided in **Table 3** of this report.

The temperature, pH, dissolved oxygen and conductivity of each surface water sample were measured in the field at the time of sample collection. The meters used for measuring the pH, dissolved oxygen and conductivity in the field were calibrated prior to use. All samples collected were entered on a Chain of Custody form, placed in coolers and maintained at or below 10°C for transport to the Exova Accutest in Ottawa, Ontario.



Surface water samples were collected, prepared and preserved in the field as follows:

Analytical Parameters	Preparation and Preservation Protocols
alkalinity, bicarbonate, bromide, carbonate, colour, fluoride, nitrate, nitrite, sulphate, total suspended solids, turbidity, TSS	plastic bottle, unfiltered and unpreserved
ammonia (un-ionized), ammonium, total phosphorus, TOC	plastic bottle, unfiltered and preserved to pH<2 with sulphuric acid
aluminum (dissolved)*, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, hardness, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, titanium, vanadium and zinc	plastic bottle and preserved to pH<2 with nitric acid *field filtered to 0.45 microns
F1-F4 PHCs	amber glass bottle, unfiltered and unpreserved
VOCs including BTEX	glass bottle containing zero headspace, unfiltered and unpreserved

4.3.1 Surface Water Compliance

In terms of surface water, TDA Leachate Indicator Parameters with applicable Provincial Water Quality Objectives (PWQO) include alkalinity, iron, zinc, benzene, toluene, total xylenes, 1,1,1-trichloroethane, 1,1-dichloroethane and trichloroethene. These parameters are used to assess potential TDA impacts on surface water quality due to TDA generated leachate.

Policy 1 (MOE, 1994b) states that "in areas which have water quality better than the PWQO, water quality shall be maintained at or above the Objective". Based on pre-construction monitoring, the background surface water quality in the vicinity of the Site did not naturally meet the PWQOs for select parameters, specifically iron, total phosphorus and zinc. Policy 2 states "water quality which presently does not meet the Provincial Water Quality Objectives shall not be degraded further and all practical measures shall be taken to upgrade the water quality to the Objectives". Therefore, for compliance assessment purposes, Policy 2 would apply with respect to iron, total phosphorus and zinc, and Policy 1 would apply with respect to the other TDA Leachate Indicator Parameters.



5.0 SITE PHYSICAL HYDROGEOLOGICAL CONDITIONS

5.1 Groundwater Levels

Groundwater levels measured during the post-construction monitoring program are shown in **Table 4**. The depth to the water table ranged from 0.6 metres below ground surface (mbgs), southwest of the north TDA embankment, to 1.4 mbgs, northwest of the north TDA embankment, and from 1.4 mbgs, southwest of the south TDA embankment, to 4.0 mbgs, east of the south TDA embankment. Groundwater levels were somewhat more variable south of Highway 401 than north of Highway 401 throughout the post-construction period.

The groundwater levels within the granular layer for during the post-construction monitoring period, from October 2014 to August 2015, are shown on **Figure 2**.

5.2 Hydraulic Gradients and Flow Direction

Based on the post-construction groundwater elevation data, the groundwater flow direction within the granular layer is interpreted to be generally towards the north and northwest across the Site, with a more and easterly component in the vicinity of the south TDA embankment, as shown on **Figure 2**. The groundwater flow direction is indicated to be generally consistent over time based on groundwater monitoring between November 2010 and August 2015 and appears to be controlled by local topography, including the TDA embankments.

The horizontal hydraulic gradient for the granular layer groundwater flow system at the Site was estimated from the post-construction monitoring sessions completed between October 2014 and August 2015. In general, the horizontal hydraulic gradient across the Site remained consistent throughout the duration of the monitoring program: between 0.002 to 0.003 metres per metre (m/m) in the vicinity of the north TDA embankment (estimated using water level data from MW 01, MW 02 and MW 05) and 0.01 m/m in the vicinity of the south TDA embankment (estimated using water level data from MW 03, MW 04 and MW 06).

Multi-level monitors were not installed, thus vertical gradients and vertical flow directions are not assessed.

5.3 Horizontal Hydraulic Conductivity

Monitoring wells are primarily screened within the Fort Covington Till and/or Malone Till and include the target sand and gravel interglacial zone between the two units where applicable (see **Appendix B**). Published horizontal hydraulic conductivities range from 7.8×10^{-5} to 4.0×10^{-9} metres per second (m/s) with a geometric mean of 5.1×10^{-7} m/s and 2.6×10^{-6} to 4×10^{-9} m/s for the Fort Covington Till with a geometric mean of 6.5×10^{-8} m/s for the Malone Till (Kolley et al., 1994).

These values are considered generally representative of what would be expected for the granular layer present in the subsurface at the Site and are in agreement with the range of published horizontal hydraulic conductivity values reported for similar materials (Freeze and Cherry, 1979).



5.4 Groundwater Flux and Average Linear Velocity

The groundwater flux or specific discharge, q , is the volumetric flow rate of groundwater per unit area per unit time and is calculated from the Darcy's equation, as follows:

$$q = -Ki \quad (2)$$

Where:

q = groundwater flux (m/s);

K = horizontal hydraulic conductivity (m/s);

i = horizontal hydraulic gradient (m/m).

Using conservative estimates of the horizontal hydraulic gradient of 0.003 m/m for the north TDA embankment area and 0.01 m/m for the south embankment area, and published geometric mean of horizontal hydraulic conductivity testing in the Fort Covington Till (5.1×10^{-7} m/s), the maximum groundwater flux across the Site is estimated to be 1.5×10^{-9} m/s and 5.1×10^{-9} m/s in the vicinity of the north and south TDA embankments, respectively. For an assumed porosity of 0.3, these fluxes translate to a range in average linear groundwater velocity of 0.2 metres per year (m/yr) in the vicinity of the north TDA area and 0.5 m/yr in the vicinity of the south TDA area. Therefore, the approximate horizontal travel time of TDA leachate from the south TDA embankment to downgradient monitoring well MW 03 would be approximately 16 years, and greater than 50 years from the north TDA embankment to MW 01.



6.0 PAN LYSIMETER WATER QUALITY

The results of the field and laboratory analyses of the pan lysimeter leachate samples collected during the construction and post-construction monitoring periods water quality data are presented in **Appendix C-I** along with the relevant ODWQS (MOE, 2001; MOE, 2006). The laboratory reports of analysis for the post-construction monitoring period are provided electronically on a data CD in **Appendix D**.

6.1 Background Pan Lysimeter Leachate Monitoring

Pan lysimeters PL1 and PL4 serve as background leachate quality monitoring for pan lysimeters PL2 and PL3, situated downgradient of TDA embankments. With the exception of the first quarterly construction monitoring event at pan lysimeter PL4, both background monitors have consistently been dry throughout the duration of the construction and post-construction monitoring programs.

The results of the field and analytical laboratory analyses on the leachate quality samples were compared to the relevant Ontario Drinking Water Quality Standards (ODWQS) included in **Appendix A**. Background pan lysimeter leachate quality is characterized by a single monitoring event at PL4 in June 2012 following the initial placement of TDA fill materials and the results are summarized in the table below:

TDA Leachate Indicator Parameters	Groundwater Quality Criteria ¹		(Background) Concentration at PL-4 (mg/L)
	ODWQS ² (mg/L)	STATUS	
Alkalinity	—	—	99
Iron	0.3	AO	<0.03
Hardness			41
Manganese	0.05	AO	<0.01
Sulphate			177
Zinc	5	AO	<0.01
Benzene	0.005	MAC	<0.0005
Toluene	0.024	AO	<0.0005
Xylenes, Total	0.3	AO	<0.0010
1,1,1-Trichloroethane	—	—	<0.0004
1,1, Dichloroethane	—	—	<0.0004
Trichloroethene	0.005	MAC	<0.0003

Notes: ¹ Considers Aesthetic Objectives (AO) and Maximum Acceptable Concentrations (MAC)

² ODWQS - Ontario Drinking Water Quality Standards and Objectives (MOE, 2006)



6.2 Pan Lysimeter Leachate Quality Assessment

The parameters with reported levels exceeding their respective ODWQS; trends in leachate quality; and, an interpretation of the pan lysimeter leachate quality results are summarized in **Table 5** at the end of the report.

Pan lysimeter locations PL1 and PL4, situated outside of the TDA fill areas were consistently dry throughout the entire duration of the post-construction monitoring period; therefore, no background leachate quality samples could be collected and compared to TDA leachate monitors PL2 and PL3. Based on the data obtained throughout the duration of the post-construction monitoring program at PL2 and PL3, TDA Leachate Indicator Parameters with concentrations exceeding the applicable ODWQS (AO) included iron, manganese and sulphate.

Concentrations of benzene measured at PL3 during the post-construction monitoring period were consistently below the MAC value of 0.005 mg/L, while concentrations of benzene at PL2 remained below the laboratory method detection limit (<0.0005 mg/L). Concentrations of benzene at pan lysimeters PL2 and PL3 have declined following the placement of TDA fill over time and have generally stabilized at PL2 (non-detect) and PL3 (below ODWQS) (refer to **Figure 7**).

Iron concentrations increased in pan lysimeter leachate monitors PL2 and PL3 following the placement of TDA fill, but have decreased since July 2013 (refer to **Figure 8**). The declining concentrations of iron at PL3 have been variable at times. Concentrations of manganese at pan lysimeters PL2 and PL3 initially increased following the TDA placement in May 2012, and remain variable (refer to **Figure 9**).

At the request of the MOECC, alkalinity, hardness and sulphate were added to the list of TDA leachate parameters following a sharp increase in concentrations during the first year of construction. Concentrations of sulphate have declined but remain somewhat variable at PL2 and PL3 (refer to **Figure 10**), while concentrations of alkalinity and hardness remain variable (refer to **Figures 11 and 12**).

Concentrations of the remaining Leachate Indicator Parameters including o-xylene, toluene, 1,1,-trichloroethane, 1,1-dichloroethane, trichloroethene and zinc were consistently measured at trace levels or below the method detection limit at all pan lysimeter locations throughout the duration of the two year construction monitoring program.

Elevated concentrations of ammonium, conductivity, strontium, potassium and sodium have also been observed in the leachate samples collected; however, these parameters were not previously identified as parameters of concern related to the TDA. The elevated concentrations of sodium in the leachate is interpreted to be related to the application of road de-icing agents along Boundary Road. Note, sodium, along with chloride, acetate, potassium, calcium and magnesium (hardness) are primary components of de-icing agents, while phosphorus, nitrogen, sulphate and zinc represent possible secondary components of de-icing agents which may impact leachate quality. Increasing conductivity in the leachate samples is likely attributed to an increase in sodium and chloride or metals ions such as iron and manganese that have leached from the TDA due to application of de-icing agents. The variable concentrations of hardness observed in the leachate may be attributed to seasonal effects, as peak concentrations are measured in the late winter/spring, and are attributed to snow meltwater laden with de-icing agents.



7.0 GROUNDWATER QUALITY

Historical results of the field and laboratory analyses of the groundwater samples collected during the post-construction and construction periods as well as pre-construction groundwater quality data are presented in **Appendix C-II** along with the relevant Ontario Drinking Water Quality Standards (MOE, 2006). The laboratory reports of analysis for the four post-construction monitoring sessions are provided electronically on a data CD in **Appendix D**.

Discussions regarding compliance with the Ontario Drinking Water Quality Standards (ODWQS) relate specifically to non-health related objectives (i.e., aesthetic parameters) and health-related parameters for which a Maximum Acceptable Concentration (MAC) or Interim Maximum Acceptable Concentration (IMAC) have been established.

7.1 Background Groundwater Quality

Background Site groundwater quality was characterized as part of the Pre-Construction Baseline Study conducted by Golder (June 2012). Site specific reasonable use limits (RULs) were established from the historical Pre-Construction baseline results as discussed in Section 4.1.1. The range in concentrations of the TDA Leachate Indicator Parameters at all groundwater monitors MW 01, MW 02, MW 03, MW 04, MW 05 and MW 06, for which MAC or AO objectives have been established are provided below, along with the calculated RULs. Note the list of TDA leachate indicator parameters was revised to include alkalinity, hardness and sulphate at the request of the MOECC as previously discussed in Section 2.0.

TDA Leachate Indicator Parameters	Groundwater Quality Criteria ¹		Pre-Concentration Range at all Monitors ³ (mg/L)	Reasonable Use Limit (mg/L)
	ODWQS ² (mg/L)	STATUS		
Alkalinity	—	—	242 – 434	—
Iron	0.3	AO	<0.03 – 21.5	0.17
Hardness	—	—	240 – 1680	—
Manganese	0.05	AO	<0.01 – 6.8	0.30
Sulphate	500	AO	9 – 98	276
Zinc	5	AO	<0.1	2.5
Benzene	0.005	MAC	<0.001	0.002
Toluene	0.024	AO	<0.001	0.012
Xylenes, Total	0.3	AO	<0.003	0.15
1,1,1-Trichloroethane	—	—	<0.0008	—
1,1-Dichloroethane	—	—	<0.0008	—
Trichloroethene	0.005	MAC	<0.0006	0.001

Notes: ¹ Considers Aesthetic Objectives (AO) and Maximum Acceptable Concentrations (MAC)

² ODWQS - Ontario Drinking Water Quality Standards and Objectives (MOE, 2006)

³ Pre-Construction (background) groundwater quality data sampled between November 2010 and May 2012

The RULs are calculated as the median value of all pre-construction groundwater quality data (MW 01, MW 02, MW 03, MW 04, MW 05 and MW 06). Where concentrations of parameters analyzed were below the method detection limit, a concentration equivalent to the method detection limit value was used in the calculation of the RUL. For the purpose of this compliance assessment, it is recognized that the background groundwater quality



in the vicinity of the Site does not naturally meet the ODWQS aesthetic objective for iron and manganese at all monitoring locations, and the maximum background concentrations of iron and manganese are substantially higher than the median concentrations. Therefore, exceedance of the calculated RUL following emplacement of the TDA as part of the construction monitoring program would not necessarily be indicative of leachate impact.

7.2 Groundwater Compliance Assessment

Trends in groundwater quality; a comparison of post-construction groundwater quality to pre-construction conditions; and, an interpretation of groundwater quality at each groundwater monitor are summarized in detail in **Table 6**.

Based on the data obtained during the post-construction groundwater monitoring program, a summary of the TDA Leachate Indicator parameters with concentrations exceeding the RUL at each monitoring well location is provided in the table below:

Monitoring Well	TDA Leachate Indicator Parameters Exceeding Reasonable Use Limit	Concentration (mg/L)
MW 01	Iron Manganese	0.34 ¹ , 0.44 ⁴ 1.19 ¹ , 0.58 ² , 0.91 ³ , 1.04 ⁴
MW 02	[none]	--
MW 03	Iron Manganese Sulphate	19.6 ¹ , 6.13 ² , 8.9 ³ , 10.9 ⁴ 9.04 ¹ , 5.62 ² , 5.2 ³ , 3.2 ⁴ 335 ¹ , 318 ² , 299 ³ , 337 ⁴
MW 04	Iron Manganese	0.34 ³ 0.78 ³
MW 05	[none]	--
MW 06	Iron	0.44 ²

Notes: ¹ Post-Construction I; ² Post-Construction II; ³ Post-Construction III; ⁴ Post-Construction IV

The post-construction groundwater quality in monitoring wells MW 01, MW 03 and MW 04 exhibited manganese, iron and sulphate (MW 03 only) exceedances of the respective TDA Leachate Indicator Parameter RUL as presented in the table above. Concentrations of iron also exceeded the RUL at monitoring well MW 06 on one occasion only during the post-construction period. All RUL exceedances of iron and manganese at MW 01 were below the maximum observed pre-construction concentrations with the exception of manganese at MW 03 (9.04 mg/L) during the Post-Construction I event. Concentrations of sulphate at MW 03 were consistently above the maximum observed pre-construction concentrations.

Concentrations of the remaining Leachate Indicator Parameters including benzene, total xylenes, toluene, 1,1,-trichloroethane, 1,1-dichloroethane, trichloroethene and zinc were consistently below the method detection limit at all groundwater monitoring locations throughout the duration of the construction and post-construction monitoring programs.



Concentrations of sulphate, hardness and alkalinity at monitoring wells MW 03 and MW 04 are elevated compared to background conditions (refer to **Figures 10, 11 and 12**) while concentrations of manganese at MW 01, MW 02, MW 05 and MW 06 have been variable, but have generally decreased during the post-construction monitoring program. Elevated concentrations of manganese and iron in groundwater at MW 03 prior to the placement of TDA suggest a pre-existing source of groundwater impact; while concentrations of manganese at MW 04 have increased slightly during the post-construction period (refer to **Figures 8 and 9**).

The groundwater quality at monitoring wells MW 01, MW 02, MW 03, MW 05 and MW 06 consistently exceeded the ODWQS-AO for sodium (200 mg/L) throughout the duration of the pre-construction, construction and post-construction monitoring programs. The elevated concentrations of sodium at these monitoring locations is interpreted to be the result of groundwater quality impacts related to the application of road de-icing agents along Highway 401 and/or Boundary Road. Note, sodium, along with chloride, acetate, potassium, calcium and magnesium (hardness) are primary components of de-icing agents, while phosphorus, nitrogen, sulphate and zinc represent secondary components which may also impact groundwater quality. The elevated concentrations of hardness and sulphate observed at monitoring well MW 04 are weekly correlated to the slight increase in concentrations of sodium.

The RUL exceedances of manganese at MW 01 are not interpreted to be related to the TDA based on the estimated horizontal travel time of TDA leachate to the monitor as discussed in Section 5.4. The available groundwater monitoring data indicates that groundwater monitor MW 03 situated downgradient of the southern TDA fill area may be impacted by leachate generated from the southern TDA embankment due to elevated and/or increasing trend in concentrations of TDA leachate indicator parameters manganese, sulphate and hardness (refer to **Figures 9, 10 and 11**). Note: increased concentrations of manganese, sulphate and hardness have also been observed at groundwater monitor MW 04, however this monitor is situated hydrogeologically upgradient of the south TDA area and therefore is not likely impacted by the TDA. Elevated concentrations of manganese may also be related to the fill materials used for the embankments at MW 03 or the application of the additional 0.4 metres of fill materials applied during the final grading nearby MW 03 (0.4 metres) and MW 04 (1.4 metres). In general, groundwater quality results during the post-construction monitoring program are consistent with the historical Pre-Construction results. Monitoring well MW 03, which is potentially impacted by TDA leachate, is located within the site boundary, therefore the site is in compliance with MOE Guideline B-7.



8.0 SURFACE WATER QUALITY

The results of the construction monitoring field and laboratory analyses conducted on surface water samples, along with the relevant PWQO (MOE, 1994b), are presented in **Appendix C-III**. The laboratory reports of analysis for the second annual construction monitoring sessions are provided electronically on a data CD in **Appendix D**.

8.1 Background Surface Water Monitoring

Background surface quality was characterized as part of the Pre-Construction Baseline Study conducted by Golder (June 2012). The TDA Leachate Indicator Parameters for the Site, the relevant water quality criteria, and the background range in concentrations of the parameters at surface water stations SW 01, SW 02, SW 03, SW 04, SW 06, SW 07 and SW 08 are summarized in the following table:

TDA Leachate Indicator Parameters	Surface Water Quality Criteria		Pre-Concentration Background Concentration Range (µg/L)
	Objective	Status	
Alkalinity	—	—	129,000 – 417,000
Iron	300	PWQO	<30 – 1,780
Hardness	—	—	216,000 – 565,000
Manganese	—	—	20 – 410
Sulphate	—	—	7,000 – 111,000
Zinc	30	PWQO	<10 – 50
Benzene	100	Interim PWQO	<1
o-xylene	40	Interim PWQO	<1
Toluene	0.8	Interim PWQO	<1
1,1,1-Trichloroethane	10	Interim PWQO	<0.8
1,1, Dichloroethane	200	Interim PWQO	<0.8
Trichloroethene	20	Interim PWQO	<0.6

Notes: All concentrations are reported in micrograms per litre (µg/L)
PWQO - Provincial Water Quality Objectives (MOE, 1994b)

8.2 Surface Water Compliance Assessment

Surface water post-construction monitoring program field observations are presented in **Table 7**. The parameters with reported levels exceeding their respective PWQO; trends in surface water quality; a comparison of the surface water quality compared to background conditions at all monitors; and, an interpretation of the surface water quality results are summarized in **Table 8**. Photographs of surface water monitoring locations during each monitoring session are presented in **Figures 3** through **6** included at the end of the report.

TDA Leachate Indicator parameters with concentrations exceeding the respective PWQO include iron (PWQO = 300 µg/L) at SW 02, SW 04 and SW 07 and zinc (PWQO = 30 µg/L) at SW 02 during the Post-Construction III session. Concentrations of TDA Leachate Indicator Parameters measured during the post-construction monitoring sessions were all within the relevant historic Pre-Construction ranges.



Concentrations of BTEX, PAHs and VOCs (EPA 624 list) including TDA Leachate Indicator Parameters 1,1,1-trichloroethane, 1,1-dichloroethane and trichloroethane have consistently been below laboratory detection limits during the construction and post-construction surface water monitoring program.

Surface water quality exceeded the PWQO for boron (200 ug/L) at SW 06 and vanadium (6 ug/L) at SW 03 during the Post-Construction III monitoring event. Concentrations of dissolved oxygen were also consistently below the PWQO at all surface water locations. Boron, vanadium and dissolved oxygen have not been identified as TDA Leachate Indicator Parameters. Depleted dissolved oxygen concentrations are likely the result of stagnant and low flow conditions that were typically observed at specified surface water monitoring locations when water was present.

Based on the Pre-Construction water quality at surface water stations SW 01 and SW 02, concentrations of TDA Leachate Indicator parameter zinc have been variable and occasionally elevated compared to the PWQO during the construction and post-construction of the TDA filled embankments; however, there is limited evidence to suggest these stations are located downstream of the TDA area due to the observed stagnant flow conditions. Concentrations of zinc measured in the pan lysimeter leachate quality monitors have also consistently been below laboratory method detection limit, therefore PWQO exceedances are likely attributable to another source.

Based on our understanding of the hydrology at the site observed during wet conditions (, the remaining surface water stations are assumed to be located upgradient of the TDA fill area (i.e. SW 04 and SW 08) or are not situated directly within the surface water drainage flow path from the TDA embankments (SW 06 and SW 07). Surface water monitor SW 03 is situated within the roadside ditch of Glen Road and it is possibly hydrogeologically downgradient from the TDA embankments. The results of the post-construction surface water monitoring program suggest that the surface water quality at SW 03 has not been impacted as a result of the TDA emplacement as concentrations of TDA leachate indicator parameters have been generally stable or have declined over time. Review of the available groundwater elevation data from monitoring wells located downgradient of the TDA areas indicates there is limited evidence to suggest a viable hydrogeologic connection exists between the saturated zone and the surface water monitors (i.e. groundwater elevations are typically below the elevation of the surface water monitors).



9.0 QUALITY ASSURANCE/QUALITY CONTROL

One groundwater, surface water (where applicable), pan lysimeter sample duplicate was analyzed per post-construction monitoring session and submitted to the analytical laboratory for analysis as part of the quality control ('QA/QC') protocol. Trip blanks for BTEX were also submitted to the laboratory for analysis during the post-construction I and IV sampling events.

QA/QC results for the trip blank and duplicate samples were within acceptable tolerance limits (20% relative percent difference), with the exception of the following:

- Iron, manganese, turbidity and TSS and total phosphorous in duplicate samples of groundwater, surface water and/or leachate from pan lysimeters. Duplicate concentrations of iron exceeded the acceptable tolerance limits at groundwater monitor MW 01 (post-construction II), surface water locations SW 01 (III) and SW 07 (I) and pan lysimeter PL3 (II); and,
- Duplicate concentrations of parameters also exceeding the acceptable tolerance limits include manganese at SW 07 (I) and SW 03 (III), turbidity at SW 07 (I), TSS at MW 01 (III and IV) and total phosphorus at MW 01 (III) and PL3 (IV).

The reason for the observed differences in duplicate concentrations of turbidity, total phosphorus and TSS is likely related to the variability in the amount and composition of suspended sediment between the samples and duplicates. Based on the available historical data for the groundwater, surface water and pan lysimeter monitoring locations, the analytical results for samples discussed above are interpreted to be representative of the water quality.



10.0 PROPOSED 2016 MONITORING PROGRAM

The required post-construction monitoring of groundwater, surface water and pan lysimeters is described in Addendum No.1 of the MTO Contract 2010-4003. The monitoring was to continue for one year following completion of the construction program (i.e. August 2015).

The available TDA leachate quality data indicates that iron, manganese and benzene are leaching from the TDA. Based on the potential TDA leachate impact observed at monitoring wells MW 03 due (increasing trend in concentrations of key TDA leachate indicator parameters manganese in addition to hardness and sulphate), Golder recommends TDA leachate and groundwater quality monitoring continue at the site in order to confirm TDA leachate impacts and/or identify another source. Based on the understanding of the hydrology at the site and the available surface water quality data, impacts to nearby surface water features as a result of the TDA leachate are not apparent and are not anticipated, therefore we do not recommend continuation of the surface water quality monitoring program.

In accordance with Condition 30 of the ECA, the MTO received approval from the Director of the MOECC for the groundwater monitoring program described in Table 1 of Addendum No. 1 of the MTO Contract 2010-4003. Subject to approval from the MOECC, it is recommended that the following parameters be removed from the proposed 2016 monitoring program: aluminum, arsenic, barium, beryllium, bromide, cadmium, chromium, cobalt, colour, copper, fluoride, lead, molybdenum, nickel, nitrate, nitrite, selenium, silver, thallium, titanium, vanadium, ethylbenzene, petroleum hydrocarbons (F1-F4) and VOCs with the exception of TDA leachate indicator parameters 1,1,1-trichloroethane, 1,1-dichloroethane, trichloroethene and tetrachloroethylene. The rationale for the removal of these parameters is that they have not been detected or have only been detected at low concentrations in TDA leachate monitors PL2 and PL3 or the parameters are not suitable given the background concentrations observed at the on-site groundwater monitoring locations. The following parameters will be added to the monitoring program: chloride, total dissolved solids (TDS) and in order to further evaluate potential impacts of road de-icing agents on the leachate and groundwater monitors.

The proposed additional post-construction monitoring program for the groundwater (six) and pan lysimeters (four) monitors are provided in **Table 9**. The 2016 monitoring is proposed to be completed on a quarterly basis. The results of the additional groundwater and leachate quality monitoring will be evaluated in order to confirm groundwater impacts from the application of the TDA fill materials.

Based on the results of the groundwater impact source investigation (to be reported by Golder in early 2016), and possible future discussions with the MOECC, the recommended 2016 monitoring program could be altered.



11.0 CONCLUSIONS

Based on monitoring of groundwater and surface water quality at the existing network of monitoring locations, the Site is in compliance with the applicable MOE guideline B-7 (groundwater) and PWQO Policies 1 and 2 (surface water).

Three years of TDA leachate quality data indicates that iron, manganese and benzene are leaching from the TDA. TDA leachate may also be characterized by elevated concentrations of alkalinity, hardness and sulphate, which are parameters which have not previously been identified in leachates generated from TDA and/or TCPL testing.

Concentrations of benzene in the leachate have declined following the placement of TDA fill over time and have generally stabilized at pan lysimeter PL2 (non-detect) and PL3 (below ODWQS). Iron and sulphate concentrations increased in the leachate pan lysimeters following the placement of TDA fill, but have decreased and remain slightly variable overtime. Measured concentrations of iron at MW 03 have been variable over time. Concentrations of manganese at groundwater monitor MW 03 were elevated following the TDA placement, but have steadily declined to within pre-construction concentrations as of March 2015. Concentrations of manganese in the leachate monitors initially increased following the TDA placement in May 2012, remain variable and consistently below the concentrations observed at the downgradient monitor MW 03. Concentrations of manganese have undergone a slight increase over time at MW 04, which is situated hydrogeologically upgradient of the south TDA area and therefore not likely attributed to the TDA. Concentrations of hardness and sulphate increased at groundwater monitor MW 03 and MW 04 since the placement of TDA fill, but have generally stabilized since March 2015.

The available groundwater and surface water monitoring data indicates that TDA has probably not impacted groundwater or surface water quality at the monitoring locations; however, the elevated concentrations of manganese, hardness and/or sulphate at downgradient monitor MW 03 may be related to the TDA leachate. The source of the elevated concentrations could also be related to the soil used to backfill the abutments, cover the TDA and for final grading in the vicinity of MW 03 and MW 04. Elevated concentrations of manganese and iron at MW 03 prior to the placement of the TDA fill also suggest a pre-existing source of groundwater impact.

In response to the technical review comments from Mr. Frank Crossley of the MOECC, dated March 13, 2015, Golder has conducted an investigation on the cover and native materials used at the site (MTO Agreement # 4014-E-0012 (Retainer Assignment #2)). The purpose of this investigation was to determine the physical and chemical constituents of the native materials and fill used for the construction of the TDA north and south embankments. Analytical testing of the soil constituents was conducted in order to assess whether or not the elevated concentrations of select parameters of interest may be attributed to sources other than the TDA. The findings of this investigation will be reported in a separate report in early 2016.

Pending the results of this investigation, Golder recommends TDA leachate and groundwater quality monitoring continue in 2016. Based on the understanding of the hydrology at the site and the available surface water quality data, impacts to nearby surface water features as a result of the TDA leachate are not apparent and are not anticipated; therefore we do not recommend continued surface water monitoring.



12.0 LIMITATIONS AND USE OF REPORT

This report was prepared for the exclusive use of McIntosh Perry Consulting Engineers Ltd. and the Ontario Ministry of Transportation. The report, which specifically includes all tables, figures and appendices, is based on data and information collected by Golder Associates Ltd. and is based solely on the conditions of the properties at the time of the work, supplemented by historical information and data obtained by Golder Associates Ltd. provided by others as described in this report.

Golder Associates Ltd. has relied in good faith on all information provided and does not accept responsibility for any deficiency, misstatements, or inaccuracies contained in the reports as a result of omissions, misinterpretation, or fraudulent acts of the persons contacted or errors or omissions in the reviewed documentation.

The assessment of environmental conditions at this Site has been made using the results of physical measurements and chemical analyses of liquids from a number of locations. The Site conditions between sampling locations have been inferred based on conditions observed at surface water stations, borehole, groundwater and pan lysimeter monitoring locations. Subsurface conditions may vary from these sampled locations.

The services performed, as described in this report, were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practising under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Golder Associates Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The findings and conclusions of this report are valid only as of the date of this report. If new information is discovered in future work, including excavations, borings, or other studies, Golder Associates Ltd. should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.



13.0 CLOSURE

We trust this report meets your current needs. If you have any further questions regarding this report, please contact the undersigned.

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Table 1: Post-Construction Pan Lysimeter Monitoring Program

Sampling Frequency	Analytical Parameters	
Quarterly	Major cations/anions	fluoride*, bromide, nitrite*, nitrate*, ammonia, ammonium, hardness, carbonate, bicarbonate, sulphate, total phosphorus
	Field parameters	temperature, conductivity, pH, turbidity
	BTEX	benzene*, toluene, ethylbenzene, o-xylene, m,p-xylenes
	Miscellaneous parameters	TSS, TOC, turbidity
	Metals	aluminum, arsenic*, barium*, beryllium, boron*, cadmium*, calcium, chromium*, cobalt, copper, hardness, iron, lead*, magnesium, manganese, molybdenum, nickel, potassium, selenium*, silver*, sodium, strontium, thallium, titanium, vanadium and zinc
Annually	VOCs	1,1,1,2-tetrachloroethane, 1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane*, 1,1-dichloroethylene*, 1,2-dibromoethane, 1,2-dichlorobenzene*, 1,2-dichloroethane*, 1,2-dichloropropane, 1,3,5-trimethylbenzene, 1,3-Dichlorobenzene, 1,4-dichlorobenzene*, bromodichloromethane, bromoform, bromomethane, carbon tetrachloride*, chlorobenzene*, chloroethane, chloroform*, chloromethane, cis-1,2-dichloroethene, cis-1,2-dichloropropene, dibromochloromethane, methylene chloride*, styrene, tetrachloroethylene*, trans-1,2-dichloroethene, trans-1,3-dichloropropene, trichloroethene, trichlorofluoromethane, vinyl chloride* (EPA 624)
	PAHs**	1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[a]pyrene*, benzo[b]fluoranthene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, ideno[1,2,3-cd]pyrene, naphthalene, phenanthrene, pyrene
	Petroleum Hydrocarbons	benzene*, toluene, ethylbenzene, o-xylene, m,p-xylenes (BTEX), F1, F2, F3, F4

Notes: * O.Reg. 347 Schedule 4 Leachate Quality Criteria Parameters.

** PAHs were removed from the annual construction and post-construction monitoring programs following recommendation from the MOE in a letter dated October 28, 2013.



Table 2: Post-Construction Groundwater Monitoring Program

Sampling Frequency	Analytical Parameters	
Quarterly	Major cations/anions	ammonia, ammonium, hardness, carbonate, bicarbonate, sulphate, chloride
	Field parameters	temperature, conductivity, pH, turbidity
	BTEX	benzene, toluene, ethylbenzene, o-xylene, m,p-xylenes
	Miscellaneous parameters	Total dissolved solids (TDS), total suspended solids (TSS), biological oxygen demand (BOD), total organic carbon (TOC)
	Metals	aluminum, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, hardness, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, titanium, vanadium and zinc
Annually	Volatile Organic Compounds (VOCs)	1,1,1,2-tetrachloroethane, 1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dibromoethane, 1,2-dichlorobenzene, 1,2-dichloroethane, 1,2-dichloropropane, 1,3,5-trimethylbenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, bromodichloromethane, bromoform, bromomethane, carbon tetrachloride, chlorobenzene, chloroethane, chloroform, chloromethane, cis-1,2-dichloroethene, cis-1,2-dichloropropene, dibromochloromethane, methylene chloride, styrene, tetrachloroethylene, trans-1,2-dichloroethene, trans-1,3-dichloropropene, trichloroethene, trichlorofluoromethane, vinyl chloride (EPA 624)
	Petroleum Hydrocarbons	benzene, toluene, ethylbenzene, o-xylene, m,p-xylenes (BTEX), F1, F2, F3, F4

Notes: * O.Reg. 347 Schedule 4 Leachate Quality Criteria Parameters.



Table 3: Construction and Post-Construction Surface Water Monitoring Program

Sampling Frequency	Analytical Parameters	
Quarterly	Major cations/anions	fluoride, bromide, nitrite, nitrate, ammonia, ammonium, hardness, carbonate, bicarbonate, sulphate, total phosphorus
	Field parameters	temperature, conductivity, pH
	BTEX	benzene, toluene, ethylbenzene, o-xylene, m,p-xylenes
	Miscellaneous parameters	colour, total suspended solids (TSS), pH, turbidity, TOC
	Metals	aluminum, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, hardness, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, titanium, vanadium and zinc
Annually	VOCs	1,1,1,2-tetrachloroethane, 1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dibromoethane, 1,2-dichlorobenzene, 1,2-dichloroethane, 1,2-dichloropropane, 1,3,5-trimethylbenzene, 1,3-Dichlorobenzene, 1,4-dichlorobenzene, bromodichloromethane, bromoform, bromomethane, carbon tetrachloride, chlorobenzene, chloroethane, chloroform, chloromethane, cis-1,2-dichloroethene, cis-1,2-dichloropropene, dibromochloromethane, methylene chloride, styrene, tetrachloroethylene, trans-1,2-dichloroethene, trans-1,3-dichloropropene, trichloroethene, trichlorofluoromethane, vinyl chloride (EPA 624)
	PAHs**	1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, ideno[1,2,3-cd]pyrene, naphthalene, phenanthrene, pyrene
	Petroleum Hydrocarbons	benzene, toluene, ethylbenzene, o-xylene, m,p-xylenes (BTEX), F1, F2, F3, F4

Notes: * O.Reg. 347 Schedule 4 Leachate Quality Criteria Parameters.

** PAHs were removed from the annual construction and post-construction monitoring programs following recommendation from the MOE in a letter dated October 28, 2013.

Table 4: Groundwater Elevation Data

Groundwater Monitor	Ground Surface Elevation (mASL)	Well Casing Elevation (mASL)	Groundwater Elevation (mASL)															
			Pre-Construction				Construction								Post-Construction			
			26/Nov/10	28/Feb/11	7/Apr/11	10/May/12	14/Jun/12	17/Sep/12	18/Dec/12	11/Apr/13	5/Jul/13	21/Oct/13	3/Feb/14	25/May/14	9/Oct/14	24/Mar/15	17/Jun/15	27/Aug/15
MW 01	56.63	57.42	55.27	55.32	55.30	55.24	55.18	54.55	55.18	55.13	55.12	55.16	55.12	55.24	55.37	55.26	55.20	55.25
MW 02	56.95	57.79	56.06	56.05	56.10	56.11	56.03	55.40	55.93	56.37	55.53	55.55	55.51	55.59	55.80	55.62	55.54	55.60
MW 03	59.73	60.18	57.41	57.13	57.34	57.40	57.35	56.47	57.26	57.20	57.22	57.09	57.07	57.18	56.67	57.31	57.16	56.64
MW 04	60.64	60.68	57.00	57.60	58.12	57.96	¹	56.93	57.86	57.74	57.73	57.50	57.47	57.59	56.80 ⁴	57.60 ⁴	57.57 ⁴	56.62 ⁵
MW 05	55.47	56.30	55.49	³	55.41	55.35	55.32	²	55.28	55.26	55.11	55.38	³	55.12	55.01	³	55.09	²
MW 06	59.46	60.32	58.67	58.31	58.41	58.37	58.33	²	58.31	58.24	58.16	58.03	58.00	58.11	²	58.06	58.10	²

Notes: Elevations are referred to geodetic datum established at the site by McIntosh Perry on May 19, 2011 (Pre-Construction), with the exception of MW 03 and MW 04 which were re-surveyed by McIntosh Perry or October 7, 2015 (Post-Construction).

mASL – metres above sea level

¹ Monitoring well MW 04 was buried/inaccessible on June 14, 2012

² Monitoring well location was dry

³ Monitoring well location was frozen

⁴ MW 04 was damaged following completion of the final grading of the south embankment in July 2014

⁵ MW 04 well casing elevation revised following June 19, 2015 well repairs



POST-CONSTRUCTION MONITORING REPORT, ANNUAL REPORT #3 (PR #51)
TDA EMBANKMENT, CORNWALL, ONTARIO

Table 5: Interpretation of Pan Lysimeter Leachate Quality Data

Pan Lysimeter Monitor	Parameters Exceeding ODWQS during Post-Construction	Trend(s)	Interpretation and Comments
PL1	Not applicable	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> PL1 is situated northeast of the north TDA fill area and is used as a background pan lysimeter water quality monitor PL1 has consistently been dry following its initial construction
PL2	Colour ^{I, II, III, IV} Iron ^{I, III} Manganese ^{I, II, III, IV} Turbidity ^{I, II, III, IV} Sodium ^{I, II, III, IV} Sulphate ^{III}	<ul style="list-style-type: none"> Pan lysimeter leachate quality generally variable over time Concentrations of ammonia, alkalinity, boron, benzene, sulphate, sodium, strontium and conductivity are relatively stable and have decreased since the construction period 	<ul style="list-style-type: none"> PL2 is situated within the north TDA fill area and is representative of TDA leachate TDA leachate indicator parameters iron and manganese are present in the TDA leachate Consistently elevated concentrations of alkalinity, ammonia, boron, hardness, strontium, sulphate, sodium and conductivity compared to groundwater quality
PL3	Colour ^{I, II, III, IV} Iron ^{I, II, III, IV} Manganese ^{I, II, III, IV} Turbidity ^{I, II, III, IV} Sodium ^{I, II, III, IV} Sulphate ^{II, III, IV}	<ul style="list-style-type: none"> Pan lysimeter leachate quality generally variable over time Decreasing trend in concentrations of boron and iron since the construction period 	<ul style="list-style-type: none"> PL3 is situated within the south TDA fill area is representative of TDA leachate TDA leachate indicator parameters iron, manganese and benzene are present in the TDA leachate Consistently elevated concentrations of alkalinity, ammonia, boron, hardness, strontium, sulphate, sodium and conductivity compared to groundwater quality
PL4	Not applicable	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> PL4 is situated south of the south TDA fill area and is representative of background pan lysimeter water quality PL4 has consistently been dry following the initial construction sampling event in June 2012.

Notes:

- 1) I – Post-Construction I (October 2014); II – Post-Construction II (March 2015); III – Construction III (June 2015) and IV – Post-Construction IV (August 2015)
 2) Not applicable – surface monitoring station SW 08 was consistently dry or frozen throughout the duration of the Post-Construction Monitoring Program



POST-CONSTRUCTION MONITORING REPORT, ANNUAL REPORT #3 (PR #51)
TDA EMBANKMENT, CORNWALL, ONTARIO

Table 6: Interpretation of Groundwater Quality Data

Groundwater Monitor	Geological Unit	Parameters Exceeding ODWQS during Post-Construction Monitoring	Trend(s)	TDA Leachate Indicator Parameters Elevated Compared to Pre-Construction Conditions ¹	Interpretation and Comments
MW 01	Transition from sand and gravel to Malone Till	Colour ^{I, II, III, IV} Iron ^{I, IV} Manganese ^{I, II, III, IV} Sodium ^{I, II, III, IV} Turbidity ^{I, II, III, IV}	<ul style="list-style-type: none"> Groundwater quality generally consistent over time, with the exception of variable concentrations of iron, sulphate and TSS 	None	<ul style="list-style-type: none"> MW 01 is located approximately 60 metres east and possibly downgradient from the north TDA fill area Concentrations of Leachate Indicator parameters zinc, benzene, xylene, toluene, 1,1,1-trichloroethane, 1,1 dichloroethane, and trichloroethene were present in trace amounts or below the laboratory method detection limit Based on elevated Pre-Construction concentrations of TDA Leachate Indicator Parameter manganese, groundwater quality at MW 01 is interpreted not to be impacted by TDA leachate
MW 02	Sand and gravel interglacial zone	Manganese ^{I, II, IV} Sodium ^{I, II, III, IV} Turbidity ^{I, II, III, IV}	<ul style="list-style-type: none"> Groundwater quality generally consistent over time for most parameters Variable concentrations of hardness, sodium, strontium and sulphate Concentrations of manganese variable over time with general decrease in concentrations of since pre-construction 	None	<ul style="list-style-type: none"> MW 02 is located upgradient of the north TDA fill area and possibly downgradient of the south TDA area Concentrations of Leachate Indicator parameters iron, zinc, benzene, xylene, toluene, 1,1,1-trichloroethane, 1,1 dichloroethane, and trichloroethene were present in trace amounts Based on elevated background concentrations of TDA Leachate Indicator Parameter manganese, groundwater quality at MW 02 is interpreted not to be impacted by TDA leachate MW 02 is located in the vicinity of the westbound lane of Highway 401, where elevated concentrations of sodium are interpreted to be the result of groundwater quality impacts related to the application of road de-icing agents



POST-CONSTRUCTION MONITORING REPORT, ANNUAL REPORT #3 (PR #51)
TDA EMBANKMENT, CORNWALL, ONTARIO

Groundwater Monitor	Geological Unit	Parameters Exceeding ODWQS during Post-Construction Monitoring	Trend(s)	TDA Leachate Indicator Parameters Elevated Compared to Pre-Construction Conditions ¹	Interpretation and Comments
MW 03	Contact between Fort Covington Till and Malone Till	Colour ^{I, II} Iron ^{I, II, III, IV} Manganese ^{I, II, III, IV} Sodium ^{I, II, III, IV} Turbidity ^{I, II, III, IV}	<ul style="list-style-type: none"> Variable concentrations of ammonia, iron, total phosphorus and TOC General increasing trend in concentrations of conductivity, hardness, sodium, strontium and sulphate Steady decrease in concentration of manganese since October 2013 	Manganese ^I Sulphate ^{I, II, III, IV}	<ul style="list-style-type: none"> MW 03 is located approximately 20 metres downgradient of the south TDA fill area Concentrations of Leachate Indicator parameters zinc, benzene, xylene, toluene, 1,1,1-trichloroethane, 1,1 dichloroethane, and trichloroethene were present in trace amounts Based on the elevated historical levels of TDA Leachate Indicator Parameters iron (<0.03 – 21.5 mg/L) and manganese (<0.03 – 6.8 mg/L) at MW 03, groundwater quality at MW 03 is interpreted to be possibly impacted by landfill leachate MW 03 is located in the vicinity of the eastbound lane of Highway 401, where elevated concentrations of sodium are interpreted to be the result of groundwater quality impacts related to the application of road de-icing agents
MW 04	Contact between Fort Covington Till and Malone Till	Colour ^{III, IV} Iron ^{III} Manganese ^{II, III, IV} Turbidity ^{V, VI, VII, VIII}	<ul style="list-style-type: none"> General increasing trend in concentrations of alkalinity, conductivity, hardness, sulphate, manganese, sodium and strontium 	Alkalinity ^{III} Sulphate ^{I, II, III, IV}	<ul style="list-style-type: none"> MW 04 is located hydrogeologically upgradient of the south and north TDA fill areas Concentrations of all Leachate Indicator parameters were present in trace amounts Groundwater quality at MW 04 is not interpreted to be impacted by TDA leachate despite the increasing trend of TDA leachate indicator parameters manganese, hardness and sulphate since the monitor is situated upgradient of the TDA area



POST-CONSTRUCTION MONITORING REPORT, ANNUAL REPORT #3 (PR #51)
TDA EMBANKMENT, CORNWALL, ONTARIO

Groundwater Monitor	Geological Unit	Parameters Exceeding ODWQS during Post-Construction Monitoring	Trend(s)	TDA Leachate Indicator Parameters Elevated Compared to Pre-Construction Conditions ¹	Interpretation and Comments
MW 05	Sand and gravel interglacial zone	Colour ^{I, III} Manganese ^{III} Sodium ^{I, III} Turbidity ^{I, III}	<ul style="list-style-type: none"> Groundwater quality generally consistent over time Variable concentrations of hardness, manganese and strontium 	None	<ul style="list-style-type: none"> MW 05 is located approximately 55 metres west and hydrogeologically cross-gradient from the north TDA fill area MW 05 is located in the vicinity of the westbound off ramp Highway 401, where elevated concentrations of sodium are interpreted to be the result of groundwater quality impacts related to the application of road de-icing agents Concentrations of all Leachate Indicator parameters were present in trace amounts Groundwater quality at MW 05 is interpreted not to be impacted by TDA leachate Monitoring well MW 05 was frozen in March 2015 and dry during the August 2015 monitoring sessions
MW 06	Sand and gravel interglacial zone	Colour ^{II, III} Sodium ^{III} Turbidity ^{II, III}	<ul style="list-style-type: none"> Groundwater quality generally consistent over time for most parameters Variable concentrations of alkalinity, iron, manganese and TOC General decreasing trend in concentrations of conductivity, hardness, strontium and sodium 	Sulphate ^{III}	<ul style="list-style-type: none"> MW 06 is located approximately 40 metres west and upgradient of the south TDA fill area MW 06 is located in the vicinity of the southbound lane of Boundary Road, where elevated concentrations of sodium are interpreted to be the result of groundwater quality impacts related to the application of road de-icing agents Groundwater quality at MW 06 is interpreted not to be impacted by TDA leachate Monitoring well MW 06 was dry during the October 2014 and August 2015 monitoring sessions

Notes:

- 1) Pre-Construction conditions established from groundwater quality sampling at all six monitoring well locations between November 2010 and May 2012 prior to TDA fill placement.
2) I – Post-Construction I (October 2014); II – Post-Construction II (March 2015); III – Construction III (June 2015) and IV – Post-Construction IV (August 2015)



POST-CONSTRUCTION MONITORING REPORT, ANNUAL REPORT #3 (PR #51)
TDA EMBANKMENT, CORNWALL, ONTARIO

Table 7: Surface Water Station Field Observations

Location	Location Description	October 9, 2014	March 24, 2015	June 17, 2015	August 27, 2015
SW 01	North of side of ditch of Glen Rd, situated within wetland	Dry	Frozen	No apparent flow	Dry
SW 02	At north side of ditch of Glen Rd.	Dry	No apparent flow	No apparent flow	Dry
SW 03	At south side of ditch of Glen Rd.	Dry	No apparent flow	No apparent flow	Dry
SW 04	Along ditch of a former access road (Glen Rd).	Dry	Frozen	No apparent flow	Dry
SW 06	Located in culvert crossing north-south ramps of highway 401.	No apparent flow	Dry	No apparent flow	Dry
SW 07	Installed at south side of ditch located at culvert crossing highway 401.	Negligible flow present	Dry	Negligible flow present	Dry
SW 08	Located in the eastern portion of the ditch on Boundary Rd, containing waste and debris.	Dry	Dry	Dry	Dry

Note: All surface water monitoring stations correspond to locations identified by Aecon.



POST-CONSTRUCTION MONITORING REPORT, ANNUAL REPORT #3 (PR #51)
TDA EMBANKMENT, CORNWALL, ONTARIO

Table 8: Interpretation of Surface Water Quality Data

Surface Water Monitor	Parameters Exceeding PWQO during Post-Construction Monitoring	Trend(s)	TDA Leachate Indicator Parameters Elevated Compared to Pre-Construction Conditions ¹	Interpretation and Comments
SW 01	Dissolved oxygen ^{III}	<ul style="list-style-type: none"> ■ Surface water quality generally consistent over time with the exception of a few parameters ■ Variable concentrations of iron, manganese, total phosphorus and zinc ■ Slight increase in concentrations of strontium and sulphate since April 2013 ■ Highest concentrations of barium and fluoride reported to date in August 2015 	None	<ul style="list-style-type: none"> ■ SW 01 is North of side of ditch of Glen Rd, at inlet of the surface water area ■ Surface water quality at SW 01 interpreted not to be impacted by TDA generated leachate ■ SW 01 was dry during the October 2014, March and August 2015 monitoring events
SW 02	Dissolved oxygen ^{III} Iron ^{III} Zinc ^{III}	<ul style="list-style-type: none"> ■ Surface water quality generally consistent over time for most parameters ■ Variable concentrations of alkalinity, hardness, iron, manganese, sodium and zinc ■ Highest concentrations of barium and fluoride reported to date in August 2015 	None	<ul style="list-style-type: none"> ■ SW 02 is situated at the north side ditch of Glen Rd ■ Surface water quality at SW 02 is interpreted not to be impacted by TDA generated leachate ■ SW 02 was dry in October 2014 and August 2015 and frozen during the March 2015 monitoring sessions
SW 03	Dissolved oxygen ^{III} Vanadium ^{III}	<ul style="list-style-type: none"> ■ Surface water quality generally consistent over time for most parameters ■ Variable concentrations of iron and sulphate ■ Slight decrease in concentrations of hardness and sodium since pre-construction ■ Highest concentrations of barium and fluoride reported to date in August 2015 	None	<ul style="list-style-type: none"> ■ SW 03 is situated at south side of ditch of Glen Rd. ■ Surface water quality at SW 03 interpreted not to be impacted by TDA generated leachate ■ SW 03 was dry during the October 2014, March and August 2015 monitoring events



POST-CONSTRUCTION MONITORING REPORT, ANNUAL REPORT #3 (PR #51)
TDA EMBANKMENT, CORNWALL, ONTARIO

Surface Water Monitor	Parameters Exceeding PWQO during Post-Construction Monitoring	Trend(s)	TDA Leachate Indicator Parameters Elevated Compared to Pre-Construction Conditions ¹	Interpretation and Comments
SW 04	Dissolved oxygen ^{III} Iron ^{III}	<ul style="list-style-type: none"> ■ Surface water quality generally consistent over time for most parameters ■ Highest concentrations of sodium and TOC reported to date in August 2015 	None	<ul style="list-style-type: none"> ■ Surface water quality at SW 04 interpreted not to be impacted by TDA generated leachate ■ SW 04 was dry in October 2014 and August 2015 and frozen during the March 2015 monitoring sessions
SW 06	Boron ^{III} Dissolved oxygen ^{III}	<ul style="list-style-type: none"> ■ Surface water quality generally consistent over time for most parameters ■ Variable concentrations of manganese, total phosphorus and sodium ■ Highest concentrations of boron, fluoride, sulphate reported to date in August 2015 ■ Slight increasing trend in concentrations of sulphate and strontium 	Sulphate ^{III}	<ul style="list-style-type: none"> ■ SW 06 is interpreted not to be impacted by TDA generated leachate ■ SW 06 was dry during the October 2014, March and August 2015 monitoring events
SW 07	Dissolved oxygen ^{III} Iron ^{III}	<ul style="list-style-type: none"> ■ Surface water quality generally consistent over time for most parameters ■ Variable concentrations of iron ■ Concentrations of manganese elevated compared to pre-construction conditions 	Sulphate ^I	<ul style="list-style-type: none"> ■ SW 07 is interpreted not to be impacted by TDA generated leachate ■ SW 07 was dry during the March and August 2015 monitoring events
SW 08	Not applicable	<ul style="list-style-type: none"> ■ Surface water quality generally consistent with other stations based on one pre-construction sampling event, with the exception of elevated concentrations of zinc (November 2010 only) 	Not applicable	<ul style="list-style-type: none"> ■ SW 08 is located in the eastern portion of the ditch on Boundary Rd, containing waste and debris. ■ SW 08 was consistently dry during the post-construction monitoring program

Notes:

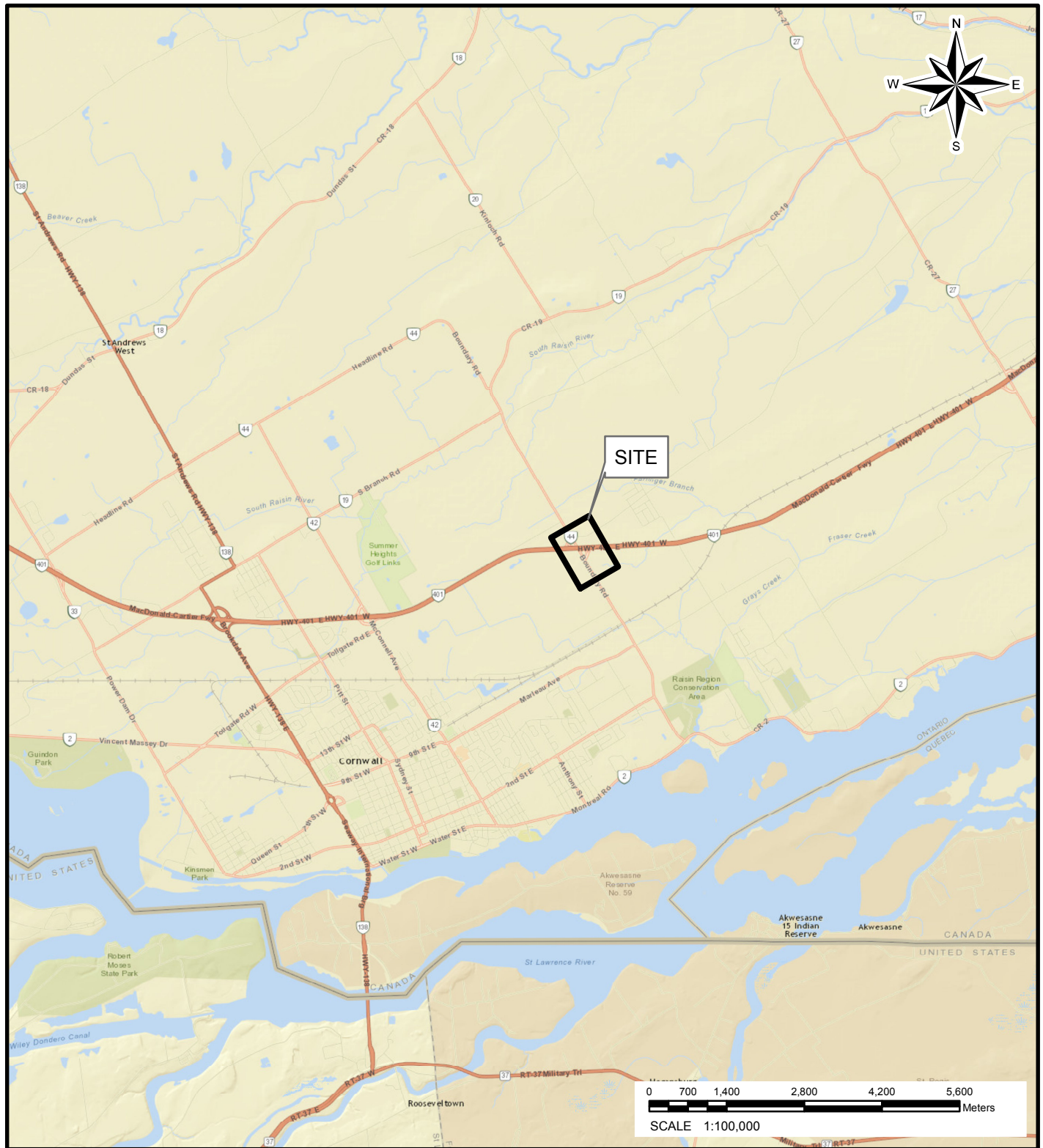
- 1) Pre-Construction conditions established from groundwater quality sampling at all six monitoring well locations between November 2010 and May 2012 prior to TDA fill placement
- 2) I – Post-Construction I (October 2014); II – Post-Construction II (March 2015); III – Construction III (June 2015) and IV – Post-Construction IV (August 2015)
- 3) Not applicable – surface monitoring station SW 08 was consistently dry throughout the duration of the Post-Construction Monitoring Program



Table 9: Recommended 2016 Groundwater and Pan Lysimeter Monitoring Program

Sampling Frequency	Analytical Parameters	
Quarterly	Major cations/anions	ammonia, ammonium, hardness, carbonate, bicarbonate, sulphate, chloride
	Field parameters	temperature, conductivity, pH
	Petroleum Hydrocarbons	benzene, toluene, o-xylene, m,p-xylenes
	Miscellaneous parameters	Total dissolved solids (TDS), total suspended solids (TSS), total organic carbon (TOC)
	Metals	boron, calcium, iron, magnesium, manganese, potassium, sodium, strontium and zinc
	Volatile Organic Compounds (VOCs)	1,1,1-trichloroethane, 1,1-dichloroethane, tetrachloroethylene, trichloroethene

Notes: Pan lysimeters: PL1, PL2, PL3 and PL4
Groundwater monitors: MW 01, MW 02, MW 03, MW 04, MW 05 and MW 06



NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT No. 10-1121-0197-5.

REFERENCE

ESRI, DELORME, NAVTEQ, USGS, INTERMAP, IPC, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI (THAILAND), TOMTOM, 2012.

DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 18

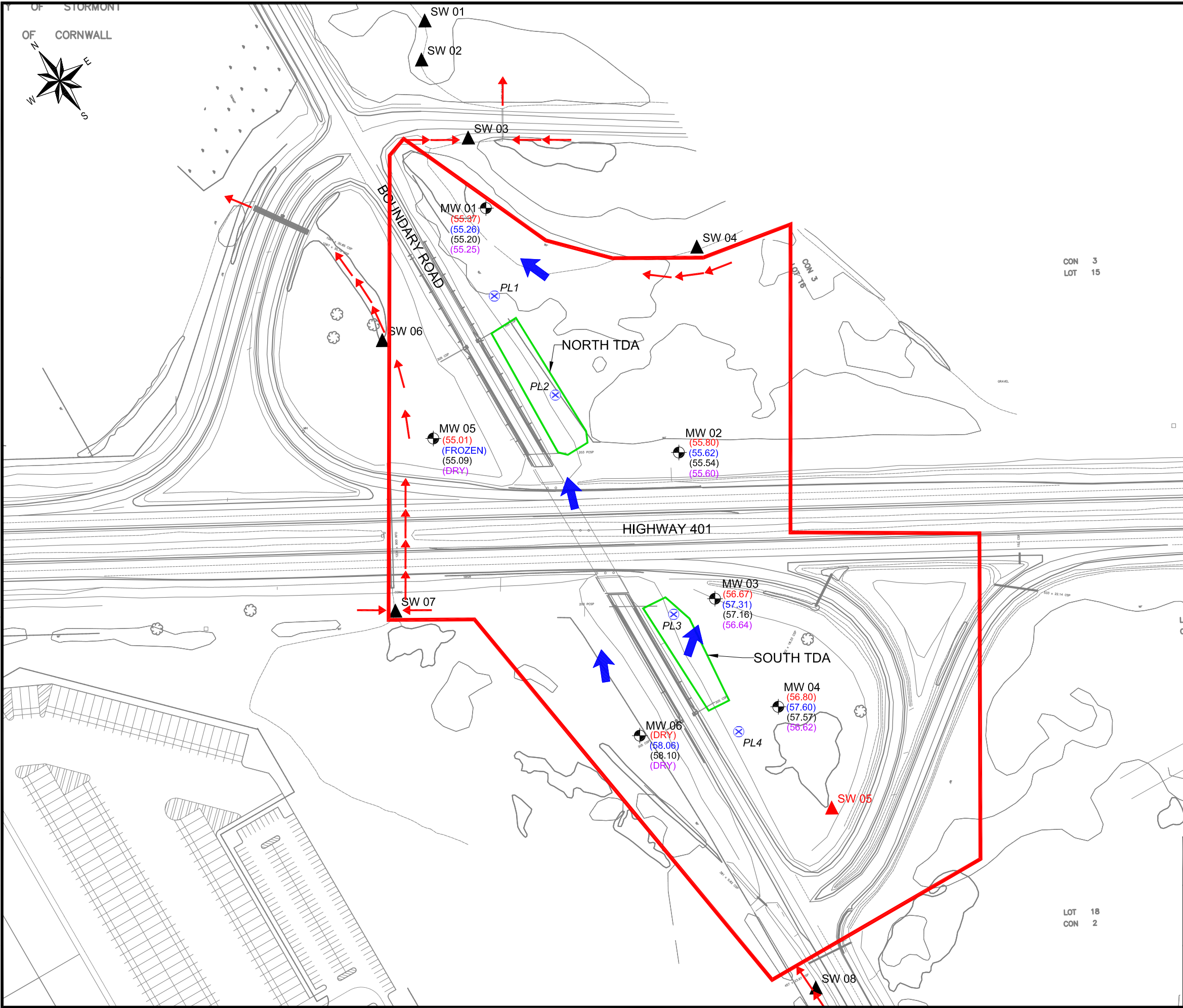


DATE	2014-11-13
DESIGN	DH
GIS	BR
CHECK	DH
REVIEW	BTB

TITLE	KEY PLAN	
PROJECT		
MTO TIRE DERIVED AGGREGATE EMBANKMENT CORNWALL, ONTARIO		FIGURE 1

PROJECT No.	10-1121-0197-5
SCALE	AS SHOWN
REV.	0

FILENAME: N:\Active\2010\1121 - Geotechnical\10-1121-0197 TDA Emb Monitoring Cornwall\Spatial\1011210197-5\1011210197-1000-5-02.dwg



LEGEND

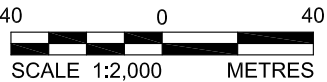
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- GROUNDWATER MONITORING LOCATION
- SURFACE WATER MONITORING LOCATION (NOT ESTABLISHED)
- PAN LYSIMETER MONITORING LOCATION
- TDA AREA
- TDA SITE BOUNDARY (APPROXIMATE)
- GROUNDWATER ELEVATION (masl), CONSTRUCTION V (OCTOBER 2014)
- GROUNDWATER ELEVATION (masl), CONSTRUCTION VI (MARCH 2015)
- GROUNDWATER ELEVATION (masl), CONSTRUCTION VII (JUNE 2015)
- GROUNDWATER ELEVATION (masl), CONSTRUCTION VIII (AUGUST 2015)
- INTREPRETED DIRECTION OF SHALLOW GROUNDWATER FLOW
- GENERAL SURFACE WATER FLOW DIRECTION (WHEN FLOW IS PRESENT)

REFERENCE

BASE PLAN PROVIDED IN ELECTRONIC FORMAT BY AECON

NOTE

- THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING GOLDER ASSOCIATES LTD. REPORT No. 10-1121-0197-5



PROJECT MTO
TIRE DERIVED AGGREGATE EMBANKMENT
CORNWALL, ONTARIO

TITLE
**SITE PLAN WITH
GROUNDWATER ELEVATION AND
FLOW DIRECTION**



PROJECT	No.10-1121-0197-5	FILE	No. 1011210197-1000-5-02.dwg
DESIGN	DH 2015-11-13	SCALE	AS SHOWN
CADD	BR 2015-11-13	REV.	0
CHECK	DH 2015-11-13		
REVIEW	BTB 2015-11-13		

FIGURE 2



SW 01



SW 02



SW 03



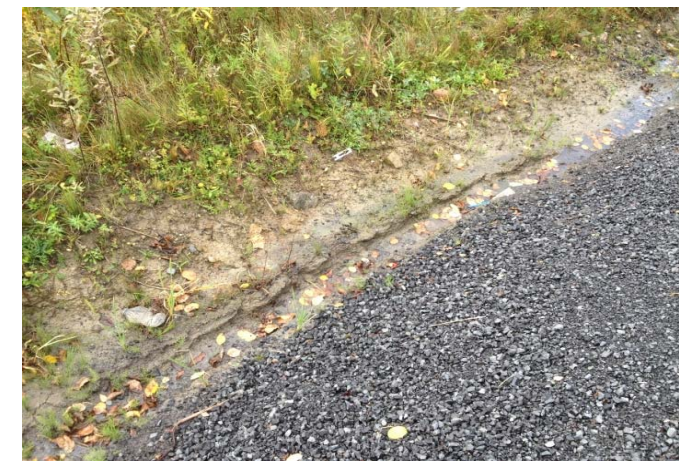
SW 04



SW 06



SW 07



SW 08



Date: December 2015

Project: 10-1121-0197

Created by: DH

Checked by: BTB

**PHOTOGRAPHS OF SURFACE WATER STATIONS
OCTOBER 2014 - POST-CONSTRUCTION I**

FIGURE 3



SW 01



SW 02



SW 03



SW 04



SW 06



SW 07



SW 08



Date: December 2015

Project: 10-1121-0197

Created by: DH

Checked by: BTB

**PHOTOGRAPHS OF SURFACE WATER STATIONS
MARCH 2015 - POST-CONSTRUCTION II**

FIGURE 4



SW 01



SW 02



SW 03



SW 04



SW 06



SW 07



SW 08



Date: December 2015

Project: 10-1121-0197

Created by: DH

Checked by: BTB

**PHOTOGRAPHS OF SURFACE WATER STATIONS
JUNE 2015 - POST-CONSTRUCTION III**

FIGURE 5



SW 01



SW 02



SW 03



SW 04



SW 06



SW 07



SW 08



Date: December 2015

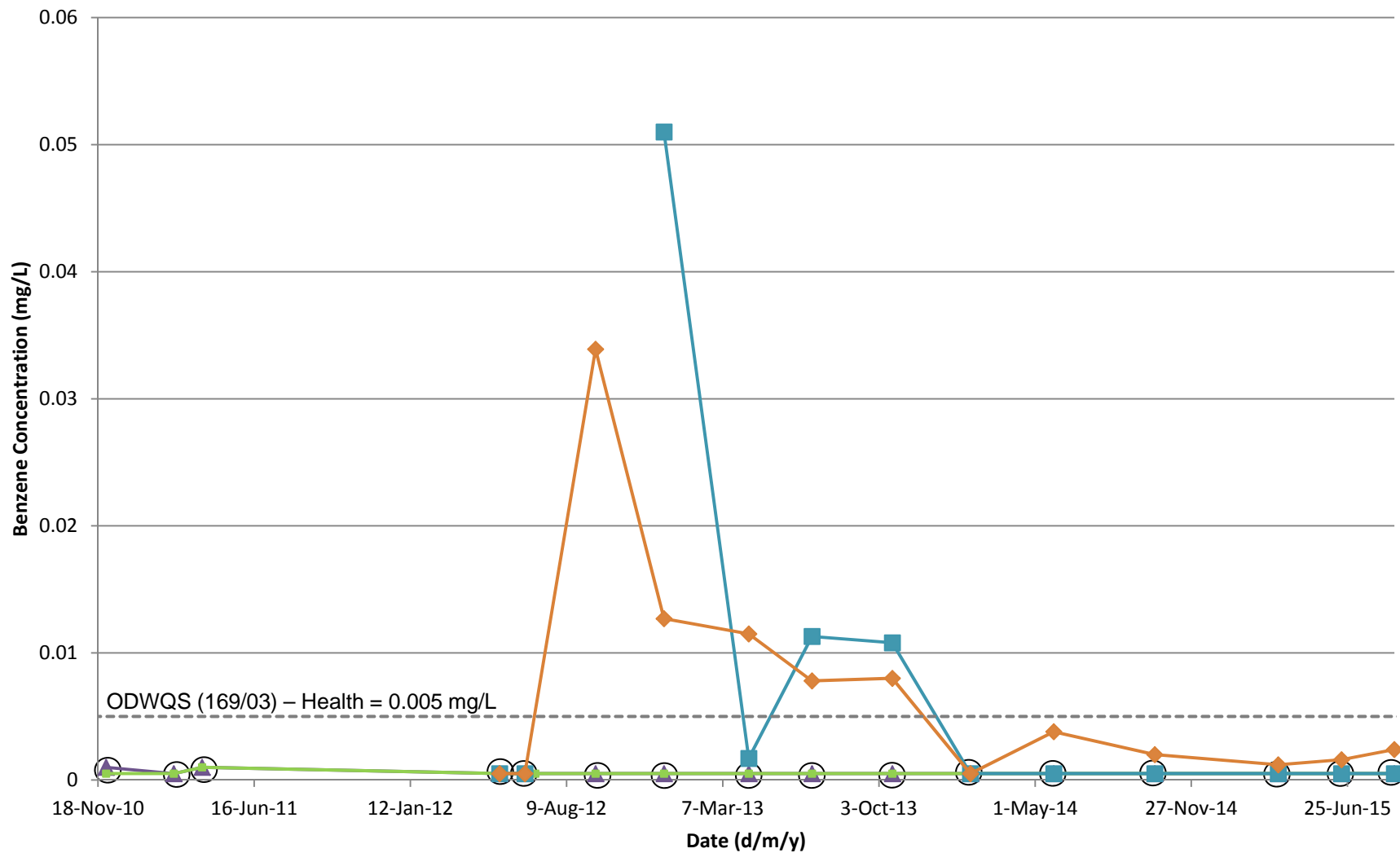
Project: 10-1121-0197

Created by: DH

Checked by: BTB

**PHOTOGRAPHS OF SURFACE WATER STATIONS
AUGUST 2015 - POST-CONSTRUCTION IV**

FIGURE 6



Note: PL2 was dry on September 17, 2012

○ denotes concentration(s) below laboratory method detection limit



PROJECT No. 10-1121-0197

Created by DH Dec 2015

Reviewed by BTB Dec 2015

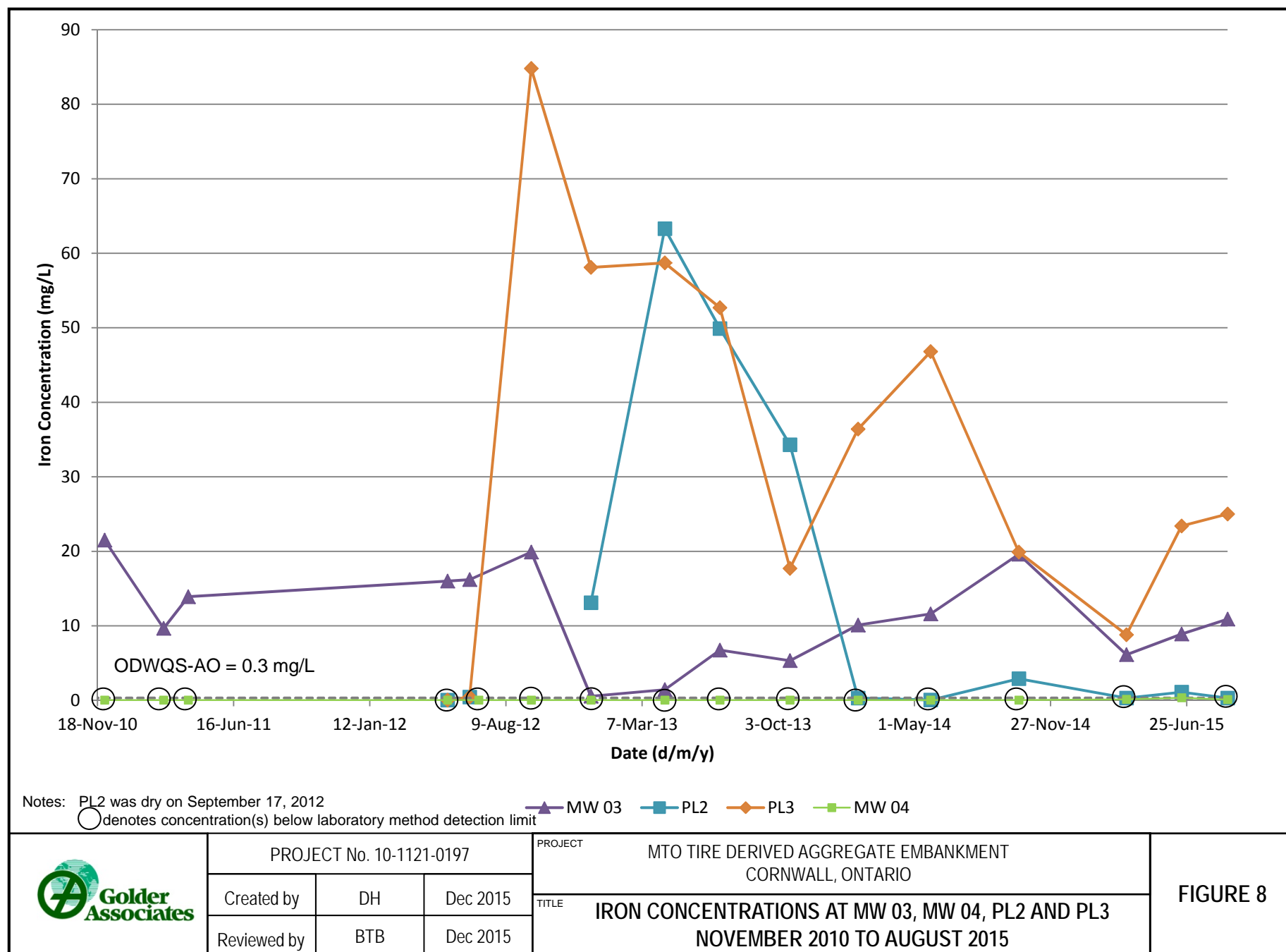
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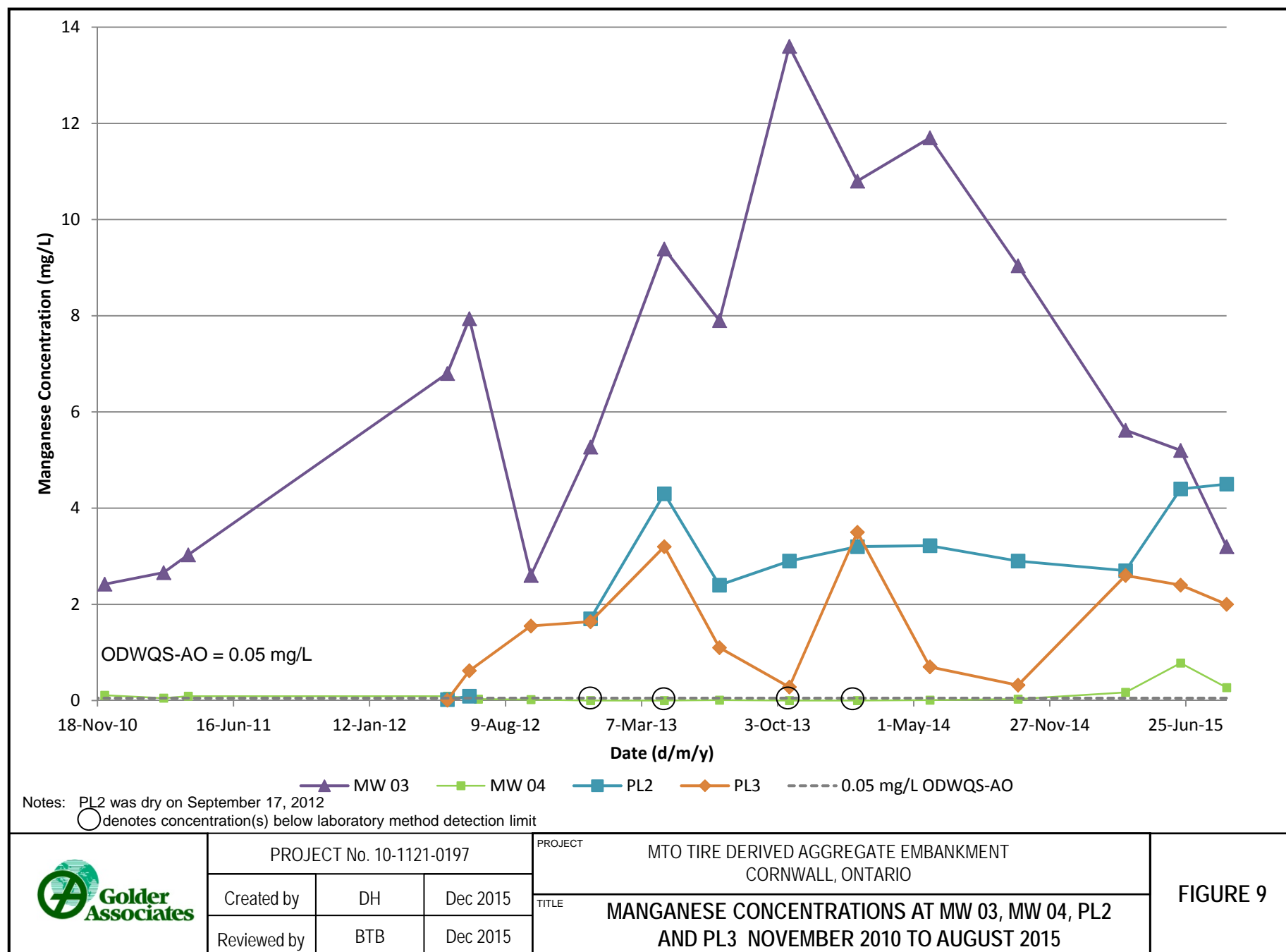
MTO TIRE DERIVED AGGREGATE EMBANKMENT
CORNWALL, ONTARIO

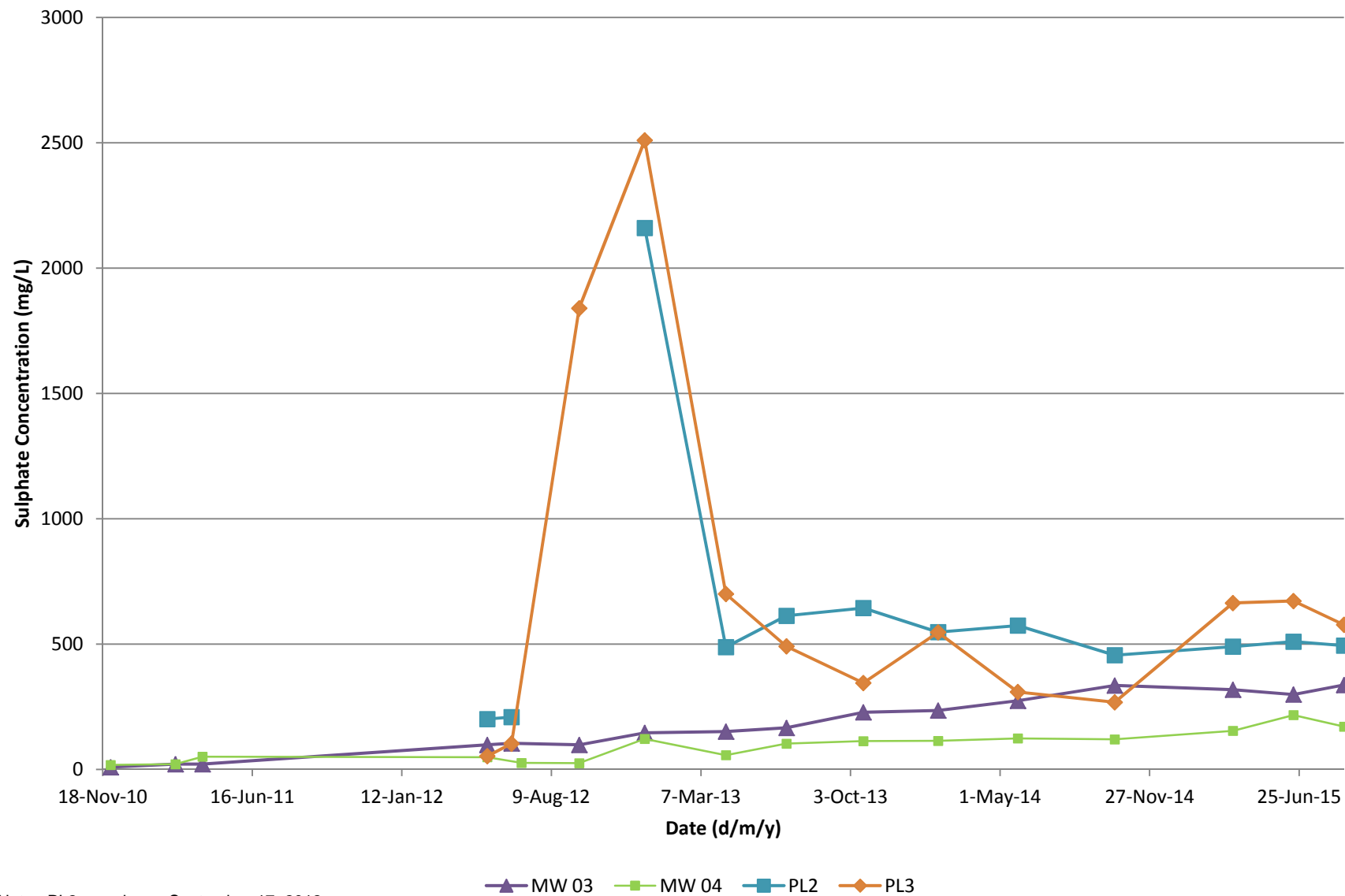
TITLE

BENZENE CONCENTRATIONS AT MW 03, MW 04, PL2 AND PL3
NOVEMBER 2010 TO AUGUST 2015

FIGURE 7







Note: PL2 was dry on September 17, 2012



PROJECT No. 10-1121-0197

Created by

DH

Dec 2015

Reviewed by

BTB

Dec 2015

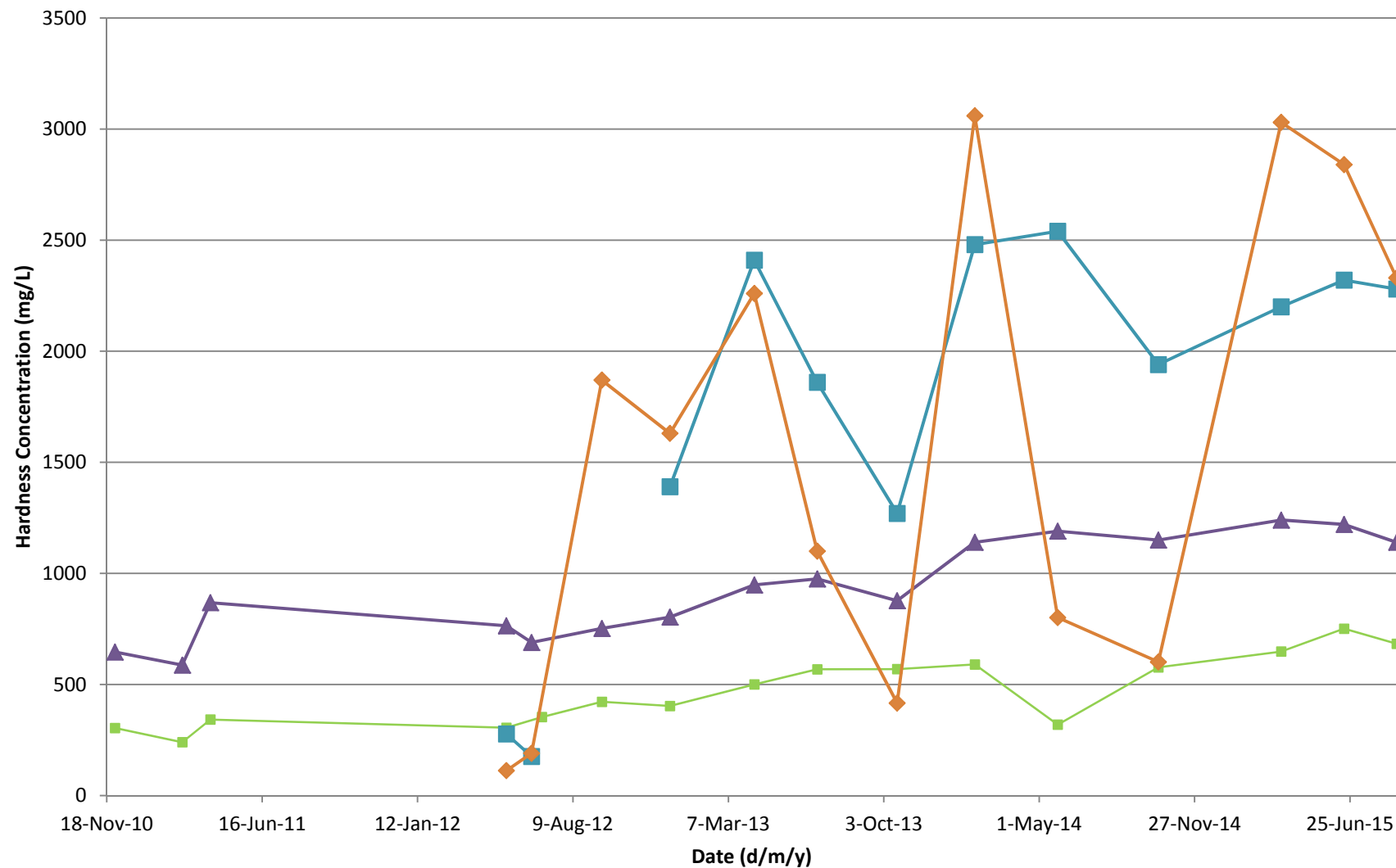
PROJECT

MTO TIRE DERIVED AGGREGATE EMBANKMENT
CORNWALL, ONTARIO

TITLE

SULPHATE CONCENTRATIONS AT MW 03, MW 04, PL2 AND PL3
NOVEMBER 2010 TO AUGUST 2015

FIGURE 10



Note: PL2 was dry on September 17, 2012

—▲— MW 03 —■— MW 04 —■— PL2 —◆— PL3



PROJECT No. 10-1121-0197

Created by DH Dec 2015

Reviewed by BTB Dec 2015

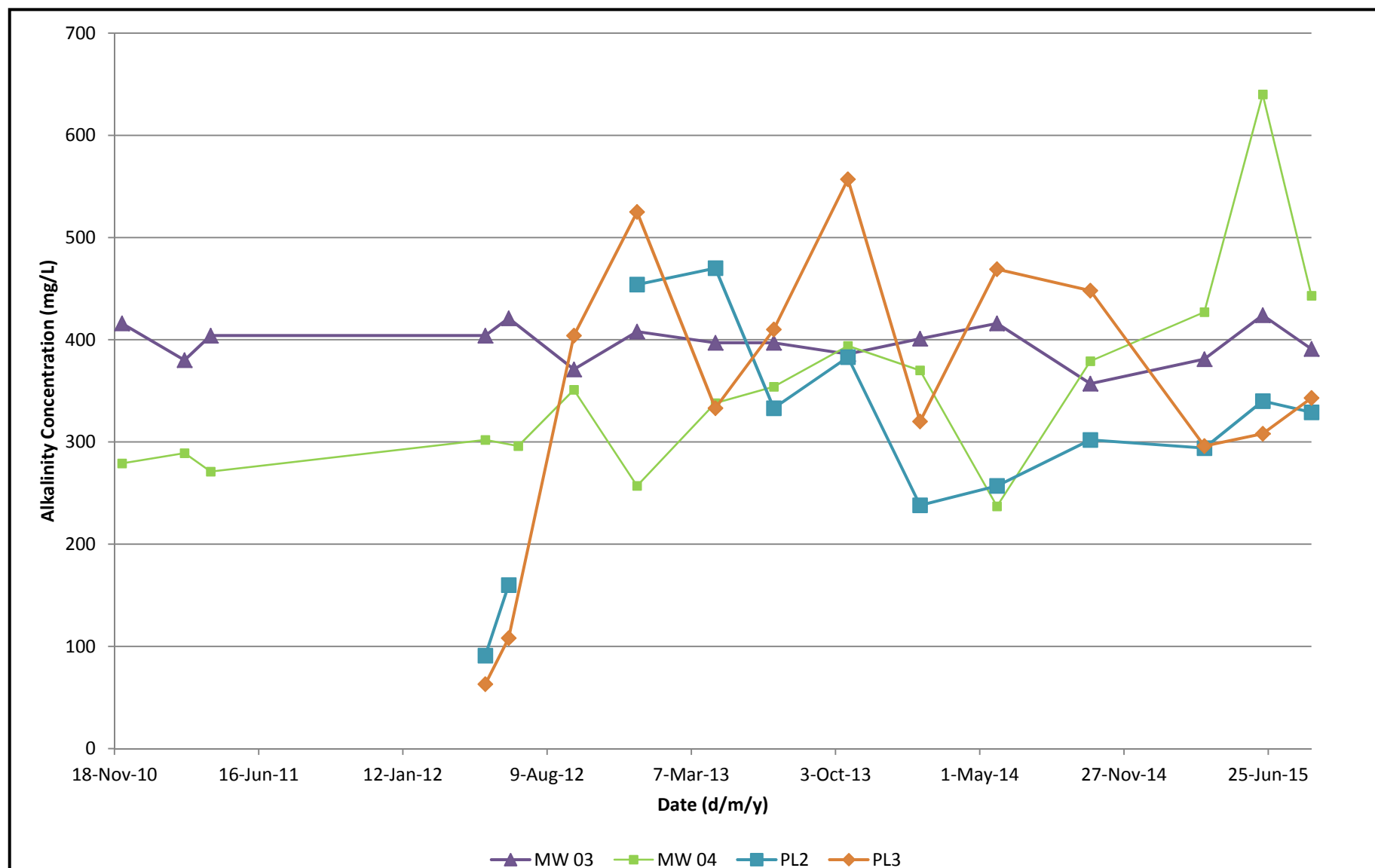
PROJECT

MTO TIRE DERIVED AGGREGATE EMBANKMENT
CORNWALL, ONTARIO


TITLE

HARDNESS CONCENTRATIONS AT MW 03, MW 04, PL2 AND PL3
NOVEMBER 2010 TO AUGUST 2015

FIGURE 11



Note: PL2 was dry on September 17, 2012

	PROJECT No. 10-1121-0197			PROJECT	MTO TIRE DERIVED AGGREGATE EMBANKMENT CORNWALL, ONTARIO	FIGURE 12
	Created by	DH	Dec 2015	TITLE	ALKALINITY CONCENTRATIONS AT MW 03, MW 04, PL2 AND PL3	
	Reviewed by	BTB	Dec 2015		NOVEMBER 2010 TO AUGUST 2015	



APPENDIX A

Provisional Certificate of Approval No. 5558-83WSFB and Comments from MOECC

PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER 5558-83WSFB
Issue Date: May 14, 2010

Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation
1355 John Counter Blvd Postal Bag 4000
Kingston, Ontario
K7L 5A3

Site Location: Boundary Road & Highway 401 Interchange
Cornwall, United Counties of Stormont, Dundas and Glengarry
K6H 6M1

You have applied in accordance with Section 27 of the Environmental Protection Act for approval of:
the use and operation of a 0.50 hectare tire derived aggregate footprint for construction of embankments
within a total site area of 7.5 hectares

Note: Use of the site for any other type of waste is not approved under this Certificate, and requires obtaining a separate approval amending this Certificate.

For the purpose of this Provisional Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Crown " means Her Majesty the Queen in the Right of Ontario;

"Certificate " means this entire provisional Certificate of Approval document, issued in accordance with section 39 of the EPA , and includes any schedules to it, the application and the supporting documentation listed in schedule "A";

"Director " means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part V of the EPA;

"District Manager " means the District Manager of the local district office of the Ministry in which the Site is geographically located;

"*EPA* " means *Environmental Protection Act* , R.S.O. 1990, c. E. 19, as amended;

"*Ministry* " means the Ontario Ministry of the Environment;

"*Operator*" has the same meaning as ``operator`` as defined in Section 25 of the *EPA* and means the contractor retained by the Ministry of Transportation for construction of Tire Derived Aggregate embankments;

"*Owner* " means Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation and its successors and assigns;

"*Provincial Officer* " means any person designated in writing by the Minister as a provincial officer pursuant to section 5 of the *OWRA* or section 5 of the *EPA* or section 17 of *PA* .

"*Regional Director* " means the Regional Director of the local Regional Office of the Ministry in which the Site is located.

"*Regulation 347* " or "*Reg. 347* " means Regulation 347, R.R.O. 1990, made under the *EPA* , as amended from time to time;

"*Site* " means the entire TDA site , including the buffer lands located at Boundary Road and Highway 401 and legally described as Part of Lot D, Concession 2, City of Cornwall and Part of Lot 16, Concession 3, Township of South Glengarry, approved by this *Certificate* .

"*Tire Derived Aggregate* " or "*TDA* " means pieces of scrap tires (tire chips and tire shreds) that have a basic geometrical shape and are generally between 12 mm and 305 mm in size and are intended for use in civil engineering operations.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

GENERAL

Compliance

1. The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of the *Certificate* and the conditions herein and shall take all reasonable measures to ensure the person complies with the same.
2. Any person authorized to carry out work on or operate any aspect of the *Site* shall comply with the conditions of this *Certificate* .

In Accordance

3. Except as otherwise provided for in this *Certificate*, the *Site* shall be designed, developed, built, operated and maintained in accordance with the application for this *Certificate*, dated December 21, 2009, and the supporting documentation listed in Schedule "A".

Other Legal Obligations

4. The issuance of, and compliance with, this *Certificate* does not:
- relieve any person of any obligation to comply with any provision of the *EPA* or any other applicable statute, regulation or other legal requirement; or
 - limit in any way the authority of the *Ministry* to require certain steps be taken or to request that any further information related to compliance with this *Certificate* be provided to the *Ministry*;

unless a provision of this *Certificate* specifically refers to the other requirement or authority and clearly states that the other requirement or authority is to be replaced or limited by the this *Certificate*.

Adverse Effect

5. The *Owner* and *Operator* shall take all reasonable steps to minimize and ameliorate any adverse effect or impairment of water quality resulting from the operation of the *Site*, including such accelerated or additional monitoring as may be necessary to determine the nature of the effect or impairment.
6. The *Owner Operator* shall remain responsible for any contravention of any other condition of this *Certificate* or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect or impairment of water quality.

Furnish Information

7. Any information requested by the *Director* or a *Provincial Officer* concerning the *Site* and its operation under this *Certificate*, including but not limited to any records required to be kept by this *Certificate* shall be provided in a timely manner.
8. The receipt of any information by the *Ministry* or the failure of the *Ministry* to prosecute any person or to require any person to take any action, under this *Certificate* or under any statute, regulation or subordinate legal instrument, in relation to the information, shall not be construed as:
- an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any condition of this *Certificate* or any statute, regulation or other subordinate legal requirement; or
 - acceptance by the *Ministry* of the information's completeness or accuracy.

Freedom of Information Act

9. Any information related to this Certificate and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, RSO 1990, CF-31.

Interpretation

10. Where there is a conflict between a provision of any document, including the application, referred to in this *Certificate*, and the conditions of this *Certificate*, the conditions in this *Certificate* shall take precedence.
11. Where there is a conflict between the application and a provision in any documents listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the *Ministry* approved the amendment.
12. Where there is a conflict between any two documents listed in Schedule "A", other than the application, the document bearing the most recent date shall take precedence.
13. The conditions of this *Certificate* are severable. If any condition of this *Certificate*, or the application of any condition of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

Inspections

14. No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA*, or the *EPA*, of any place to which this *Certificate* relates, and without limiting the foregoing:
 - to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Certificate* are kept;
 - to have access to, inspect, and copy any records required to be kept by the conditions of this *Certificate*;
 - to inspect the *Site*, related equipment and appurtenances;
 - to inspect the practices, procedures, or operations required by the conditions of this *Certificate*; and
 - to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Certificate* or the *EPA*, the *OWRA* or the *PA*.

Waste Type

15. Only the following types of waste shall be accepted at the *Site*:
 - Tire Derived Aggregate

16. Any waste type not listed in the previous condition shall not be accepted at the *Site*.

Capacity

17. The *Owner* shall only accept and deposit TDA at the site as long as there is available capacity as defined by the TDA limits for the *Site* approved by this *Certificate* as shown in Figure 18 of Item 2 in Schedule "A".
18. The amount of TDA deposited at the site shall not exceed the site capacity of 20,000 cubic metres.

Service Area

19. Only TDA that is generated **within the Province of Ontario** shall be accepted at the *Site*.

Operation

Proper Operation

20. The TDA embankments at the Site shall be properly constructed and maintained at all times. All TDA shall be managed in accordance with the requirements of this Certificate, the EPA and Regulation 347. At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

Placement of TDA

21. TDA shall be placed in accordance with the following requirements:
- A minimum of 2 metres above the groundwater table;
 - A minimum of 30 metres from any surface waterbody, watercourse, swamp or wetland; and
 - A minimum of 100 metres from any potable groundwater well.
22. TDA shall be placed in accordance with the procedures detailed in Item 2 of Schedule "A".

TDA Limits

23. TDA shall not be placed, compacted and covered outside the limits shown in Item 4 in Schedule "A" attached to this *Certificate*.

Hours of Operation

24. TDA may be accepted at the Site 24 hours per day, seven days per week.

Site Security

25. During non-operating hours, the TDA Site shall be secured against access by unauthorized

persons

TDA Inspection

26. The *Operator* shall develop and implement a program to inspect TDA to ensure that the TDA is of a type approved for acceptance under this *Certificate*.

MONITORING, RECORDING NOTIFICATION

Monthly Inspections and Log Book

27. An inspection of the TDA Site shall be conducted each month during construction to ensure compliance with this *Certificate*. Any deficiencies discovered as a result of the inspection shall be remedied immediately.
28. A record of the inspections shall be kept in a monthly log book *or a dedicated electronic file* that includes:
- the name and signature of person that conducted the inspection;
 - the date and time of the inspection;
 - the list of any deficiencies discovered;
 - the recommendations for remedial action; and
 - the date, time and description of actions taken.
29. A record shall be kept in the monthly log book of all refusal of TDA shipments, the reason(s) for refusal, and the origin of the TDA, if known.

Monitoring Program

30. Within sixty (60) days of issuance of this *Certificate*, the Owner shall submit a ground-water monitoring program to the Director for approval. The groundwater monitoring program shall include a parameter list, sampling frequency, the location of proposed on-site wells and the location of off-site domestic wells.
31. Placement and compaction of TDA may not occur until the monitoring program is approved by the Director.

Record Retention

32. Except as authorized in writing by the Director, all records required by this *Certificate* shall be retained at the Site for a minimum of two (2) years from their date of creation.
33. The Owner shall retain all documentation listed in Schedule "A" for as long as this *Certificate* is valid.

34. All monthly summary reports are to be kept at the site until they are included in the Final Report.
35. The Owner shall make all of the above documents available for inspection upon request of Ministry staff.

Emergency Situations

36. In the event of a fire or discharge of a contaminant to the environment, TDA site staff shall contact the MOE Spills Action Centre (1-800-268-6060) and the District Office of the MOE.
37. The Operator shall submit to the District Manager a written report within 3 days of the spill or incident, outlining the nature of the incident, remedial measures taken and measures taken to prevent future occurrences at the TDA Site.
38. The Operator shall prepare an Emergency Response Manual for the TDA site prior to receipt of TDA at this Site in consultation with local emergency response agencies. The Emergency Response Manual should indicate the responsibility of each of the stakeholders with respect to handling possible emergency situations.
39. The Emergency Response Manual shall be updated on a regular basis and be provided to the District Manager within one month of the revision date.
40. The Operator shall ensure that adequate fire fighting and contingency spill clean up equipment is available and that emergency response personnel are familiar with its use and location.

Final Report

41. A written report on the completion of TDA embankment construction and monitoring of the TDA Site, shall be completed (the "Final Report") and shall be submitted to the *District Manager* by March 31, 2013.
42. The Final Report shall include the following:
 - a. the results and an interpretive analysis of the results of all groundwater monitoring;
 - b. site plans showing the final TDA embankment construction;
 - c. a discussion of any operational problems encountered at the Site and corrective action taken;
 - d. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;
 - e. any other information with respect to the site which the District Manager or Regional Director may require from time to time;
 - f. a statement of compliance with all conditions of this Certificate of Approval and other relevant Ministry groundwater and surface water requirements;
 - g. Summary of inspections undertaken at the site; and,
 - h. interpretations, conclusions and recommendations for future use of TDA as a recycled engineered material in Ontario.

SCHEDULE "A":

1. Application for a Provisional Certificate of Approval for a Waste Disposal Site for the Boundary Road/Highway 401 Interchange, signed and dated on December 21, 2009.
2. Document entitled "*Design Brief Tire Derived Aggregate Ministry of Transportation Application to Ministry of the Environment*" and Appendices A to D inclusive prepared by the Ministry of Transportation, dated December 2009.
3. Letter dated March 2, 2010 to Mr. David Staseff, Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation from Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE.
4. Letter dated March 12, 2010 and attached figures entitled "TDA Site Boundary" and "MTO Property Limits" from Mr. David Staseff, Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation to Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE.
5. Letter and attached draft Certificate of Approval dated April 8, 2010 from Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE to David Staseff, Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation.
6. E-mail dated April 21, 2010 from Mr. David Staseff, Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation from Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE.
7. Document entitled "MTO TDA Site - Boundary Road/Hwy 401 - Cornwall Comments on Draft C of A dated April 8/10 - REF #5447-7ZGRK2" created by Mr. David Staseff, Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation, dated April 21, 2010.
8. Letter and attached draft Certificate of Approval dated May 4, 2010 from Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE to David Staseff, Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation.
9. E-mail dated May 5, 2010 from Mr. David Staseff, Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation from Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE.
10. E-mail dated May 7, 2010 from Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, MOE to David Staseff, Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation.
11. E-mail dated May 7, 2010 from Mr. David Staseff, Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation from Greg Washuta, Senior Waste Engineer, Waste

Unit, EAAB, MOE.

The reasons for the imposition of these terms and conditions are as follows:

- 1. The reason for the definitions is to define the specific meaning of terms and simplify the wording of conditions in this Certificate of Approval.*
- 2. The reason for Condition 1 and 2 is to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*
- 3. The reason for Conditions 3 to 6 inclusive, 10-13 inclusive and 31-35 inclusive is to clarify the legal rights and responsibilities of the Owner under this Certificate of Approval.*
- 4. Conditions 7 and 8 are included to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site, which are approved under this Certificate.*
- 5. Condition 9 is needed in order to clarify the Owner's responsibilities under the Freedom of Information Act.*
- 6. The reason for Condition 14 is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Certificate of Approval. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA and OWRA.*
- 7. The reason for Conditions 15, 16 and 19 is to specify the approved areas from which TDA may be accepted at the Site and the types and amounts of TDA that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.*
- 8. The reason for Conditions 17 and 18 is to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the site. Approval to landfill beyond these limits would require an application with supporting documentation submitted to the Director.*
- 9. The reasons for Condition 24 are to specify the normal hours of operation for the TDA Site and a mechanism for amendment of the hours of operation.*
- 10. The reasons for Condition 25 are to specify site access to/from the Site and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.*
- 11. The reason for Conditions 23 is to ensure that placement of TDA is conducted in an environmentally acceptable manner.*

12. *The reasons for Conditions 20 to 22 inclusive, 26 and 27 are to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.*
13. *The reason for Condition 29 is to ensure that accurate TDA records are maintained to ensure compliance with the conditions in this Certificate of Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the EPA and its regulations.*
14. *The reason for Condition 30 is to demonstrate that the TDA site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.*
15. *The reasons for Condition 28 are to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this Certificate of Approval, the EPA and its regulations.*
16. *The reasons for Conditions 41 and 42 are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. A final report is an important tool used in reviewing site activities and for determining the effectiveness of site design.*
17. *The reasons for Condition 36 are to ensure that the Ministry is informed of any spills or fires at the Site and to provide public health and safety and environmental protection.*
18. *Conditions 37-40 are contained in the Certificate to guarantee that appropriate measures are taken by the Owner to prevent future occurrences of spills or fires at the site and to protect public health and safety and the environment.*

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. *The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;*
2. *The grounds on which you intend to rely at the hearing in relation to each portion appealed.*

The Notice should also include:

3. *The name of the appellant;*
4. *The address of the appellant;*
5. *The Certificate of Approval number;*

6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 14th day of May, 2010



Tesfaye Gebrezghi, P.Eng.
Director
Section 39, *Environmental Protection Act*

GW/

c: District Manager, MOE Cornwall
David Staseff, Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation
Lisa Chalmers, MOE, Cornwall



MEMORANDUM

13 March 2015

TO: L. Chalmers
Sr. Environmental Officer
Cornwall Area Office
Eastern Region

FROM: F. Crossley
Hydrogeologist
Technical Support Section
Eastern Region

RE: Annual Monitoring Report #2 - Tire Derived Aggregates
Ministry of Transportation Ontario
Highway 401 at Boundary Road, Cornwall, Ontario
5558-83WSFB

This Ministry issued (May, 2010) an Environmental Compliance Approval, 5558-83WSFB, to Her Majesty the Queen in Right of Ontario as represented by the Minister of Transportation for the use and operation of a 0.5 hectare tire derived aggregate (TDA) footprint for construction of embankments within a total site area of 7.5 hectares. The site is located at Boundary Road and Highway 41 interchange, Cornwall, Ontario.

TDA is derived from scrap tires. The scrap tires are mechanically processed, shredded. The tires are shredded to various sizes and based on their sizes are referred to as tire shreds (50-305 mms) or tire chips (12-60 mms). During the shredding process, some wire is removed from the tires, especially the tire chipping process. TDA consists of tire shreds and tire chips. TDA is used as an alternate to conventional fill materials (soils).

As part of the approval, a pre construction monitoring program was required. Golder Associates (Golder) conducted the pre construction monitoring program and summarized their results in "Pre Construction Baseline Study, TDA Embankment Boundary Road, Cornwall" dated June, 2012. The results in this report provide baseline conditions.

The TDA Embankments were installed in May, 2012. It is reported that approximately 400,000 used tires were used in the construction of the two embankments. The interchange was open to traffic in November, 2012.

Golder conducted monitoring in June, September, December, 2012 and April, 2013. Golder referred to these monitoring events as construction monitoring. Golder produced a summary report "Construction Monitoring Annual Report #1 TDA Embankment, Boundary Road, Cornwall" dated August, 2013 (received October, 2013). I reviewed this report to determine if the TDA is causing environmental impacts. I provided comments in a memorandum dated October 25, 2013. It was concluded that the TDA produces a leachate. The key leachate

indicator parameters are: benzene, iron and manganese. This was determined from the liquids (leachate) in the pan lysimeters. The results from the monitoring well network did not show leachate impacts (2012, 2013).

Golder conducted monitoring in July 2013, October 2013, February 2014 and May 2014. Golder produced a summary report "Construction Monitoring Report Annual Report #2, TDA Embankment, Boundary Road, Cornwall" dated August, 2014 (received October, 2014). I reviewed this report to determine if the TDA is causing environmental impacts.

Pan lysimeters were installed prior to the addition of TDA. In total, four pan lysimeters were installed: two north of Highway 401 (PL1 and PL2) and two south of Highway 401 (PL3 and PL4). The pan lysimeters are installed above the water table, thus the pan lysimeters collect leachate and/or infiltration. PL1 and PL4 are located outside the TDA area to provide control results (infiltration). PL2 and PL3 are located within the TDA area to collect leachate/infiltration. The purpose of the pan lysimeters is to provide a leachate characterization.

PL1 and PLS4, control lysimeters, were reported as "dry" throughout the monitoring program.

PL2 shows an increase in numerous chemical parameters compared to the pre construction results. PL3 shows an increase in numerous chemical parameters compared to the pre construction results.

Based on the results from the pan lysimeters, the key leachate indicator parameters are: iron; manganese; benzene; alkalinity; hardness and sulphates.

Groundwater monitoring wells were installed in November, 2010, prior to construction activities. In total, six boreholes/monitoring wells were installed: three monitoring wells north of Highway 401 (MW01, MW02 and MW05) and three monitoring wells south of Highway 401 (MW03, MW04 and MW06). The borehole logs generally show the geology to be: fill (structural fill); brown silty sand (Fort Covington); sand and gravel seam and grey sandy silt (Malone). The monitoring wells target the interface zone of the Fort Covington/sand and gravel seam/Malone units.

Golder determined the physical hydrogeological characteristics to be:

- The groundwater flow is to the northwest with a hydraulic gradient of 0.003 to 0.005 in the north TDA embankment. The depth to water in the north TDA embankment is 0.1 to 1.4 metres below ground surface.
- The groundwater flow is to the east with a horizontal hydraulic gradient of 0.01 in the south TDA embankment. The depth to water in the south embankment is 1.4 to 2.3 metres below ground surface.

The groundwater results are summarized in Appendix C-1. In comparing the results from the pre construction sampling events to the construction/post construction sampling events the following trends are noted at each monitoring well:

MW1 - No discernable trend.

MW2 - No discernable trend.

- MW3 - Increasing trend in hardness and sulphates and fluctuating trend in iron and manganese.
- MW4 - Slightly increasing trend in hardness and sulphates.
- MW5 - No discernable trend.
- MW6 - No discernable trend.

Since the site has an Environmental Compliance Approval, Guideline B-7 applies. Golder applied Guideline B-7 to the site. Exceedances of the Reasonable Use limits for iron and manganese occur at MW1 and MW3. MW1 is not interpreted to be impacted by leachate. MW3 is interpreted to be impacted by leachate.

As part of the pre construction and construction monitoring program, surface water samples were collected. The surface water results are not part of this review and will be reviewed separately by a Surface Water Evaluator.

I offer the following conclusions and recommendations:

- The Minister of Transportation was issued (May, 2010) an Environmental Compliance Approval, 5558-83WSFB, for the use and operation of a 0.5 hectare tire derived aggregates (TDA) footprint for construction of embankments within a total site area of 7.5 hectares located at the interchange of Boundary Road and Highway 401, Cornwall, Ontario.
- The Environmental Compliance Approval required pre construction sampling, construction sampling and post construction sampling.
- The pre construction sampling results provide baseline conditions.
- The pan lysimeter results provide a leachate characterization. The key leachate indicator parameters are: iron; manganese; benzene; alkalinity; hardness and sulphates.
- The pan lysimeters outside (control) the TDA area typically are reported as “dry” whereas the pan lysimeters within the TDA area have liquids (historical overflow reported). This suggests that the materials covering the TDA area are not a low permeable material or are insufficient to reduce infiltration into the TDA area. This issue should be addressed.
- The groundwater results show that the leachate is impacting MW3 and possibly MW4.
- The site is regulated (Environmental Compliance Approval), thus Guideline B-7 applies.
- The site is considered to be in compliance with Guideline B-7 as MW3 is within the site boundary. Ongoing monitoring will determine if further action is required.
- The monitoring program is to be continued.

- The Minister of Transportation Ontario is requesting the exemption of TDA from Regulation 347 and Part V of the Environmental Protection Act. TDA is not inert and generates a leachate best characterized by: iron; manganese; benzene; alkalinity; hardness and sulphates. Therefore it is recommended that TDA remain regulated and can be used in site specific cases where the leachate generation does not produce environmental impacts.



F. Crossley, P.Geo.
/sh

ec: V. Castro
M. Séguin
G. Faaren (Acting Supervisor)
P. Taylor

c: File GW ST CC 01 02 BO (TDA Boundary Road/Highway 401)
FC/IDS #7120-9PFM7L



MEMORANDUM

June 10, 2015

TO: Lisa Chalmers
Senior Environmental Officer
Cornwall Area Office
Eastern Region

FROM: Victor Castro
Senior Aquatic Scientist
Technical Support Section
Eastern Region

RE: Tire Derived Aggregate (TDA) Annual Report #2
Ministry of Transportation
Environmental Compliance Approval No. 5558-83WSFB
Highway #401 at Boundary Road, Cornwall, Ontario

I have reviewed the report titled, "*Construction Monitoring Report, Annual Report #2 (PR #44), MTO Contract 2010-4003, TDA Embankment, WP-385-01-01, Boundary Road, Cornwall, Ontario*" dated August 2014 prepared by Golder Associates and offer the following comments for your consideration.

In Ontario, used tires that have not been refurbished for road use are a designated waste under Ontario Regulation 347 of the *Environmental Protection Act*. Land application of shredded or chipped tires as an engineered fill requires an approval under Part V of the Environmental Protection Act (EPA).

On May 14, 2010 Environmental Compliance (ECA) No. 5558-83WSFB was issued to the Ontario Ministry of Transportation (MTO) for the use and operation of a 0.50 hectare tire derived aggregate footprint for construction of embankments at the Boundary Road and Highway #401 interchange, in Cornwall, Ontario. The total site area is 7.5 hectares. Tire derived aggregate (TDA) is a recycled material processed from scrap tires into chips and shreds generally between 12 mm and 305 mm in size. Approximately 400,000 shredded tires were placed as fill within the approach embankments for the new bridge structure spanning Highway 401 at Boundary Road. The TDA embankments were installed in May 2012.

This is the second post-construction annual report submitted for this site spanning the period July 2013 to May 2014. I have previously provided comments dated February 13, 2014 on a March 2013 MTP Final Report, which included pre-construction sampling of baseline conditions in groundwater monitors, surface water stations and pan lysimeters.

The surface water sampling events took place on July 5, 2013, October 21, 2013, February 3, 2014 and May 25, 2014. During these periods numerous stations (SW03, SW04 and SW08) could not be sampled due to frozen or dry conditions. The remaining stations were reported as stagnant or with negligible flow. Sampling results for stations SW01, SW02 and SW07 show elevated levels of several TDA leachate indicator parameters: iron, manganese and zinc. The consultants do not attribute these elevated concentrations of indicator parameters to the TDA filled embankments, but instead they indicate there is limited evidence to suggest these stations are located downstream of the TDA area. The drainage patterns for the surface water stations is obviously an issue and needs to be confirmed in order to properly assess the surface water data. It may be quite possible for the elevated metals to be natural in origin, particularly in stagnant shallow surface water features; however, there is a source of these contaminants in close proximity (i.e. TDA embankments) and therefore an understanding of drainage and flow patterns during wet periods is necessary to explain the elevated concentrations.

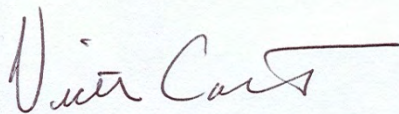
Pan lysimeters PL1 and PL4 are situated outside the TDA fills areas and were reported as dry throughout the monitoring period. This has been a common observation throughout the monitoring programs.

Pan lysimeters PL2 and PL3, which were installed directly in the TDA embankments above the water table, continue to show elevated levels of TDA leachate indicator parameters iron, manganese and benzene. Alkalinity, hardness and sulphates are also considered good leachate indicators for TDA.

During the sampling event on June 20, 2013 the consultants observed flow coming from the end cap of the horizontal drain pipe at PL3. Iron stained water was observed at the same location on October 21, 2013. These types of observations have been noted in past monitoring events and indicate higher than expected infiltration.

The consultants have recommended that surface water and groundwater monitoring continue at this site. I support this recommendation.

If you have any questions regarding these comments, please contact me at (613) 540-6862.



Victor Castro, B.Sc., M.Pl.
VC/sh

ec: Greg Faaren

c: File SW ST CC 03 06 (MTO Boundary Road/401, TDA Site – Cornwall)



APPENDIX B

Genivar Consultants Limited Partnership Borehole Logs



GENIVAR

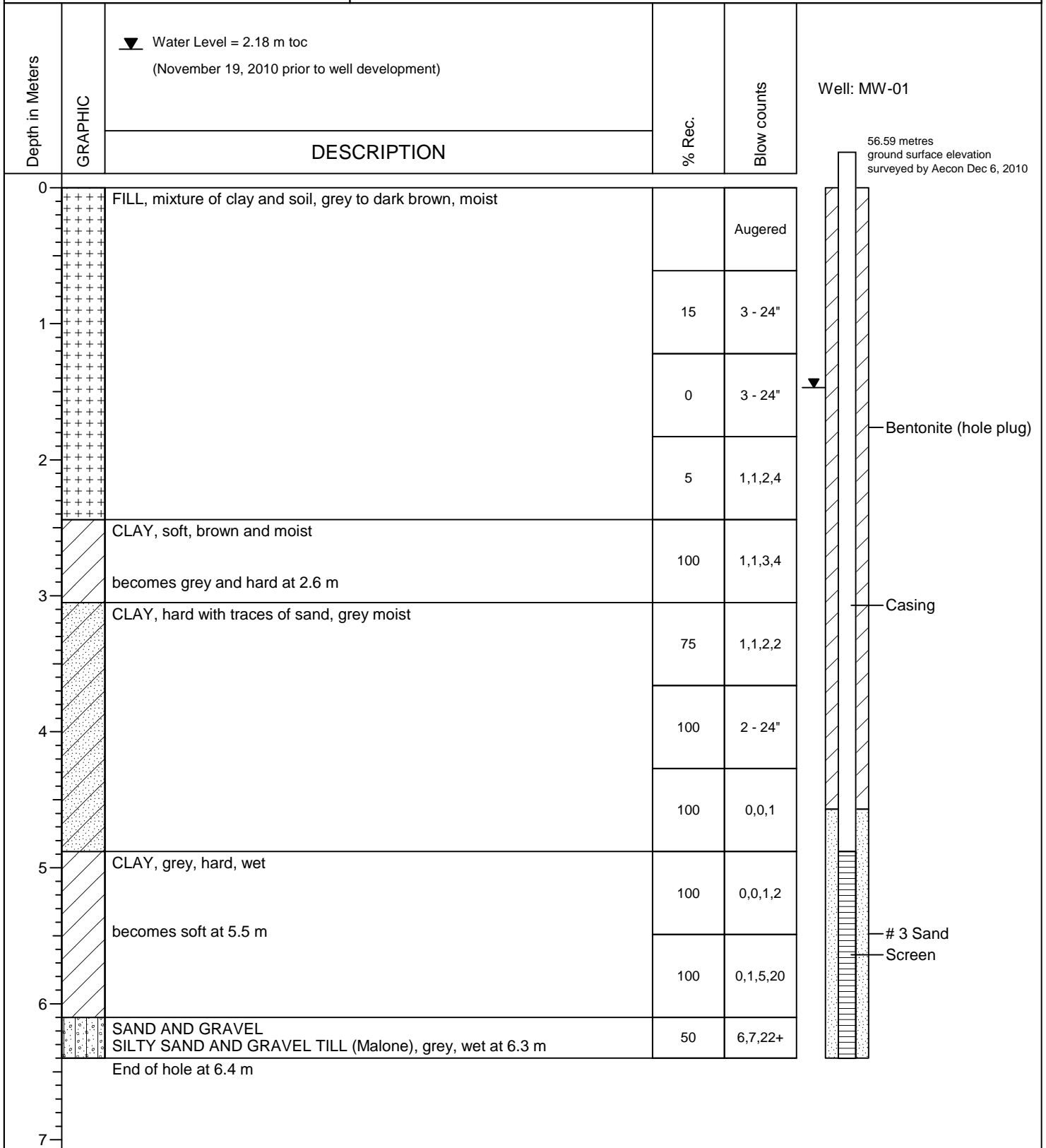
MW-01

Aecon Construction and Material
Installation of Monitoring Wells
MTO Boundary Road

Project # 10106125

Date Completed : November 19, 2010
Site Location : Boundary Rd and Hwy 401
Drilling Method : Auger
Sampling Method : SS
Hole Diameter : 0.15

Company Rep. : GR
Borehole Location : North East of Site
Logged By : GR
Easting : 524264 m
Northing : 4990225 m





GENIVAR

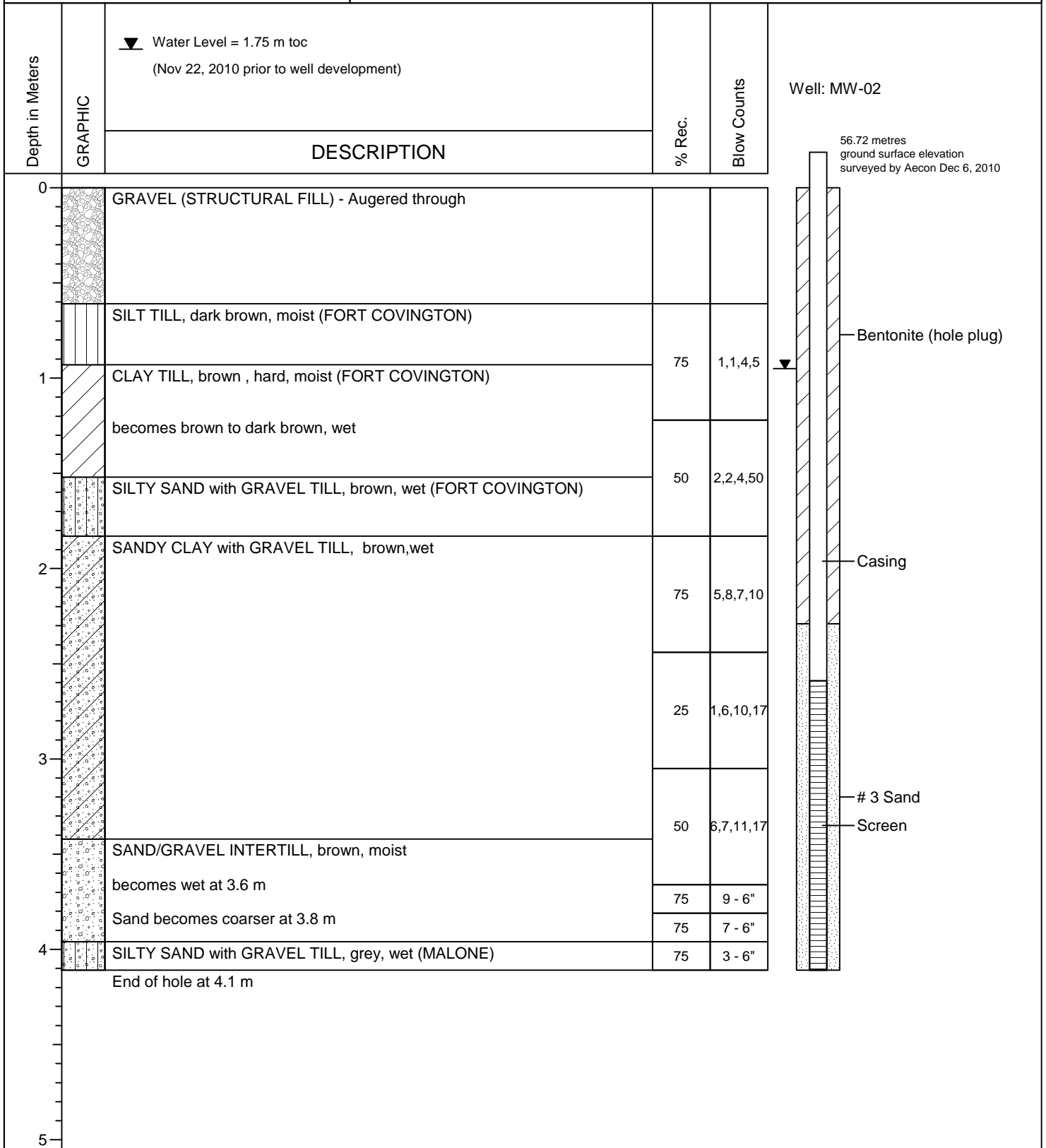
MW-02

Aecon Construction and Material
Installation of Monitoring Wells
MTO Boundary Road

Project # 10106125

Date Completed : November 22, 2010
Location : Boundary Rd and HWY 401
Drilling Method : Auger
Sampling Method : SS
Hole Diameter : 0.15 m

Company Rep. : GR
Borehole Location : North East of Site
Logged By : GR
Easting : 524351 m
Northing : 4990111 m





GENIVAR

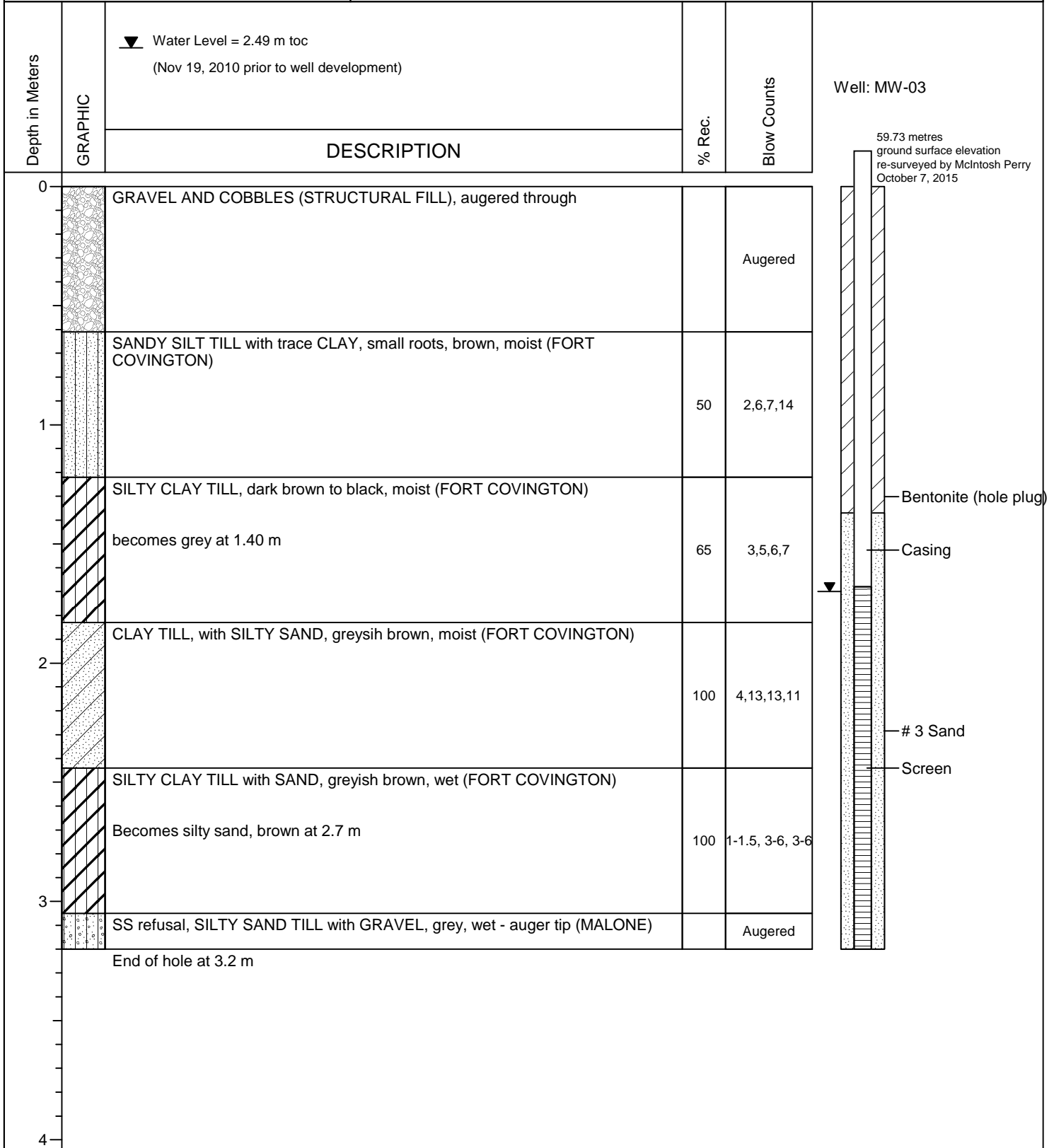
MW-03

Aecon Construction and Material
Installation of Monitoring Wells
MTO Boundary Road

Project # 10106125

Date Completed : November 19, 2010
Site Location : Boundary Rd and HWY 401
Drilling Method : Auger
Sampling Method : SS
Hole Diameter : 0.15 m

Company Rep. : GR
Borehole Location : South East of Site
Logged By : GR
Easting : 524381 m
Northing : 4990027 m





GENIVAR

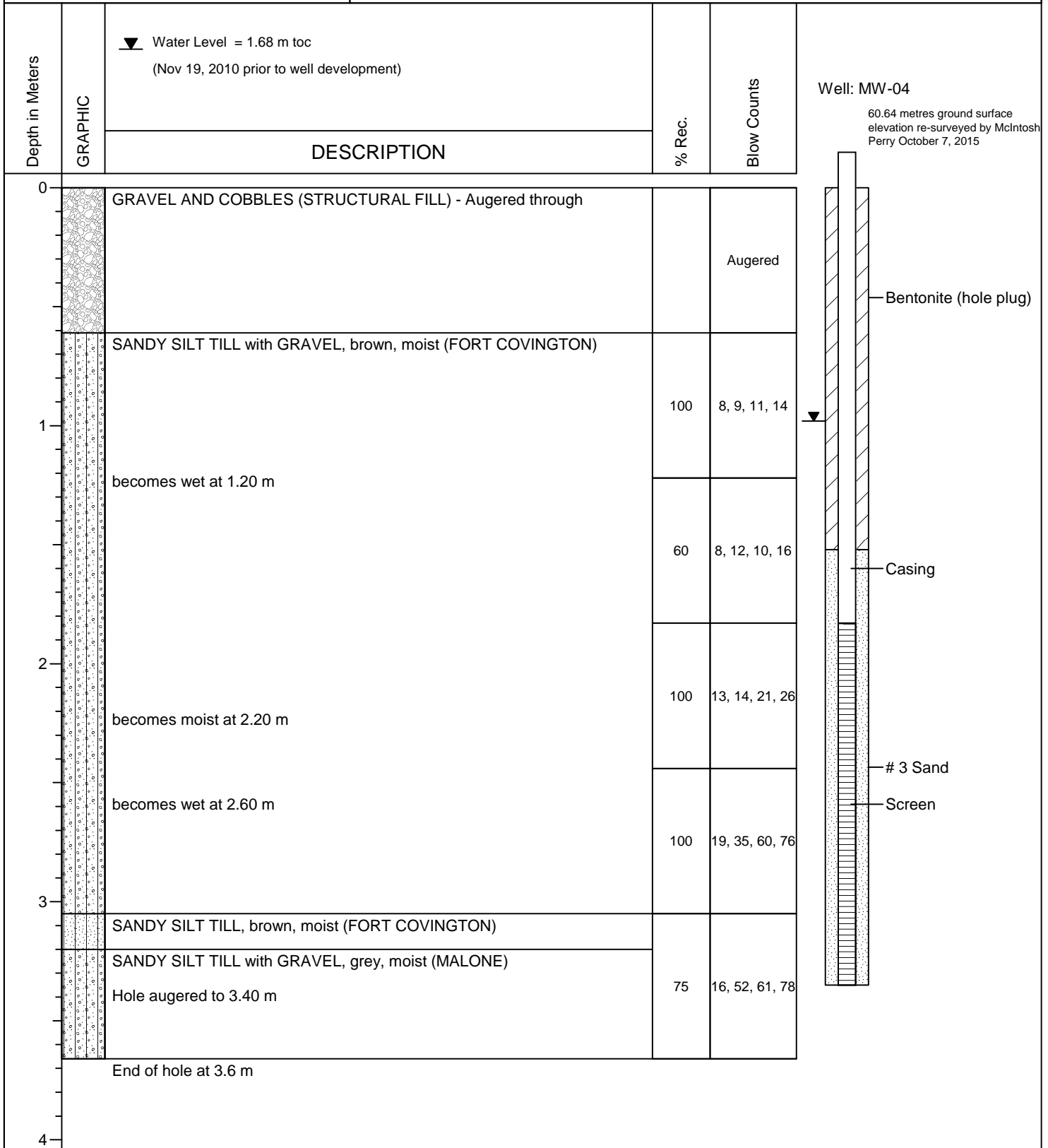
MW-04

Aecon Construction and Material
Installation of Monitoring Wells
MTO Boundary Road

Project # 10106125

Date Completed : November 19, 2010
Site Location : Boundary Rd and Hwy 401
Drilling Method : Auger
Sampling Method : SS
Hole Diameter : 0.15 m

Company Rep. : GR
Borehole Location : South East of Site
Logged By : GR
Easting : 524422 m
Northing : 4989974 m





GENIVAR

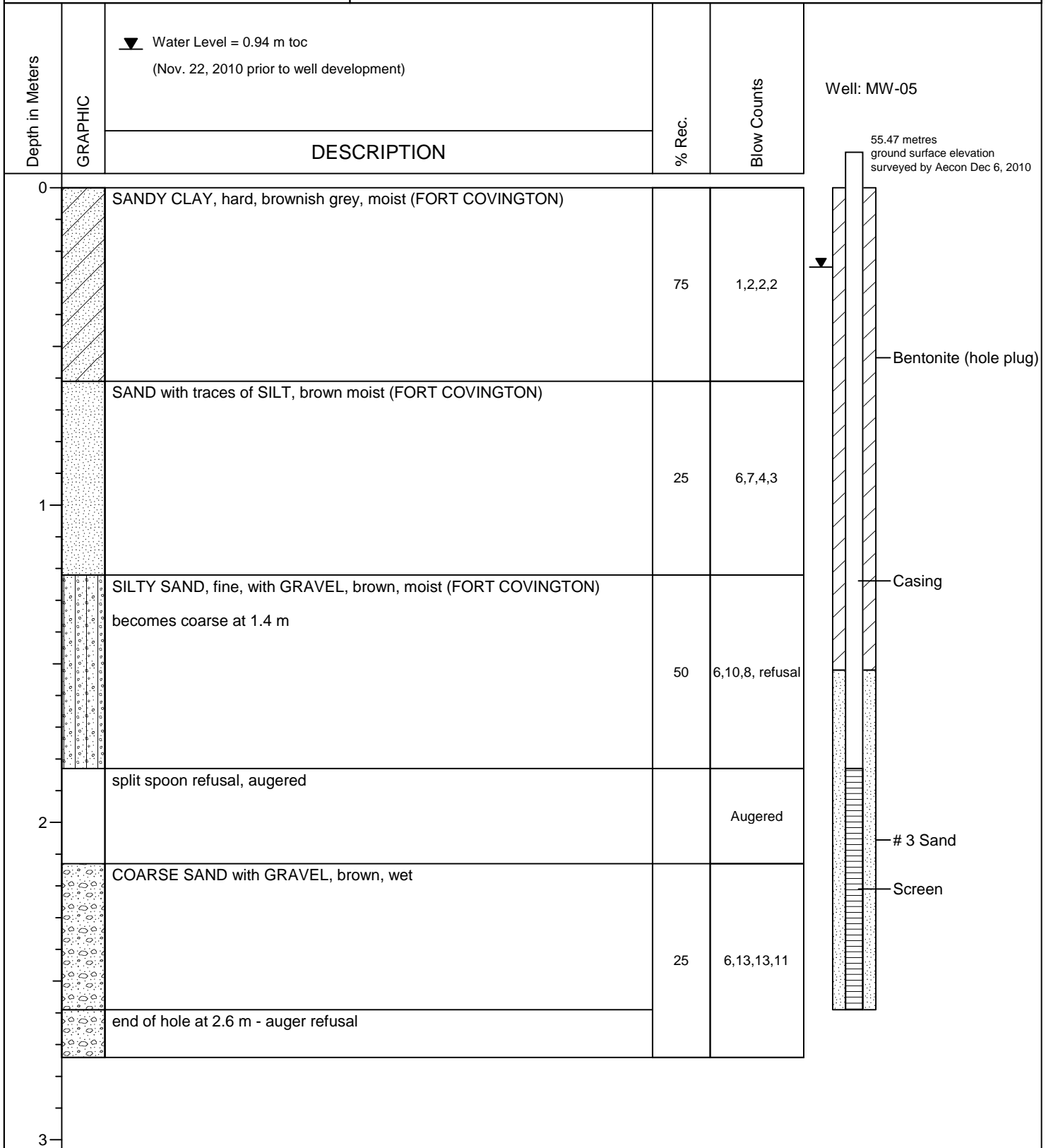
MW-05

Aecon Construction and Material
Installation of Monitoring Wells
MTO Boundary Road

Project # 10106125

Date Completed : November 22, 2010
Site Location : Boundary Rd and Hwy 401
Drilling Method : Auger
Sampling Method : SS
Hole Diameter : 0.15 m

Company Rep. : GR
Borehole Location : North West of Site
Logged By : GR
Easting : 524239 m
Logged By : 4990111 m





GENIVAR

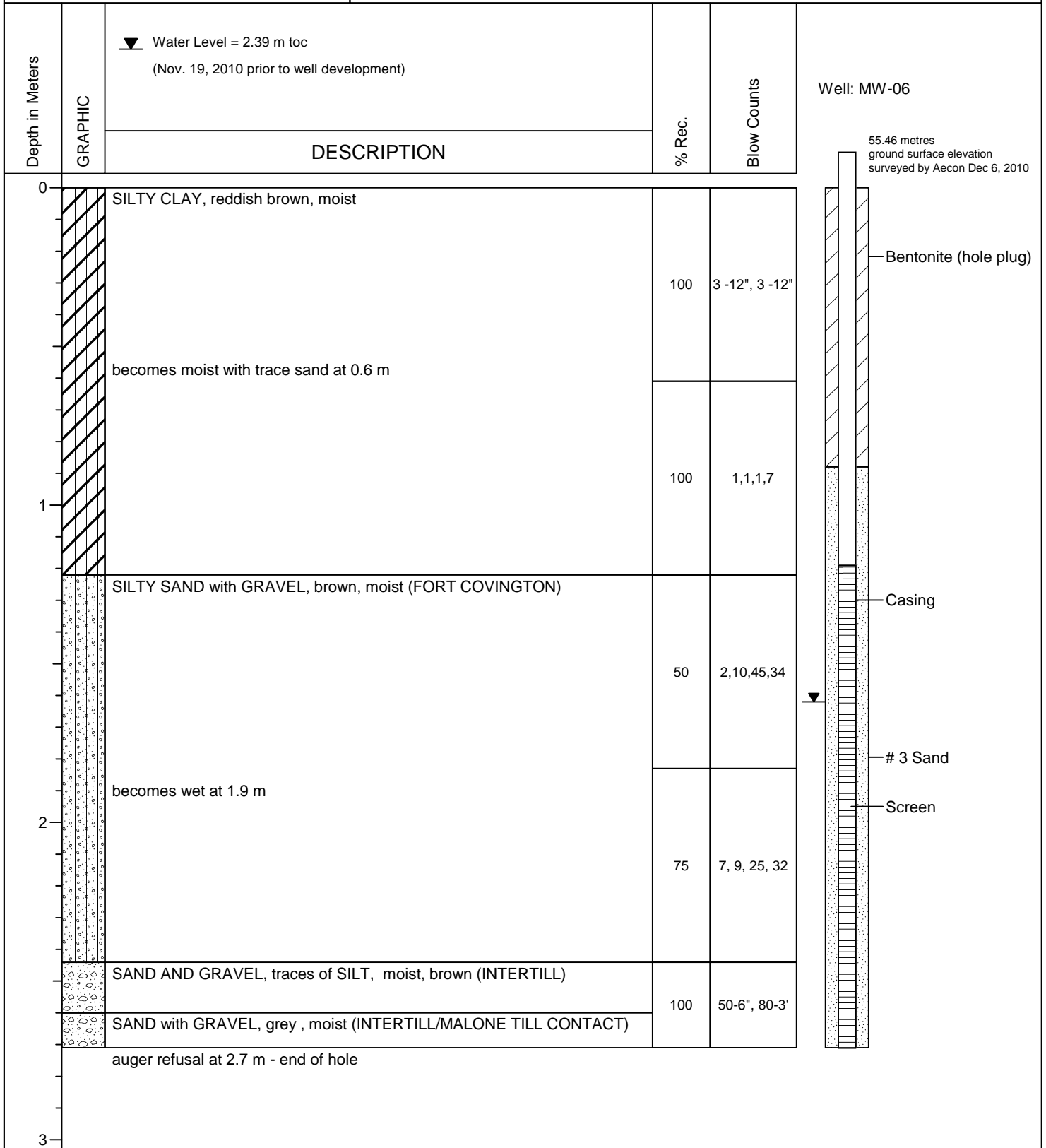
MW-06

Aecon Construction and Material
Installation of Monitoring Wells
MTO Boundary Road

Project # 10106125

Date Completed : November 19, 2010
Site Location : Boundary Rd and Hwy 401
Drilling Method : Auger
Sampling Method : SS
Hole Diameter : 0.15

Company Rep. : GR
Borehole Location : South West of Site
Logged By : GR
Easting : 524355 m
Northing : 4989961 m





APPENDIX C

Results of Field and Laboratory Chemical and Physical Analyses

(November 2010 to August 2015)

Appendix C-I – Pan Lysimeter Monitoring Locations

Appendix C-II – Groundwater Monitoring Locations

Appendix C-III – Surface Water Monitoring Locations



Appendix C-I – Pan Lysimeter Monitoring Locations

Parameter	Unit	(2) (1) ODWQS(169/ 03)-Health	(4) (3) ODWQS- AO	Construction PL1								Post-Construction PL1			
				14-Jun-2012 ⁽⁶⁾	17-Sep-2012 ⁽⁶⁾	18-Dec-2012 ⁽⁶⁾	11-Apr-2013 ⁽⁶⁾	05-Jul-2013 ⁽⁶⁾	21-Oct-2013 ⁽⁶⁾	03-Feb-2014 ⁽⁶⁾	26-May-2014 ⁽⁶⁾	09-Oct-2014 ⁽⁶⁾	24-Mar-2015 ⁽⁶⁾	17-Jun-2015 ⁽⁶⁾	27-Aug-2015 ⁽⁶⁾
				p-1	p1	1	p1	p1	p1	p1	p1	1	1	1	22
General Chemistry															
Alkalinity (Total as CaCO3)	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia, unionized	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia Nitrogen	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonium	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bicarbonate	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbonate (CO3)	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	color unit	--	5	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity	uS/cm	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity (Field)	uS/cm	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	mg/l	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness, Calcium Carbonate	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate as N	mg/l	10	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite as N	mg/l	1	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH (Field)	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	mg/l	--	500 ⁽⁸⁾	--	--	--	--	--	--	--	--	--	--	--	--
Temperature (Field)	deg c	--	15	--	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Suspended Solids	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	ntu	--	5 ⁽⁹⁾	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity (Field)	ntu	--	5 ⁽⁹⁾	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic, dissolved	mg/l	0.025	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium, dissolved	mg/l	1	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron, dissolved	mg/l	5	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium, dissolved	mg/l	0.005	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, dissolved	mg/l	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper, dissolved	mg/l	--	1	--	--	--	--	--	--	--	--	--	--	--	--
Iron, dissolved	mg/l	--	0.3	--	--	--	--	--	--	--	--	--	--	--	--
Lead, dissolved	mg/l	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese, dissolved	mg/l	--	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium, dissolved	mg/l	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium, dissolved	mg/l	--	200 ⁽¹⁰⁾	--	--	--	--	--	--	--	--	--	--	--	--
Strontium, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium, dissolved	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc, dissolved	mg/l	--	5	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons															
Benzene	mg/l	0.005	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	mg/l	--	0.0024	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTEX	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	mg/l	--	0.024	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	mg/l	--	0.3	--	--	--	--	--	--	--	--	--	--	--	--

Parameter	Unit	(2) (1) ODWQS(169/ 03)-Health	(4) (3) ODWQS- AO	Construction PL1								Post-Construction PL1			
				14-Jun-2012 ⁽⁶⁾	17-Sep-2012 ⁽⁶⁾	18-Dec-2012 ⁽⁶⁾	11-Apr-2013 ⁽⁶⁾	05-Jul-2013 ⁽⁶⁾	21-Oct-2013 ⁽⁶⁾	03-Feb-2014 ⁽⁶⁾	26-May-2014 ⁽⁶⁾	09-Oct-2014 ⁽⁶⁾	24-Mar-2015 ⁽⁶⁾	17-Jun-2015 ⁽⁶⁾	27-Aug-2015 ⁽⁶⁾
				p-1	p1	1	p1	p1	p1	p1	p1	1	1	1	22
Semi-VOCs															
1-Methylnaphthalene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[a]anthracene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs															
1,1,1,2-Tetrachloroethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethylene	mg/l	0.014	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	mg/l	0.005	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	mg/l	0.005	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	mg/l	0.08	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloropropene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	mg/l	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethylene	mg/l	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene	mg/l	0.005	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	mg/l	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--

Parameter	Unit	(2) (1) ODWQS(169/ 03)-Health	(4) (3) ODWQS- AO	Construction PL2								Post-Construction PL2			
				14-Jun-2012 ⁽¹²⁾	17-Sep-2012 ⁽⁶⁾	18-Dec-2012 ⁽¹³⁾	11-Apr-2013 ⁽¹⁴⁾	05-Jul-2013 ⁽¹⁵⁾	21-Oct-2013 ⁽¹⁶⁾	03-Feb-2014 ⁽¹⁶⁾	26-May-2014	09-Oct-2014 ⁽¹⁷⁾	24-Mar-2015	17-Jun-2015 ⁽¹⁸⁾	27-Aug-2015 ⁽¹⁸⁾
				P-1	p12	P-3	PL-1	P-2	P - 3	P-1	PL - 2	PL - 2	PL-3	P-3	PL-3
General Chemistry															
Alkalinity (Total as CaCO3)	mg/l	--	--	160	--	454	470	333	383	238	257	302	294	340	329
Ammonia, unionized	mg/l	--	--	0.05	--	0.06	<0.02	0.02	0.03	<0.02	<0.02	0.05	<0.02	<0.05	<0.02
Ammonia Nitrogen	mg/l	--	--	1.28	--	5.31	1.83	1.87	2.40	1.21	1.09	1.27	1.41	0.79	0.862
Ammonium	mg/l	--	--	1.23	--	5.25	1.83	1.85	2.37	1.21	1.09	1.22	1.41	0.79	0.86
Bicarbonate	mg/l	--	--	160	--	454	470	333	383	238	257	302	294	340	329
Bromide	mg/l	--	--	10.2	--	12.0	<1.25	2.09	1.60	<2.50	3.56	<1.25	3.44	<1.25	<2.5
Carbonate (CO3)	mg/l	--	--	<1 ⁽⁷⁾	--	<1 ⁽⁷⁾	<1 ⁽⁷⁾	<1 ⁽⁷⁾	<1 ⁽⁷⁾	<1 ⁽⁷⁾	<1 ⁽⁷⁾	<1 ⁽⁷⁾	<1 ⁽⁷⁾	<1 ⁽⁷⁾	<1 ⁽⁷⁾
Color	color unit	--	5	72	--	33	11	10	17	8	8	8	6	10	7
Conductivity	uS/cm	--	--	1480	--	8230	26800	15500	12600	13700	13600	11300	12700	14400	14100
Conductivity (Field)	uS/cm	--	--	1505	--	>5000	>4000	>3999	>4000	3140	>5000	>5000	>5000	>5000	>5000
Fluoride	mg/l	1.5	--	0.69	--	0.25	0.10	0.20	0.22	0.22	0.20	0.21	0.20	0.19	0.16
Hardness, Calcium Carbonate	mg/l	--	--	176	--	1390	2410	1860	1270	2480	2540	1940	2200	2320	2280
Nitrate as N	mg/l	10	--	0.90	--	<0.10	<0.10	<0.10	<0.10	<0.10	0.22	0.11	0.40	0.54	0.55
Nitrite as N	mg/l	1	--	<0.10	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	-	--	--	7.78	--	7.71	7.07	7.65	7.54	7.29	7.74	7.83	7.40	7.47	7.95
pH (Field)	-	--	--	7.8	--	7.2	7.4	7.6	7.5	7.6	7.5	7.4	7.4	7.7	7.5
Phosphorus	mg/l	--	--	0.11	--	0.04	0.19	0.02	0.14	0.03	0.03	0.06	0.04	<0.05	<0.05
Sulfate	mg/l	--	500 ⁽⁸⁾	209	--	2160	488	613	644	548	574	456	490	510	494
Temperature (Field)	deg c	--	15	15	--	6	3	17	14	8	11	9	8	13	15
Total Organic Carbon	mg/l	--	--	75	--	29.1	6.0	9.5	16.3	7.7	6.3	5.5	5.9	10.1	8.9
Total Suspended Solids	mg/l	--	--	26	--	63	464	147	237	209	17	97	75	21	40
Turbidity	ntu	--	5 ⁽⁹⁾	10.6	--	>100	85.6	>100	>100	89.6	10.0	99.0	66.0	8.0	23.4
Turbidity (Field)	ntu	--	5 ⁽⁹⁾	19.9	--	152	527	>100	>100	>100	>100	>100	>100	>100	>100
Metals															
Aluminum, dissolved	mg/l	--	--	0.02	--	<0.01	<0.1	<0.1	<0.1	<0.1	<0.01	<0.1	<0.1	<0.1	<0.1
Arsenic, dissolved	mg/l	0.025	--	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.01	<0.01	<0.01	<0.01
Barium, dissolved	mg/l	1	--	0.07	--	0.06	0.5	0.2	0.2	0.3	0.16	0.1	0.2	0.2	0.2
Beryllium, dissolved	mg/l	--	--	<0.0005	--	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.005	<0.005	<0.005	<0.005
Boron, dissolved	mg/l	5	--	0.39	--	0.70	0.3	0.4	0.3	0.4	0.45	0.5	0.5	0.4	0.3
Cadmium, dissolved	mg/l	0.005	--	<0.0001	--	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001
Calcium, dissolved	mg/l	--	--	49	--	403	754	556	374	729	747	585	649	696	679
Chromium, dissolved	mg/l	0.05	--	0.001	--	0.008	<0.05	<0.01	<0.01	<0.01	<0.001	<0.01	<0.01	<0.01	<0.01
Cobalt, dissolved	mg/l	--	--	0.0034	--	0.0051	0.005	0.002	0.006	0.004	0.0044	0.004	0.003	0.015	0.013
Copper, dissolved	mg/l	--	1	0.015	--	0.004	<0.01	<0.01	<0.01	<0.01	0.001	<0.01	<0.01	<0.01	<0.01
Iron, dissolved	mg/l	--	0.3	0.44	--	13.1	63.3	49.9	34.3	<0.3	0.04	2.9	<0.3	1.1	<0.3
Lead, dissolved	mg/l	0.01	--	0.001	--	<0.001	<0.01	<0.01	<0.01	<0.01	<0.001	<0.01	<0.01	<0.01	<0.01
Magnesium, dissolved	mg/l	--	--	13	--	94	128	114	81	159	165	116	140	141	143
Manganese, dissolved	mg/l	--	0.05	0.09	--	1.70	4.3	2.4	2.9	3.2	3.22	2.9	2.7	4.4	4.5
Molybdenum, dissolved	mg/l	--	--	0.019	--	0.007	<0.05	<0.05	<0.05	<0.05	<0.005	<0.05	<0.05	<0.05	<0.05
Nickel, dissolved	mg/l	--	--	0.022	--	0.016	<0.05	<0.05	<0.05	<0.05	0.014	<0.05	<0.05	<0.05	<0.05
Potassium, dissolved	mg/l	--	--	20	--	26	38	41	27	43	40	28	35	40	36
Selenium, dissolved	mg/l	0.01	--	<0.01	--	<0.1	<0.01	<0.01	<0.1	<0.01	<0.001	<0.01	<0.01	<0.01	<0.01
Silver, dissolved	mg/l	--	--	<0.0001	--	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001
Sodium, dissolved	mg/l	--	200 ⁽¹⁰⁾	191	--	1410	6560	2900	1910	2020	2080	1620	2060	2250	2180
Strontium, dissolved	mg/l	--	--	6.66	--	9.08	34.4	25.5	19.0	38.0	43.7	28.4	31.4	26.7	25.7
Thallium, dissolved	mg/l	--	--	<0.0001	--	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001
Titanium, dissolved	mg/l	--	--	<0.01	--	<0.01	<0.1	<0.1	<0.1	<0.1	<0.01	<0.1	<0.1	<0.1	<0.1
Vanadium, dissolved	mg/l	--	--	<0.001	--	0.002	<0.01	<0.01	<0.01	<0.01	<0.001	<0.01	<0.01	<0.01	<0.01
Zinc, dissolved	mg/l	--	5	0.12	--	<0.01	<0.1	<0.1	<0.1	<0.1	<0.01	<0.1	<0.1	<0.1	<0.1
Petroleum Hydrocarbons															
Benzene	mg/l	0.005	--	<0.0005	--	0.0510	0.0017	0.0113	0.0108	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/l	--	0.0024	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
m,p-Xylenes	mg/l	--	--	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004
o-Xylene	mg/l	--	--	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	--	--	<0.1	--	--	--	<0.1	--	--	<0.02	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	<0.1	--	--	--	--	--	--	<0.1	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	--	--	--	<0.1	--	--	--	<0.1	--	--	0.03	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	--	--	--	0.3	--	--	--	<0.2	--	--	<0.05	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	--	--	--	<0.2	--	--	--	<0.2	--	--	<0.05	--
Toluene	mg/l	--	0.024	<0.0005	--	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005
Xylenes, Total	mg/l	--	0.3	<0.0010	--	--	<0.0010	--	--	--	<0.0010	--	--	<0.0010	--

Parameter	Unit	(2) (1)	(4) (3)	Construction PL2								Post-Construction PL2			
		ODWQS(169/ 03)-Health	ODWQS- AO	14-Jun-2012 ⁽¹²⁾	17-Sep-2012 ⁽⁶⁾	18-Dec-2012 ⁽¹³⁾	11-Apr-2013 ⁽¹⁴⁾	05-Jul-2013 ⁽¹⁵⁾	21-Oct-2013 ⁽¹⁶⁾	03-Feb-2014 ⁽¹⁶⁾	26-May-2014	09-Oct-2014 ⁽¹⁷⁾	24-Mar-2015	17-Jun-2015 ⁽¹⁸⁾	27-Aug-2015 ⁽¹⁸⁾
				P-1	pl2	P-3	PL-1	P-2	P - 3	P-1	PL - 2	PL - 2	PL-3	P-3	PL-3
Semi-VOCs															
1-Methylnaphthalene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
2-Methylnaphthalene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Acenaphthene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Acenaphthylene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Anthracene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Benzo[a]anthracene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	--	--	--	0.00001	--	--	--	--	--	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	--	--	--	<0.00005	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	--	--	--	<0.00005	--	--	--	--	--	--	--	--
Chrysene	mg/l	--	--	--	--	--	<0.00005	--	--	--	--	--	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Fluoranthene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Fluorene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Naphthalene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Phenanthrene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Pyrene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Styrene	mg/l	--	--	<0.0005	--	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
VOCs															
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	--	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
1,2-Dibromoethane	mg/l	--	--	<0.0002	--	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	--	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
1,2-Dichloroethane	mg/l	0.005	--	<0.0002	--	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
1,2-Dichloropropane	mg/l	--	--	<0.0005	--	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	--	--	<0.0003	--	--	--	<0.0003	--	--	<0.0003	--
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	--	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	--	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
Bromodichloromethane	mg/l	--	--	<0.0003	--	--	<0.0003	--	--	--	<0.0003	--	--	<0.0003	--
Bromoform	mg/l	--	--	<0.0004	--	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
Bromomethane	mg/l	--	--	<0.0005	--	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
Carbon Tetrachloride	mg/l	0.005	--	<0.0002	--	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
Chlorobenzene	mg/l	0.08	0.03	<0.0002	--	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
Chloroethane	mg/l	--	--	<0.0002	--	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
Chloroform	mg/l	--	--	<0.0005	--	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
Chloromethane	mg/l	--	--	<0.0002	--	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	--	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
Dibromochloromethane	mg/l	--	--	<0.0003	--	--	<0.0003	--	--	--	<0.0003	--	--	<0.0003	--
Dichlorodifluoromethane	mg/l	--	--	<0.0005	--	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
Methylene Chloride	mg/l	0.05	--	<0.0040	--	--	<0.0040	--	--	--	<0.0040	--	--	<0.0040	--
Tetrachloroethylene	mg/l	0.03	--	<0.0003	--	--	<0.0005	--	--	--	<0.0003	--	--	0.0004	--
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	--	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
Trichloroethene	mg/l	0.005	--	<0.0003	--	--	<0.0003	--	--	--	<0.0003	--	--	<0.0003	--
Trichlorofluoromethane	mg/l	--	--	<0.0005	--	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
Vinyl Chloride	mg/l	0.002	--	<0.0002	--	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--

Parameter	Unit	(2) (1) ODWQS(169 /03)-Health	(4) (2) ODWQS- AO	Construction PL3								Post-Construction PL3			
				14-Jun-2012 (25)	17-Sep-2012 (21)	18-Dec-2012 (13)	11-Apr-2013 (14)	05-Jul-2013 (15)	21-Oct-2013 (21)	03-Feb-2014 (22)	26-May-2014	09-Oct-2014	24-Mar-2015	17-Jun-2015 (18)	27-Aug-2015 (18)
				P-2	P-1	P-1	PL-3	P-1	P-1	P-3	PL-1	PL-3	PL-2	P-1	PL-1
General Chemistry															
Alkalinity (Total as CaCO3)	mg/l	--	--	108	404	525	333	410	557	320	469	448	296	308	343
Ammonia, unionized	mg/l	--	--	0.03	0.04	0.08	<0.02	<0.02	0.08	<0.02	<0.02	0.04	<0.02	<0.05	<0.02
Ammonia Nitrogen	mg/l	--	--	0.84	9.55	6.95	2.48	0.94	1.99	1.21	0.62	0.97	1.82	1.79	1.53
Ammonium	mg/l	--	--	0.81	9.51	6.87	2.48	0.94	1.91	1.21	0.62	0.93	1.82	1.79	1.53
Bicarbonate	mg/l	--	--	108	404	525	333	410	557	320	469	448	296	308	343
Bromide	mg/l	--	--	4.15	16.6	13.0	<1.25	0.70	1.46	<2.50	1.30	<0.25	<1.25	<5	<5
Carbonate (CO3)	mg/l	--	--	<1 (7)	<1 (7)	<1 (7)	<1 (7)	<1 (7)	<1 (7)	<1 (7)	<1 (7)	<1 (7)	<1 (7)	<1 (7)	<1 (7)
Color	color unit	--	5	42	30	29	15	10	13	13	13	10	6	7	8
Conductivity	uS/cm	--	--	1660	11200	9910	16500	10600	3040	20300	5680	4640	30800	30100	21700
Conductivity (Field)	uS/cm	--	--	1595	1805	>5000	>4000	>3999	>4000	>5000	>5000	>5000	>5000	>5000	>5000
Fluoride	mg/l	1.5	--	0.24	0.17	0.20	0.20	0.19	0.23	0.11	0.37	0.31	<0.10	0.10	0.12
Hardness, Calcium Carbonate	mg/l	--	--	190	1870	1630	2260	1100	416	3060	801	601	3030	2840	2330
Nitrate as N	mg/l	10	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrite as N	mg/l	1	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	-	--	--	7.90	7.04	7.32	7.08	7.70	7.82	7.03	7.61	7.85	6.82	7.15	7.67
pH (Field)	-	--	--	7.9	8.0	7.3	7.5	7.6	7.5	7.7	7.4	7.3	7.3	7.6	7.4
Phosphorus	mg/l	--	--	2.66	0.52	0.47	0.03	0.24	0.35	0.27	0.10	0.13	0.04	0.96	0.30
Sulfate	mg/l	--	500 (8)	103	1840	2510	700	491	345	547	309	268	664	672	577
Temperature (Field)	deg c	--	15	15	16	5	3	15	12	8	11	8	8	13	16
Total Organic Carbon	mg/l	--	--	42.6	54.3	32.1	9.7	10.4	77.4	20.0	10.6	12.1	4.0	7.4	7.7
Total Suspended Solids	mg/l	--	--	1760	982	663	196	332	8600	1590	408	670	890	1350	1100
Turbidity	ntu	--	5 (9)	30.5	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
Turbidity (Field)	ntu	--	5 (9)	45	62	128	450	>100	>100	>100	>100	>100	>100	>100	>100
Metals															
Aluminum, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.1	<0.1	<0.01	<0.1	<0.01	<0.01	<0.1	<0.1	<0.1
Arsenic, dissolved	mg/l	0.025	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.01	<0.01	<0.01
Barium, dissolved	mg/l	1	--	0.07	0.14	0.07	0.3	0.1	0.09	0.4	0.10	0.10	0.5	0.2	0.2
Beryllium, dissolved	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.005	<0.005	<0.005
Boron, dissolved	mg/l	5	--	0.12	0.88	0.81	0.5	0.4	0.45	0.2	0.18	0.30	0.3	0.2	0.2
Cadmium, dissolved	mg/l	0.005	--	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.001	<0.0001	<0.0001	<0.001	<0.001	<0.001
Calcium, dissolved	mg/l	--	--	58	518	452	660	309	117	966	240	183	946	915	722
Chromium, dissolved	mg/l	0.05	--	<0.001	<0.005	<0.005	<0.05	<0.01	<0.005	<0.01	<0.001	<0.001	<0.01	<0.01	<0.01
Cobalt, dissolved	mg/l	--	--	0.0027	0.0048	0.0026	0.003	<0.002	0.0003	0.003	0.0004	0.0002	<0.002	<0.002	<0.002
Copper, dissolved	mg/l	--	1	0.003	0.005	0.004	<0.01	<0.01	0.001	<0.01	<0.001	<0.001	<0.01	<0.01	<0.01
Iron, dissolved	mg/l	--	0.3	0.45	84.8	58.1	58.7	52.7	17.7	36.4	46.8	19.9	8.8	23.4	25.0
Lead, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.01	<0.01	<0.001	<0.01	<0.001	<0.001	<0.01	<0.01	<0.01
Magnesium, dissolved	mg/l	--	--	11	139	121	148	79	30	158	49	35	163	135	129
Manganese, dissolved	mg/l	--	0.05	0.62	1.55	1.64	3.2	1.1	0.28	3.5	0.70	0.32	2.6	2.4	2.0
Molybdenum, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.05	<0.05	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.05
Nickel, dissolved	mg/l	--	--	0.010	0.019	0.009	<0.05	<0.05	<0.005	<0.05	<0.005	<0.005	<0.05	<0.05	<0.05
Potassium, dissolved	mg/l	--	--	10	26	30	48	19	10	36	8	9	38	41	32
Selenium, dissolved	mg/l	0.01	--	<0.01	<0.001	<0.1	<0.1	<0.01	<0.001	<0.01	<0.001	<0.001	<0.01	<0.01	<0.01
Silver, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.001	<0.0001	<0.0001	<0.001	<0.001	<0.001
Sodium, dissolved	mg/l	--	200 (10)	224	2060	1710	3470	2000	419	3420	978	767	6540	5560	4550
Strontium, dissolved	mg/l	--	--	3.02	8.20	8.71	32.1	13.7	5.19	37.6	5.93	4.94	33.3	31.3	21.2
Thallium, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.001	<0.0001	<0.0001	<0.001	<0.001	<0.001
Titanium, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.1	<0.1	<0.01	<0.1	<0.01	<0.01	<0.1	<0.1	<0.1
Vanadium, dissolved	mg/l	--	--	<0.001	0.003	0.004	<0.01	<0.01	0.005	<0.01	<0.001	<0.001	<0.01	<0.01	<0.01
Zinc, dissolved	mg/l	--	5	0.03	<0.01	<0.01	<0.1	<0.1	<0.01	<0.1	<0.01	<0.01	<0.1	<0.1	<0.1
Petroleum Hydrocarbons															
Benzene	mg/l	0.005	--	<0.0005	0.0339	0.0127	0.0115	0.0078	0.0080	<0.0005	0.0038	0.0020	0.012	0.0016	0.0024
Ethylbenzene	mg/l	--	0.0024	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
m,p-Xylenes	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004
o-Xylene	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	--	--	<0.1	--	--	<0.1	<0.1	--	--	<0.02	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTEX	mg/l	--	--	<0.1	--	--	--	--	--	<0.1	<0.1	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	--	--	--	<0.1	--	--	--	<0.1	--	--	0.04	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	--	--	--	<0.2	--	--	--	<0.2	--	--	0.05	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	--	--	--	<0.2	--	--	--	<0.2	--	--	<0.05	--
Toluene	mg/l	--	0.024	<0.0005	<0.0005	0.0006	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005
Xylenes, Total	mg/l	--	0.3	<0.0010	<0.0010	--	<0.0010	--	--	--	<0.0010	--	<0.0010	<0.0005	--

Parameter	Unit	(2) (1)	(4) (2)	Construction PL3								Post-Construction PL3			
		ODWQS(169 /03)-Health	ODWQS-AO	14-Jun-2012 ⁽²⁵⁾	17-Sep-2012 ⁽²¹⁾	18-Dec-2012 ⁽¹³⁾	11-Apr-2013 ⁽¹⁴⁾	05-Jul-2013 ⁽¹⁵⁾	21-Oct-2013 ⁽²¹⁾	03-Feb-2014 ⁽²²⁾	26-May-2014	09-Oct-2014	24-Mar-2015	17-Jun-2015 ⁽¹⁸⁾	27-Aug-2015 ⁽¹⁸⁾
				P-2	P-1	P-1	PL-3	P-1	P - 1	P-3	PL - 1	PL - 3	PL-2	P-1	PL-1
Semi-VOCs															
1-Methylnaphthalene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
2-Methylnaphthalene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Acenaphthene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Acenaphthylene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Anthracene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Benzo[a]anthracene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	--	--	--	<0.00001	--	--	--	--	--	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	--	--	--	<0.00005	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	--	--	--	<0.00005	--	--	--	--	--	--	--	--
Chrysene	mg/l	--	--	--	--	--	<0.00005	--	--	--	--	--	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Fluoranthene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Fluorene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Naphthalene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Phenanthrene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Pyrene	mg/l	--	--	--	--	--	<0.0001	--	--	--	--	--	--	--	--
Styrene	mg/l	--	--	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
VOCs															
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethane	mg/l	--	--	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
1,2-Dibromoethane	mg/l	--	--	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
1,2-Dichloroethane	mg/l	0.005	--	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
1,2-Dichloropropane	mg/l	--	--	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	<0.0003	--	<0.0003	--	--	--	<0.0003	--	--	<0.0003	--
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
Bromodichloromethane	mg/l	--	--	<0.0003	<0.0003	--	<0.0003	--	--	--	<0.0003	--	--	<0.0003	--
Bromoform	mg/l	--	--	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
Bromomethane	mg/l	--	--	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
Carbon Tetrachloride	mg/l	0.005	--	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
Chlorobenzene	mg/l	0.08	0.03	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
Chloroethane	mg/l	--	--	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
Chloroform	mg/l	--	--	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
Chloromethane	mg/l	--	--	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
Dibromochloromethane	mg/l	--	--	<0.0003	<0.0003	--	<0.0003	--	--	--	<0.0003	--	--	<0.0003	--
Dichlorodifluoromethane	mg/l	--	--	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
Methylene Chloride	mg/l	0.05	--	<0.0040	<0.0040	--	<0.0040	--	--	--	<0.0040	--	--	<0.0040	--
Tetrachloroethylene	mg/l	0.03	--	<0.0003	0.0006	--	0.0005	--	--	--	0.0006	--	--	<0.0003	--
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004	--	--	<0.0004	--
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--
Trichloroethene	mg/l	0.005	--	<0.0003	<0.0003	--	<0.0003	--	--	--	0.0005	--	--	0.0007	--
Trichlorofluoromethane	mg/l	--	--	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005	--	--	<0.0005	--
Vinyl Chloride	mg/l	0.002	--	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002	--	--	<0.0002	--

Parameter	Unit	(2) (1) ODWQS(169 /03)-Health	(4) (3) ODWQS- AO	Construction PL4								Post-Construction PL4			
				14-Jun-2012 ⁽²⁾	17-Sep-2012 ⁽²⁾	18-Dec-2012 ⁽²⁾	11-Apr-2013 ⁽²⁾	05-Jul-2013 ⁽²⁾	21-Oct-2013 ⁽²⁾	03-Feb-2014 ⁽²⁾	26-May-2014 ⁽²⁾	09-Oct-2014 ⁽²⁾	24-Mar-2015 ⁽²⁾	17-Jun-2015 ⁽²⁾	27-Aug-2015 ⁽²⁾
				P-3	p3	4	p4	p4	p4	p4	p4	4	4	4	44
General Chemistry															
Alkalinity (Total as CaCO3)	mg/l	--	--	96	--	--	--	--	--	--	--	--	--	--	--
Ammonia, unionized	mg/l	--	--	0.02	--	--	--	--	--	--	--	--	--	--	--
Ammonia Nitrogen	mg/l	--	--	0.09	--	--	--	--	--	--	--	--	--	--	--
Ammonium	mg/l	--	--	0.07	--	--	--	--	--	--	--	--	--	--	--
Bicarbonate	mg/l	--	--	90	--	--	--	--	--	--	--	--	--	--	--
Bromide	mg/l	--	--	0.84	--	--	--	--	--	--	--	--	--	--	--
Carbonate (CO3)	mg/l	--	--	5	--	--	--	--	--	--	--	--	--	--	--
Color	color unit	--	5	34	--	--	--	--	--	--	--	--	--	--	--
Conductivity	uS/cm	--	--	1010	--	--	--	--	--	--	--	--	--	--	--
Conductivity (Field)	uS/cm	--	--	1080	--	--	--	--	--	--	--	--	--	--	--
Fluoride	mg/l	1.5	--	1.04	--	--	--	--	--	--	--	--	--	--	--
Hardness, Calcium Carbonate	mg/l	--	--	41	--	--	--	--	--	--	--	--	--	--	--
Nitrate as N	mg/l	10	--	2.97	--	--	--	--	--	--	--	--	--	--	--
Nitrite as N	mg/l	1	--	1.91	--	--	--	--	--	--	--	--	--	--	--
pH	-	--	--	8.79	--	--	--	--	--	--	--	--	--	--	--
pH (Field)	-	--	--	8.6	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	mg/l	--	--	0.24	--	--	--	--	--	--	--	--	--	--	--
Sulfate	mg/l	--	500 ⁽²⁾	177	--	--	--	--	--	--	--	--	--	--	--
Temperature (Field)	deg c	--	15	14	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	mg/l	--	--	1.5	--	--	--	--	--	--	--	--	--	--	--
Total Suspended Solids	mg/l	--	--	68	--	--	--	--	--	--	--	--	--	--	--
Turbidity	ntu	--	5 ⁽²⁾	>100	--	--	--	--	--	--	--	--	--	--	--
Turbidity (Field)	ntu	--	5 ⁽²⁾	99	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum, dissolved	mg/l	--	--	0.05	--	--	--	--	--	--	--	--	--	--	--
Arsenic, dissolved	mg/l	0.025	--	<0.01	--	--	--	--	--	--	--	--	--	--	--
Barium, dissolved	mg/l	1	--	0.03	--	--	--	--	--	--	--	--	--	--	--
Beryllium, dissolved	mg/l	--	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
Boron, dissolved	mg/l	5	--	0.37	--	--	--	--	--	--	--	--	--	--	--
Cadmium, dissolved	mg/l	0.005	--	<0.0001	--	--	--	--	--	--	--	--	--	--	--
Calcium, dissolved	mg/l	--	--	8	--	--	--	--	--	--	--	--	--	--	--
Chromium, dissolved	mg/l	0.05	--	0.002	--	--	--	--	--	--	--	--	--	--	--
Cobalt, dissolved	mg/l	--	--	<0.0002	--	--	--	--	--	--	--	--	--	--	--
Copper, dissolved	mg/l	--	1	0.001	--	--	--	--	--	--	--	--	--	--	--
Iron, dissolved	mg/l	--	0.3	<0.03	--	--	--	--	--	--	--	--	--	--	--
Lead, dissolved	mg/l	0.01	--	<0.001	--	--	--	--	--	--	--	--	--	--	--
Magnesium, dissolved	mg/l	--	--	5	--	--	--	--	--	--	--	--	--	--	--
Manganese, dissolved	mg/l	--	0.05	<0.01	--	--	--	--	--	--	--	--	--	--	--
Molybdenum, dissolved	mg/l	--	--	0.018	--	--	--	--	--	--	--	--	--	--	--
Nickel, dissolved	mg/l	--	--	<0.005	--	--	--	--	--	--	--	--	--	--	--
Potassium, dissolved	mg/l	--	--	13	--	--	--	--	--	--	--	--	--	--	--
Selenium, dissolved	mg/l	0.01	--	<0.01	--	--	--	--	--	--	--	--	--	--	--
Silver, dissolved	mg/l	--	--	<0.0001	--	--	--	--	--	--	--	--	--	--	--
Sodium, dissolved	mg/l	--	200 ⁽²⁾	161	--	--	--	--	--	--	--	--	--	--	--
Strontium, dissolved	mg/l	--	--	2.80	--	--	--	--	--	--	--	--	--	--	--
Thallium, dissolved	mg/l	--	--	<0.0001	--	--	--	--	--	--	--	--	--	--	--
Titanium, dissolved	mg/l	--	--	<0.01	--	--	--	--	--	--	--	--	--	--	--
Vanadium, dissolved	mg/l	--	--	0.001	--	--	--	--	--	--	--	--	--	--	--
Zinc, dissolved	mg/l	--	5	<0.01	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons															
Benzene	mg/l	0.005	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	mg/l	--	0.0024	<0.0005	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	mg/l	--	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	mg/l	--	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTEX	mg/l	--	--	<0.1	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	mg/l	--	0.024	<0.0005	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	mg/l	--	0.3	<0.0010	--	--	--	--	--	--	--	--	--	--	--

Parameter	Unit	(2) (1)	(4) (3)	Construction PL4								Post-Construction PL4			
		ODWQS(169 /03)-Health	ODWQS-AO	14-Jun-2012 ⁽²⁾	17-Sep-2012 ⁽²⁾	18-Dec-2012 ⁽²⁾	11-Apr-2013 ⁽²⁾	05-Jul-2013 ⁽²⁾	21-Oct-2013 ⁽²⁾	03-Feb-2014 ⁽²⁾	26-May-2014 ⁽²⁾	09-Oct-2014 ⁽²⁾	24-Mar-2015 ⁽²⁾	17-Jun-2015 ⁽²⁾	27-Aug-2015 ⁽²⁾
				P-3	p3	4	p4	p4	p4	p4	p4	4	4	4	44
Semi-VOCs															
1-Methylnaphthalene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[a]anthracene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	mg/l	--	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
VOCs															
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	mg/l	--	--	<0.0004	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	mg/l	--	--	<0.0002	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	mg/l	0.005	--	<0.0002	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	mg/l	--	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	mg/l	--	--	<0.0003	--	--	--	--	--	--	--	--	--	--	--
Bromoform	mg/l	--	--	<0.0004	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	mg/l	--	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	mg/l	0.005	--	<0.0002	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	mg/l	0.08	0.03	<0.0002	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	mg/l	--	--	<0.0002	--	--	--	--	--	--	--	--	--	--	--
Chloroform	mg/l	--	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	mg/l	--	--	<0.0002	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	mg/l	--	--	<0.0003	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	mg/l	--	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	mg/l	0.05	--	<0.0040	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethylene	mg/l	0.03	--	<0.0003	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene	mg/l	0.005	--	<0.0003	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	mg/l	--	--	<0.0005	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	mg/l	0.002	--	<0.0002	--	--	--	--	--	--	--	--	--	--	--

Footnotes:

Tables should be read in conjunction with the accompanying document.

< value = Indicates parameter not detected above laboratory method detection limit.

> value = Indicates parameter detected above equipment analytical range.

-- Chemical not analyzed or criteria not defined.

Grey background indicates exceedances.

(1) Ontario Drinking Water Quality Standards - Health Based Standards (June 2003, revised June 2006).

(2) Bold Font = Parameter concentration greater than ODWQS(169/03)-Health

(3) Ontario Drinking Water Quality Standards - Aesthetic Objectives. Aesthetic Objectives are established for parameters that may impair the taste, odour or colour of water or which may interfere with good water quality control practices. For certain parameters, both aesthetic objectives and health-related MACs have been derived (June 2003, revised June 2006).

(4) Underlined Font = Parameter concentration greater than ODWQS-AO

(5) Metals MRL elevated due to matrix interference.

(6) Monitoring location was dry during this sampling event. No sample was collected.

(7) Not available - pH < 8.3

(8) There may be a laxative effect in some individuals when sulphate levels exceed 500 mg/L.

(9) Applicable for all waters at the point of consumption.

(10) The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

(11) Selenium MRL elevated due to matrix interference.

(12) Arsenic and Selenium MRL elevated due to matrix interference.

(13) Arsenic and Selenium MRL elevated due to matrix interference (dilution was done).

(14) Metals and Br MRL elevated due to matrix interference (dilution was done).

(15) Metals MRL elevated due to high conductivity (dilution was done).

(16) Metals MRL elevated due to high conductivity (dilution was done). Br MRL elevated due to matrix interference (dilution was done).

(17) Br MRL elevated due to matrix interference (dilution was done). Metals MRL elevated due to high conductivity (dilution was done).

(18) Metals MRLs elevated due to matrix interference (10x dilution was done). Bromide MRL elevated due to matrix interference (dilution was done).

(19) No result value available.

(20) TOC was not shaken prior to analysis due to sediment content. Arsenic and Selenium MRL elevated due to matrix interference.

(21) Arsenic MRL elevated due to matrix interference (dilution was done).

(22) Metals MRL elevated due to high conductivity (dilution was done). Br MRL elevated due to matrix interference (dilution was done).

(23) TOC was not shaken prior to analysis due to sediment content. Arsenic and Selenium MRL elevated due to matrix interference.



Appendix C-II – Groundwater Monitoring Locations

Parameter	Unit	(2) (1) ODWQS(169/03) Health	(4) (3) ODWQS- AO	MW 01 Pre-Construction				MW 01 Construction							
				26-Nov-2010	28-Feb-2011 (6)	07-Apr-2011 (6)	11-May-2012	14-Jun-2012 (7)	17-Sep-2012	18-Dec-2012	11-Apr-2013	05-Jul-2013	21-Oct-2013	03-Feb-2014 (8)	26-May-2014
				S-1	S-2	S-2	S-2	S-2	S-4	S-4	S-6	S-5	S-6	S-1	MW-1
General Chemistry															
Alkalinity (Total as CaCO3)	mg/l	--	--	424	434	426	398	378	372	363	399	383	404	419	408
Ammonia, unionized	mg/l	--	--	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Ammonia Nitrogen	mg/l	--	--	0.24	0.05	0.08	0.18	0.13	0.06	0.07	0.06	0.06	0.06	0.08	0.06
Ammonium	mg/l	--	--	0.24	0.05	0.08	0.18	0.13	0.06	0.07	0.06	0.06	0.06	0.08	0.06
Bicarbonate	mg/l	--	--	424	434	426	398	378	372	363	399	383	404	419	408
Bromide	mg/l	--	--	<0.25	<0.25	<0.25	0.48	<0.25	0.34	<0.25	<0.25	<0.25	<0.25	<0.50	0.32
Carbonate (CO3)	mg/l	--	--	<2 (10)	<2 (10)	<2 (10)	<1 (10)	<1 (10)	<1 (10)	<1 (10)	<1 (10)	<1 (10)	<1 (10)	<1 (10)	<1 (10)
Color	color unit	--	5	8	<2	7	4	11	12	10	6	8	7	4	12
Conductivity	uS/cm	--	--	2890	2850	--	2670	1990	1970	2030	2550	2110	2420	2820	2180
Conductivity (Field)	uS/cm	--	--	2280	2410	2640	2760	1980	2005	2080	2505	2180	2005	2205	1970
Fluoride	mg/l	1.5	--	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	0.14	0.11	0.27
Hardness, Calcium Carbonate	mg/l	--	--	647	695	682	665	446	570	555	678	578	545	669	556
Nitrate as N	mg/l	10	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrite as N	mg/l	1	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	-	--	--	--	7.53	--	7.69	7.83	7.55	7.72	7.72	7.82	7.75	7.59	7.86
pH (Field)	-	--	--	6.66	7.25	7.26	7.25	7.7	7.6	7.8	7.4	7.8	7.6	7.8	7.5
Phosphorus	mg/l	--	--	5.51	1.83	3.97	1.06	1.77	0.88	3.80	2.30	1.08	1.97	6.71	1.54
Sulfate	mg/l	--	500 (11)	90	72	62	74	56	99	77	75	57	75	73	58
Temperature (Field)	deg c	--	15	8.2	6.2	7.0	9	13	13	6	4	12	8	5	8
Total Organic Carbon	mg/l	--	--	9.4	4.2	4.4	3.1	4.5	5.8	4.7	3.4	5.2	7.0	4.7	4.2
Total Suspended Solids	mg/l	--	--	5510	5430	5380	2500	969	988	1110	1290	587	1580	1050	691
Turbidity	ntu	--	5 (12)	>100	>100	--	<0.1	>100	>100	>100	17.1 (13)	>100	>100	>100	>100
Turbidity (Field)	ntu	--	5 (12)	--	--	--	239	140	162	204	-- (13)	>100	>100	>100	>100
Metals															
Aluminum, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic, dissolved	mg/l	0.025	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium, dissolved	mg/l	1	--	0.33	0.33	0.31	0.28	0.23	0.26	0.27	0.27	0.22	0.25	0.30	0.23
Beryllium, dissolved	mg/l	--	--	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron, dissolved	mg/l	5	--	0.03	0.02	0.02	0.03	0.03	0.06	0.03	0.03	0.04	0.04	0.03	0.05
Cadmium, dissolved	mg/l	0.005	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcium, dissolved	mg/l	--	--	185	204	207	189	129	169	163	194	167	154	192	160
Chromium, dissolved	mg/l	0.05	--	0.007	<0.005	<0.005	<0.005	0.003	<0.005	0.008	0.010	0.007	0.007	0.009	<0.001
Cobalt, dissolved	mg/l	--	--	0.0030	0.0019	0.0020	0.0020	0.0021	0.0032	0.0029	0.0011	0.0019	0.0027	0.0013	0.0016
Copper, dissolved	mg/l	--	1	<0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron, dissolved	mg/l	--	0.3	<0.03	0.05	0.04	0.10	0.11	0.25	0.35	<0.03	0.12	0.23	0.06	0.10
Lead, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium, dissolved	mg/l	--	--	45	45	40	47	30	36	36	47	39	39	46	38
Manganese, dissolved	mg/l	--	0.05	1.75	1.18	1.12	1.05	0.95	1.38	1.27	0.56	0.87	0.97	0.59	0.80
Molybdenum, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel, dissolved	mg/l	--	--	0.008	0.007	0.008	0.009	0.008	0.011	0.006	0.009	0.006	0.007	0.005	<0.005
Potassium, dissolved	mg/l	--	--	3	3	2	3	2	3	3	3	3	3	5	3
Selenium, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium, dissolved	mg/l	--	200 (14)	291	297	328	281	178	178	196	329	238	238	248	242
Strontium, dissolved	mg/l	--	--	1.18	1.01	1.01	0.986	0.936	1.08	1.03	1.07	0.858	0.959	1.04	0.944
Thallium, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium, dissolved	mg/l	--	--	0.004	0.004	0.003	0.004	0.001	0.005	0.005	0.003	0.003	0.002	0.004	<0.001
Zinc, dissolved	mg/l	--	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Petroleum Hydrocarbons															
Benzene	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/l	--	0.0024	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
m,p-Xylenes	mg/l	--	--	<0.0010	<0.0010	<0.0020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
o-Xylene	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--	--	--	<0.1
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	--	<0.1	--	<0.1	<0.1	--	--	--	--	--	--	<0.1
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	--	--	--	<0.1	--	--	--	<0.1
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	<0.2	<0.2	<0.2	<0.2	--	--	--	<0.2	--	--	--	<0.2
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	<0.2	<0.2	<0.2	<0.2	--	--	--	<0.2	--	--	--	<0.2
Toluene	mg/l	--	0.024	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Xylenes, Total	mg/l	--	0.3	--	<0.0015	<0.003	<0.0010	<0.0010	<0.0010	--	<0.0010	--	--	--	<0.0010

Parameter	Unit	(2) (1)	(4) (3)	MW 01 Pre-Construction				MW 01 Construction							
		ODWQS(169/03) Health	ODWQS- AO	26-Nov-2010 S-1	28-Feb-2011 ⁽⁶⁾ S - 2	07-Apr-2011 ⁽⁶⁾ S-2	11-May-2012 S - 2	14-Jun-2012 ⁽⁷⁾ S-2	17-Sep-2012 S-4	18-Dec-2012 S-4	11-Apr-2013 S-6	05-Jul-2013 S-5	21-Oct-2013 S - 6	03-Feb-2014 ⁽⁸⁾ S-1	26-May-2014 MW - 1
Semi-VOCs															
1-Methylnaphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--	--
2-Methylnaphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--	--
Acenaphthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--	--
Acenaphthylene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--	--
Anthracene	mg/l	--	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	<0.0001	--	--	--	--
Benzo[a]anthracene	mg/l	--	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	<0.0001	--	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	<0.00001	--	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--	--
Chrysene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--	--
Fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--	--
Fluorene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--	--
Naphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--	--
Phenanthrene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--	--
Pyrene	mg/l	--	--	<0.00002	<0.00004	0.00010	<0.00002	--	--	--	<0.0001	--	--	--	--
Styrene	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005
VOCs															
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	<0.0008	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	<0.0008	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004
1,1-Dichloroethane	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005
1,2-Dibromoethane	mg/l	--	--	<0.0010	<0.0010	<0.0020	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004
1,2-Dichloroethane	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002
1,2-Dichloropropane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--	<0.0003
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004
Bromodichloromethane	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--	<0.0003
Bromoform	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004
Bromomethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005
Carbon Tetrachloride	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002
Chlorobenzene	mg/l	0.08	0.03	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002
Chloroethane	mg/l	--	--	<0.0010	<0.0020	<0.0020	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002
Chloroform	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005
Chloromethane	mg/l	--	--	<0.0010	<0.0020	<0.0020	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002
Dibromochloromethane	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--	<0.0003
Dichlorodifluoromethane	mg/l	--	--	--	--	--	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005
Methylene Chloride	mg/l	0.05	--	<0.0040	<0.0040	<0.0080	<0.0040	<0.0040	<0.0040	--	<0.0040	--	--	--	<0.0040
Tetrachloroethylene	mg/l	0.03	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--	<0.0003
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--	<0.0004
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002
Trichloroethene	mg/l	0.005	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--	<0.0003
Trichlorofluoromethane	mg/l	--	--	<0.0005	<0.001	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--	<0.0005
Vinyl Chloride	mg/l	0.002	--	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--	<0.0002

Parameter	Unit	(2) (1) ODWQS(169/03) Health	(4) (3) ODWQS- AO	MW 01 Post-Construction			
				09-Oct-2014 MW1	24-Mar-2015 S-5	17-Jun-2015 S-7	27-Aug-2015 S-3
General Chemistry							
Alkalinity (Total as CaCO3)	mg/l	--	--	405	389	399	401
Ammonia, unionized	mg/l	--	--	<0.02	<0.02	<0.05	<0.02
Ammonia Nitrogen	mg/l	--	--	0.12	0.02	0.07	0.073
Ammonium	mg/l	--	--	0.12	0.02	0.07	0.07
Bicarbonate	mg/l	--	--	405	389	399	401
Bromide	mg/l	--	--	<0.25	0.55	<0.25	<0.25
Carbonate (CO3)	mg/l	--	--	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾
Color	color unit	--	5	7	17	7	17
Conductivity	uS/cm	--	--	2410	2540	2280	2230
Conductivity (Field)	uS/cm	--	--	1880	1835	2310	2205
Fluoride	mg/l	1.5	--	0.20	0.15	0.24	0.24
Hardness, Calcium Carbonate	mg/l	--	--	665	655	599	623
Nitrate as N	mg/l	10	--	<0.10	<0.10	<0.10	<0.10
Nitrite as N	mg/l	1	--	<0.10	<0.10	<0.10	<0.10
pH	-	--	--	7.99	7.66	7.73	7.97
pH (Field)	-	--	--	7.6	7.5	7.6	7.6
Phosphorus	mg/l	--	--	1.51	0.91	0.82	0.68
Sulfate	mg/l	--	500 ⁽¹¹⁾	96	88	110	106
Temperature (Field)	deg c	--	15	8	5	9	12
Total Organic Carbon	mg/l	--	--	4.2	3.3	2.5	2.8
Total Suspended Solids	mg/l	--	--	1800	839	330	890
Turbidity	ntu	--	5 ⁽¹²⁾	>100	>100	>100	100
Turbidity (Field)	ntu	--	5 ⁽¹²⁾	>100	78	81	>100
Metals							
Aluminum, dissolved	mg/l	--	--	<0.01	0.01	<0.01	<0.01
Arsenic, dissolved	mg/l	0.025	--	<0.001	<0.001	<0.001	<0.001
Barium, dissolved	mg/l	1	--	0.24	0.29	0.25	0.21
Beryllium, dissolved	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.0005
Boron, dissolved	mg/l	5	--	0.08	0.04	0.07	0.07
Cadmium, dissolved	mg/l	0.005	--	<0.0001	<0.0001	<0.0001	<0.0001
Calcium, dissolved	mg/l	--	--	197	188	174	182
Chromium, dissolved	mg/l	0.05	--	<0.001	<0.001	<0.001	<0.001
Cobalt, dissolved	mg/l	--	--	0.0032	0.0011	0.0014	0.0029
Copper, dissolved	mg/l	--	1	<0.001	<0.001	<0.001	<0.001
Iron, dissolved	mg/l	--	0.3	0.34	0.16	0.16	0.44
Lead, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.001
Magnesium, dissolved	mg/l	--	--	42	45	40	41
Manganese, dissolved	mg/l	--	0.05	1.19	0.58	0.91	1.04
Molybdenum, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.005
Nickel, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.005
Potassium, dissolved	mg/l	--	--	5	3	3	4
Selenium, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.001
Silver, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001
Sodium, dissolved	mg/l	--	200 ⁽¹⁴⁾	249	249	225	224
Strontium, dissolved	mg/l	--	--	1.06	1.10	1.13	0.954
Thallium, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001
Titanium, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.01
Vanadium, dissolved	mg/l	--	--	<0.001	<0.001	<0.001	<0.001
Zinc, dissolved	mg/l	--	5	<0.01	<0.01	<0.01	<0.01
Petroleum Hydrocarbons							
Benzene	mg/l	0.005	--	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/l	--	0.0024	<0.0005	<0.0005	<0.0005	<0.0005
m,p-Xylenes	mg/l	--	--	<0.0005	<0.0005	<0.0004	<0.0004
o-Xylene	mg/l	--	--	<0.0005	<0.0005	<0.0004	<0.0004
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	--	--	<0.02	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	--	--	<0.02	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	--	--	<0.05	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	--	--	<0.05	--
Toluene	mg/l	--	0.024	<0.0005	<0.0005	<0.0005	<0.0005
Xylenes, Total	mg/l	--	0.3	--	<0.0010	<0.0005	--

Parameter	Unit	(2) (1)	(4) (3)	MW 01 Post-Construction			
		ODWQS(169/03) Health	ODWQS- AO	09-Oct-2014 MW1	24-Mar-2015 S-5	17-Jun-2015 S-7	27-Aug-2015 S-3
Semi-VOCs							
1-Methylnaphthalene	mg/l	--	--	--	--	--	--
2-Methylnaphthalene	mg/l	--	--	--	--	--	--
Acenaphthene	mg/l	--	--	--	--	--	--
Acenaphthylene	mg/l	--	--	--	--	--	--
Anthracene	mg/l	--	--	--	--	--	--
Benzo[a]anthracene	mg/l	--	--	--	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	--	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	--	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	--	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	--	--	--	--
Chrysene	mg/l	--	--	--	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	--	--	--	--
Fluoranthene	mg/l	--	--	--	--	--	--
Fluorene	mg/l	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	--	--	--	--
Naphthalene	mg/l	--	--	--	--	--	--
Phenanthrene	mg/l	--	--	--	--	--	--
Pyrene	mg/l	--	--	--	--	--	--
Styrene	mg/l	--	--	--	--	<0.0005	--
VOCs							
1,1,1,2-Tetrachloroethane	mg/l	--	--	--	--	<0.0005	--
1,1,1-Trichloroethane	mg/l	--	--	--	--	<0.0004	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	--	--	<0.0005	--
1,1,2-Trichloroethane	mg/l	--	--	--	--	<0.0004	--
1,1-Dichloroethane	mg/l	--	--	--	--	<0.0004	--
1,1-Dichloroethylene	mg/l	0.014	--	--	--	<0.0005	--
1,2-Dibromoethane	mg/l	--	--	--	--	<0.0002	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	--	--	<0.0004	--
1,2-Dichloroethane	mg/l	0.005	--	--	--	<0.0002	--
1,2-Dichloropropane	mg/l	--	--	--	--	<0.0005	--
1,3,5-Trimethylbenzene	mg/l	--	--	--	--	<0.0003	--
1,3-Dichlorobenzene	mg/l	--	--	--	--	<0.0004	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	--	--	<0.0004	--
Bromodichloromethane	mg/l	--	--	--	--	<0.0003	--
Bromoform	mg/l	--	--	--	--	<0.0004	--
Bromomethane	mg/l	--	--	--	--	<0.0005	--
Carbon Tetrachloride	mg/l	0.005	--	--	--	<0.0002	--
Chlorobenzene	mg/l	0.08	0.03	--	--	<0.0002	--
Chloroethane	mg/l	--	--	--	--	<0.0002	--
Chloroform	mg/l	--	--	--	--	<0.0005	--
Chloromethane	mg/l	--	--	--	--	<0.0002	--
cis-1,2-Dichloroethene	mg/l	--	--	--	--	<0.0004	--
cis-1,2-Dichloropropene	mg/l	--	--	--	--	<0.0002	--
Dibromochloromethane	mg/l	--	--	--	--	<0.0003	--
Dichlorodifluoromethane	mg/l	--	--	--	--	<0.0005	--
Methylene Chloride	mg/l	0.05	--	--	--	<0.0040	--
Tetrachloroethylene	mg/l	0.03	--	--	--	<0.0003	--
trans-1,2-Dichloroethene	mg/l	--	--	--	--	<0.0004	--
trans-1,3-Dichloropropene	mg/l	--	--	--	--	<0.0002	--
Trichloroethene	mg/l	0.005	--	--	--	<0.0003	--
Trichlorofluoromethane	mg/l	--	--	--	--	<0.0005	--
Vinyl Chloride	mg/l	0.002	--	--	--	<0.0002	--

Parameter	Unit	(2) (1) ODWQS(169/03)- Health	(4) (3) ODWQS- AO	MW 02 Pre-Construction				MW 02 Construction						
				26-Nov-2010 ⁽¹⁾	28-Feb-2011 ⁽¹⁵⁾	07-Apr-2011 ⁽⁶⁾	11-May-2012	14-Jun-2012 ⁽⁷⁾	17-Sep-2012	18-Dec-2012 ⁽¹⁶⁾	11-Apr-2013	05-Jul-2013	21-Oct-2013	03-Feb-2014 ⁽⁸⁾
				S-2	S-1	S-4	S-1	S-1	S-3	S-6	S-5	S-4	S-5	S-3
General Chemistry														
Alkalinity (Total as CaCO ₃)	mg/l	--	--	378	414	402	396	409	431	409	381	383	392	399
Ammonia, unionized	mg/l	--	--	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Ammonia Nitrogen	mg/l	--	--	0.11	0.05	0.02	0.03	0.06	0.04	0.05	0.05	0.04	0.02	0.07
Ammonium	mg/l	--	--	--	--	--	0.03	0.06	0.04	0.05	0.05	<0.02	0.02	0.07
Bicarbonate	mg/l	--	--	378	414	402	396	409	431	409	381	383	392	399
Bromide	mg/l	--	--	<0.25	<0.25	<0.25	0.51	0.58	<0.25	<0.25	<0.25	<0.25	<0.25	<0.50
Carbonate (CO ₃)	mg/l	--	--	<2 ⁽¹⁰⁾	<2 ⁽¹⁰⁾	<2 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾
Color	color unit	--	5	8	<2	4	2	3	<2	5	9	3	2	4
Conductivity	uS/cm	--	--	3460	2930	--	2740	2720	5170	4730	3110	2990	3790	3640
Conductivity (Field)	uS/cm	--	--	2819	2500	2760	2360	2730	2905	2130	3060	3050	2940	3910
Fluoride	mg/l	1.5	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Hardness, Calcium Carbonate	mg/l	--	--	668	530	529	511	398	862	879	606	575	652	642
Nitrate as N	mg/l	10	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrite as N	mg/l	1	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	-	--	--	--	7.64	--	7.78	7.93	7.48	7.71	7.80	7.76	7.76	7.65
pH (Field)	-	--	--	6.79	7.36	7.7	7.2	7.7	7.6	7.3	7.2	7.7	7.6	7.6
Phosphorus	mg/l	--	--	0.06	0.02	0.03	3.60	0.52	6.13	5.95	5.62	5.54	2.94	1.72
Sulfate	mg/l	--	500 ⁽¹¹⁾	49	44	40	52	55	92	88	56	55	68	53
Temperature (Field)	deg c	--	15	8.3	5.6	5	13	12	13	7	5	12	8	6
Total Organic Carbon	mg/l	--	--	5.8	2.9	2.9	2.5	2.6	3.9	2.9	2.6	3.1	4.1	2.3
Total Suspended Solids	mg/l	--	--	132000	62500	57900	28000	15400	9030	7740	9370	6060	6460	1050
Turbidity	ntu	--	5 ⁽¹²⁾	>100	>100	--	<0.1	>100	>100	>100	42.6 ⁽¹³⁾	>100	>100	>100
Turbidity (Field)	ntu	--	5 ⁽¹²⁾	--	--	--	208	195	145	220	-- ⁽¹³⁾	>100	>100	>100
Metals														
Aluminum, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic, dissolved	mg/l	0.025	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001
Barium, dissolved	mg/l	1	--	0.28	0.24	0.19	0.12	0.17	0.33	0.28	0.17	0.20	0.24	0.21
Beryllium, dissolved	mg/l	--	--	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron, dissolved	mg/l	5	--	0.02	<0.01	<0.01	0.01	0.02	0.03	0.01	<0.01	<0.01	0.01	<0.01
Cadmium, dissolved	mg/l	0.005	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcium, dissolved	mg/l	--	--	190	153	154	142	115	256	258	175	166	187	188
Chromium, dissolved	mg/l	0.05	--	<0.005	<0.005	<0.005	<0.005	0.001	<0.005	<0.005	0.007	0.005	0.008	0.007
Cobalt, dissolved	mg/l	--	--	0.0032	0.0021	0.0018	0.0006	0.0011	0.0018	0.0011	0.0004	0.0023	0.0014	0.0002
Copper, dissolved	mg/l	1	--	0.001	0.001	0.001	<0.001	0.004	0.001	0.001	0.001	<0.001	<0.001	<0.001
Iron, dissolved	mg/l	--	0.3	<0.03	<0.03	<0.03	<0.03	<0.03	0.08	<0.03	<0.03	<0.03	0.09	<0.03
Lead, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium, dissolved	mg/l	--	--	47	36	35	38	27	54	57	41	39	45	42
Manganese, dissolved	mg/l	--	0.05	0.43	0.33	0.25	0.07	0.12	0.14	0.13	0.03	0.24	0.17	0.02
Molybdenum, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel, dissolved	mg/l	--	--	0.008	0.005	0.006	<0.005	<0.005	0.008	0.006	<0.005	<0.005	0.005	<0.005
Potassium, dissolved	mg/l	--	--	3	2	2	2	1	3	3	2	2	2	3
Selenium, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium, dissolved	mg/l	--	200 ⁽¹⁴⁾	446	355	358	351	297	711	608	473	438	425	462
Strontium, dissolved	mg/l	--	--	0.744	0.586	0.513	0.429	0.482	0.994	0.820	0.565	0.525	0.704	0.618
Thallium, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium, dissolved	mg/l	--	--	0.004	0.004	0.003	0.004	<0.001	0.004	0.003	0.002	0.001	0.002	0.002
Zinc, dissolved	mg/l	--	5	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Petroleum Hydrocarbons														
Benzene	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/l	--	0.0024	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
m,p-Xylenes	mg/l	--	--	<0.0010	<0.0010	<0.0020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
o-Xylene	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	--	<0.1	--	<0.1	<0.1	--	--	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	--	--	--	<0.1	--	--	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	0.2	<0.2	<0.2	<0.2	--	--	--	<0.2	--	--	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	<0.2	<0.2	<0.2	<0.2	--	--	--	<0.2	--	--	--
Toluene	mg/l	--	0.024	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Xylenes, Total	mg/l	--	0.3	--	<0.0015	<0.003	<0.0010	<0.0010	<0.0010	--	<0.0010	--	--	--

Parameter	Unit	(2) (1) ODWQS(169/03)- Health	(4) (3) ODWQS- AO	MW 02 Pre-Construction				MW 02 Construction						
				26-Nov-2010	28-Feb-2011 ⁽¹⁵⁾	07-Apr-2011 ⁽⁶⁾	11-May-2012	14-Jun-2012 ⁽⁷⁾	17-Sep-2012	18-Dec-2012 ⁽¹⁶⁾	11-Apr-2013	05-Jul-2013	21-Oct-2013	03-Feb-2014 ⁽⁸⁾
				S-2	S - 1	S-4	S - 1	S-1	S-3	S-6	S-5	S-4	S - 5	S-3
Semi-VOCs														
1-Methylnaphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
2-Methylnaphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Acenaphthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Acenaphthylene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Anthracene	mg/l	--	--	0.00032	<0.00002	<0.00001	<0.00001	--	--	--	<0.0001	--	--	--
Benzo[a]anthracene	mg/l	--	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	<0.0001	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	<0.00001	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Chrysene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Fluorene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Naphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Phenanthrene	mg/l	--	--	0.00046	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Pyrene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Styrene	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
VOCs														
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	<0.0008	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	<0.0008	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
1,1-Dichloroethane	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
1,2-Dibromoethane	mg/l	--	--	<0.0010	<0.0010	<0.0020	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
1,2-Dichloroethane	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
1,2-Dichloropropane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
Bromodichloromethane	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--
Bromoform	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
Bromomethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
Carbon Tetrachloride	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Chlorobenzene	mg/l	0.08	0.03	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Chloroethane	mg/l	--	--	<0.0010	<0.0020	<0.0020	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Chloroform	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
Chloromethane	mg/l	--	--	<0.0010	<0.0020	<0.0020	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Dibromochloromethane	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--
Dichlorodifluoromethane	mg/l	--	--	--	--	--	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
Methylene Chloride	mg/l	0.05	--	<0.0040	<0.0040	<0.0080	<0.0040	<0.0040	<0.0040	--	<0.0040	--	--	--
Tetrachloroethylene	mg/l	0.03	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Trichloroethene	mg/l	0.005	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--
Trichlorofluoromethane	mg/l	--	--	<0.0005	<0.001	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
Vinyl Chloride	mg/l	0.002	--	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--

Parameter	Unit	(2) (1) ODWQS(169/03)- Health	(4) (3) ODWQS- AO	Construction MW 02	Post-Construction MW 02				
				26-May-2014	09-Oct-2014	24-Mar-2015	17-Jun-2015 ⁽⁷⁾	27-Aug-2015 ⁽⁸⁾	
				MW - 2	MW 2	S-4	S-5	S-5	
General Chemistry									
Alkalinity (Total as CaCO3)	mg/l	--	--	392	385	405	354	394	
Ammonia, unionized	mg/l	--	--	<0.02	<0.02	<0.02	<0.05	<0.02	
Ammonia Nitrogen	mg/l	--	--	0.05	0.08	<0.02	<0.05	<0.025	
Ammonium	mg/l	--	--	0.05	0.08	<0.02	<0.05	<0.02	
Bicarbonate	mg/l	--	--	392	385	405	354	394	
Bromide	mg/l	--	--	0.53	<0.25	0.95	<0.50	<1.25	
Carbonate (CO3)	mg/l	--	--	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	
Color	color unit	--	5	12	2	4	2	4	
Conductivity	uS/cm	--	--	2860	3970	3980	3370	5060	
Conductivity (Field)	uS/cm	--	--	3010	2895	3150	3410	1985	
Fluoride	mg/l	1.5	--	<0.10	<0.10	<0.10	<0.10	<0.10	
Hardness, Calcium Carbonate	mg/l	--	--	506	720	756	476	968	
Nitrate as N	mg/l	10	--	<0.10	<0.10	<0.10	<0.10	<0.10	
Nitrite as N	mg/l	1	--	<0.10	<0.10	<0.10	<0.10	<0.10	
pH	-	--	--	7.73	7.89	7.63	7.82	7.98	
pH (Field)	-	--	--	7.3	7.4	7.4	7.7	7.6	
Phosphorus	mg/l	--	--	1.56	2.26	2.46	14.6	2.42	
Sulfate	mg/l	--	500 ⁽¹¹⁾	48	83	68	60	98	
Temperature (Field)	deg c	--	15	8	7	6	9	13	
Total Organic Carbon	mg/l	--	--	2.4	2.5	2.6	1.3	1.5	
Total Suspended Solids	mg/l	--	--	2180	713	2640	8220	1840	
Turbidity	ntu	--	5 ⁽¹²⁾	>100	>100	>100	>100	100	
Turbidity (Field)	ntu	--	5 ⁽¹²⁾	>100	>100	>100	>100	>100	
Metals									
Aluminum, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.1	<0.01	
Arsenic, dissolved	mg/l	0.025	--	<0.001	<0.001	<0.001	<0.01	<0.001	
Barium, dissolved	mg/l	1	--	0.14	0.28	0.27	0.3	0.30	
Beryllium, dissolved	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	
Boron, dissolved	mg/l	5	--	<0.01	0.02	0.01	<0.1	0.01	
Cadmium, dissolved	mg/l	0.005	--	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	
Calcium, dissolved	mg/l	--	--	145	219	222	138	292	
Chromium, dissolved	mg/l	0.05	--	<0.001	<0.001	<0.001	<0.01	<0.001	
Cobalt, dissolved	mg/l	--	--	0.0005	0.0007	0.0005	<0.002	0.0027	
Copper, dissolved	mg/l	--	1	<0.001	<0.001	<0.001	<0.01	<0.001	
Iron, dissolved	mg/l	--	0.3	<0.03	0.09	<0.03	<0.3	0.24	
Lead, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.01	<0.001	
Magnesium, dissolved	mg/l	--	--	35	42	49	32	58	
Manganese, dissolved	mg/l	--	0.05	0.05	0.06	0.06	<0.1	0.19	
Molybdenum, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.05	<0.005	
Nickel, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.05	<0.005	
Potassium, dissolved	mg/l	--	--	<1	3	2	2	3	
Selenium, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.01	<0.001	
Silver, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	
Sodium, dissolved	mg/l	--	200 ⁽¹⁴⁾	430	548	596	522	697	
Strontium, dissolved	mg/l	--	--	0.454	0.870	0.794	1.13	0.961	
Thallium, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	
Titanium, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.1	<0.01	
Vanadium, dissolved	mg/l	--	--	<0.001	<0.001	<0.001	<0.01	<0.001	
Zinc, dissolved	mg/l	--	5	<0.01	<0.01	<0.01	<0.1	<0.01	
Petroleum Hydrocarbons									
Benzene	mg/l	0.005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Ethylbenzene	mg/l	--	0.0024	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
m,p-Xylenes	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	
o-Xylene	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	--	--	<0.02	--	
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	<0.1	--	--	--	--	
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	<0.1	--	--	<0.02	--	
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	<0.2	--	--	<0.05	--	
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	<0.2	--	--	<0.05	--	
Toluene	mg/l	--	0.024	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Xylenes, Total	mg/l	--	0.3	<0.0010	--	<0.0010	<0.0005	--	

Parameter	Unit	(2) (1)	(4) (3)	Construction MW 02	Post-Construction MW 02				
		ODWQS(169/03)- Health	ODWQS- AO	26-May-2014	09-Oct-2014	24-Mar-2015	17-Jun-2015 ⁽⁷⁾	27-Aug-2015 ⁽⁸⁾	
				MW - 2	MW 2	S-4	S-5	S-5	
Semi-VOCs									
1-Methylnaphthalene	mg/l	--	--	--	--	--	--	--	
2-Methylnaphthalene	mg/l	--	--	--	--	--	--	--	
Acenaphthene	mg/l	--	--	--	--	--	--	--	
Acenaphthylene	mg/l	--	--	--	--	--	--	--	
Anthracene	mg/l	--	--	--	--	--	--	--	
Benzo[a]anthracene	mg/l	--	--	--	--	--	--	--	
Benzo[a]pyrene	mg/l	0.00001	--	--	--	--	--	--	
Benzo[b]fluoranthene	mg/l	--	--	--	--	--	--	--	
Benzo[g,h,i]perylene	mg/l	--	--	--	--	--	--	--	
Benzo[k]fluoranthene	mg/l	--	--	--	--	--	--	--	
Chrysene	mg/l	--	--	--	--	--	--	--	
Dibenzo[a,h]anthracene	mg/l	--	--	--	--	--	--	--	
Fluoranthene	mg/l	--	--	--	--	--	--	--	
Fluorene	mg/l	--	--	--	--	--	--	--	
Indeno[1,2,3-cd]pyrene	mg/l	--	--	--	--	--	--	--	
Naphthalene	mg/l	--	--	--	--	--	--	--	
Phenanthrene	mg/l	--	--	--	--	--	--	--	
Pyrene	mg/l	--	--	--	--	--	--	--	
Styrene	mg/l	--	--	<0.0005	--	--	<0.0005	--	
VOCs									
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	<0.0005	--	
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--	
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	<0.0005	--	
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--	
1,1-Dichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--	
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	--	--	<0.0005	--	
1,2-Dibromoethane	mg/l	--	--	<0.0002	--	--	<0.0002	--	
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	--	--	<0.0004	--	
1,2-Dichloroethane	mg/l	0.005	--	<0.0002	--	--	<0.0002	--	
1,2-Dichloropropane	mg/l	--	--	<0.0005	--	--	<0.0005	--	
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	--	--	<0.0003	--	
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	--	--	<0.0004	--	
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	--	--	<0.0004	--	
Bromodichloromethane	mg/l	--	--	<0.0003	--	--	<0.0003	--	
Bromoform	mg/l	--	--	<0.0004	--	--	<0.0004	--	
Bromomethane	mg/l	--	--	<0.0005	--	--	<0.0005	--	
Carbon Tetrachloride	mg/l	0.005	--	<0.0002	--	--	<0.0002	--	
Chlorobenzene	mg/l	0.08	0.03	<0.0002	--	--	<0.0002	--	
Chloroethane	mg/l	--	--	<0.0002	--	--	<0.0002	--	
Chloroform	mg/l	--	--	<0.0005	--	--	<0.0005	--	
Chloromethane	mg/l	--	--	<0.0002	--	--	<0.0002	--	
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	<0.0004	--	
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	--	--	<0.0002	--	
Dibromochloromethane	mg/l	--	--	<0.0003	--	--	<0.0003	--	
Dichlorodifluoromethane	mg/l	--	--	<0.0005	--	--	<0.0005	--	
Methylene Chloride	mg/l	0.05	--	<0.0040	--	--	<0.0040	--	
Tetrachloroethylene	mg/l	0.03	--	<0.0003	--	--	<0.0003	--	
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	<0.0004	--	
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	--	--	<0.0002	--	
Trichloroethene	mg/l	0.005	--	<0.0003	--	--	<0.0003	--	
Trichlorofluoromethane	mg/l	--	--	<0.0005	--	--	<0.0005	--	
Vinyl Chloride	mg/l	0.002	--	<0.0002	--	--	<0.0002	--	

Parameter	Unit	(2) (1) ODWQS(169/ 03)-Health	(4) (3) ODWQS- AO	MW 03 Pre-Construction				Construction MW 03						
				29-Nov-2010 ⁽¹⁶⁾ S-1	28-Feb-2011 ⁽¹⁶⁾ S- 4	07-Apr-2011 ⁽²⁰⁾ S-5	11-May-2012 ⁽²¹⁾ S- 5	14-Jun-2012 ⁽²²⁾ S-4	17-Sep-2012 ⁽²³⁾ S-1	18-Dec-2012 ⁽²⁴⁾ S-1	11-Apr-2013 ⁽²⁴⁾ S-3	05-Jul-2013 ⁽²⁴⁾ S-2	21-Oct-2013 ⁽²⁴⁾ S- 3	03-Feb-2014 ⁽¹⁶⁾ S-4
General Chemistry														
Alkalinity (Total as CaCO3)	mg/l	--	--	416	380	404	404	421	371	408	397	397	386	401
Ammonia, unionized	mg/l	--	--	0.05	0.03	0.05	0.03	0.04	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
Ammonia Nitrogen	mg/l	--	--	4.32	2.36	4.46	2.42	3.28	2.97	0.48	0.82	0.68	0.81	1.02
Ammonium	mg/l	--	--	4.27	2.33	4.41	2.39	3.24	2.93	0.48	0.82	0.68	0.81	1.02
Bicarbonate	mg/l	--	--	416	380	404	404	421	371	408	397	397	386	401
Bromide	mg/l	--	--	<0.25	1.01	1.00	1.35	1.77	0.86	1.41	3.98	1.99	0.80	0.84
Carbonate (CO3)	mg/l	--	--	<2 ⁽¹⁶⁾	<2 ⁽¹⁶⁾	<2 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾
Color	color unit	--	5	10	11	23	12	10	6	3	3	3	5	4
Conductivity	uS/cm	--	--	2280	2330	--	2650	2610	2640	2760	2850	3080	3520	3810
Conductivity (Field)	uS/cm	--	--	1960	2500	2740	2814	2590	2605	2650	2860	3100	3210	3180
Fluoride	mg/l	1.5	--	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10
Hardness, Calcium Carbonate	mg/l	--	--	646	587	868	764	689	752	803	948	975	877	1140
Nitrate as N	mg/l	10	--	<0.10	<0.10	<0.10	0.52	0.54	0.15	0.12	0.72	0.40	<0.10	0.75
Nitrite as N	mg/l	1	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	-	--	--	7.49	7.35	--	7.40	7.56	7.43	7.34	7.39	7.35	7.32	7.26
pH (Field)	-	--	--	6.98	7.1	7.35	6.92	7.8	7.7	7.4	6.9	7.4	7.5	7.4
Phosphorus	mg/l	--	--	12.1	3.27	2.86	2.55	1.74	19.4	1.25	2.73	2.34	3.18	6.89
Sulfate	mg/l	--	500 ⁽¹¹⁾	9	21	21	98	104	98	146	151	166	228	235
Temperature (Field)	deg c	--	15	8.2	6.7	6.6	8.8	12	14	7	6	11	8	6
Total Organic Carbon	mg/l	--	--	24.5	10.0	10.0	8.5	7.3	15.3	7.6	6.6	8.6	9.1	16.0
Total Suspended Solids	mg/l	--	--	8720	4380	7930	4920	3240	8660	1120	3330	1630	3460	4000
Turbidity	ntu	--	5 ⁽¹²⁾	>100	>100	--	<0.1	>100	>100	<0.1	47.5	>100	>100	>100
Turbidity (Field)	ntu	--	5 ⁽¹²⁾	--	--	--	250	145	--	213	410	>100	>100	>100
Metals														
Aluminum, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic, dissolved	mg/l	0.025	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium, dissolved	mg/l	1	--	0.32	0.30	0.35	0.28	0.34	0.34	0.30	0.28	0.32	0.32	0.40
Beryllium, dissolved	mg/l	--	--	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron, dissolved	mg/l	5	--	0.03	0.02	0.02	0.02	0.02	0.16	0.06	0.02	0.03	0.03	0.02
Cadmium, dissolved	mg/l	0.005	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001
Calcium, dissolved	mg/l	--	--	183	174	270	222	200	194	236	279	280	249	333
Chromium, dissolved	mg/l	0.05	--	0.007	0.009	<0.005	<0.005	0.005	0.009	0.008	0.009	0.009	<0.005	0.008
Cobalt, dissolved	mg/l	--	--	0.0033	0.0043	0.0039	0.0068	0.0079	0.0043	0.0059	0.0073	0.0075	0.0130	0.0106
Copper, dissolved	mg/l	--	1	<0.001	0.001	0.001	<0.001	0.001	0.001	0.002	0.002	0.002	0.001	0.001
Iron, dissolved	mg/l	--	0.3	21.5	9.66	13.9	16.0	16.2	19.9	0.55	1.43	6.74	5.32	10.1
Lead, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium, dissolved	mg/l	--	--	46	37	47	51	46	65	52	61	67	62	74
Manganese, dissolved	mg/l	--	0.05	2.42	2.66	3.03	6.80	7.94	2.60	5.27	9.39	7.90	13.6	10.8
Molybdenum, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel, dissolved	mg/l	--	--	<0.005	0.006	0.008	0.010	0.012	0.006	0.008	0.015	0.010	0.015	0.016
Potassium, dissolved	mg/l	--	--	5	2	3	2	2	9	3	3	5	3	6
Selenium, dissolved	mg/l	0.01	--	<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001
Silver, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium, dissolved	mg/l	--	200 ⁽¹⁴⁾	173	196	239	238	215	239	214	301	294	249	346
Strontium, dissolved	mg/l	--	--	0.739	0.671	0.799	0.794	0.908	0.863	0.878	0.995	0.938	1.00	1.11
Thallium, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium, dissolved	mg/l	--	--	0.006	0.005	0.004	0.006	0.002	0.006	0.006	0.005	0.004	0.005	0.004
Zinc, dissolved	mg/l	--	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Petroleum Hydrocarbons														
Benzene	mg/l	0.005	--	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/l	--	0.0024	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
m,p-Xylenes	mg/l	--	--	<0.0020	<0.0010	<0.0020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
o-Xylene	mg/l	--	--	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	--	<0.1	--	<0.1	<0.1	--	--	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	--	--	--	<0.1	--	--	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	<0.2	<0.2	<0.2	<0.2	--	--	--	<0.2	--	--	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	<0.2	<0.2	<0.2	<0.2	--	--	--	<0.2	--	--	--
Toluene	mg/l	--	0.024	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Xylenes, Total	mg/l	--	0.3	--	<0.0015	<0.003	<0.0010	<0.0010	<0.0010	--	<0.0010	--	--	--

Parameter	Unit	(2) (1)	(4) (3)	MW 03 Pre-Construction				Construction MW 03						
		ODWQS(169/ 03)-Health	ODWQS- AO	29-Nov-2010 ⁽¹⁰⁾ S-1	28-Feb-2011 ⁽¹⁰⁾ S-4	07-Apr-2011 ⁽²⁰⁾ S-5	11-May-2012 ⁽²¹⁾ S-5	14-Jun-2012 ⁽²²⁾ S-4	17-Sep-2012 ⁽²³⁾ S-1	18-Dec-2012 ⁽²⁴⁾ S-1	11-Apr-2013 ⁽²⁴⁾ S-3	05-Jul-2013 ⁽²⁴⁾ S-2	21-Oct-2013 ⁽²⁴⁾ S-3	03-Feb-2014 ⁽¹⁶⁾ S-4
Semi-VOCs														
1-Methylnaphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
2-Methylnaphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Acenaphthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Acenaphthylene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Anthracene	mg/l	--	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	<0.0001	--	--	--
Benzo[a]anthracene	mg/l	--	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	<0.0001	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	<0.00001	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Chrysene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Fluorene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Naphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Phenanthrene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Pyrene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Styrene	mg/l	--	--	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
VOCs														
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
1,1,1-Trichloroethane	mg/l	--	--	<0.0008	<0.0008	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
1,1,2-Trichloroethane	mg/l	--	--	<0.0008	<0.0008	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
1,1-Dichloroethane	mg/l	--	--	<0.0008	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
1,1-Dichloroethylene	mg/l	0.014	--	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
1,2-Dibromoethane	mg/l	--	--	<0.0020	<0.0010	<0.0020	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0008	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
1,2-Dichloroethane	mg/l	0.005	--	<0.001	<0.0005	<0.001	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
1,2-Dichloropropane	mg/l	--	--	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0006	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--
1,3-Dichlorobenzene	mg/l	--	--	<0.0008	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0008	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
Bromodichloromethane	mg/l	--	--	<0.0006	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--
Bromoform	mg/l	--	--	<0.0008	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
Bromomethane	mg/l	--	--	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
Carbon Tetrachloride	mg/l	0.005	--	<0.001	<0.0005	<0.001	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Chlorobenzene	mg/l	0.08	0.03	<0.0004	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Chloroethane	mg/l	--	--	<0.0020	<0.0020	<0.0020	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Chloroform	mg/l	--	--	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
Chloromethane	mg/l	--	--	<0.0020	<0.0020	<0.0020	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
cis-1,2-Dichloroethene	mg/l	--	--	<0.0008	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
cis-1,2-Dichloropropene	mg/l	--	--	<0.0004	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Dibromochloromethane	mg/l	--	--	<0.0006	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--
Dichlorodifluoromethane	mg/l	--	--	--	--	--	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
Methylene Chloride	mg/l	0.05	--	<0.0080	<0.0040	<0.0080	<0.0040	<0.0040	<0.0040	--	<0.0040	--	--	--
Tetrachloroethylene	mg/l	0.03	--	<0.0006	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--
trans-1,2-Dichloroethene	mg/l	--	--	<0.0008	<0.0004	<0.0008	<0.0004	<0.0004	<0.0004	--	<0.0004	--	--	--
trans-1,3-Dichloropropene	mg/l	--	--	<0.0004	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Trichloroethene	mg/l	0.005	--	<0.0006	<0.0003	<0.0006	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--
Trichlorofluoromethane	mg/l	--	--	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
Vinyl Chloride	mg/l	0.002	--	<0.0004	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--

Parameter	Unit	(2) (1) ODWQS(169/ 03)-Health	(4) (3) ODWQS- AO	Construction MW 03	Post-Cosntruction MW 03				
				26-May-2014	09-Oct-2014	24-Mar-2015	17-Jun-2015 ⁽¹⁷⁾	27-Aug-2015 ⁽¹⁷⁾	
				MW - 3	MW 3	S-1	S-2	S-1	
General Chemistry									
Alkalinity (Total as CaCO3)	mg/l	--	--	416	357	381	424	391	
Ammonia, unionized	mg/l	--	--	<0.02	<0.02	<0.02	<0.05	0.06	
Ammonia Nitrogen	mg/l	--	--	1.48	1.39	0.88	1.05	1.48	
Ammonium	mg/l	--	--	1.48	1.39	0.88	1.04	1.42	
Bicarbonate	mg/l	--	--	416	357	381	424	391	
Bromide	mg/l	--	--	1.44	<0.25	1.33	<0.50	<1.25	
Carbonate (CO3)	mg/l	--	--	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	
Color	color unit	--	5	16	17	6	4	2	
Conductivity	uS/cm	--	--	4150	4690	4560	4700	4940	
Conductivity (Field)	uS/cm	--	--	3100	3210	3205	4250	--	
Fluoride	mg/l	1.5	--	<0.10	<0.10	<0.10	<0.10	<0.10	
Hardness, Calcium Carbonate	mg/l	--	--	1190	1150	1240	1220	1140	
Nitrate as N	mg/l	10	--	0.48	<0.10	<0.10	0.51	<0.10	
Nitrite as N	mg/l	1	--	<0.10	<0.10	<0.10	<0.10	<0.10	
pH	-	--	--	7.52	7.59	7.17	7.32	7.89	
pH (Field)	-	--	--	7.3	7.4	7.3	7.3	--	
Phosphorus	mg/l	--	--	2.01	3.91	1.26	1.85	0.97	
Sulfate	mg/l	--	500 ⁽¹¹⁾	274	335	318	299	337	
Temperature (Field)	deg c	--	15	7	7	4	10	--	
Total Organic Carbon	mg/l	--	--	7.5	9.8	6.4	4.5	7.2	
Total Suspended Solids	mg/l	--	--	1330	7050	1240	694	6770	
Turbidity	ntu	--	5 ⁽¹²⁾	>100	>100	>100	>100	100	
Turbidity (Field)	ntu	--	5 ⁽¹²⁾	>100	>100	>100	>100	>100	
Metals									
Aluminum, dissolved	mg/l	--	--	<0.01	0.02	<0.01	<0.1	<0.1	
Arsenic, dissolved	mg/l	0.025	--	<0.001	0.002	<0.001	<0.01	<0.01	
Barium, dissolved	mg/l	1	--	0.41	0.37	0.36	0.3	0.3	
Beryllium, dissolved	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.005	<0.005	
Boron, dissolved	mg/l	5	--	0.02	0.05	0.02	<0.1	<0.1	
Cadmium, dissolved	mg/l	0.005	--	<0.0001	<0.0001	<0.0001	<0.001	<0.001	
Calcium, dissolved	mg/l	--	--	339	347	361	364	336	
Chromium, dissolved	mg/l	0.05	--	<0.001	<0.001	<0.001	<0.01	<0.01	
Cobalt, dissolved	mg/l	--	--	0.0085	0.0068	0.0042	0.004	0.003	
Copper, dissolved	mg/l	--	1	<0.001	<0.001	<0.001	<0.01	<0.01	
Iron, dissolved	mg/l	--	0.3	11.6	19.6	6.13	8.9	10.9	
Lead, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.01	<0.01	
Magnesium, dissolved	mg/l	--	--	83	69	83	76	72	
Manganese, dissolved	mg/l	--	0.05	11.7	9.04	5.62	5.2	3.2	
Molybdenum, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.05	<0.05	
Nickel, dissolved	mg/l	--	--	0.011	<0.005	0.008	<0.05	<0.05	
Potassium, dissolved	mg/l	--	--	2	6	3	4	7	
Selenium, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.01	<0.01	
Silver, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.001	<0.001	
Sodium, dissolved	mg/l	--	200 ⁽¹⁴⁾	428	529	555	600	693	
Strontium, dissolved	mg/l	--	--	1.25	1.34	1.32	1.25	1.00	
Thallium, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.001	<0.001	
Titanium, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.1	<0.1	
Vanadium, dissolved	mg/l	--	--	<0.001	<0.001	<0.001	<0.01	<0.01	
Zinc, dissolved	mg/l	--	5	<0.01	<0.01	<0.01	<0.1	<0.1	
Petroleum Hydrocarbons									
Benzene	mg/l	0.005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Ethylbenzene	mg/l	--	0.0024	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
m,p-Xylenes	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	
o-Xylene	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	--	--	<0.02	--	
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	<0.1	--	--	--	--	
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	<0.1	--	--	<0.02	--	
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	<0.2	--	--	<0.05	--	
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	<0.2	--	--	<0.05	--	
Toluene	mg/l	--	0.024	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Xylenes, Total	mg/l	--	0.3	<0.0010	--	<0.0010	<0.0005	--	

Parameter	Unit	(2) (1)	(4) (3)	Construction MW 03	Post-Construction MW 03			
		ODWQS(169/03)-Health	ODWQS-AO	26-May-2014 MW - 3	09-Oct-2014 MW 3	24-Mar-2015 S-1	17-Jun-2015 ⁽¹⁷⁾ S-2	27-Aug-2015 ⁽¹⁷⁾ S-1
Semi-VOCs								
1-Methylnaphthalene	mg/l	--	--	--	--	--	--	--
2-Methylnaphthalene	mg/l	--	--	--	--	--	--	--
Acenaphthene	mg/l	--	--	--	--	--	--	--
Acenaphthylene	mg/l	--	--	--	--	--	--	--
Anthracene	mg/l	--	--	--	--	--	--	--
Benzo[a]anthracene	mg/l	--	--	--	--	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	--	--	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	--	--	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	--	--	--	--	--
Chrysene	mg/l	--	--	--	--	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	--	--	--	--	--
Fluoranthene	mg/l	--	--	--	--	--	--	--
Fluorene	mg/l	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	--	--	--	--	--
Naphthalene	mg/l	--	--	--	--	--	--	--
Phenanthrene	mg/l	--	--	--	--	--	--	--
Pyrene	mg/l	--	--	--	--	--	--	--
Styrene	mg/l	--	--	<0.0005	--	--	<0.0005	--
VOCs								
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	--	--	<0.0005	--
1,2-Dibromoethane	mg/l	--	--	<0.0002	--	--	<0.0002	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	--	--	<0.0004	--
1,2-Dichloroethane	mg/l	0.005	--	<0.0002	--	--	<0.0002	--
1,2-Dichloropropane	mg/l	--	--	<0.0005	--	--	<0.0005	--
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	--	--	<0.0003	--
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	--	--	<0.0004	--
Bromodichloromethane	mg/l	--	--	<0.0003	--	--	<0.0003	--
Bromoform	mg/l	--	--	<0.0004	--	--	<0.0004	--
Bromomethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
Carbon Tetrachloride	mg/l	0.005	--	<0.0002	--	--	<0.0002	--
Chlorobenzene	mg/l	0.08	0.03	<0.0002	--	--	<0.0002	--
Chloroethane	mg/l	--	--	<0.0002	--	--	<0.0002	--
Chloroform	mg/l	--	--	<0.0005	--	--	<0.0005	--
Chloromethane	mg/l	--	--	<0.0002	--	--	<0.0002	--
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	<0.0004	--
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	--	--	<0.0002	--
Dibromochloromethane	mg/l	--	--	<0.0003	--	--	<0.0003	--
Dichlorodifluoromethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
Methylene Chloride	mg/l	0.05	--	<0.0040	--	--	<0.0040	--
Tetrachloroethylene	mg/l	0.03	--	<0.0003	--	--	<0.0003	--
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	<0.0004	--
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	--	--	<0.0002	--
Trichloroethene	mg/l	0.005	--	<0.0003	--	--	<0.0003	--
Trichlorofluoromethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
Vinyl Chloride	mg/l	0.002	--	<0.0002	--	--	<0.0002	--

Parameter	Unit	(2) (1) ODWQS(169/03)- Health	(4) (3) ODWQS- AO	Pre-Construction MW 04				Construction MW 04						
				26-Nov-2010 ⁽²⁾	28-Feb-2011 ⁽²⁾	07-Apr-2011 ⁽²⁾	11-May-2012	14-Jun-2012 ⁽²⁾	28-Jun-2012 ⁽²⁾	17-Sep-2012 ⁽²⁾	18-Dec-2012 ⁽²⁾	11-Apr-2013 ⁽²⁾	05-Jul-2013 ⁽²⁾	21-Oct-2013 ⁽²⁾
				S-4	S - 5	S-6	S - 4	s4	S-1	S-2	S-2	S-4	S-1	S - 1
General Chemistry														
Alkalinity (Total as CaCO3)	mg/l	--	--	279	289	271	302	--	296	351	257	338	354	394
Ammonia, unionized	mg/l	--	--	<0.02	<0.02	<0.02	<0.02	--	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Ammonia Nitrogen	mg/l	--	--	0.07	0.04	0.03	0.03	--	0.11	0.03	0.03	0.03	0.04	0.03
Ammonium	mg/l	--	--	0.07	0.04	0.03	0.03	--	0.11	0.03	0.03	0.03	0.04	0.03
Bicarbonate	mg/l	--	--	279	289	271	302	--	296	351	257	338	354	394
Bromide	mg/l	--	--	<0.25	<0.25	0.75	0.31	--	0.40	1.42	0.61	0.82	0.69	0.99
Carbonate (CO3)	mg/l	--	--	<2 ⁽¹⁰⁾	<2 ⁽¹⁰⁾	<2 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	--	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾
Color	color unit	--	5	12	<2	3	<2	--	3	2	7	10	3	2
Conductivity	uS/cm	--	--	610	601	--	735	--	719	807	1120	908	1100	1270
Conductivity (Field)	uS/cm	--	--	532	1050	1390	764	--	740	1420	1080	1090	1114	1070
Fluoride	mg/l	1.5	--	0.13	0.12	<0.10	0.10	--	0.11	0.10	0.15	0.10	0.11	<0.10
Hardness, Calcium Carbonate	mg/l	--	--	304	240	342	305	--	353	422	403	500	568	569
Nitrate as N	mg/l	10	--	0.14	0.13	0.50	0.34	--	0.22	0.15	2.45	0.37	0.35	0.11
Nitrite as N	mg/l	1	--	<0.10	<0.10	<0.10	<0.10	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	-	--	--	--	7.96	--	7.96	--	7.81	7.71	7.83	7.81	7.59	7.77
pH (Field)	-	--	--	7.29	7.9	7.8	7.6	--	7.9	7.36	7.7	7.0	7.5	7.4
Phosphorus	mg/l	--	--	4.96	6.50	2.69	3.81	--	3.03	3.57	2.65	2.31	4.30	4.48
Sulfate	mg/l	--	500 ⁽¹¹⁾	18	21	51	49	--	26	25	122	57	103	113
Temperature (Field)	deg c	--	15	7.6	6.8	5.8	9	--	13.9	14	6	3	12	8
Total Organic Carbon	mg/l	--	--	5.4	2.6	2.7	2.5	--	2.0	2.5	3.1	3.3	4.2	5.4
Total Suspended Solids	mg/l	--	--	15300	29800	14700	12100	--	4700	6080	4010	11400	6660	6790
Turbidity	ntu	--	5 ⁽¹²⁾	>100	>100	--	<0.1	--	>100	>100	>100	77.9 ⁽¹³⁾	>100	>100
Turbidity (Field)	ntu	--	5 ⁽¹²⁾	--	--	--	180	--	142	98	145	-- ⁽¹³⁾	>100	>100
Metals														
Aluminum, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic, dissolved	mg/l	0.025	--	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium, dissolved	mg/l	1	--	0.05	0.04	0.06	0.05	--	0.05	0.06	0.06	0.05	0.08	0.08
Beryllium, dissolved	mg/l	--	--	<0.001	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron, dissolved	mg/l	5	--	0.02	<0.01	0.04	0.03	--	<0.01	0.02	0.01	<0.01	0.02	0.01
Cadmium, dissolved	mg/l	0.005	--	<0.0001	<0.0001	<0.0001	<0.0001	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcium, dissolved	mg/l	--	--	87	63	99	89	--	105	126	122	149	173	170
Chromium, dissolved	mg/l	0.05	--	0.003	0.004	0.005	0.004	--	0.002	0.003	0.003	0.006	0.002	0.002
Cobalt, dissolved	mg/l	--	--	0.0005	0.0003	0.0006	0.0005	--	0.0002	0.0002	<0.0002	<0.0002	0.0002	0.0002
Copper, dissolved	mg/l	1	--	<0.001	<0.001	<0.001	<0.001	--	<0.001	0.009	<0.001	<0.001	<0.001	0.001
Iron, dissolved	mg/l	--	0.3	<0.03	<0.03	<0.03	<0.03	--	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Lead, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium, dissolved	mg/l	--	--	21	20	23	20	--	22	26	24	31	33	35
Manganese, dissolved	mg/l	--	0.05	0.11	0.05	0.09	0.09	--	0.03	0.02	<0.01	<0.01	0.01	<0.01
Molybdenum, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.005	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.005	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Potassium, dissolved	mg/l	--	--	2	2	2	<1	--	1	1	2	1	2	1
Selenium, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.01	<0.001	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium, dissolved	mg/l	--	200 ⁽¹⁴⁾	15	11	31	16	--	22	17	82	27	41	26
Strontium, dissolved	mg/l	--	--	0.279	0.207	0.452	0.708	--	0.611	0.506	0.655	0.631	0.607	0.556
Thallium, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium, dissolved	mg/l	--	--	0.002	0.002	0.002	0.003	--	0.001	0.003	0.003	0.002	<0.001	0.003
Zinc, dissolved	mg/l	--	5	<0.01	<0.01	<0.01	<0.01	--	<0.01	0.03	<0.01	<0.01	<0.01	0.01
Petroleum Hydrocarbons														
Benzene	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/l	--	0.0024	<0.0005	<0.0005	<0.001	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
m,p-Xylenes	mg/l	--	--	<0.0010	<0.0010	<0.0020	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
o-Xylene	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	--	--	--	--	<0.1	--	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	--	<0.1	--	<0.1	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	--	--	--	--	<0.1	--	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	<0.2	<0.2	<0.2	<0.2	--	--	--	--	<0.2	--	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	<0.2	<0.2	<0.2	<0.2	--	--	--	--	<0.2	--	--
Toluene	mg/l	--	0.024	<0.0005	<0.0005	<0.001	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Xylenes, Total	mg/l	--	0.3	--	<0.0015	<0.003	<0.0010	--	--	<0.0010	--	<0.0010	--	--

Parameter	Unit	(2) (1) ODWQS(169/03)- Health	(4) (3) ODWQS- AO	Pre-Construction MW 04				Construction MW 04						
				26-Nov-2010	28-Feb-2011 ⁽²⁾	07-Apr-2011 ⁽²⁾	11-May-2012	14-Jun-2012 ⁽²⁾	28-Jun-2012 ⁽²⁾	17-Sep-2012 ⁽²⁾	18-Dec-2012 ⁽²⁾	11-Apr-2013 ⁽²⁾	05-Jul-2013 ⁽²⁾	21-Oct-2013 ⁽²⁾
				S-4	S - 5	S-6	S - 4	s4	S-1	S-2	S-2	S-4	S-1	S - 1
Semi-VOCs														
1-Methylnaphthalene	mg/l	--	--	0.00004	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.0001	--	--
2-Methylnaphthalene	mg/l	--	--	0.00004	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.0001	--	--
Acenaphthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.0001	--	--
Acenaphthylene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.0001	--	--
Anthracene	mg/l	--	--	0.00044	<0.00002	<0.00001	<0.00001	--	--	--	--	<0.0001	--	--
Benzo[a]anthracene	mg/l	--	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	--	<0.0001	--	--
Benzo[a]pyrene	mg/l	0.00001	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	--	<0.00001	--	--
Benzo[b]fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.00005	--	--
Benzo[g,h,i]perylene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.0001	--	--
Benzo[k]fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.00005	--	--
Chrysene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.00005	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.0001	--	--
Fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.0001	--	--
Fluorene	mg/l	--	--	0.00023	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.0001	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.0001	--	--
Naphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.0001	--	--
Phenanthrene	mg/l	--	--	0.00032	<0.00004	<0.00002	<0.00002	--	--	--	--	<0.0001	--	--
Pyrene	mg/l	--	--	0.00004	<0.00004	0.00009	<0.00002	--	--	--	--	<0.0001	--	--
Styrene	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	--	--	<0.0005	--	<0.0005	--	--
VOCs														
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	--	--	<0.0005	--	<0.0005	--	--
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	<0.0008	<0.0008	<0.0004	--	--	<0.0004	--	<0.0004	--	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	--	--	<0.0005	--	<0.0005	--	--
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	<0.0008	<0.0008	<0.0004	--	--	<0.0004	--	<0.0004	--	--
1,1-Dichloroethane	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	--	--	<0.0004	--	<0.0004	--	--
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	<0.0005	<0.001	<0.0005	--	--	<0.0005	--	<0.0005	--	--
1,2-Dibromoethane	mg/l	--	--	<0.0010	<0.0010	<0.0020	<0.0002	--	--	<0.0002	--	<0.0002	--	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	<0.0004	<0.0008	<0.0004	--	--	<0.0004	--	<0.0004	--	--
1,2-Dichloroethane	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0002	--	--	<0.0002	--	<0.0002	--	--
1,2-Dichloropropane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	--	--	<0.0005	--	<0.0005	--	--
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	--	--	<0.0003	--	<0.0003	--	--
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	--	--	<0.0004	--	<0.0004	--	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	<0.0004	<0.0008	<0.0004	--	--	<0.0004	--	<0.0004	--	--
Bromodichloromethane	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	--	--	<0.0003	--	<0.0003	--	--
Bromoform	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	--	--	<0.0004	--	<0.0004	--	--
Bromomethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	--	--	<0.0005	--	<0.0005	--	--
Carbon Tetrachloride	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0002	--	--	<0.0002	--	<0.0002	--	--
Chlorobenzene	mg/l	0.08	0.03	<0.0002	<0.0002	<0.0004	<0.0002	--	--	<0.0002	--	<0.0002	--	--
Chloroethane	mg/l	--	--	<0.0010	<0.0020	<0.0020	<0.0002	--	--	<0.0002	--	<0.0002	--	--
Chloroform	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	--	--	<0.0005	--	<0.0005	--	--
Chloromethane	mg/l	--	--	<0.0010	<0.0020	<0.0020	<0.0002	--	--	<0.0002	--	<0.0002	--	--
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	--	--	<0.0004	--	<0.0004	--	--
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	<0.0002	<0.0004	<0.0002	--	--	<0.0002	--	<0.0002	--	--
Dibromochloromethane	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	--	--	<0.0003	--	<0.0003	--	--
Dichlorodifluoromethane	mg/l	--	--	--	--	--	<0.0005	--	--	<0.0005	--	<0.0005	--	--
Methylene Chloride	mg/l	0.05	--	<0.0040	<0.0040	<0.0080	<0.0040	--	--	<0.0040	--	<0.0040	--	--
Tetrachloroethylene	mg/l	0.03	--	<0.0003	<0.0003	<0.0006	<0.0003	--	--	<0.0003	--	<0.0003	--	--
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	--	--	<0.0004	--	<0.0004	--	--
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	<0.0002	<0.0004	<0.0002	--	--	<0.0002	--	<0.0002	--	--
Trichloroethene	mg/l	0.005	--	<0.0003	<0.0003	<0.0006	<0.0003	--	--	<0.0003	--	<0.0003	--	--
Trichlorofluoromethane	mg/l	--	--	<0.0005	<0.001	<0.001	<0.0005	--	--	<0.0005	--	<0.0005	--	--
Vinyl Chloride	mg/l	0.002	--	<0.0002	<0.0002	<0.0004	<0.0002	--	--	<0.0002	--	<0.0002	--	--

Parameter	Unit	(2) (1) ODWQS(169/03)- Health	(4) (3) ODWQS- AO	Construction MW 04		Post-Construction MW 04			
				03-Feb-2014 ⁽²⁾	26-May-2014	09-Oct-2014	24-Mar-2015	17-Jun-2015	27-Aug-2015
				S-5	MW - 4	MW 4	S-2	S-1	S-2
General Chemistry									
Alkalinity (Total as CaCO3)	mg/l	--	--	370	237	379	427	640	443
Ammonia, unionized	mg/l	--	--	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
Ammonia Nitrogen	mg/l	--	--	<0.02	0.09	0.10	0.11	0.10	0.045
Ammonium	mg/l	--	--	<0.02	0.09	0.10	0.11	0.10	0.04
Bicarbonate	mg/l	--	--	370	237	379	427	640	443
Bromide	mg/l	--	--	1.18	<0.25	0.36	0.56	<0.25	0.53
Carbonate (CO3)	mg/l	--	--	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾
Color	color unit	--	5	15	12	2	4	10	23
Conductivity	uS/cm	--	--	1190	804	1100	1400	1860	1360
Conductivity (Field)	uS/cm	--	--	1290	1085	1105	1140	1280	1320
Fluoride	mg/l	1.5	--	<0.10	0.20	0.10	<0.10	<0.10	<0.10
Hardness, Calcium Carbonate	mg/l	--	--	590	319	577	648	751	683
Nitrate as N	mg/l	10	--	0.22	1.00	<0.10	<0.10	<0.10	<0.10
Nitrite as N	mg/l	1	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH	-	--	--	7.73	7.89	7.88	7.54	7.40	7.95
pH (Field)	-	--	--	7.7	7.5	7.6	7.4	7.8	7.6
Phosphorus	mg/l	--	--	0.01	4.05	2.20	0.44	0.81	2.42
Sulfate	mg/l	--	500 ⁽¹¹⁾	114	124	120	154	217	171
Temperature (Field)	deg c	--	15	5	7	6	5	9	13
Total Organic Carbon	mg/l	--	--	4.7	3.9	3.8	5.3	6.8	2.9
Total Suspended Solids	mg/l	--	--	9200	3420	5040	1010	324	5560
Turbidity	ntu	--	5 ⁽¹²⁾	>100	>100	>100	>100	>100	100
Turbidity (Field)	ntu	--	5 ⁽¹²⁾	>100	>100	>100	>100	>100	>100
Metals									
Aluminum, dissolved	mg/l	--	--	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
Arsenic, dissolved	mg/l	0.025	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium, dissolved	mg/l	1	--	0.07	0.06	0.09	0.08	0.16	0.09
Beryllium, dissolved	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron, dissolved	mg/l	5	--	<0.01	0.10	0.02	0.03	0.16	0.01
Cadmium, dissolved	mg/l	0.005	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcium, dissolved	mg/l	--	--	177	98	175	195	228	206
Chromium, dissolved	mg/l	0.05	--	0.007	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt, dissolved	mg/l	--	--	<0.0002	<0.0002	0.0002	0.0018	0.0027	0.0026
Copper, dissolved	mg/l	--	1	0.002	0.001	0.001	0.002	<0.001	<0.001
Iron, dissolved	mg/l	--	0.3	<0.03	<0.03	<0.03	0.13	0.34	0.10
Lead, dissolved	mg/l	0.01	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium, dissolved	mg/l	--	--	36	18	34	39	44	41
Manganese, dissolved	mg/l	--	0.05	<0.01	0.01	0.03	0.17	0.78	0.27
Molybdenum, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel, dissolved	mg/l	--	--	<0.005	<0.005	<0.005	<0.005	0.007	<0.005
Potassium, dissolved	mg/l	--	--	2	2	2	2	3	2
Selenium, dissolved	mg/l	0.01	--	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
Silver, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium, dissolved	mg/l	--	200 ⁽¹⁴⁾	26	56	32	80	138	50
Strontium, dissolved	mg/l	--	--	0.421	1.33	0.542	1.30	5.61	0.676
Thallium, dissolved	mg/l	--	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium, dissolved	mg/l	--	--	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc, dissolved	mg/l	--	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Petroleum Hydrocarbons									
Benzene	mg/l	0.005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/l	--	0.0024	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
m,p-Xylenes	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004
o-Xylene	mg/l	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	--	<0.1	--	--	<0.02	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	--	<0.1	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	--	<0.1	--	--	<0.02	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	--	<0.2	--	--	<0.05	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	--	<0.2	--	--	<0.05	--
Toluene	mg/l	--	0.024	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Xylenes, Total	mg/l	--	0.3	--	<0.0010	--	<0.0010	<0.0005	--

Parameter	Unit	(2) (1)	(4) (3)	Construction MW 04		Post-Construction MW 04			
		ODWQS(169/03)- Health	ODWQS- AO	03-Feb-2014 ^(2b)	26-May-2014	09-Oct-2014	24-Mar-2015	17-Jun-2015	27-Aug-2015
				S-5	MW - 4	MW 4	S-2	S-1	S-2
Semi-VOCs									
1-Methylnaphthalene	mg/l	--	--	--	--	--	--	--	--
2-Methylnaphthalene	mg/l	--	--	--	--	--	--	--	--
Acenaphthene	mg/l	--	--	--	--	--	--	--	--
Acenaphthylene	mg/l	--	--	--	--	--	--	--	--
Anthracene	mg/l	--	--	--	--	--	--	--	--
Benzo[a]anthracene	mg/l	--	--	--	--	--	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	--	--	--	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	--	--	--	--	--	--
Chrysene	mg/l	--	--	--	--	--	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	--	--	--	--	--	--
Fluoranthene	mg/l	--	--	--	--	--	--	--	--
Fluorene	mg/l	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	--	--	--	--	--	--
Naphthalene	mg/l	--	--	--	--	--	--	--	--
Phenanthrene	mg/l	--	--	--	--	--	--	--	--
Pyrene	mg/l	--	--	--	--	--	--	--	--
Styrene	mg/l	--	--	--	<0.0005	--	--	<0.0005	--
VOCs									
1,1,1,2-Tetrachloroethane	mg/l	--	--	--	<0.0005	--	--	<0.0005	--
1,1,1-Trichloroethane	mg/l	--	--	--	<0.0004	--	--	<0.0004	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	--	<0.0005	--	--	<0.0005	--
1,1,2-Trichloroethane	mg/l	--	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethane	mg/l	--	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethylene	mg/l	0.014	--	--	<0.0005	--	--	<0.0005	--
1,2-Dibromoethane	mg/l	--	--	--	<0.0002	--	--	<0.0002	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	--	<0.0004	--	--	<0.0004	--
1,2-Dichloroethane	mg/l	0.005	--	--	<0.0002	--	--	<0.0002	--
1,2-Dichloropropane	mg/l	--	--	--	<0.0005	--	--	<0.0005	--
1,3,5-Trimethylbenzene	mg/l	--	--	--	<0.0003	--	--	<0.0003	--
1,3-Dichlorobenzene	mg/l	--	--	--	<0.0004	--	--	<0.0004	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	--	<0.0004	--	--	<0.0004	--
Bromodichloromethane	mg/l	--	--	--	<0.0003	--	--	<0.0003	--
Bromoform	mg/l	--	--	--	<0.0004	--	--	<0.0004	--
Bromomethane	mg/l	--	--	--	<0.0005	--	--	<0.0005	--
Carbon Tetrachloride	mg/l	0.005	--	--	<0.0002	--	--	<0.0002	--
Chlorobenzene	mg/l	0.08	0.03	--	<0.0002	--	--	<0.0002	--
Chloroethane	mg/l	--	--	--	<0.0002	--	--	<0.0002	--
Chloroform	mg/l	--	--	--	<0.0005	--	--	<0.0005	--
Chloromethane	mg/l	--	--	--	<0.0002	--	--	<0.0002	--
cis-1,2-Dichloroethene	mg/l	--	--	--	<0.0004	--	--	<0.0004	--
cis-1,2-Dichloropropene	mg/l	--	--	--	<0.0002	--	--	<0.0002	--
Dibromochloromethane	mg/l	--	--	--	<0.0003	--	--	<0.0003	--
Dichlorodifluoromethane	mg/l	--	--	--	<0.0005	--	--	<0.0005	--
Methylene Chloride	mg/l	0.05	--	--	<0.0040	--	--	<0.0040	--
Tetrachloroethylene	mg/l	0.03	--	--	<0.0003	--	--	<0.0003	--
trans-1,2-Dichloroethene	mg/l	--	--	--	<0.0004	--	--	<0.0004	--
trans-1,3-Dichloropropene	mg/l	--	--	--	<0.0002	--	--	<0.0002	--
Trichloroethene	mg/l	0.005	--	--	<0.0003	--	--	<0.0003	--
Trichlorofluoromethane	mg/l	--	--	--	<0.0005	--	--	<0.0005	--
Vinyl Chloride	mg/l	0.002	--	--	<0.0002	--	--	<0.0002	--

Parameter	Unit	(2) (1) ODWQS/169/ 03)-Health	(4) (3) ODWQS- AO	Pre-Construction MW 05				Construction MW 05						
				29-Nov-2010 S-2	28-Feb-2011 (30) MW 05	07-Apr-2011 (31) S-1	11-May-2012 S- 7	14-Jun-2012 (7) S-6	17-Sep-2012 (32) sw5	18-Dec-2012 S-7	11-Apr-2013 (33) S-1	05-Jul-2013 S- 7	21-Oct-2013 S- 7	03-Feb-2014 (34) m5
General Chemistry														
Alkalinity (Total as CaCO3)	mg/l	--	--	387	--	304	299	384	--	329	335	354	360	--
Ammonia, unionized	mg/l	--	--	<0.02	--	<0.02	<0.02	<0.02	--	<0.02	<0.02	<0.02	<0.02	--
Ammonia Nitrogen	mg/l	--	--	0.02	--	0.03	0.03	0.24	--	0.02	0.06	<0.02	0.02	--
Ammonium	mg/l	--	--	0.02	--	0.03	0.03	0.24	--	0.02	0.06	<0.02	0.02	--
Bicarbonate	mg/l	--	--	387	--	304	299	384	--	329	335	354	360	--
Bromide	mg/l	--	--	1.07	--	<0.25	0.66	1.10	--	<0.25	<0.50	0.41	0.35	--
Carbonate (CO3)	mg/l	--	--	<2 (16)	--	<2 (16)	<1 (16)	<1 (16)	--	<1 (16)	<1 (16)	<1 (16)	<1 (16)	--
Color	color unit	--	5	3	--	9	4	2	--	<2	5	2	<2	--
Conductivity	uS/cm	--	--	3790	--	--	3150	3980	--	3920	3600	4390	4090	--
Conductivity (Field)	uS/cm	--	--	3250	--	2390	2405	4010	--	2880	3600	4400	>4000	--
Fluoride	mg/l	1.5	--	<0.10	--	<0.10	<0.10	<0.10	--	<0.10	<0.10	<0.10	<0.10	--
Hardness, Calcium Carbonate	mg/l	--	--	508	--	1360	378	491	--	460	572	612	400	--
Nitrate as N	mg/l	10	--	<0.10	--	0.24	<0.10	<0.10	--	<0.10	<0.10	<0.10	<0.10	--
Nitrite as N	mg/l	1	--	<0.10	--	<0.10	<0.10	<0.10	--	<0.10	<0.10	<0.10	<0.10	--
pH	-	--	--	7.84	--	--	8.10	7.91	--	7.94	7.88	7.95	7.94	--
pH (Field)	-	--	--	7.5	--	7.7	7.5	7.9	--	7.8	7.66	8.0	7.8	--
Phosphorus	mg/l	--	--	2.86	--	1.73	2.24	0.74	--	1.94	5.43	1.66	1.32	--
Sulfate	mg/l	--	500 (11)	60	--	78	50	61	--	61	52	61	68	--
Temperature (Field)	deg c	--	15	7.9	--	5.8	12	13	--	7	5	13	9	--
Total Organic Carbon	mg/l	--	--	4.4	--	2.8	2.5	2.1	--	2.7	3.0	2.7	3.2	--
Total Suspended Solids	mg/l	--	--	3040	--	11200	2480	577	--	1810	22800	1980	3680	--
Turbidity	ntu	--	5 (12)	>100	--	--	<0.1	>100	--	>100	41.7 (13)	>100	>100	--
Turbidity (Field)	ntu	--	5 (12)	--	--	--	180	185	--	149	-- (13)	>100	>100	--
Metals														
Aluminum, dissolved	mg/l	--	--	<0.01	--	<0.1	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--
Arsenic, dissolved	mg/l	0.025	--	<0.001	--	<0.01	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	--
Barium, dissolved	mg/l	1	--	0.20	--	0.2	0.14	0.22	--	0.19	0.18	0.27	0.22	--
Beryllium, dissolved	mg/l	--	--	<0.001	--	<0.005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	--
Boron, dissolved	mg/l	5	--	0.06	--	<0.1	0.04	0.04	--	0.05	0.03	0.03	0.04	--
Cadmium, dissolved	mg/l	0.005	--	<0.0001	--	<0.001	<0.0001	<0.0001	--	<0.0001	<0.0001	<0.0001	<0.0001	--
Calcium, dissolved	mg/l	--	--	136	--	477	92	124	--	110	145	156	99	--
Chromium, dissolved	mg/l	0.05	--	<0.005	--	<0.01	0.005	0.002	--	0.005	0.006	0.007	0.007	--
Cobalt, dissolved	mg/l	--	--	0.0019	--	<0.002	<0.0002	0.0003	--	<0.0002	<0.0002	0.0004	0.0003	--
Copper, dissolved	mg/l	--	1	0.002	--	<0.01	0.002	0.001	--	<0.001	0.001	<0.001	<0.001	--
Iron, dissolved	mg/l	--	0.3	<0.03	--	<0.3	<0.03	<0.03	--	<0.03	<0.03	<0.03	<0.03	--
Lead, dissolved	mg/l	0.01	--	<0.001	--	<0.01	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	--
Magnesium, dissolved	mg/l	--	--	41	--	41	36	44	--	45	51	54	37	--
Manganese, dissolved	mg/l	--	0.05	0.33	--	0.2	<0.01	0.05	--	<0.01	0.02	0.22	0.05	--
Molybdenum, dissolved	mg/l	--	--	<0.005	--	<0.05	<0.005	<0.005	--	<0.005	<0.005	<0.005	<0.005	--
Nickel, dissolved	mg/l	--	--	0.006	--	<0.05	<0.005	0.005	--	<0.005	<0.005	0.007	<0.005	--
Potassium, dissolved	mg/l	--	--	4	--	3	3	3	--	3	3	4	3	--
Selenium, dissolved	mg/l	0.01	--	<0.001	--	<0.01	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	--
Silver, dissolved	mg/l	--	--	<0.0001	--	<0.001	<0.0001	<0.0001	--	<0.0001	<0.0001	<0.0001	<0.0001	--
Sodium, dissolved	mg/l	--	200 (14)	592	--	2420	531	523	--	607	604	706	582	--
Strontium, dissolved	mg/l	--	--	0.780	--	0.68	0.625	0.912	--	0.782	0.794	1.10	0.779	--
Thallium, dissolved	mg/l	--	--	<0.0001	--	<0.001	<0.0001	<0.0001	--	<0.0001	<0.0001	<0.0001	<0.0001	--
Titanium, dissolved	mg/l	--	--	<0.01	--	<0.1	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--
Vanadium, dissolved	mg/l	--	--	0.004	--	<0.01	0.001	<0.001	--	0.001	0.002	0.002	0.002	--
Zinc, dissolved	mg/l	--	5	<0.01	--	<0.1	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--
Petroleum Hydrocarbons														
Benzene	mg/l	0.005	--	<0.0005	--	<0.001	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	--
Ethylbenzene	mg/l	--	0.0024	<0.0005	--	<0.001	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	--
m,p-Xylenes	mg/l	--	--	<0.0010	--	<0.0020	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	--
o-Xylene	mg/l	--	--	<0.0005	--	<0.001	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	--
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	--	<0.1	<0.1	<0.1	--	--	<0.1	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	--	--	--	<0.1	<0.1	--	--	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	<0.1	--	0.2	<0.1	--	--	--	<0.1	--	--	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	0.6	--	<0.2	<0.2	--	--	--	<0.2	--	--	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	<0.2	--	<0.2	<0.2	--	--	--	<0.2	--	--	--
Toluene	mg/l	--	0.024	<0.0005	--	<0.001	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	--
Xylenes, Total	mg/l	--	0.3	--	--	<0.003	<0.0010	<0.0010	--	--	<0.0010	--	--	--

Parameter	Unit	(2) (1) ODWQS/169/ 03-Health	(4) (3) ODWQS- AO	Pre-Construction MW 05				Construction MW 05						
				29-Nov-2010 S-2	28-Feb-2011 ⁽²⁾ MW 05	07-Apr-2011 ⁽³⁾ S-1	11-May-2012 S - 7	14-Jun-2012 ⁽¹⁾ S-6	17-Sep-2012 ⁽²⁾ sw5	18-Dec-2012 S-7	11-Apr-2013 ⁽³⁾ S-1	05-Jul-2013 S-7	21-Oct-2013 S - 7	03-Feb-2014 ⁽³⁾ ms
Semi-VOCs														
1-Methylnaphthalene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
2-Methylnaphthalene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Acenaphthene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Acenaphthylene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Anthracene	mg/l	--	--	<0.00001	--	<0.00001	<0.00001	--	--	--	<0.0001	--	--	--
Benzo[a]anthracene	mg/l	--	--	<0.00001	--	<0.00001	<0.00001	--	--	--	<0.0001	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	<0.00001	--	<0.00001	<0.00001	--	--	--	<0.00001	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Chrysene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Fluoranthene	mg/l	--	--	<0.00002	--	0.00005	<0.00002	--	--	--	<0.0001	--	--	--
Fluorene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Naphthalene	mg/l	--	--	<0.00002	--	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Phenanthrene	mg/l	--	--	<0.00002	--	<0.00002	0.00005	--	--	--	<0.0001	--	--	--
Pyrene	mg/l	--	--	<0.00002	--	0.00007	0.00002	--	--	--	<0.0001	--	--	--
Styrene	mg/l	--	--	<0.0005	--	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
VOCs														
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	--	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	--	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
1,1-Dichloroethane	mg/l	--	--	<0.0004	--	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	--	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
1,2-Dibromoethane	mg/l	--	--	<0.0010	--	<0.0020	<0.0002	<0.0002	--	--	<0.0002	--	--	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	--	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
1,2-Dichloroethane	mg/l	0.005	--	<0.0005	--	<0.001	<0.0002	<0.0002	--	--	<0.0002	--	--	--
1,2-Dichloropropane	mg/l	--	--	<0.0005	--	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	--	<0.0006	<0.0003	<0.0003	--	--	<0.0003	--	--	--
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	--	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	--	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
Bromodichloromethane	mg/l	--	--	<0.0003	--	<0.0006	<0.0003	<0.0003	--	--	<0.0003	--	--	--
Bromoform	mg/l	--	--	<0.0004	--	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
Bromomethane	mg/l	--	--	<0.0005	--	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
Carbon Tetrachloride	mg/l	0.005	--	<0.0005	--	<0.001	<0.0002	<0.0002	--	--	<0.0002	--	--	--
Chlorobenzene	mg/l	0.08	0.03	<0.0002	--	<0.0004	<0.0002	<0.0002	--	--	<0.0002	--	--	--
Chloroethane	mg/l	--	--	<0.0010	--	<0.0020	<0.0002	<0.0002	--	--	<0.0002	--	--	--
Chloroform	mg/l	--	--	<0.0005	--	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
Chloromethane	mg/l	--	--	<0.0010	--	<0.0020	<0.0002	<0.0002	--	--	<0.0002	--	--	--
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	--	<0.0004	<0.0002	<0.0002	--	--	<0.0002	--	--	--
Dibromochloromethane	mg/l	--	--	<0.0003	--	<0.0006	<0.0003	<0.0003	--	--	<0.0003	--	--	--
Dichlorodifluoromethane	mg/l	--	--	--	--	--	<0.0005	<0.0005	--	--	<0.0005	--	--	--
Methylene Chloride	mg/l	0.05	--	<0.0040	--	<0.0080	<0.0040	<0.0040	--	--	<0.0040	--	--	--
Tetrachloroethylene	mg/l	0.03	--	<0.0003	--	<0.0006	<0.0003	<0.0003	--	--	<0.0003	--	--	--
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	--	<0.0004	<0.0002	<0.0002	--	--	<0.0002	--	--	--
Trichloroethene	mg/l	0.005	--	<0.0003	--	<0.0006	<0.0003	<0.0003	--	--	<0.0003	--	--	--
Trichlorofluoromethane	mg/l	--	--	<0.0005	--	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
Vinyl Chloride	mg/l	0.002	--	<0.0002	--	<0.0004	<0.0002	<0.0002	--	--	<0.0002	--	--	--

Parameter	Unit	(2) (1) ODWQS(169/ 03)-Health	(4) (3) ODWQS- AO	Construction MW 05	Post-Construction MW 05				
				26-May-2014	09-Oct-2014	24-Mar-2015 ⁽³⁰⁾	17-Jun-2015 ⁽¹⁷⁾	27-Aug-2015 ⁽³²⁾	
				MW - 5	MW 5	5	S-6	S5	
General Chemistry									
Alkalinity (Total as CaCO3)	mg/l	--	--	409	368	--	419	--	
Ammonia, unionized	mg/l	--	--	<0.02	<0.02	--	<0.05	--	
Ammonia Nitrogen	mg/l	--	--	0.07	0.05	--	<0.05	--	
Ammonium	mg/l	--	--	0.07	0.05	--	<0.05	--	
Bicarbonate	mg/l	--	--	409	368	--	419	--	
Bromide	mg/l	--	--	0.94	<0.25	--	<0.50	--	
Carbonate (CO3)	mg/l	--	--	<1 ⁽¹⁶⁾	<1 ⁽¹⁶⁾	--	<1 ⁽¹⁶⁾	--	
Color	color unit	--	5	13	2	--	4	--	
Conductivity	uS/cm	--	--	4420	3760	--	3450	--	
Conductivity (Field)	uS/cm	--	--	4150	4210	--	3720	--	
Fluoride	mg/l	1.5	--	<0.10	<0.10	--	<0.10	--	
Hardness, Calcium Carbonate	mg/l	--	--	580	495	--	610	--	
Nitrate as N	mg/l	10	--	<0.10	<0.10	--	<0.10	--	
Nitrite as N	mg/l	1	--	<0.10	<0.10	--	<0.10	--	
pH	-	--	--	7.78	7.90	--	7.74	--	
pH (Field)	-	--	--	7.6	7.4	--	7.7	--	
Phosphorus	mg/l	--	--	4.01	2.39	--	1.61	--	
Sulfate	mg/l	--	500 ⁽¹¹⁾	77	64	--	60	--	
Temperature (Field)	deg c	--	15	8	7	--	10	--	
Total Organic Carbon	mg/l	--	--	3.2	3.7	--	1.3	--	
Total Suspended Solids	mg/l	--	--	3630	1730	--	1840	--	
Turbidity	ntu	--	5 ⁽¹²⁾	>100	>100	--	>100	--	
Turbidity (Field)	ntu	--	5 ⁽¹²⁾	>100	>100	--	>100	--	
Metals									
Aluminum, dissolved	mg/l	--	--	<0.01	<0.01	--	<0.1	--	
Arsenic, dissolved	mg/l	0.025	--	<0.001	<0.001	--	<0.01	--	
Barium, dissolved	mg/l	1	--	0.26	0.19	--	0.2	--	
Beryllium, dissolved	mg/l	--	--	<0.0005	<0.0005	--	<0.005	--	
Boron, dissolved	mg/l	5	--	0.04	0.03	--	<0.1	--	
Cadmium, dissolved	mg/l	0.005	--	<0.0001	<0.0001	--	<0.001	--	
Calcium, dissolved	mg/l	--	--	150	142	--	180	--	
Chromium, dissolved	mg/l	0.05	--	<0.001	<0.001	--	<0.01	--	
Cobalt, dissolved	mg/l	--	--	<0.0002	<0.0002	--	<0.002	--	
Copper, dissolved	mg/l	--	1	<0.001	<0.001	--	<0.01	--	
Iron, dissolved	mg/l	--	0.3	<0.03	<0.03	--	<0.3	--	
Lead, dissolved	mg/l	0.01	--	<0.001	<0.001	--	<0.01	--	
Magnesium, dissolved	mg/l	--	--	50	34	--	39	--	
Manganese, dissolved	mg/l	--	0.05	<0.01	0.05	--	0.2	--	
Molybdenum, dissolved	mg/l	--	--	<0.005	<0.005	--	<0.05	--	
Nickel, dissolved	mg/l	--	--	<0.005	<0.005	--	<0.05	--	
Potassium, dissolved	mg/l	--	--	2	4	--	2	--	
Selenium, dissolved	mg/l	0.01	--	<0.001	<0.001	--	<0.01	--	
Silver, dissolved	mg/l	--	--	<0.0001	<0.0001	--	<0.001	--	
Sodium, dissolved	mg/l	--	200 ⁽¹⁴⁾	715	603	--	499	--	
Strontium, dissolved	mg/l	--	--	1.08	0.818	--	0.56	--	
Thallium, dissolved	mg/l	--	--	<0.0001	<0.0001	--	<0.001	--	
Titanium, dissolved	mg/l	--	--	<0.01	<0.01	--	<0.1	--	
Vanadium, dissolved	mg/l	--	--	<0.001	<0.001	--	<0.01	--	
Zinc, dissolved	mg/l	--	5	<0.01	<0.01	--	<0.1	--	
Petroleum Hydrocarbons									
Benzene	mg/l	0.005	--	<0.0005	<0.0005	--	<0.0005	--	
Ethylbenzene	mg/l	--	0.0024	<0.0005	<0.0005	--	<0.0005	--	
m,p-Xylenes	mg/l	--	--	<0.0005	<0.0005	--	<0.0004	--	
o-Xylene	mg/l	--	--	<0.0005	<0.0005	--	<0.0004	--	
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	--	--	<0.02	--	
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	<0.1	--	--	--	--	
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	<0.1	--	--	<0.02	--	
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	<0.2	--	--	<0.05	--	
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	<0.2	--	--	<0.05	--	
Toluene	mg/l	--	0.024	<0.0005	<0.0005	--	<0.0005	--	
Xylenes, Total	mg/l	--	0.3	<0.0010	--	--	<0.0005	--	

Parameter	Unit	(2) (1) ODWQS(169/ 03)-Health	(4) (3) ODWQS- AO	Construction MW 05	Post-Construction MW 05			
				26-May-2014	09-Oct-2014	24-Mar-2015 ⁽³⁰⁾	17-Jun-2015 ⁽¹⁷⁾	27-Aug-2015 ⁽³²⁾
				MW - 5	MW 5	5	S-6	55
Semi-VOCs								
1-Methylnaphthalene	mg/l	--	--	--	--	--	--	--
2-Methylnaphthalene	mg/l	--	--	--	--	--	--	--
Acenaphthene	mg/l	--	--	--	--	--	--	--
Acenaphthylene	mg/l	--	--	--	--	--	--	--
Anthracene	mg/l	--	--	--	--	--	--	--
Benzo[a]anthracene	mg/l	--	--	--	--	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	--	--	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	--	--	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	--	--	--	--	--
Chrysene	mg/l	--	--	--	--	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	--	--	--	--	--
Fluoranthene	mg/l	--	--	--	--	--	--	--
Fluorene	mg/l	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	--	--	--	--	--
Naphthalene	mg/l	--	--	--	--	--	--	--
Phenanthrene	mg/l	--	--	--	--	--	--	--
Pyrene	mg/l	--	--	--	--	--	--	--
Styrene	mg/l	--	--	<0.0005	--	--	<0.0005	--
VOCs								
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	--	--	<0.0005	--
1,2-Dibromoethane	mg/l	--	--	<0.0002	--	--	<0.0002	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	--	--	<0.0004	--
1,2-Dichloroethane	mg/l	0.005	--	<0.0002	--	--	<0.0002	--
1,2-Dichloropropane	mg/l	--	--	<0.0005	--	--	<0.0005	--
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	--	--	<0.0003	--
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	--	--	<0.0004	--
Bromodichloromethane	mg/l	--	--	<0.0003	--	--	<0.0003	--
Bromoform	mg/l	--	--	<0.0004	--	--	<0.0004	--
Bromomethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
Carbon Tetrachloride	mg/l	0.005	--	<0.0002	--	--	<0.0002	--
Chlorobenzene	mg/l	0.08	0.03	<0.0002	--	--	<0.0002	--
Chloroethane	mg/l	--	--	<0.0002	--	--	<0.0002	--
Chloroform	mg/l	--	--	<0.0005	--	--	<0.0005	--
Chloromethane	mg/l	--	--	<0.0002	--	--	<0.0002	--
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	<0.0004	--
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	--	--	<0.0002	--
Dibromochloromethane	mg/l	--	--	<0.0003	--	--	<0.0003	--
Dichlorodifluoromethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
Methylene Chloride	mg/l	0.05	--	<0.0040	--	--	<0.0040	--
Tetrachloroethylene	mg/l	0.03	--	<0.0003	--	--	<0.0003	--
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	<0.0004	--
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	--	--	<0.0002	--
Trichloroethene	mg/l	0.005	--	<0.0003	--	--	<0.0003	--
Trichlorofluoromethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
Vinyl Chloride	mg/l	0.002	--	<0.0002	--	--	<0.0002	--

Parameter	Unit	(2) (1) ODWQS(169/ 03)-Health	(4) (3) ODWQS- AO	Pre-Construction MW 06				Construction MW 06						
				26-Nov-2010 ⁽³⁴⁾	28-Feb-2011 ⁽³⁵⁾	07-Apr-2011 ⁽³⁶⁾	11-May-2012 ⁽³⁷⁾	14-Jun-2012 ⁽³⁸⁾	17-Sep-2012 ⁽³²⁾	18-Dec-2012	11-Apr-2013	05-Jul-2013	21-Oct-2013	03-Feb-2014
				S-6	S - 6	S-7	S - 6	S-5	sw6	S-3	S-2	S-3	S - 4	S-6
General Chemistry														
Alkalinity (Total as CaCO3)	mg/l	--	--	256	242	288	410	549	--	384	568	646	638	465
Ammonia, unionized	mg/l	--	--	<0.02	<0.02	<0.02	<0.02	<0.02	--	<0.02	<0.02	<0.02	<0.02	<0.02
Ammonia, unionized (Field)	mg/l	--	--	<0.02	--	--	--	--	--	--	--	--	--	--
Ammonia Nitrogen	mg/l	--	--	0.07	0.07	0.09	0.13	0.18	--	0.05	0.07	0.12	0.05	0.08
Ammonium	mg/l	--	--	--	--	--	0.13	0.18	--	0.05	0.07	0.12	0.05	0.08
Bicarbonate	mg/l	--	--	256	242	288	410	549	--	384	568	646	638	465
Bromide	mg/l	--	--	<0.25	<0.25	<0.25	<0.50	<0.50	--	<0.25	<0.25	<0.25	<0.25	<0.25
Carbonate (CO3)	mg/l	--	--	<2 ⁽¹⁰⁾	<2 ⁽¹⁰⁾	<2 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	--	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾
Color	color unit	--	5	9	4	14	34	119	--	73	72	81	79	31
Conductivity	uS/cm	--	--	7400	17800	--	11700	5790	--	1910	2960	2450	3150	1930
Conductivity (Field)	uS/cm	--	--	>3995	>5000	2270	>5000	>4000	--	2000	3100	2400	2365	3090
Fluoride	mg/l	1.5	--	0.11	<0.10	<0.10	0.10	0.16	--	0.20	0.17	0.21	0.20	0.20
Hardness, Calcium Carbonate	mg/l	--	--	811	1680	1230	911	815	--	117	185	171	164	193
Nitrate as N	mg/l	10	--	0.15	0.37	0.27	<0.10	<0.10	--	0.37	0.19	<0.10	0.18	0.24
Nitrite as N	mg/l	1	--	<0.10	<0.10	<0.10	<0.10	<0.10	--	<0.10	<0.10	<0.10	<0.10	<0.10
pH	-	--	--	--	7.37	--	7.51	7.86	--	7.88	7.75	7.76	7.75	7.86
pH (Field)	-	--	--	6.62	7.1	7.48	6.98	7.8	--	7.8	7.1	7.8	7.6	7.6
Phosphorus	mg/l	--	--	0.15	2.35	4.86	6.53	2.71	--	2.90	2.26	4.84	2.75	4.77
Sulfate	mg/l	--	500 ⁽¹¹⁾	24	92	81	93	65	--	78	160	231	437	160
Temperature (Field)	deg c	--	15	5.6	6.7	6.5	9	12	--	6	4	12	7	6
Total Organic Carbon	mg/l	--	--	6.5	4.7	6.0	9.2	15.8	--	10.8	12.5	19.6	30.6	14.3
Total Suspended Solids	mg/l	--	--	25000	18300	17300	11400	8420	--	4720	4250	6750	4570	13800
Turbidity	ntu	--	5 ⁽¹²⁾	>100	>100	--	<0.1	>100	--	>100	>100	>100	>100	>100
Turbidity (Field)	ntu	--	5 ⁽¹²⁾	--	--	--	169	165	--	182	438	>100	80.2	>100
Metals														
Aluminum, dissolved	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	--	0.02	0.02	0.03	0.04	0.01
Arsenic, dissolved	mg/l	0.025	--	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.001	<0.001	<0.01	<0.001	<0.001
Barium, dissolved	mg/l	1	--	0.4	0.7	0.4	0.3	0.4	--	0.02	0.04	0.04	0.05	0.03
Beryllium, dissolved	mg/l	--	--	<0.01	<0.005	<0.005	<0.005	<0.005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron, dissolved	mg/l	5	--	<0.1	<0.1	<0.1	<0.1	<0.1	--	0.01	0.01	0.04	0.03	0.01
Cadmium, dissolved	mg/l	0.005	--	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcium, dissolved	mg/l	--	--	292	592	440	327	290	--	42	66	62	59	64
Chromium, dissolved	mg/l	0.05	--	<0.005	<0.005	<0.005	<0.05	<0.01	--	0.010	<0.005	0.006	0.010	0.010
Cobalt, dissolved	mg/l	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.0002	<0.0002	0.0017	0.0004	<0.0002
Copper, dissolved	mg/l	--	1	<0.01	<0.01	<0.01	<0.01	<0.01	--	0.004	0.005	0.004	0.007	0.003
Iron, dissolved	mg/l	--	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	--	0.06	0.04	0.44	0.10	<0.03
Lead, dissolved	mg/l	0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium, dissolved	mg/l	--	--	20	49	32	23	22	--	3	5	4	4	8
Manganese, dissolved	mg/l	--	0.05	0.2	0.3	<0.1	0.2	<0.1	--	0.01	<0.01	0.29	0.03	0.03
Molybdenum, dissolved	mg/l	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel, dissolved	mg/l	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.005	<0.005	<0.005	<0.005	<0.005
Potassium, dissolved	mg/l	--	--	4	3	3	<1	2	--	1	2	1	<1	8
Selenium, dissolved	mg/l	0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.001	<0.001	<0.001	<0.001	<0.001
Silver, dissolved	mg/l	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium, dissolved	mg/l	--	200 ⁽¹⁴⁾	1230	2910	2080	2390	2070	--	371	693	545	590	372
Strontium, dissolved	mg/l	--	--	2.39	4.91	3.20	2.44	2.59	--	0.232	0.421	0.391	0.389	0.435
Thallium, dissolved	mg/l	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium, dissolved	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	--	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium, dissolved	mg/l	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	--	0.004	0.005	0.006	0.006	0.003
Zinc, dissolved	mg/l	--	5	<0.1	<0.1	<0.1	<0.1	<0.1	--	<0.01	<0.01	<0.01	<0.01	<0.01
Petroleum Hydrocarbons														
Benzene	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/l	--	0.0024	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
m,p-Xylenes	mg/l	--	--	<0.0010	<0.0010	<0.0020	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
o-Xylene	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	--	<0.1	--	<0.1	<0.1	--	--	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	<0.1	<0.1	<0.1	<0.1	--	--	--	<0.1	--	--	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	<0.2	<0.2	<0.2	<0.2	--	--	--	<0.2	--	--	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	<0.2	<0.2	<0.2	<0.2	--	--	--	<0.2	--	--	--
Toluene	mg/l	--	0.024	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Xylenes, Total	mg/l	--	0.3	--	<0.0015	<0.003	<0.0010	<0.0010	--	--	<0.0010	--	--	--

Parameter	Unit	(2) (1) ODWQS(169/ 03)-Health	(4) (3) ODWQS- AO	Pre-Construction MW 06				Construction MW 06						
				26-Nov-2010 ⁽³⁴⁾	28-Feb-2011 ⁽³⁵⁾	07-Apr-2011 ⁽³⁶⁾	11-May-2012 ⁽³⁷⁾	14-Jun-2012 ⁽³⁸⁾	17-Sep-2012 ⁽³²⁾	18-Dec-2012	11-Apr-2013	05-Jul-2013	21-Oct-2013	03-Feb-2014
				S-6	S - 6	S-7	S - 6	S-5	sw6	S-3	S-2	S-3	S - 4	S-6
Semi-VOCs														
1-Methylnaphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
2-Methylnaphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Acenaphthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Acenaphthylene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Anthracene	mg/l	--	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	<0.0001	--	--	--
Benzo[a]anthracene	mg/l	--	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	<0.0001	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	<0.00001	<0.00002	<0.00001	<0.00001	--	--	--	<0.00001	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Chrysene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.00005	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Fluoranthene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Fluorene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Naphthalene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Phenanthrene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Pyrene	mg/l	--	--	<0.00002	<0.00004	<0.00002	<0.00002	--	--	--	<0.0001	--	--	--
Styrene	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
VOCs														
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	<0.0008	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	<0.0008	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
1,1-Dichloroethane	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
1,2-Dibromoethane	mg/l	--	--	<0.0010	<0.0010	<0.0020	<0.0002	<0.0002	--	--	<0.0002	--	--	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
1,2-Dichloroethane	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0002	<0.0002	--	--	<0.0002	--	--	--
1,2-Dichloropropane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	--	--	<0.0003	--	--	--
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
Bromodichloromethane	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	--	--	<0.0003	--	--	--
Bromoform	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
Bromomethane	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
Carbon Tetrachloride	mg/l	0.005	--	<0.0005	<0.0005	<0.001	<0.0002	<0.0002	--	--	<0.0002	--	--	--
Chlorobenzene	mg/l	0.08	0.03	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	--	--	<0.0002	--	--	--
Chloroethane	mg/l	--	--	<0.0010	<0.0020	<0.0020	<0.0002	<0.0002	--	--	<0.0002	--	--	--
Chloroform	mg/l	--	--	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
Chloromethane	mg/l	--	--	<0.0010	<0.0020	<0.0020	<0.0002	<0.0002	--	--	<0.0002	--	--	--
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	--	--	<0.0002	--	--	--
Dibromochloromethane	mg/l	--	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	--	--	<0.0003	--	--	--
Dichlorodifluoromethane	mg/l	--	--	--	--	--	<0.0005	<0.0005	--	--	<0.0005	--	--	--
Methylene Chloride	mg/l	0.05	--	<0.0040	<0.0040	<0.0080	<0.0040	<0.0040	--	--	<0.0040	--	--	--
Tetrachloroethylene	mg/l	0.03	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	--	--	<0.0003	--	--	--
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	<0.0004	<0.0008	<0.0004	<0.0004	--	--	<0.0004	--	--	--
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	--	--	<0.0002	--	--	--
Trichloroethene	mg/l	0.005	--	<0.0003	<0.0003	<0.0006	<0.0003	<0.0003	--	--	<0.0003	--	--	--
Trichlorofluoromethane	mg/l	--	--	<0.0005	<0.001	<0.001	<0.0005	<0.0005	--	--	<0.0005	--	--	--
Vinyl Chloride	mg/l	0.002	--	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	--	--	<0.0002	--	--	--

Parameter	Unit	(2) (1) ODWQS(169/ 03)-Health	(4) (3) ODWQS- AO	Construction MW 06	Post-Construction MW 06			
				26-May-2014	09-Oct-2014 ⁽²⁾	24-Mar-2015	17-Jun-2015	27-Aug-2015 ⁽²⁾
				MW - 6	6	S-3	S-4	66
General Chemistry								
Alkalinity (Total as CaCO3)	mg/l	--	--	480	--	262	388	--
Ammonia, unionized	mg/l	--	--	<0.02	--	<0.02	<0.05	--
Ammonia, unionized (Field)	mg/l	--	--	--	--	--	--	--
Ammonia Nitrogen	mg/l	--	--	0.08	--	0.02	0.08	--
Ammonium	mg/l	--	--	0.08	--	0.02	0.08	--
Bicarbonate	mg/l	--	--	480	--	262	388	--
Bromide	mg/l	--	--	<0.25	--	<0.25	<0.25	--
Carbonate (CO3)	mg/l	--	--	<1 ⁽¹⁰⁾	--	<1 ⁽¹⁰⁾	<1 ⁽¹⁰⁾	--
Color	color unit	--	5	35	--	134	33	--
Conductivity	uS/cm	--	--	1560	--	937	1440	--
Conductivity (Field)	uS/cm	--	--	2205	--	2180	1010	--
Fluoride	mg/l	1.5	--	0.23	--	0.16	0.18	--
Hardness, Calcium Carbonate	mg/l	--	--	179	--	162	234	--
Nitrate as N	mg/l	10	--	<0.10	--	0.80	0.10	--
Nitrite as N	mg/l	1	--	<0.10	--	<0.10	<0.10	--
pH	-	--	--	8.00	--	7.62	7.65	--
pH (Field)	-	--	--	7.4	--	7.5	7.8	--
Phosphorus	mg/l	--	--	2.08	--	2.48	7.93	--
Sulfate	mg/l	--	500 ⁽¹¹⁾	136	--	56	226	--
Temperature (Field)	deg c	--	15	8	--	6	9	--
Total Organic Carbon	mg/l	--	--	8.9	--	6.5	11.5	--
Total Suspended Solids	mg/l	--	--	1920	--	3250	550	--
Turbidity	ntu	--	5 ⁽¹²⁾	>100	--	>100	>100	--
Turbidity (Field)	ntu	--	5 ⁽¹²⁾	70	--	53.0	>100	--
Metals								
Aluminum, dissolved	mg/l	--	--	0.02	--	0.02	<0.01	--
Arsenic, dissolved	mg/l	0.025	--	<0.001	--	<0.001	<0.001	--
Barium, dissolved	mg/l	1	--	0.03	--	0.02	0.03	--
Beryllium, dissolved	mg/l	--	--	<0.0005	--	<0.0005	<0.0005	--
Boron, dissolved	mg/l	5	--	0.06	--	0.03	0.12	--
Cadmium, dissolved	mg/l	0.005	--	<0.0001	--	<0.0001	<0.0001	--
Calcium, dissolved	mg/l	--	--	57	--	55	82	--
Chromium, dissolved	mg/l	0.05	--	<0.001	--	<0.001	<0.001	--
Cobalt, dissolved	mg/l	--	--	0.0004	--	<0.0002	<0.0002	--
Copper, dissolved	mg/l	--	1	0.004	--	0.003	0.006	--
Iron, dissolved	mg/l	--	0.3	0.03	--	<0.03	<0.03	--
Lead, dissolved	mg/l	0.01	--	<0.001	--	<0.001	<0.001	--
Magnesium, dissolved	mg/l	--	--	9	--	6	7	--
Manganese, dissolved	mg/l	--	0.05	0.08	--	<0.01	<0.01	--
Molybdenum, dissolved	mg/l	--	--	<0.005	--	<0.005	<0.005	--
Nickel, dissolved	mg/l	--	--	<0.005	--	<0.005	<0.005	--
Potassium, dissolved	mg/l	--	--	8	--	4	1	--
Selenium, dissolved	mg/l	0.01	--	<0.001	--	<0.001	<0.001	--
Silver, dissolved	mg/l	--	--	<0.0001	--	<0.0001	<0.0001	--
Sodium, dissolved	mg/l	--	200 ⁽¹⁴⁾	327	--	161	230	--
Strontium, dissolved	mg/l	--	--	0.431	--	0.280	0.574	--
Thallium, dissolved	mg/l	--	--	<0.0001	--	<0.0001	<0.0001	--
Titanium, dissolved	mg/l	--	--	<0.01	--	<0.01	<0.01	--
Vanadium, dissolved	mg/l	--	--	<0.001	--	<0.001	<0.001	--
Zinc, dissolved	mg/l	--	5	<0.01	--	<0.01	<0.01	--
Petroleum Hydrocarbons								
Benzene	mg/l	0.005	--	<0.0005	--	<0.0005	<0.0005	--
Ethylbenzene	mg/l	--	0.0024	<0.0005	--	<0.0005	<0.0005	--
m,p-Xylenes	mg/l	--	--	<0.0005	--	<0.0005	<0.0004	--
o-Xylene	mg/l	--	--	<0.0005	--	<0.0005	<0.0004	--
Petroleum Hydrocarbons - F1 (C6-C10)	mg/l	--	--	<0.1	--	--	<0.02	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	mg/l	--	--	<0.1	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	mg/l	--	--	<0.1	--	--	<0.02	--
Petroleum Hydrocarbons - F3 (C16-C34)	mg/l	--	--	<0.2	--	--	<0.05	--
Petroleum Hydrocarbons - F4 (C34-C50)	mg/l	--	--	<0.2	--	--	<0.05	--
Toluene	mg/l	--	0.024	<0.0005	--	<0.0005	<0.0005	--
Xylenes, Total	mg/l	--	0.3	<0.0010	--	<0.0010	<0.0005	--

Parameter	Unit	(2) (1) ODWQS(169/ 03)-Health	(4) (3) ODWQS- AO	Construction MW 06	Post-Construction MW 06			
				26-May-2014	09-Oct-2014 ⁽²⁾	24-Mar-2015	17-Jun-2015	27-Aug-2015 ⁽²⁾
				MW - 6	6	S-3	S-4	66
Semi-VOCs								
1-Methylnaphthalene	mg/l	--	--	--	--	--	--	--
2-Methylnaphthalene	mg/l	--	--	--	--	--	--	--
Acenaphthene	mg/l	--	--	--	--	--	--	--
Acenaphthylene	mg/l	--	--	--	--	--	--	--
Anthracene	mg/l	--	--	--	--	--	--	--
Benzo[a]anthracene	mg/l	--	--	--	--	--	--	--
Benzo[a]pyrene	mg/l	0.00001	--	--	--	--	--	--
Benzo[b]fluoranthene	mg/l	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	mg/l	--	--	--	--	--	--	--
Benzo[k]fluoranthene	mg/l	--	--	--	--	--	--	--
Chrysene	mg/l	--	--	--	--	--	--	--
Dibenzo[a,h]anthracene	mg/l	--	--	--	--	--	--	--
Fluoranthene	mg/l	--	--	--	--	--	--	--
Fluorene	mg/l	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	mg/l	--	--	--	--	--	--	--
Naphthalene	mg/l	--	--	--	--	--	--	--
Phenanthrene	mg/l	--	--	--	--	--	--	--
Pyrene	mg/l	--	--	--	--	--	--	--
Styrene	mg/l	--	--	<0.0005	--	--	<0.0005	--
VOCs								
1,1,1,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
1,1,1-Trichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,1,2,2-Tetrachloroethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
1,1,2-Trichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethane	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,1-Dichloroethylene	mg/l	0.014	--	<0.0005	--	--	<0.0005	--
1,2-Dibromoethane	mg/l	--	--	<0.0002	--	--	<0.0002	--
1,2-Dichlorobenzene	mg/l	0.2	0.003	<0.0004	--	--	<0.0004	--
1,2-Dichloroethane	mg/l	0.005	--	<0.0002	--	--	<0.0002	--
1,2-Dichloropropane	mg/l	--	--	<0.0005	--	--	<0.0005	--
1,3,5-Trimethylbenzene	mg/l	--	--	<0.0003	--	--	<0.0003	--
1,3-Dichlorobenzene	mg/l	--	--	<0.0004	--	--	<0.0004	--
1,4-Dichlorobenzene	mg/l	0.005	0.001	<0.0004	--	--	<0.0004	--
Bromodichloromethane	mg/l	--	--	<0.0003	--	--	<0.0003	--
Bromoform	mg/l	--	--	<0.0004	--	--	<0.0004	--
Bromomethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
Carbon Tetrachloride	mg/l	0.005	--	<0.0002	--	--	<0.0002	--
Chlorobenzene	mg/l	0.08	0.03	<0.0002	--	--	<0.0002	--
Chloroethane	mg/l	--	--	<0.0002	--	--	<0.0002	--
Chloroform	mg/l	--	--	<0.0005	--	--	<0.0005	--
Chloromethane	mg/l	--	--	<0.0002	--	--	<0.0002	--
cis-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	<0.0004	--
cis-1,2-Dichloropropene	mg/l	--	--	<0.0002	--	--	<0.0002	--
Dibromochloromethane	mg/l	--	--	<0.0003	--	--	<0.0003	--
Dichlorodifluoromethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
Methylene Chloride	mg/l	0.05	--	<0.0040	--	--	<0.0040	--
Tetrachloroethylene	mg/l	0.03	--	<0.0003	--	--	<0.0003	--
trans-1,2-Dichloroethene	mg/l	--	--	<0.0004	--	--	<0.0004	--
trans-1,3-Dichloropropene	mg/l	--	--	<0.0002	--	--	<0.0002	--
Trichloroethene	mg/l	0.005	--	<0.0003	--	--	<0.0003	--
Trichlorofluoromethane	mg/l	--	--	<0.0005	--	--	<0.0005	--
Vinyl Chloride	mg/l	0.002	--	<0.0002	--	--	<0.0002	--

Footnotes:

Tables should be read in conjunction with the accompanying document.

< value = Indicates parameter not detected above laboratory method detection limit.

> value = Indicates parameter detected above equipment analytical range.

-- Chemical not analyzed or criteria not defined.

Grey background indicates exceedances.

(1) Ontario Drinking Water Quality Standards - Health Based Standards (June 2003, revised June 2006).

(2) Bold Font = Parameter concentration greater than ODWQS(169/03)-Health

(3) Ontario Drinking Water Quality Standards - Aesthetic Objectives. Aesthetic Objectives are established for parameters that may impair the taste, odour or colour of water or which may interfere with good water quality control practices. For certain parameters, both aesthetic objectives and health-related MACs have been derived (June 2003, revised June 2006).

(4) Underlined Font = Parameter concentration greater than ODWQS-AO

(5) PAH MRLs elevated due to insufficient sample volume.

(6) Due to matrix interference 2x dilution factor required for VOCs.

(7) TOC was not shaken prior to analysis due to sediment content.

(8) Br MRL elevated due to matrix interference (dilution was done).

(9) Bromide MRL elevated due to matrix interference (dilution was done).

(10) Not available - pH < 8.3

(11) There may be a laxative effect in some individuals when sulphate levels exceed 500 mg/L.

(12) Applicable for all waters at the point of consumption.

(13) No result value available.

(14) The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

(15) PAH MRL elevated due to insufficient sample volume.

(16) Arsenic MRL elevated due to matrix interference (dilution was done).

(17) Metals MRLs elevated due to matrix interference (10x dilution was done). Bromide MRL elevated due to matrix interference (dilution was done).

(18) Arsenic MRL elevated due to matrix interference. Due to matrix interference 2 X dilution factor required for VOCs.

(19) Arsenic and Selenium MRL elevated due to matrix interference. PAH MRLs elevated due to insufficient sample volume.

(20) Due to matrix interference 2x dilution factor required for VOCs. Arsenic and Selenium MRL elevated due to matrix interference.

(21) Arsenic and Selenium MRL elevated due to matrix interference.

(22) TOC was not shaken prior to analysis due to sediment content. Arsenic and Selenium MRL elevated due to matrix interference.

(23) Holding time for Turbidity analysis was exceeded for the entire report. Arsenic and Selenium MRL elevated due to matrix interference (dilution was done).

(24) Arsenic and Selenium MRL elevated due to matrix interference (dilution was done).

(25) Due to matrix interference 2x dilution factor required for VOCs. Selenium MRL elevated due to matrix interference.

(26) Monitoring location was not accessible.

(27) Selenium MRL elevated due to matrix interference.

(28) Selenium MRL elevated due to matrix interference (dilution was done).

(29) Selenium MRL elevated due to matrix interference (dilution was done). All samples were subcontracted for TOC analysis.

(30) Monitoring location was frozen during this sampling event. No sample was collected.

(31) Due to matrix interference 2x dilution factor required for VOCs. Metals MRL elevated due to matrix interference.

(32) Monitoring location was dry during this sampling event. No sample was collected.

(33) Br MRL elevated due to matrix interference (dilution was done).

(34) Metals MRL elevated due to matrix interference.

(35) Metals MRL elevated due to matrix interference. PAH MRLs elevated due to insufficient sample volume.

(36) Metals MRL elevated due to matrix interference. Due to matrix interference 2x dilution factor required for VOCs.

(37) Metals and Br MRL elevated due to matrix interference.

(38) Metals and Bromide MRL elevated due to matrix interference. TOC was not shaken prior to analysis due to sediment content.



Appendix C-III – Surface Water Monitoring Locations

Parameter	Unit	(a) PWQO	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1
			12-Nov-2010	28-Feb-2011 (b)	07-Apr-2011 (c)	10-May-2012	14-Jun-2012	17-Sep-2012 (b)	18-Dec-2012 (b)	11-Apr-2013	05-Jul-2013 (b)	21-Oct-2013	03-Feb-2014 (b)	26-May-2014	09-Oct-2014 (b)
			SW-7	SW-1	W-3	W-6	W-4	sw1	1	W-5	1	W - 3	1	SW - 1	s1
General Chemistry															
Alkalinity (Total as CaCO3)	mg/l	-- (d)	331	--	129	360	369	--	--	246	--	397	--	452	--
Ammonia, unionized	ug/l	20	--	--	<20	<20	<20	--	--	<20	--	<20	--	<20	--
Ammonia Nitrogen	ug/l	--	<20	--	40	<20	120	--	--	100	--	<20	--	40	--
Ammonium	ug/l	--	<20	--	--	<20	120	--	--	100	--	<20	--	40	--
Bicarbonate	ug/l	--	331000	--	129000	360000	369000	--	--	246000	--	397000	--	452000	--
Bromide	ug/l	--	<250	--	<250	280	<250	--	--	<250	--	<250	--	<250	--
Carbonate (CO3)	ug/l	--	<2000 (f)	--	<2000 (f)	<1000 (f)	<1000 (f)	--	--	<1000 (f)	--	<1000 (f)	--	<1000 (f)	--
Color	color unit	--	99	--	69	56	107	--	--	23	--	53	--	53	--
Conductivity	uS/cm	--	1640	--	885	1820	1180	--	--	1010	--	1350	--	2070	--
Conductivity (Field)	uS/cm	--	625	--	1405	1210	1095	--	--	1040	--	995	--	790	--
Dissolved Oxygen (Field)	mg/l	-- (d)	12.42	--	7.89	4.01	3.88	--	--	6.11	--	4.29	--	2.88	--
Fluoride	ug/l	--	110	--	<100	150	160	--	--	140	--	240	--	150	--
Hardness, Calcium Carbonate	ug/l	--	370000	--	216000	438000	345000	--	--	346000	--	389000	--	605000	--
Nitrate as N	ug/l	--	<100	--	<100	<100	<100	--	--	110	--	<100	--	<100	--
Nitrite as N	ug/l	--	<100	--	<100	<100	<100	--	--	<100	--	<100	--	<100	--
pH	-	8.5	7.79	--	7.76	7.74	7.98	--	--	7.87	--	7.94	--	7.99	--
pH (Field)	-	8.5	8.0	--	7.8	7.3	7.7	--	--	7.7	--	7.6	--	7.5	--
Phosphorus	ug/l	-- (d)	100	--	90	50	70	--	--	20	--	50	--	50	--
Sulfate	ug/l	--	16000	--	7000	42000	5000	--	--	44000	--	48000	--	46000	--
Temperature (Field)	deg c	-- (f)	3.4	--	1	13	20	--	--	4	--	5	--	15	--
Total Organic Carbon	ug/l	--	17900	--	11900	11600	19600	--	--	5100	--	14800	--	11300	--
Total Suspended Solids	ug/l	--	9000	--	3000	11000	17000	--	--	<2000	--	37000	--	5000	--
Turbidity	ntu	-- (f)	4.0	--	2.4	2.4	2.4	--	--	4.4	--	1.0	--	5.0	--
Turbidity (Field)	ntu	-- (f)	--	--	--	60	3.8	--	--	8.1	--	7.0	--	6.8	--
Metals															
Aluminum, dissolved	ug/l	-- (f)	<10	--	30	<10	<10	--	--	<10	--	10	--	<10	--
Arsenic	ug/l	100 (f)	<1	--	<1	<1	<1	--	--	<1	--	<1	--	<1	--
Barium	ug/l	--	80	--	40	60	60	--	--	50	--	60	--	110	--
Beryllium	ug/l	-- (f)	<1	--	<0.5	<0.5	<0.5	--	--	<0.5	--	<0.5	--	<0.5	--
Boron	ug/l	200 (f)	10	--	<10	10	20	--	--	10	--	50	--	40	--
Cadmium	ug/l	0.2 (f)	<0.1	--	<0.1	<0.1	<0.1	--	--	<0.1	--	<0.1	--	<0.1	--
Calcium	ug/l	--	112000	--	70000	139000	107000	--	--	109000	--	118000	--	191000	--
Chromium	ug/l	-- (f)	4	--	4	9	9	--	--	4	--	9	--	<1	--
Cobalt	ug/l	0.9	0.3	--	0.2	0.5	0.8	--	--	0.3	--	0.5	--	0.6	--
Copper	ug/l	5	1	--	2	1	<1	--	--	1	--	2	--	1	--
Iron	ug/l	300	350	--	240	1780	1030	--	--	140	--	170	--	700	--
Lead	ug/l	-- (f)	<1	--	<1	<1	<1	--	--	<1	--	<1	--	<1	--
Magnesium	ug/l	--	22000	--	10000	22000	19000	--	--	18000	--	23000	--	31000	--
Manganese	ug/l	--	410	--	250	260	420	--	--	80	--	130	--	880	--
Molybdenum	ug/l	40	<5	--	<5	<5	<5	--	--	<5	--	<5	--	<5	--
Nickel	ug/l	25	<5	--	<5	<5	<5	--	--	<5	--	6	--	<5	--
Potassium	ug/l	--	8000	--	2000	1000	2000	--	--	2000	--	2000	--	3000	--
Selenium	ug/l	100	<1	--	<1	<1	<1	--	--	<1	--	<1	--	<1	--
Silver	ug/l	0.1	<0.1	--	<0.1	<0.1	<0.1	--	--	<0.1	--	<0.1	--	<0.1	--
Sodium	ug/l	--	169000	--	127000	226000	82000	--	--	92000	--	103000	--	223000	--
Strontium	ug/l	--	840	--	412	866	732	--	--	1070	--	1250	--	1480	--
Thallium	ug/l	0.3 (f)	<0.1	--	<0.1	<0.1	<0.1	--	--	<0.1	--	<0.1	--	<0.1	--
Titanium	ug/l	--	<10	--	<10	<10	<10	--	--	<10	--	<10	--	<10	--
Vanadium	ug/l	6	3	--	2	4	4	--	--	2	--	4	--	2	--
Zinc	ug/l	30 (f)	<10	--	<10	<10	<10	--	--	60	--	260	--	<10	--
Petroleum Hydrocarbons															
Benzene	ug/l	100 (f)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	<0.5	--	<0.5	--
Ethylbenzene	ug/l	8	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	<0.5	--	<0.5	--
m,p-Xylenes	ug/l	--	<1.0	--	<2.0	<0.5	<0.5	--	--	<0.5	--	<0.5	--	<0.5	--
o-Xylene	ug/l	40 (f)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	<0.5	--	<0.5	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	<100	--	<100	<100	<100	--	--	<100	--	--	--	<100	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	<100	--	<100	<100	<100	--	--	--	--	--	--	<100	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	<100	--	<100	<100	<100	--	--	<100	--	--	--	<100	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	<200	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	<200	--
Toluene	ug/l	0.8	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	<0.5	--	<0.5	--
Xylenes, Total	ug/l	--	--	--	<3	<1.0	<1.0	--	--	<1.0	--	--	--	<1.0	--

Parameter	Unit	(2) (i) PWQO	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1
			12-Nov-2010	28-Feb-2011 (2)	07-Apr-2011 (4)	10-May-2012	14-Jun-2012	17-Sep-2012 (5)	18-Dec-2012 (5)	11-Apr-2013	05-Jul-2013 (5)	21-Oct-2013	03-Feb-2014 (5)	26-May-2014	09-Oct-2014 (5)
			SW-7	SW-1	W-3	W-6	W-4	sw1	1	W-5	1	W - 3	1	SW - 1	s1
Semi-VOCs															
1-Methylnaphthalene	ug/l	2 (16)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
2-Methylnaphthalene	ug/l	2 (16)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthylene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Anthracene	ug/l	0.0008 (16)	<0.01	--	<0.01	<0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]anthracene	ug/l	0.0004 (15)	<0.01	--	<0.01	<0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]pyrene	ug/l	--	<0.01	--	<0.01	<0.01	--	--	--	<0.01	--	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Chrysene	ug/l	0.0001 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Fluoranthene	ug/l	0.0008 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Fluorene	ug/l	0.2 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Naphthalene	ug/l	7 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Phenanthrene	ug/l	0.03 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Pyrene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Styrene	ug/l	4 (16)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
VOCs															
1,1,1,2-Tetrachloroethane	ug/l	20 (15)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,1,1-Trichloroethane	ug/l	10 (15)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,1,2,2-Tetrachloroethane	ug/l	70	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,1,2-Trichloroethane	ug/l	800	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,1-Dichloroethane	ug/l	200	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,1-Dichloroethylene	ug/l	40	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,2-Dibromoethane	ug/l	5 (15)	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
1,2-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,2-Dichloroethane	ug/l	100	<0.5	--	<1	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
1,2-Dichloropropane	ug/l	0.7 (15)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,3,5-Trimethylbenzene	ug/l	--	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
1,3-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,4-Dichlorobenzene	ug/l	4	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
Bromodichloromethane	ug/l	200 (15)	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
Bromoform	ug/l	60 (15)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
Bromomethane	ug/l	0.9 (20)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Carbon Tetrachloride	ug/l	--	<0.5	--	<1	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Chlorobenzene	ug/l	15 (21)	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Chloroethane	ug/l	--	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Chloroform	ug/l	--	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Chloromethane	ug/l	700 (15)	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
cis-1,2-Dichloroethene	ug/l	200 (22)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
cis-1,2-Dichloropropene	ug/l	--	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Dibromochloromethane	ug/l	40 (15)	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
Dichlorodifluoromethane	ug/l	--	--	--	--	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Methylene Chloride	ug/l	100 (23)	<4.0	--	<8.0	<4.0	<4.0	--	--	<4.0	--	--	--	<4.0	--
Tetrachloroethylene	ug/l	50 (24)	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
trans-1,2-Dichloroethene	ug/l	200 (22)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
trans-1,3-Dichloropropene	ug/l	7 (15)	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Trichloroethene	ug/l	20	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
Trichlorofluoromethane	ug/l	--	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Vinyl Chloride	ug/l	600 (15)	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--

Parameter	Unit	(2) (1) PWQO	SW-1	SW-1	SW-1
			24-Mar-2015 (2)	17-Jun-2015	27-Aug-2015 (2)
			1	W-5	1
General Chemistry					
Alkalinity (Total as CaCO ₃)	mg/l	-- (6)	--	242	--
Ammonia, unionized	ug/l	20	--	<50	--
Ammonia Nitrogen	ug/l	--	--	60	--
Ammonium	ug/l	--	--	60	--
Bicarbonate	ug/l	--	--	242000	--
Bromide	ug/l	--	--	<250	--
Carbonate (CO ₃)	ug/l	--	--	<1000 (7)	--
Color	color unit	--	--	36	--
Conductivity	uS/cm	--	--	925	--
Conductivity (Field)	uS/cm	--	--	1680	--
Dissolved Oxygen (Field)	mg/l	-- (8)	--	1.98	--
Fluoride	ug/l	--	--	1510	--
Hardness, Calcium Carbonate	ug/l	--	--	314000	--
Nitrate as N	ug/l	--	--	<100	--
Nitrite as N	ug/l	--	--	<100	--
pH	-	8.5	--	8.01	--
pH (Field)	-	8.5	--	7.7	--
Phosphorus	ug/l	-- (9)	--	<50	--
Sulfate	ug/l	--	--	92000	--
Temperature (Field)	deg c	-- (10)	--	15	--
Total Organic Carbon	ug/l	--	--	6800	--
Total Suspended Solids	ug/l	--	--	<2000	--
Turbidity	ntu	-- (11)	--	6.6	--
Turbidity (Field)	ntu	-- (11)	--	5.8	--
Metals					
Aluminum, dissolved	ug/l	-- (12)	--	<10	--
Arsenic	ug/l	100 (13)	--	<1	--
Barium	ug/l	--	--	50	--
Beryllium	ug/l	-- (14)	--	<0.5	--
Boron	ug/l	200 (15)	--	130	--
Cadmium	ug/l	0.2 (13)	--	<0.1	--
Calcium	ug/l	--	--	101000	--
Chromium	ug/l	-- (16)	--	<1	--
Cobalt	ug/l	0.9	--	<0.2	--
Copper	ug/l	5	--	4	--
Iron	ug/l	300	--	250	--
Lead	ug/l	-- (17)	--	<1	--
Magnesium	ug/l	--	--	15000	--
Manganese	ug/l	--	--	30	--
Molybdenum	ug/l	40	--	<5	--
Nickel	ug/l	25	--	<5	--
Potassium	ug/l	--	--	4000	--
Selenium	ug/l	100	--	<1	--
Silver	ug/l	0.1	--	<0.1	--
Sodium	ug/l	--	--	80000	--
Strontium	ug/l	--	--	1450	--
Thallium	ug/l	0.3 (18)	--	<0.1	--
Titanium	ug/l	--	--	10	--
Vanadium	ug/l	6	--	3	--
Zinc	ug/l	30 (13)	--	30	--
Petroleum Hydrocarbons					
Benzene	ug/l	100 (18)	--	<0.5	--
Ethylbenzene	ug/l	8	--	<0.5	--
m,p-Xylenes	ug/l	--	--	<0.4	--
o-Xylene	ug/l	40 (18)	--	<0.4	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	--	<20	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTEX	ug/l	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	--	<20	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	--	<50	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	--	<50	--
Toluene	ug/l	0.8	--	<0.5	--
Xylenes, Total	ug/l	--	--	<0.5	--

Parameter	Unit	(2) (1) PWQO	SW-1	SW-1	SW-1
			24-Mar-2015 (3)	17-Jun-2015	27-Aug-2015 (5)
			1	W-5	1
Semi-VOCs					
1-Methylnaphthalene	ug/l	2 (18)	--	--	--
2-Methylnaphthalene	ug/l	2 (18)	--	--	--
Acenaphthene	ug/l	--	--	--	--
Acenaphthylene	ug/l	--	--	--	--
Anthracene	ug/l	0.0008 (15)	--	--	--
Benzo[a]anthracene	ug/l	0.0004 (15)	--	--	--
Benzo[a]pyrene	ug/l	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 (15)	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 (15)	--	--	--
Chrysene	ug/l	0.0001 (15)	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 (15)	--	--	--
Fluoranthene	ug/l	0.0008 (15)	--	--	--
Fluorene	ug/l	0.2 (15)	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	--	--	--
Naphthalene	ug/l	7 (15)	--	--	--
Phenanthrene	ug/l	0.03 (15)	--	--	--
Pyrene	ug/l	--	--	--	--
Styrene	ug/l	4 (18)	--	<0.5	--
VOCs					
1,1,1,2-Tetrachloroethane	ug/l	20 (15)	--	<0.5	--
1,1,1-Trichloroethane	ug/l	10 (18)	--	<0.4	--
1,1,2,2-Tetrachloroethane	ug/l	70	--	<0.5	--
1,1,2-Trichloroethane	ug/l	800	--	<0.4	--
1,1-Dichloroethane	ug/l	200	--	<0.4	--
1,1-Dichloroethylene	ug/l	40	--	<0.5	--
1,2-Dibromoethane	ug/l	5 (15)	--	<0.2	--
1,2-Dichlorobenzene	ug/l	2.5	--	<0.4	--
1,2-Dichloroethane	ug/l	100	--	<0.2	--
1,2-Dichloropropane	ug/l	0.7 (15)	--	<0.5	--
1,3,5-Trimethylbenzene	ug/l	--	--	<0.3	--
1,3-Dichlorobenzene	ug/l	2.5	--	<0.4	--
1,4-Dichlorobenzene	ug/l	4	--	<0.4	--
Bromodichloromethane	ug/l	200 (15)	--	<0.3	--
Bromoform	ug/l	60 (15)	--	<0.4	--
Bromomethane	ug/l	0.9 (20)	--	<0.5	--
Carbon Tetrachloride	ug/l	--	--	<0.2	--
Chlorobenzene	ug/l	15 (21)	--	<0.2	--
Chloroethane	ug/l	--	--	<0.2	--
Chloroform	ug/l	--	--	<0.5	--
Chloromethane	ug/l	700 (15)	--	<0.2	--
cis-1,2-Dichloroethene	ug/l	200 (22)	--	<0.4	--
cis-1,2-Dichloropropene	ug/l	--	--	<0.2	--
Dibromochloromethane	ug/l	40 (15)	--	<0.3	--
Dichlorodifluoromethane	ug/l	--	--	<0.5	--
Methylene Chloride	ug/l	100 (23)	--	<4	--
Tetrachloroethylene	ug/l	50 (24)	--	<0.3	--
trans-1,2-Dichloroethene	ug/l	200 (22)	--	<0.4	--
trans-1,3-Dichloropropene	ug/l	7 (15)	--	<0.2	--
Trichloroethene	ug/l	20	--	<0.3	--
Trichlorofluoromethane	ug/l	--	--	<0.5	--
Vinyl Chloride	ug/l	600 (15)	--	<0.2	--

Parameter	Unit	(a) (i) PWQO	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2
			12-Nov-2010	28-Feb-2011 (b)	07-Apr-2011 (c)	10-May-2012	14-Jun-2012 (d)	17-Sep-2012 (e)	18-Dec-2012	11-Apr-2013	05-Jul-2013	21-Oct-2013 (f)	03-Feb-2014 (g)	26-May-2014	09-Oct-2014 (h)
			SW-6	SW-2	W-2	W-4	W-3	SW2	W-4	W-6	W-2	W - 1	2	SW - 2	S2
General Chemistry															
Alkalinity (Total as CaCO3)	mg/l	-- (6)	362	--	339	309	365	--	202	241	355	479	--	480	--
Ammonia, unionized	ug/l	20	--	--	<20	<20	<20	--	<20	<20	<20	<20	--	<20	--
Ammonia Nitrogen	ug/l	--	<20	--	50	<20	100	--	40	80	60	<20	--	30	--
Ammonium	ug/l	--	<20	--	--	<20	100	--	40	80	60	<20	--	30	--
Bicarbonate	ug/l	--	362000	--	339000	309000	365000	--	202000	241000	355000	479000	--	480000	--
Bromide	ug/l	--	<250	--	<250	<250	420	--	<250	<250	<250	<250	--	<250	--
Carbonate (CO3)	ug/l	--	<2000 (i)	--	<2000 (i)	<1000 (i)	<1000 (i)	--	<1000 (i)	<1000 (i)	<1000 (i)	<1000 (i)	--	<1000 (i)	--
Color	color unit	--	61	--	28	8	66	--	37	24	53	55	--	55	--
Conductivity	uS/cm	--	1400	--	1790	907	1630	--	936	966	1300	2350	--	2080	--
Conductivity (Field)	uS/cm	--	705	--	1820	1505	1665	--	988	980	1408	1240	--	840	--
Dissolved Oxygen (Field)	mg/l	-- (6)	12.89	--	5.25	3.66	3.41	--	4.08	5.99	2.99	3.98	--	2.48	--
Fluoride	ug/l	--	130	--	100	180	130	--	130	140	390	150	--	230	--
Hardness, Calcium Carbonate	ug/l	--	392000	--	565000	291000	392000	--	286000	341000	413000	594000	--	605000	--
Nitrate as N	ug/l	--	<100	--	<100	<100	<100	--	220	130	<100	<100	--	<100	--
Nitrite as N	ug/l	--	<100	--	<100	<100	<100	--	<100	<100	<100	<100	--	<100	--
pH	-	8.5	7.92	--	7.89	8.10	7.82	--	7.86	7.87	8.09	7.71	--	8.04	--
pH (Field)	-	8.5	8.0	--	7.7	7.3	7.8	--	7.9	8.0	7.8	7.6	--	7.4	--
Phosphorus	ug/l	-- (6)	30	--	30	10	70	--	70	20	20	20	--	50	--
Sulfate	ug/l	--	26000	--	53000	50000	62000	--	67000	42000	42000	118000	--	45000	--
Temperature (Field)	deg c	-- (10)	3.2	--	3.7	14	20	--	2	3	24	6	--	13	--
Total Organic Carbon	ug/l	--	11800	--	6500	3800	12600	--	7700	5500	11300	15300	--	11100	--
Total Suspended Solids	ug/l	--	<2000	--	4000	14000	46000	--	17000	5000	3000	69000	--	2000	--
Turbidity	ntu	-- (11)	1.1	--	1.6	2.4	3.2	--	24.2	5.2	2.5	4.4	--	5.2	--
Turbidity (Field)	ntu	-- (11)	--	--	--	79	3.1	--	29	6.01	4.2	7.3	--	6.21	--
Metals															
Aluminum, dissolved	ug/l	-- (12)	<10	--	<10	20	<10	--	80	<10	<10	<10	--	<10	--
Arsenic	ug/l	100 (13)	<1	--	<1	<1	<10	--	<1	<1	<10	<10	--	<1	--
Barium	ug/l	--	60	--	80	60	70	--	40	50	60	90	--	110	--
Beryllium	ug/l	-- (14)	<1	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	--	<0.5	--
Boron	ug/l	200 (15)	10	--	10	40	30	--	20	10	100	30	--	50	--
Cadmium	ug/l	0.2 (13)	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	<0.1	--
Calcium	ug/l	--	119000	--	180000	92000	119000	--	90000	107000	129000	182000	--	191000	--
Chromium	ug/l	-- (16)	3	--	7	4	9	--	5	5	5	7	--	<1	--
Cobalt	ug/l	0.9	0.2	--	0.3	0.2	0.6	--	0.4	0.4	1.0	0.8	--	0.7	--
Copper	ug/l	5	2	--	<1	2	2	--	2	2	2	1	--	2	--
Iron	ug/l	300	60	--	310	120	1300	--	250	160	270	340	--	700	--
Lead	ug/l	-- (17)	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--	<1	--
Magnesium	ug/l	--	23000	--	28000	15000	23000	--	15000	18000	22000	34000	--	31000	--
Manganese	ug/l	--	170	--	210	20	270	--	70	80	570	800	--	860	--
Molybdenum	ug/l	40	<5	--	<5	<5	<5	--	<5	<5	<5	<5	--	<5	--
Nickel	ug/l	25	<5	--	<5	<5	<5	--	<5	<5	<5	<5	--	<5	--
Potassium	ug/l	--	4000	--	2000	2000	1000	--	3000	2000	3000	1000	--	3000	--
Selenium	ug/l	100	<1	--	<1	<1	<1	--	<1	<1	<1	<1	--	<1	--
Silver	ug/l	0.1	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	<0.1	--
Sodium	ug/l	--	127000	--	204000	52000	146000	--	81000	85000	136000	219000	--	222000	--
Strontium	ug/l	--	1030	--	1320	1870	1490	--	1010	1170	1570	1270	--	1460	--
Thallium	ug/l	0.3 (18)	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	<0.1	--
Titanium	ug/l	--	<10	--	<10	<10	<10	--	20	<10	<10	<10	--	<10	--
Vanadium	ug/l	6	2	--	2	3	4	--	4	2	4	4	--	2	--
Zinc	ug/l	30 (13)	<10	--	<10	10	10	--	40	60	130	<10	--	<10	--
Petroleum Hydrocarbons															
Benzene	ug/l	100 (18)	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	--	<0.5	--
Ethylbenzene	ug/l	8	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	--	<0.5	--
m,p-Xylenes	ug/l	--	<1.0	--	<2.0	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	--	<0.5	--
o-Xylene	ug/l	40 (18)	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	--	<0.5	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	<100	--	<100	<100	<100	--	--	<100	--	--	--	<100	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	<100	--	<100	<100	<100	--	--	--	--	--	--	<100	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	<100	--	<100	<100	<100	--	--	<100	--	--	--	<100	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	<200	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	<200	--
Toluene	ug/l	0.8	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	--	<0.5	--
Xylenes, Total	ug/l	--	--	--	<3	<1.0	<1.0	--	--	<1.0	<1.0	--	--	<1.0	--

Parameter	Unit	(2) (i) PWQO	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2
			12-Nov-2010	28-Feb-2011 (2)	07-Apr-2011 (4)	10-May-2012	14-Jun-2012 (25)	17-Sep-2012 (26)	18-Dec-2012	11-Apr-2013	05-Jul-2013	21-Oct-2013 (27)	03-Feb-2014 (3)	26-May-2014	09-Oct-2014 (6)
			SW-6	SW-2	W-2	W-4	W-3	sw2	W-4	W-6	W-2	W - 1	2	SW - 2	s2
Semi-VOCs															
1-Methylnaphthalene	ug/l	2 (18)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
2-Methylnaphthalene	ug/l	2 (18)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthylene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Anthracene	ug/l	0.0008 (16)	<0.01	--	<0.01	<0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]anthracene	ug/l	0.0004 (15)	<0.01	--	<0.01	<0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]pyrene	ug/l	--	<0.01	--	<0.01	<0.01	--	--	--	<0.01	--	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Chrysene	ug/l	0.0001 (16)	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Fluoranthene	ug/l	0.0008 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Fluorene	ug/l	0.2 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Naphthalene	ug/l	7 (16)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Phenanthrene	ug/l	0.03 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Pyrene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Styrene	ug/l	4 (16)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
VOCs															
1,1,1,2-Tetrachloroethane	ug/l	20 (15)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,1,1-Trichloroethane	ug/l	10 (18)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,1,2,2-Tetrachloroethane	ug/l	70	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,1,2-Trichloroethane	ug/l	800	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,1-Dichloroethane	ug/l	200	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,1-Dichloroethylene	ug/l	40	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,2-Dibromoethane	ug/l	5 (16)	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
1,2-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,2-Dichloroethane	ug/l	100	<0.5	--	<1	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
1,2-Dichloropropane	ug/l	0.7 (15)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,3,5-Trimethylbenzene	ug/l	--	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
1,3-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,4-Dichlorobenzene	ug/l	4	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
Bromodichloromethane	ug/l	200 (15)	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
Bromoform	ug/l	60 (15)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
Bromomethane	ug/l	0.9 (20)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Carbon Tetrachloride	ug/l	--	<0.5	--	<1	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Chlorobenzene	ug/l	15 (21)	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Chloroethane	ug/l	--	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Chloroform	ug/l	--	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Chloromethane	ug/l	700 (15)	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
cis-1,2-Dichloroethene	ug/l	200 (22)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
cis-1,2-Dichloropropene	ug/l	--	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Dibromochloromethane	ug/l	40 (15)	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
Dichlorodifluoromethane	ug/l	--	--	--	--	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Methylene Chloride	ug/l	100 (23)	<4.0	--	<8.0	<4.0	<4.0	--	--	<4.0	--	--	--	<4.0	--
Tetrachloroethylene	ug/l	50 (24)	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
trans-1,2-Dichloroethene	ug/l	200 (22)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
trans-1,3-Dichloropropene	ug/l	7 (15)	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Trichloroethene	ug/l	20	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
Trichlorofluoromethane	ug/l	--	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Vinyl Chloride	ug/l	600 (15)	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--

Parameter	Unit	(2) (1) PWQO	SW-2	SW-2	SW-2
			24-Mar-2015 (2)	17-Jun-2015	27-Aug-2015 (2)
			2	W-3	2
General Chemistry					
Alkalinity (Total as CaCO ₃)	mg/l	-- (6)	--	269	--
Ammonia, unionized	ug/l	20	--	<50	--
Ammonia Nitrogen	ug/l	--	--	<50	--
Ammonium	ug/l	--	--	<50	--
Bicarbonate	ug/l	--	--	269000	--
Bromide	ug/l	--	--	<250	--
Carbonate (CO ₃)	ug/l	--	--	<1000 (7)	--
Color	color unit	--	--	43	--
Conductivity	uS/cm	--	--	1040	--
Conductivity (Field)	uS/cm	--	--	1840	--
Dissolved Oxygen (Field)	mg/l	-- (8)	--	1.96	--
Fluoride	ug/l	--	--	990	--
Hardness, Calcium Carbonate	ug/l	--	--	329000	--
Nitrate as N	ug/l	--	--	<100	--
Nitrite as N	ug/l	--	--	<100	--
pH	-	8.5	--	7.95	--
pH (Field)	-	8.5	--	7.8	--
Phosphorus	ug/l	-- (9)	--	<50	--
Sulfate	ug/l	--	--	71000	--
Temperature (Field)	deg c	-- (10)	--	14	--
Total Organic Carbon	ug/l	--	--	7600	--
Total Suspended Solids	ug/l	--	--	6000	--
Turbidity	ntu	-- (11)	--	7.8	--
Turbidity (Field)	ntu	-- (11)	--	6.1	--
Metals					
Aluminum, dissolved	ug/l	-- (12)	--	<10	--
Arsenic	ug/l	100 (13)	--	<1	--
Barium	ug/l	--	--	50	--
Beryllium	ug/l	-- (14)	--	<0.5	--
Boron	ug/l	200 (15)	--	140	--
Cadmium	ug/l	0.2 (13)	--	<0.1	--
Calcium	ug/l	--	--	107000	--
Chromium	ug/l	-- (16)	--	<1	--
Cobalt	ug/l	0.9	--	0.3	--
Copper	ug/l	5	--	3	--
Iron	ug/l	300	--	380	--
Lead	ug/l	-- (17)	--	<1	--
Magnesium	ug/l	--	--	15000	--
Manganese	ug/l	--	--	160	--
Molybdenum	ug/l	40	--	<5	--
Nickel	ug/l	25	--	<5	--
Potassium	ug/l	--	--	4000	--
Selenium	ug/l	100	--	<1	--
Silver	ug/l	0.1	--	<0.1	--
Sodium	ug/l	--	--	103000	--
Strontium	ug/l	--	--	1490	--
Thallium	ug/l	0.3 (18)	--	<0.1	--
Titanium	ug/l	--	--	10	--
Vanadium	ug/l	6	--	4	--
Zinc	ug/l	30 (13)	--	40	--
Petroleum Hydrocarbons					
Benzene	ug/l	100 (18)	--	<0.5	--
Ethylbenzene	ug/l	8	--	<0.5	--
m,p-Xylenes	ug/l	--	--	<0.4	--
o-Xylene	ug/l	40 (18)	--	<0.4	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	--	<20	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTEX	ug/l	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	--	<20	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	--	<50	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	--	<50	--
Toluene	ug/l	0.8	--	<0.5	--
Xylenes, Total	ug/l	--	--	<0.5	--

Parameter	Unit	(2) (1) PWQO	SW-2	SW-2	SW-2
			24-Mar-2015 (3)	17-Jun-2015	27-Aug-2015 (5)
			2	W-3	2
Semi-VOCs					
1-Methylnaphthalene	ug/l	2 (18)	--	--	--
2-Methylnaphthalene	ug/l	2 (18)	--	--	--
Acenaphthene	ug/l	--	--	--	--
Acenaphthylene	ug/l	--	--	--	--
Anthracene	ug/l	0.0008 (15)	--	--	--
Benzo[a]anthracene	ug/l	0.0004 (15)	--	--	--
Benzo[a]pyrene	ug/l	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 (15)	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 (15)	--	--	--
Chrysene	ug/l	0.0001 (15)	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 (15)	--	--	--
Fluoranthene	ug/l	0.0008 (15)	--	--	--
Fluorene	ug/l	0.2 (15)	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	--	--	--
Naphthalene	ug/l	7 (15)	--	--	--
Phenanthrene	ug/l	0.03 (15)	--	--	--
Pyrene	ug/l	--	--	--	--
Styrene	ug/l	4 (18)	--	<0.5	--
VOCs					
1,1,1,2-Tetrachloroethane	ug/l	20 (15)	--	<0.5	--
1,1,1-Trichloroethane	ug/l	10 (18)	--	<0.4	--
1,1,2,2-Tetrachloroethane	ug/l	70	--	<0.5	--
1,1,2-Trichloroethane	ug/l	800	--	<0.4	--
1,1-Dichloroethane	ug/l	200	--	<0.4	--
1,1-Dichloroethylene	ug/l	40	--	<0.5	--
1,2-Dibromoethane	ug/l	5 (15)	--	<0.2	--
1,2-Dichlorobenzene	ug/l	2.5	--	<0.4	--
1,2-Dichloroethane	ug/l	100	--	<0.2	--
1,2-Dichloropropane	ug/l	0.7 (15)	--	<0.5	--
1,3,5-Trimethylbenzene	ug/l	--	--	<0.3	--
1,3-Dichlorobenzene	ug/l	2.5	--	<0.4	--
1,4-Dichlorobenzene	ug/l	4	--	<0.4	--
Bromodichloromethane	ug/l	200 (15)	--	<0.3	--
Bromoform	ug/l	60 (15)	--	<0.4	--
Bromomethane	ug/l	0.9 (20)	--	<0.5	--
Carbon Tetrachloride	ug/l	--	--	<0.2	--
Chlorobenzene	ug/l	15 (21)	--	<0.2	--
Chloroethane	ug/l	--	--	<0.2	--
Chloroform	ug/l	--	--	<0.5	--
Chloromethane	ug/l	700 (15)	--	<0.2	--
cis-1,2-Dichloroethene	ug/l	200 (22)	--	<0.4	--
cis-1,2-Dichloropropene	ug/l	--	--	<0.2	--
Dibromochloromethane	ug/l	40 (15)	--	<0.3	--
Dichlorodifluoromethane	ug/l	--	--	<0.5	--
Methylene Chloride	ug/l	100 (23)	--	<4	--
Tetrachloroethylene	ug/l	50 (24)	--	<0.3	--
trans-1,2-Dichloroethene	ug/l	200 (22)	--	<0.4	--
trans-1,3-Dichloropropene	ug/l	7 (15)	--	<0.2	--
Trichloroethene	ug/l	20	--	<0.3	--
Trichlorofluoromethane	ug/l	--	--	<0.5	--
Vinyl Chloride	ug/l	600 (15)	--	<0.2	--

Parameter	Unit	(a) (i) PWQO	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3
			12-Nov-2010	28-Feb-2011 (a)	07-Apr-2011 (a)	10-May-2012	14-Jun-2012	17-Sep-2012 (a)	18-Dec-2012 (a)	11-Apr-2013	05-Jul-2013 (a)	21-Oct-2013 (a)	03-Feb-2014 (a)	26-May-2014 (a)	09-Oct-2014 (a)
			SW-4	SW-3	W-1	W-3	W-1	SW3	W-3	W-3	3	W3	3	s3	s3
General Chemistry															
Alkalinity (Total as CaCO3)	mg/l	-- (a)	364	--	250	251	215	--	146	210	--	--	--	--	--
Ammonia, unionized	ug/l	20	--	--	<20	<20	<20	--	<20	<20	--	--	--	--	--
Ammonia Nitrogen	ug/l	--	<20	--	20	<20	70	--	70	60	--	--	--	--	--
Ammonium	ug/l	--	<20	--	--	<20	70	--	70	60	--	--	--	--	--
Bicarbonate	ug/l	--	364000	--	250000	251000	215000	--	146000	210000	--	--	--	--	--
Bromide	ug/l	--	450	--	<250	<250	540	--	<250	<250	--	--	--	--	--
Carbonate (CO3)	ug/l	--	<2000 (a)	--	<2000 (a)	<1000 (a)	<1000 (a)	--	<1000 (a)	<1000 (a)	--	--	--	--	--
Color	color unit	--	24	--	15	19	22	--	20	17	--	--	--	--	--
Conductivity	uS/cm	--	1540	--	901	1300	1680	--	860	726	--	--	--	--	--
Conductivity (Field)	uS/cm	--	949	--	908	800	1705	--	866	770	--	--	--	--	--
Dissolved Oxygen (Field)	mg/l	-- (a)	3.99	--	3.88	2.4	1.92	--	5.08	5.28	--	--	--	--	--
Fluoride	ug/l	--	150	--	120	240	380	--	110	140	--	--	--	--	--
Hardness, Calcium Carbonate	ug/l	--	424000	--	322000	335000	396000	--	207000	291000	--	--	--	--	--
Nitrate as N	ug/l	--	<100	--	<100	<100	<100	--	270	240	--	--	--	--	--
Nitrite as N	ug/l	--	<100	--	<100	<100	<100	--	<100	<100	--	--	--	--	--
pH	-	8.5	8.04	--	8.01	7.94	8.02	--	7.85	7.92	--	--	--	--	--
pH (Field)	-	8.5	7.81	--	7.6	7.4	7.9	--	7.8	8.0	--	--	--	--	--
Phosphorus	ug/l	-- (a)	30	--	20	<10	40	--	160	20	--	--	--	--	--
Sulfate	ug/l	--	51000	--	60000	111000	246000	--	38000	39000	--	--	--	--	--
Temperature (Field)	deg c	-- (a)	2.8	--	3	13	18	--	2	4	--	--	--	--	--
Total Organic Carbon	ug/l	--	8300	--	4800	4700	5700	--	5400	4400	--	--	--	--	--
Total Suspended Solids	ug/l	--	31000	--	<2000	9000	29000	--	62000	9000	--	--	--	--	--
Turbidity	ntu	-- (a)	12.7	--	2.0	3.5	2.7	--	<0.1	5.5	--	--	--	--	--
Turbidity (Field)	ntu	-- (a)	--	--	--	80	4.5	--	121	9.2	--	--	--	--	--
Metals															
Aluminum, dissolved	ug/l	-- (a)	<10	--	20	<10	<10	--	<10	<10	--	--	--	--	--
Arsenic	ug/l	100 (a)	<1	--	<1	<1	<1	--	<1	<1	--	--	--	--	--
Barium	ug/l	--	70	--	50	50	80	--	50	40	--	--	--	--	--
Beryllium	ug/l	-- (a)	<1	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	--	--	--	--	--
Boron	ug/l	200 (a)	20	--	20	80	200	--	10	10	--	--	--	--	--
Cadmium	ug/l	0.2 (a)	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	--	--	--	--
Calcium	ug/l	--	135000	--	106000	103000	119000	--	68000	95000	--	--	--	--	--
Chromium	ug/l	-- (a)	4	--	1	5	5	--	6	4	--	--	--	--	--
Cobalt	ug/l	0.9	0.3	--	0.2	0.4	0.9	--	0.6	<0.2	--	--	--	--	--
Copper	ug/l	5	2	--	2	2	4	--	4	2	--	--	--	--	--
Iron	ug/l	300	160	--	130	70	400	--	680	100	--	--	--	--	--
Lead	ug/l	-- (a)	<1	--	<1	<1	1	--	3	<1	--	--	--	--	--
Magnesium	ug/l	--	21000	--	14000	19000	24000	--	9000	13000	--	--	--	--	--
Manganese	ug/l	--	20	--	30	20	80	--	50	<10	--	--	--	--	--
Molybdenum	ug/l	40	<5	--	<5	<5	11	--	<5	<5	--	--	--	--	--
Nickel	ug/l	25	<5	--	<5	<5	6	--	<5	<5	--	--	--	--	--
Potassium	ug/l	--	3000	--	2000	5000	7000	--	3000	3000	--	--	--	--	--
Selenium	ug/l	100	<1	--	<1	<1	<1	--	<1	<1	--	--	--	--	--
Silver	ug/l	0.1	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	--	--	--	--
Sodium	ug/l	--	149000	--	63000	133000	170000	--	88000	54000	--	--	--	--	--
Strontium	ug/l	--	1650	--	1730	3720	8100	--	958	1260	--	--	--	--	--
Thallium	ug/l	0.3 (a)	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	--	--	--	--
Titanium	ug/l	--	<10	--	<10	<10	10	--	40	<10	--	--	--	--	--
Vanadium	ug/l	6	3	--	2	2	3	--	4	1	--	--	--	--	--
Zinc	ug/l	30 (a)	<10	--	<10	<10	20	--	20	<10	--	--	--	--	--
Petroleum Hydrocarbons															
Benzene	ug/l	100 (a)	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	--	--	--	--	--
Ethylbenzene	ug/l	8	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	--	--	--	--	--
m,p-Xylenes	ug/l	--	<1.0	--	<2.0	<0.5	<0.5	--	<0.5	<0.5	--	--	--	--	--
o-Xylene	ug/l	40 (a)	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	--	--	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	<100	--	<100	<100	<100	--	--	<100	--	--	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	<100	--	<100	<100	<100	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	<100	--	<100	<100	--	--	--	<100	--	--	--	--	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	--	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	--	--
Toluene	ug/l	0.8	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	--	--	--	--	--
Xylenes, Total	ug/l	--	--	--	<3	<1.0	<1.0	--	--	<1.0	--	--	--	--	--

Parameter	Unit	(2) (i) PWQO	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3
			12-Nov-2010	28-Feb-2011 (2)	07-Apr-2011 (4)	10-May-2012	14-Jun-2012	17-Sep-2012 (25)	18-Dec-2012 (25)	11-Apr-2013	05-Jul-2013 (2)	21-Oct-2013 (2)	03-Feb-2014 (2)	26-May-2014 (2)	09-Oct-2014 (2)
			SW-4	SW-3	W-1	W-3	W-1	SW3	W-3	W-3	3	W3	3	s3	s3
Semi-VOCs															
1-Methylnaphthalene	ug/l	2 (18)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
2-Methylnaphthalene	ug/l	2 (18)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthylene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Anthracene	ug/l	0.0008 (15)	<0.01	--	<0.01	0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]anthracene	ug/l	0.0004 (15)	<0.01	--	<0.01	<0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]pyrene	ug/l	--	<0.01	--	<0.01	<0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Chrysene	ug/l	0.0001 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Fluoranthene	ug/l	0.0008 (15)	<0.02	--	<0.02	0.10	--	--	--	<0.1	--	--	--	--	--
Fluorene	ug/l	0.2 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Naphthalene	ug/l	7 (15)	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Phenanthrene	ug/l	0.03 (15)	<0.02	--	<0.02	0.04	--	--	--	<0.1	--	--	--	--	--
Pyrene	ug/l	--	0.02	--	<0.02	0.07	--	--	--	<0.1	--	--	--	--	--
Styrene	ug/l	4 (18)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	--	--
VOCs															
1,1,1,2-Tetrachloroethane	ug/l	20 (15)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	--	--
1,1,1-Trichloroethane	ug/l	10 (18)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	--	--
1,1,2,2-Tetrachloroethane	ug/l	70	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	--	--
1,1,2-Trichloroethane	ug/l	800	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	--	--
1,1-Dichloroethane	ug/l	200	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	--	--
1,1-Dichloroethylene	ug/l	40	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	--	--
1,2-Dibromoethane	ug/l	5 (15)	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	--	--
1,2-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	--	--
1,2-Dichloroethane	ug/l	100	<0.5	--	<1	<0.2	<0.2	--	--	<0.2	--	--	--	--	--
1,2-Dichloropropane	ug/l	0.7 (15)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	--	--
1,3,5-Trimethylbenzene	ug/l	--	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	--	--
1,3-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	--	--
1,4-Dichlorobenzene	ug/l	4	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	--	--
Bromodichloromethane	ug/l	200 (15)	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	--	--
Bromoform	ug/l	60 (15)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	--	--
Bromomethane	ug/l	0.9 (20)	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	--	--
Carbon Tetrachloride	ug/l	--	<0.5	--	<1	<0.2	<0.2	--	--	<0.2	--	--	--	--	--
Chlorobenzene	ug/l	15 (21)	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	--	--
Chloroethane	ug/l	--	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	--	--
Chloroform	ug/l	--	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	--	--
Chloromethane	ug/l	700 (15)	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	--	--
cis-1,2-Dichloroethene	ug/l	200 (22)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	--	--
cis-1,2-Dichloropropene	ug/l	--	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	--	--
Dibromochloromethane	ug/l	40 (15)	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	--	--
Dichlorodifluoromethane	ug/l	--	--	--	--	<0.5	<0.5	--	--	<0.5	--	--	--	--	--
Methylene Chloride	ug/l	100 (23)	<4.0	--	<8.0	<4.0	<4.0	--	--	<4.0	--	--	--	--	--
Tetrachloroethylene	ug/l	50 (24)	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	--	--
trans-1,2-Dichloroethene	ug/l	200 (22)	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	--	--
trans-1,3-Dichloropropene	ug/l	7 (15)	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	--	--
Trichloroethene	ug/l	20	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	--	--
Trichlorofluoromethane	ug/l	--	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	--	--
Vinyl Chloride	ug/l	600 (15)	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	--	--

Parameter	Unit	(2) (1) PWQO	SW-3	SW-3
			17-Jun-2015	27-Aug-2015 (5)
			W-2	3
General Chemistry				
Alkalinity (Total as CaCO ₃)	mg/l	-- (6)	165	--
Ammonia, unionized	ug/l	20	<50	--
Ammonia Nitrogen	ug/l	--	<50	--
Ammonium	ug/l	--	<50	--
Bicarbonate	ug/l	--	165000	--
Bromide	ug/l	--	<250	--
Carbonate (CO ₃)	ug/l	--	<1000 (7)	--
Color	color unit	--	23	--
Conductivity	uS/cm	--	603	--
Conductivity (Field)	uS/cm	--	849	--
Dissolved Oxygen (Field)	mg/l	-- (8)	0.91	--
Fluoride	ug/l	--	2360	--
Hardness, Calcium Carbonate	ug/l	--	232000	--
Nitrate as N	ug/l	--	130	--
Nitrite as N	ug/l	--	<100	--
pH	-	8.5	7.99	--
pH (Field)	-	8.5	8	--
Phosphorus	ug/l	-- (9)	<50	--
Sulfate	ug/l	--	85000	--
Temperature (Field)	deg c	-- (10)	15	--
Total Organic Carbon	ug/l	--	4700	--
Total Suspended Solids	ug/l	--	7000	--
Turbidity	ntu	-- (11)	13.5	--
Turbidity (Field)	ntu	-- (11)	5.9	--
Metals				
Aluminum, dissolved	ug/l	-- (12)	10	--
Arsenic	ug/l	100 (13)	<1	--
Barium	ug/l	--	40	--
Beryllium	ug/l	-- (14)	<0.5	--
Boron	ug/l	200 (15)	170	--
Cadmium	ug/l	0.2 (13)	<0.1	--
Calcium	ug/l	--	78000	--
Chromium	ug/l	-- (16)	<1	--
Cobalt	ug/l	0.9	<0.2	--
Copper	ug/l	5	4	--
Iron	ug/l	300	250	--
Lead	ug/l	-- (17)	<1	--
Magnesium	ug/l	--	9000	--
Manganese	ug/l	--	20	--
Molybdenum	ug/l	40	<5	--
Nickel	ug/l	25	<5	--
Potassium	ug/l	--	4000	--
Selenium	ug/l	100	<1	--
Silver	ug/l	0.1	<0.1	--
Sodium	ug/l	--	42000	--
Strontium	ug/l	--	1500	--
Thallium	ug/l	0.3 (18)	<0.1	--
Titanium	ug/l	--	20	--
Vanadium	ug/l	6	7	--
Zinc	ug/l	30 (13)	<10	--
Petroleum Hydrocarbons				
Benzene	ug/l	100 (19)	<0.5	--
Ethylbenzene	ug/l	8	<0.5	--
m,p-Xylenes	ug/l	--	<0.4	--
o-Xylene	ug/l	40 (18)	<0.4	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	<20	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	<20	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	<50	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	<50	--
Toluene	ug/l	0.8	<0.5	--
Xylenes, Total	ug/l	--	<0.5	--

Parameter	Unit	(2) (1) PWQO	SW-3	SW-3
			17-Jun-2015	27-Aug-2015 (5)
			W-2	3
Semi-VOCs				
1-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	--	--
2-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	--	--
Acenaphthene	ug/l	--	--	--
Acenaphthylene	ug/l	--	--	--
Anthracene	ug/l	0.0008 ⁽¹⁵⁾	--	--
Benzo[a]anthracene	ug/l	0.0004 ⁽¹⁵⁾	--	--
Benzo[a]pyrene	ug/l	--	--	--
Benzo[b]fluoranthene	ug/l	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 ⁽¹⁵⁾	--	--
Benzo[k]fluoranthene	ug/l	0.0002 ⁽¹⁵⁾	--	--
Chrysene	ug/l	0.0001 ⁽¹⁵⁾	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 ⁽¹⁵⁾	--	--
Fluoranthene	ug/l	0.0008 ⁽¹⁵⁾	--	--
Fluorene	ug/l	0.2 ⁽¹⁵⁾	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	--	--
Naphthalene	ug/l	7 ⁽¹⁵⁾	--	--
Phenanthrene	ug/l	0.03 ⁽¹⁵⁾	--	--
Pyrene	ug/l	--	--	--
Styrene	ug/l	4 ⁽¹⁸⁾	<0.5	--
VOCs				
1,1,1,2-Tetrachloroethane	ug/l	20 ⁽¹⁵⁾	<0.5	--
1,1,1-Trichloroethane	ug/l	10 ⁽¹⁸⁾	<0.4	--
1,1,2,2-Tetrachloroethane	ug/l	70	<0.5	--
1,1,2-Trichloroethane	ug/l	800	<0.4	--
1,1-Dichloroethane	ug/l	200	<0.4	--
1,1-Dichloroethylene	ug/l	40	<0.5	--
1,2-Dibromoethane	ug/l	5 ⁽¹⁵⁾	<0.2	--
1,2-Dichlorobenzene	ug/l	2.5	<0.4	--
1,2-Dichloroethane	ug/l	100	<0.2	--
1,2-Dichloropropane	ug/l	0.7 ⁽¹⁵⁾	<0.5	--
1,3,5-Trimethylbenzene	ug/l	--	<0.3	--
1,3-Dichlorobenzene	ug/l	2.5	<0.4	--
1,4-Dichlorobenzene	ug/l	4	<0.4	--
Bromodichloromethane	ug/l	200 ⁽¹⁵⁾	<0.3	--
Bromoform	ug/l	60 ⁽¹⁵⁾	<0.4	--
Bromomethane	ug/l	0.9 ⁽²⁰⁾	<0.5	--
Carbon Tetrachloride	ug/l	--	<0.2	--
Chlorobenzene	ug/l	15 ⁽²¹⁾	<0.2	--
Chloroethane	ug/l	--	<0.2	--
Chloroform	ug/l	--	<0.5	--
Chloromethane	ug/l	700 ⁽¹⁵⁾	<0.2	--
cis-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	<0.4	--
cis-1,2-Dichloropropene	ug/l	--	<0.2	--
Dibromochloromethane	ug/l	40 ⁽¹⁵⁾	<0.3	--
Dichlorodifluoromethane	ug/l	--	<0.5	--
Methylene Chloride	ug/l	100 ⁽²³⁾	<4	--
Tetrachloroethylene	ug/l	50 ⁽²⁴⁾	<0.3	--
trans-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	<0.4	--
trans-1,3-Dichloropropene	ug/l	7 ⁽¹⁵⁾	<0.2	--
Trichloroethene	ug/l	20	<0.3	--
Trichlorofluoromethane	ug/l	--	<0.5	--
Vinyl Chloride	ug/l	600 ⁽¹⁵⁾	<0.2	--

Parameter	Unit	(a) PWQO	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4
			12-Nov-2010	28-Feb-2011 ^(b)	07-Apr-2011 ^(c)	10-May-2012	14-Jun-2012 ^(b)	17-Sep-2012 ^(b)	18-Dec-2012	11-Apr-2013	05-Jul-2013 ^(b)	21-Oct-2013 ^(b)	03-Feb-2014 ^(b)	26-May-2014 ^(b)	09-Oct-2014 ^(b)
			SW-3	SW-4	W-5	W-2	w4	sw4	W-5	W-7	4	w4	4	s4	s4
General Chemistry															
Alkalinity (Total as CaCO ₃)	mg/l	-- ⁽⁶⁾	335	--	259	286	--	--	187	248	--	--	--	--	--
Ammonia, unionized	ug/l	20	--	--	<20	<20	--	--	<20	<20	--	--	--	--	--
Ammonia Nitrogen	ug/l	--	<20	--	<20	<20	--	--	40	220	--	--	--	--	--
Ammonium	ug/l	--	<20	--	--	<20	--	--	40	220	--	--	--	--	--
Bicarbonate	ug/l	--	335000	--	259000	286000	--	--	187000	248000	--	--	--	--	--
Bromide	ug/l	--	<250	--	<250	<250	--	--	<250	<250	--	--	--	--	--
Carbonate (CO ₃)	ug/l	--	<2000 ⁽⁷⁾	--	<2000 ⁽⁷⁾	<1000 ⁽⁷⁾	--	--	<1000 ⁽⁷⁾	<1000 ⁽⁷⁾	--	--	--	--	--
Color	color unit	--	7	--	8	38	--	--	23	9	--	--	--	--	--
Conductivity	uS/cm	--	907	--	834	1310	--	--	685	824	--	--	--	--	--
Conductivity (Field)	uS/cm	--	902	--	830	895	--	--	730	940	--	--	--	--	--
Dissolved Oxygen (Field)	mg/l	-- ⁽⁶⁾	4.88	--	5.18	2.7	--	--	3.01	5.11	--	--	--	--	--
Fluoride	ug/l	--	150	--	150	210	--	--	110	180	--	--	--	--	--
Hardness, Calcium Carbonate	ug/l	--	383000	--	319000	362000	--	--	231000	346000	--	--	--	--	--
Nitrate as N	ug/l	--	140	--	160	<100	--	--	290	480	--	--	--	--	--
Nitrite as N	ug/l	--	<100	--	<100	<100	--	--	<100	<100	--	--	--	--	--
pH	-	8.5	8.14	--	8.02	7.84	--	--	8.03	8.06	--	--	--	--	--
pH (Field)	-	8.5	7.82	--	8.0	7.5	--	--	8.2	8.2	--	--	--	--	--
Phosphorus	ug/l	-- ⁽⁶⁾	10	--	20	10	--	--	40	50	--	--	--	--	--
Sulfate	ug/l	--	78000	--	62000	89000	--	--	30000	51000	--	--	--	--	--
Temperature (Field)	deg c	-- ⁽¹⁰⁾	2.6	--	2	13	--	--	2	3	--	--	--	--	--
Total Organic Carbon	ug/l	--	3300	--	4200	7400	--	--	4800	3600	--	--	--	--	--
Total Suspended Solids	ug/l	--	14000	--	3000	3000	--	--	27000	7000	--	--	--	--	--
Turbidity	ntu	-- ⁽¹¹⁾	1.2	--	1.2	2.4	--	--	26.5	4.5	--	--	--	--	--
Turbidity (Field)	ntu	-- ⁽¹¹⁾	--	--	--	--	--	--	31	11.8	--	--	--	--	--
Metals															
Aluminum, dissolved	ug/l	-- ⁽¹²⁾	<10	--	<10	<10	--	--	<10	<10	--	--	--	--	--
Arsenic	ug/l	100 ⁽¹³⁾	<1	--	<1	<1	--	--	<1	<1	--	--	--	--	--
Barium	ug/l	--	50	--	40	50	--	--	40	40	--	--	--	--	--
Beryllium	ug/l	-- ⁽¹⁴⁾	<1	--	<0.5	<0.5	--	--	<0.5	<0.5	--	--	--	--	--
Boron	ug/l	200 ⁽¹⁵⁾	30	--	30	60	--	--	10	20	--	--	--	--	--
Cadmium	ug/l	0.2 ⁽¹³⁾	<0.1	--	<0.1	<0.1	--	--	<0.1	<0.1	--	--	--	--	--
Calcium	ug/l	--	122000	--	103000	112000	--	--	76000	112000	--	--	--	--	--
Chromium	ug/l	-- ⁽¹⁶⁾	2	--	2	6	--	--	4	3	--	--	--	--	--
Cobalt	ug/l	0.9	0.2	--	0.5	0.4	--	--	0.2	0.2	--	--	--	--	--
Copper	ug/l	5	1	--	1	1	--	--	2	2	--	--	--	--	--
Iron	ug/l	300	40	--	330	280	--	--	200	140	--	--	--	--	--
Lead	ug/l	-- ⁽¹⁷⁾	<1	--	<1	<1	--	--	<1	<1	--	--	--	--	--
Magnesium	ug/l	--	19000	--	15000	20000	--	--	10000	16000	--	--	--	--	--
Manganese	ug/l	--	40	--	280	100	--	--	20	20	--	--	--	--	--
Molybdenum	ug/l	40	<5	--	<5	<5	--	--	<5	<5	--	--	--	--	--
Nickel	ug/l	25	<5	--	<5	<5	--	--	<5	<5	--	--	--	--	--
Potassium	ug/l	--	2000	--	2000	3000	--	--	3000	3000	--	--	--	--	--
Selenium	ug/l	100	<1	--	<1	<1	--	--	<1	<1	--	--	--	--	--
Silver	ug/l	0.1	<0.1	--	<0.1	<0.1	--	--	<0.1	<0.1	--	--	--	--	--
Sodium	ug/l	--	40000	--	43000	124000	--	--	49000	57000	--	--	--	--	--
Strontium	ug/l	--	1950	--	2080	2650	--	--	691	1800	--	--	--	--	--
Thallium	ug/l	0.3 ⁽¹⁸⁾	<0.1	--	<0.1	<0.1	--	--	<0.1	<0.1	--	--	--	--	--
Titanium	ug/l	--	<10	--	<10	<10	--	--	20	<10	--	--	--	--	--
Vanadium	ug/l	6	2	--	3	3	--	--	3	1	--	--	--	--	--
Zinc	ug/l	30 ⁽¹³⁾	10	--	30	<10	--	--	10	20	--	--	--	--	--
Petroleum Hydrocarbons															
Benzene	ug/l	100 ⁽¹⁹⁾	<0.5	--	<1	<0.5	--	--	<0.5	<0.5	--	--	--	--	--
Ethylbenzene	ug/l	8	<0.5	--	<1	<0.5	--	--	<0.5	<0.5	--	--	--	--	--
m,p-Xylenes	ug/l	--	<1.0	--	<2.0	<0.5	--	--	<0.5	<0.5	--	--	--	--	--
o-Xylene	ug/l	40 ⁽¹⁸⁾	<0.5	--	<1	<0.5	--	--	<0.5	<0.5	--	--	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	<100	--	<100	<100	--	--	--	<100	--	--	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	<100	--	<100	<100	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	300	--	<100	<100	--	--	--	<100	--	--	--	--	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	--	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	--	--
Toluene	ug/l	0.8	<0.5	--	<1	<0.5	--	--	<0.5	<0.5	--	--	--	--	--
Xylenes, Total	ug/l	--	--	--	<3	<1.0	--	--	--	<1.0	--	--	--	--	--

Parameter	Unit	(2) (i) PWQO	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4	SW-4
			12-Nov-2010	28-Feb-2011 (2)	07-Apr-2011 (4)	10-May-2012	14-Jun-2012 (2)	17-Sep-2012 (2)	18-Dec-2012	11-Apr-2013	05-Jul-2013 (2)	21-Oct-2013 (2)	03-Feb-2014 (2)	26-May-2014 (2)	09-Oct-2014 (2)
			SW-3	SW-4	W-5	W-2	w4	sw4	W-5	W-7	4	w4	4	s4	s4
Semi-VOCs															
1-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
2-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthylene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Anthracene	ug/l	0.0008 ⁽¹⁵⁾	<0.01	--	<0.01	0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]anthracene	ug/l	0.0004 ⁽¹⁵⁾	<0.01	--	<0.01	0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]pyrene	ug/l	--	<0.01	--	<0.01	0.02	--	--	--	<0.01	--	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Chrysene	ug/l	0.0001 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Fluoranthene	ug/l	0.0008 ⁽¹⁵⁾	<0.02	--	<0.02	0.05	--	--	--	<0.1	--	--	--	--	--
Fluorene	ug/l	0.2 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Naphthalene	ug/l	7 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Phenanthrene	ug/l	0.03 ⁽¹⁵⁾	<0.02	--	<0.02	0.06	--	--	--	<0.1	--	--	--	--	--
Pyrene	ug/l	--	<0.02	--	0.03	0.04	--	--	--	<0.1	--	--	--	--	--
Styrene	ug/l	4 ⁽¹⁸⁾	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	--	--
VOCs															
1,1,1,2-Tetrachloroethane	ug/l	20 ⁽¹⁵⁾	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	--	--
1,1,1-Trichloroethane	ug/l	10 ⁽¹⁸⁾	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	--	--
1,1,2,2-Tetrachloroethane	ug/l	70	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	--	--
1,1,2-Trichloroethane	ug/l	800	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	--	--
1,1-Dichloroethane	ug/l	200	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	--	--
1,1-Dichloroethylene	ug/l	40	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	--	--
1,2-Dibromoethane	ug/l	5 ⁽¹⁵⁾	<1.0	--	<2.0	<0.2	--	--	--	<0.2	--	--	--	--	--
1,2-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	--	--
1,2-Dichloroethane	ug/l	100	<0.5	--	<1	<0.2	--	--	--	<0.2	--	--	--	--	--
1,2-Dichloropropane	ug/l	0.7 ⁽¹⁵⁾	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	--	--
1,3,5-Trimethylbenzene	ug/l	--	<0.3	--	<0.6	<0.3	--	--	--	<0.3	--	--	--	--	--
1,3-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	--	--
1,4-Dichlorobenzene	ug/l	4	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	--	--
Bromodichloromethane	ug/l	200 ⁽¹⁵⁾	<0.3	--	<0.6	<0.3	--	--	--	<0.3	--	--	--	--	--
Bromoform	ug/l	60 ⁽¹⁵⁾	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	--	--
Bromomethane	ug/l	0.9 ⁽²⁰⁾	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	--	--
Carbon Tetrachloride	ug/l	--	<0.5	--	<1	<0.2	--	--	--	<0.2	--	--	--	--	--
Chlorobenzene	ug/l	15 ⁽²¹⁾	<0.2	--	<0.4	<0.2	--	--	--	<0.2	--	--	--	--	--
Chloroethane	ug/l	--	<1.0	--	<2.0	<0.2	--	--	--	<0.2	--	--	--	--	--
Chloroform	ug/l	--	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	--	--
Chloromethane	ug/l	700 ⁽¹⁵⁾	<1.0	--	<2.0	<0.2	--	--	--	<0.2	--	--	--	--	--
cis-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	--	--
cis-1,2-Dichloropropene	ug/l	--	<0.2	--	<0.4	<0.2	--	--	--	<0.2	--	--	--	--	--
Dibromochloromethane	ug/l	40 ⁽¹⁵⁾	<0.3	--	<0.6	<0.3	--	--	--	<0.3	--	--	--	--	--
Dichlorodifluoromethane	ug/l	--	--	--	--	<0.5	--	--	--	<0.5	--	--	--	--	--
Methylene Chloride	ug/l	100 ⁽²³⁾	<4.0	--	<8.0	<4.0	--	--	--	<4.0	--	--	--	--	--
Tetrachloroethylene	ug/l	50 ⁽²⁴⁾	<0.3	--	<0.6	<0.3	--	--	--	<0.3	--	--	--	--	--
trans-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	--	--
trans-1,3-Dichloropropene	ug/l	7 ⁽¹⁵⁾	<0.2	--	<0.4	<0.2	--	--	--	<0.2	--	--	--	--	--
Trichloroethene	ug/l	20	<0.3	--	<0.6	<0.3	--	--	--	<0.3	--	--	--	--	--
Trichlorofluoromethane	ug/l	--	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	--	--
Vinyl Chloride	ug/l	600 ⁽¹⁵⁾	<0.2	--	<0.4	<0.2	--	--	--	<0.2	--	--	--	--	--

Parameter	Unit	(2) (1) PWQO	SW-4	SW-4	SW-4
			24-Mar-2015 (3)	17-Jun-2015	27-Aug-2015 (5)
			3	W-6	4
General Chemistry					
Alkalinity (Total as CaCO ₃)	mg/l	-- (6)	--	341	--
Ammonia, unionized	ug/l	20	--	<50	--
Ammonia Nitrogen	ug/l	--	--	<50	--
Ammonium	ug/l	--	--	<50	--
Bicarbonate	ug/l	--	--	341000	--
Bromide	ug/l	--	--	<250	--
Carbonate (CO ₃)	ug/l	--	--	<1000 (7)	--
Color	color unit	--	--	82	--
Conductivity	uS/cm	--	--	1520	--
Conductivity (Field)	uS/cm	--	--	860	--
Dissolved Oxygen (Field)	mg/l	-- (8)	--	1.23	--
Fluoride	ug/l	--	--	200	--
Hardness, Calcium Carbonate	ug/l	--	--	288000	--
Nitrate as N	ug/l	--	--	<100	--
Nitrite as N	ug/l	--	--	<100	--
pH	-	8.5	--	8.09	--
pH (Field)	-	8.5	--	7.9	--
Phosphorus	ug/l	-- (9)	--	<50	--
Sulfate	ug/l	--	--	53000	--
Temperature (Field)	deg c	-- (10)	--	17	--
Total Organic Carbon	ug/l	--	--	11400	--
Total Suspended Solids	ug/l	--	--	4000	--
Turbidity	ntu	-- (11)	--	9.9	--
Turbidity (Field)	ntu	-- (11)	--	5.1	--
Metals					
Aluminum, dissolved	ug/l	-- (12)	--	10	--
Arsenic	ug/l	100 (13)	--	<1	--
Barium	ug/l	--	--	60	--
Beryllium	ug/l	-- (14)	--	<0.5	--
Boron	ug/l	200 (15)	--	30	--
Cadmium	ug/l	0.2 (13)	--	<0.1	--
Calcium	ug/l	--	--	89000	--
Chromium	ug/l	-- (16)	--	1	--
Cobalt	ug/l	0.9	--	0.3	--
Copper	ug/l	5	--	5	--
Iron	ug/l	300	--	460	--
Lead	ug/l	-- (17)	--	<1	--
Magnesium	ug/l	--	--	16000	--
Manganese	ug/l	--	--	30	--
Molybdenum	ug/l	40	--	<5	--
Nickel	ug/l	25	--	<5	--
Potassium	ug/l	--	--	3000	--
Selenium	ug/l	100	--	<1	--
Silver	ug/l	0.1	--	<0.1	--
Sodium	ug/l	--	--	224000	--
Strontium	ug/l	--	--	966	--
Thallium	ug/l	0.3 (18)	--	<0.1	--
Titanium	ug/l	--	--	30	--
Vanadium	ug/l	6	--	1	--
Zinc	ug/l	30 (13)	--	<10	--
Petroleum Hydrocarbons					
Benzene	ug/l	100 (18)	--	<0.5	--
Ethylbenzene	ug/l	8	--	<0.5	--
m,p-Xylenes	ug/l	--	--	<0.4	--
o-Xylene	ug/l	40 (18)	--	<0.4	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	--	<20	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	--	<20	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	--	<50	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	--	<50	--
Toluene	ug/l	0.8	--	<0.5	--
Xylenes, Total	ug/l	--	--	<0.5	--

Parameter	Unit	(2) (1) PWQO	SW-4	SW-4	SW-4
			24-Mar-2015 (3)	17-Jun-2015	27-Aug-2015 (5)
			3	W-6	4
Semi-VOCs					
1-Methylnaphthalene	ug/l	2 (18)	--	--	--
2-Methylnaphthalene	ug/l	2 (18)	--	--	--
Acenaphthene	ug/l	--	--	--	--
Acenaphthylene	ug/l	--	--	--	--
Anthracene	ug/l	0.0008 (15)	--	--	--
Benzo[a]anthracene	ug/l	0.0004 (15)	--	--	--
Benzo[a]pyrene	ug/l	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 (15)	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 (15)	--	--	--
Chrysene	ug/l	0.0001 (15)	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 (15)	--	--	--
Fluoranthene	ug/l	0.0008 (15)	--	--	--
Fluorene	ug/l	0.2 (15)	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	--	--	--
Naphthalene	ug/l	7 (15)	--	--	--
Phenanthrene	ug/l	0.03 (15)	--	--	--
Pyrene	ug/l	--	--	--	--
Styrene	ug/l	4 (18)	--	<0.5	--
VOCs					
1,1,1,2-Tetrachloroethane	ug/l	20 (15)	--	<0.5	--
1,1,1-Trichloroethane	ug/l	10 (18)	--	<0.4	--
1,1,2,2-Tetrachloroethane	ug/l	70	--	<0.5	--
1,1,2-Trichloroethane	ug/l	800	--	<0.4	--
1,1-Dichloroethane	ug/l	200	--	<0.4	--
1,1-Dichloroethylene	ug/l	40	--	<0.5	--
1,2-Dibromoethane	ug/l	5 (15)	--	<0.2	--
1,2-Dichlorobenzene	ug/l	2.5	--	<0.4	--
1,2-Dichloroethane	ug/l	100	--	<0.2	--
1,2-Dichloropropane	ug/l	0.7 (15)	--	<0.5	--
1,3,5-Trimethylbenzene	ug/l	--	--	<0.3	--
1,3-Dichlorobenzene	ug/l	2.5	--	<0.4	--
1,4-Dichlorobenzene	ug/l	4	--	<0.4	--
Bromodichloromethane	ug/l	200 (15)	--	<0.3	--
Bromoform	ug/l	60 (15)	--	<0.4	--
Bromomethane	ug/l	0.9 (20)	--	<0.5	--
Carbon Tetrachloride	ug/l	--	--	<0.2	--
Chlorobenzene	ug/l	15 (21)	--	<0.2	--
Chloroethane	ug/l	--	--	<0.2	--
Chloroform	ug/l	--	--	<0.5	--
Chloromethane	ug/l	700 (15)	--	<0.2	--
cis-1,2-Dichloroethene	ug/l	200 (22)	--	<0.4	--
cis-1,2-Dichloropropene	ug/l	--	--	<0.2	--
Dibromochloromethane	ug/l	40 (15)	--	<0.3	--
Dichlorodifluoromethane	ug/l	--	--	<0.5	--
Methylene Chloride	ug/l	100 (23)	--	<4	--
Tetrachloroethylene	ug/l	50 (24)	--	<0.3	--
trans-1,2-Dichloroethene	ug/l	200 (22)	--	<0.4	--
trans-1,3-Dichloropropene	ug/l	7 (15)	--	<0.2	--
Trichloroethene	ug/l	20	--	<0.3	--
Trichlorofluoromethane	ug/l	--	--	<0.5	--
Vinyl Chloride	ug/l	600 (15)	--	<0.2	--

Parameter	Unit	(a) PWQO	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6
			12-Nov-2010	28-Feb-2011 (b)	07-Apr-2011 (c)	10-May-2012	14-Jun-2012	17-Sep-2012 (b)	18-Dec-2012	11-Apr-2013	05-Jul-2013 (b)	21-Oct-2013	03-Feb-2014 (b)	26-May-2014	09-Oct-2014
			SW-2	SW-6	W-6	W-7	W-5	s6	W-6	W-1	6	W-4	6	SW-6	SW-6
General Chemistry															
Alkalinity (Total as CaCO3)	mg/l	-- (d)	417	--	232	366	437	--	85	215	--	398	--	371	327
Ammonia, unionized	ug/l	20	--	--	<20	<20	<20	--	<20	<20	--	<20	--	<20	<20
Ammonia Nitrogen	ug/l	--	40	--	<20	<20	120	--	50	70	--	30	--	30	110
Ammonium	ug/l	--	40	--	--	<20	120	--	50	70	--	30	--	30	110
Bicarbonate	ug/l	--	417000	--	232000	366000	437000	--	85000	215000	--	398000	--	371000	320000
Bromide	ug/l	--	<250	--	570	<250	490	--	<250	<250	--	<250	--	<250	<250
Carbonate (CO3)	ug/l	--	<2000 (f)	--	<2000 (f)	<1000 (f)	<1000 (f)	--	<1000 (f)	<1000 (f)	--	<1000 (f)	--	<1000 (f)	6000
Color	color unit	--	41	--	24	16	127	--	40	20	--	31	--	46	38
Conductivity	uS/cm	--	1840	--	1280	1490	2500	--	1020	1010	--	1980	--	1300	1960
Conductivity (Field)	uS/cm	--	1862	--	1936	1740	2460	--	1056	720	--	1010	--	1095	885
Dissolved Oxygen (Field)	mg/l	-- (d)	8.84	--	7.69	2.88	4.91	--	4.22	6.10	--	9.3	--	5.11	4.11
Fluoride	ug/l	--	120	--	<100	100	180	--	120	110	--	140	--	150	210
Hardness, Calcium Carbonate	ug/l	--	482000	--	340000	371000	311000	--	109000	288000	--	373000	--	342000	293000
Nitrate as N	ug/l	--	<100	--	<100	<100	<100	--	190	<100	--	<100	--	<100	160
Nitrite as N	ug/l	--	<100	--	<100	<100	<100	--	<100	<100	--	<100	--	<100	<100
pH	-	8.5	7.94	--	7.89	8.11	7.82	--	7.33	7.91	--	8.08	--	8.05	8.33
pH (Field)	-	8.5	7.41	--	7.5	7.4	7.8	--	7.4	8.0	--	7.7	--	7.5	7.6
Phosphorus	ug/l	-- (b)	60	--	30	<10	130	--	140	30	--	150	--	50	80
Sulfate	ug/l	--	84000	--	35000	23000	43000	--	37000	40000	--	93000	--	57000	102000
Temperature (Field)	deg c	-- (f)	2.1	--	3	14	21	--	1	1	--	5	--	12	5
Total Organic Carbon	ug/l	--	8800	--	5300	4400	20600	--	7300	5000	--	10800	--	8300	8500
Total Suspended Solids	ug/l	--	11000	--	5000	4000	17000	--	18000	18000	--	32000	--	5000	4000
Turbidity	ntu	-- (f)	3.6	--	1.9	0.3	1.7	--	15.2	1.7	--	1.8	--	5.9	5.0
Turbidity (Field)	ntu	-- (f)	--	--	--	71	3.2	--	20	14.2	--	4.34	--	19	16.6
Metals															
Aluminum, dissolved	ug/l	-- (f)	<10	--	<10	<10	10	--	<10	<10	--	<10	--	<10	<10
Arsenic	ug/l	100 (f)	<1	--	<1	<1	<1	--	<1	<1	--	<1	--	<1	<1
Barium	ug/l	--	60	--	40	60	70	--	30	40	--	60	--	50	70
Beryllium	ug/l	-- (f)	<1	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	--	<0.5	--	<0.5	<0.5
Boron	ug/l	200 (f)	10	--	<10	<10	30	--	10	<10	--	20	--	20	40
Cadmium	ug/l	0.2 (f)	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	<0.1	--	<0.1	<0.1
Calcium	ug/l	--	147000	--	108000	114000	98000	--	37000	89000	--	113000	--	104000	91000
Chromium	ug/l	-- (f)	4	--	4	7	8	--	4	4	--	9	--	<1	<1
Cobalt	ug/l	0.9	0.3	--	<0.2	0.6	0.4	--	0.2	<0.2	--	0.2	--	0.3	0.3
Copper	ug/l	5	1	--	3	1	3	--	3	1	--	1	--	1	2
Iron	ug/l	300	390	--	270	420	360	--	290	50	--	140	--	160	250
Lead	ug/l	-- (f)	<1	--	<1	<1	<1	--	1	<1	--	<1	--	<1	<1
Magnesium	ug/l	--	28000	--	17000	21000	16000	--	4000	16000	--	22000	--	20000	16000
Manganese	ug/l	--	130	--	40	260	390	--	40	50	--	30	--	100	240
Molybdenum	ug/l	40	<5	--	<5	<5	<5	--	<5	<5	--	<5	--	<5	<5
Nickel	ug/l	25	<5	--	<5	<5	<5	--	<5	<5	--	<5	--	<5	<5
Potassium	ug/l	--	2000	--	2000	<1000	1000	--	4000	2000	--	2000	--	2000	3000
Selenium	ug/l	100	<1	--	<1	<1	<1	--	<1	<1	--	<1	--	<1	<1
Silver	ug/l	0.1	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	<0.1	--	<0.1	<0.1
Sodium	ug/l	--	213000	--	177000	149000	305000	--	145000	117000	--	222000	--	158000	246000
Strontium	ug/l	--	977	--	987	802	1140	--	421	774	--	1200	--	872	1280
Thallium	ug/l	0.3 (b)	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	--	<0.1	--	<0.1	<0.1
Titanium	ug/l	--	<10	--	<10	<10	<10	--	20	<10	--	<10	--	<10	<10
Vanadium	ug/l	6	4	--	2	3	4	--	2	2	--	3	--	<1	<1
Zinc	ug/l	30 (f)	<10	--	10	<10	<10	--	30	<10	--	<10	--	<10	<10
Petroleum Hydrocarbons															
Benzene	ug/l	100 (b)	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	--	<0.5	--	<0.5	<0.5
Ethylbenzene	ug/l	8	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	--	<0.5	--	<0.5	<0.5
m,p-Xylenes	ug/l	--	<1.0	--	<2.0	<0.5	<0.5	--	<0.5	<0.5	--	<0.5	--	<0.5	<0.5
o-Xylene	ug/l	40 (b)	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	--	<0.5	--	<0.5	<0.5
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	<100	--	<100	<100	<100	--	--	<100	--	--	--	<100	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	<100	--	<100	<100	<100	--	--	--	--	--	--	<100	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	<100	--	<100	<100	<100	--	--	<100	--	--	--	<100	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	<200	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	<200	--
Toluene	ug/l	0.8	<0.5	--	<1	<0.5	<0.5	--	<0.5	<0.5	--	<0.5	--	<0.5	<0.5
Xylenes, Total	ug/l	--	--	--	<3	<1.0	<1.0	--	--	<1.0	--	--	--	<1.0	--

Parameter	Unit	(2) (i) PWQO	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6
			12-Nov-2010	28-Feb-2011 (2)	07-Apr-2011 (4)	10-May-2012	14-Jun-2012	17-Sep-2012 (5)	18-Dec-2012	11-Apr-2013	05-Jul-2013 (5)	21-Oct-2013	03-Feb-2014 (3)	26-May-2014	09-Oct-2014
			SW-2	SW-6	W-6	W-7	W-5	S6	W-6	W-1	6	W-4	6	SW-6	SW-6
Semi-VOCs															
1-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	0.03	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
2-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthylene	ug/l	--	0.03	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Anthracene	ug/l	0.0008 ⁽¹⁵⁾	<0.01	--	<0.01	<0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]anthracene	ug/l	0.0004 ⁽¹⁵⁾	<0.01	--	<0.01	<0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]pyrene	ug/l	--	<0.01	--	<0.01	<0.01	--	--	--	<0.01	--	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Chrysene	ug/l	0.0001 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Fluoranthene	ug/l	0.0008 ⁽¹⁵⁾	0.09	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Fluorene	ug/l	0.2 ⁽¹⁵⁾	0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Naphthalene	ug/l	7 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Phenanthrene	ug/l	0.03 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Pyrene	ug/l	--	0.11	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Styrene	ug/l	4 ⁽¹⁸⁾	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
VOCs															
1,1,1,2-Tetrachloroethane	ug/l	20 ⁽¹⁵⁾	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,1,1-Trichloroethane	ug/l	10 ⁽¹⁸⁾	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,1,2,2-Tetrachloroethane	ug/l	70	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,1,2-Trichloroethane	ug/l	800	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,1-Dichloroethane	ug/l	200	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,1-Dichloroethylene	ug/l	40	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,2-Dibromoethane	ug/l	5 ⁽¹⁵⁾	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
1,2-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,2-Dichloroethane	ug/l	100	<0.5	--	<1	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
1,2-Dichloropropane	ug/l	0.7 ⁽¹⁵⁾	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
1,3,5-Trimethylbenzene	ug/l	--	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
1,3-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
1,4-Dichlorobenzene	ug/l	4	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
Bromodichloromethane	ug/l	200 ⁽¹⁵⁾	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
Bromoform	ug/l	60 ⁽¹⁵⁾	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
Bromomethane	ug/l	0.9 ⁽²⁰⁾	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Carbon Tetrachloride	ug/l	--	<0.5	--	<1	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Chlorobenzene	ug/l	15 ⁽²¹⁾	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Chloroethane	ug/l	--	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Chloroform	ug/l	--	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Chloromethane	ug/l	700 ⁽¹⁵⁾	<1.0	--	<2.0	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
cis-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
cis-1,2-Dichloropropene	ug/l	--	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Dibromochloromethane	ug/l	40 ⁽¹⁵⁾	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
Dichlorodifluoromethane	ug/l	--	--	--	--	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Methylene Chloride	ug/l	100 ⁽²³⁾	<4.0	--	<8.0	<4.0	<4.0	--	--	<4.0	--	--	--	<4.0	--
Tetrachloroethylene	ug/l	50 ⁽²⁴⁾	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
trans-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	<0.4	--	<0.8	<0.4	<0.4	--	--	<0.4	--	--	--	<0.4	--
trans-1,3-Dichloropropene	ug/l	7 ⁽¹⁵⁾	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--
Trichloroethene	ug/l	20	<0.3	--	<0.6	<0.3	<0.3	--	--	<0.3	--	--	--	<0.3	--
Trichlorofluoromethane	ug/l	--	<0.5	--	<1	<0.5	<0.5	--	--	<0.5	--	--	--	<0.5	--
Vinyl Chloride	ug/l	600 ⁽¹⁵⁾	<0.2	--	<0.4	<0.2	<0.2	--	--	<0.2	--	--	--	<0.2	--

Parameter	Unit	(2) (1) PWQO	SW-6	SW-6	SW-6
			24-Mar-2015 (6)	17-Jun-2015	27-Aug-2015 (6)
			6	W-7	6
General Chemistry					
Alkalinity (Total as CaCO ₃)	mg/l	-- (6)	--	279	--
Ammonia, unionized	ug/l	20	--	<50	--
Ammonia Nitrogen	ug/l	--	--	<50	--
Ammonium	ug/l	--	--	<50	--
Bicarbonate	ug/l	--	--	279000	--
Bromide	ug/l	--	--	<250	--
Carbonate (CO ₃)	ug/l	--	--	<1000 (7)	--
Color	color unit	--	--	10	--
Conductivity	uS/cm	--	--	1100	--
Conductivity (Field)	uS/cm	--	--	1040	--
Dissolved Oxygen (Field)	mg/l	-- (6)	--	1.09	--
Fluoride	ug/l	--	--	2150	--
Hardness, Calcium Carbonate	ug/l	--	--	491000	--
Nitrate as N	ug/l	--	--	220	--
Nitrite as N	ug/l	--	--	<100	--
pH	-	8.5	--	8.09	--
pH (Field)	-	8.5	--	7.82	--
Phosphorus	ug/l	-- (6)	--	<50	--
Sulfate	ug/l	--	--	238000	--
Temperature (Field)	deg c	-- (10)	--	16	--
Total Organic Carbon	ug/l	--	--	3400	--
Total Suspended Solids	ug/l	--	--	3000	--
Turbidity	ntu	-- (11)	--	5.2	--
Turbidity (Field)	ntu	-- (11)	--	12.2	--
Metals					
Aluminum, dissolved	ug/l	-- (12)	--	10	--
Arsenic	ug/l	100 (13)	--	<1	--
Barium	ug/l	--	--	70	--
Beryllium	ug/l	-- (14)	--	<0.5	--
Boron	ug/l	200 (15)	--	350	--
Cadmium	ug/l	0.2 (13)	--	<0.1	--
Calcium	ug/l	--	--	162000	--
Chromium	ug/l	-- (16)	--	<1	--
Cobalt	ug/l	0.9	--	<0.2	--
Copper	ug/l	5	--	3	--
Iron	ug/l	300	--	150	--
Lead	ug/l	-- (17)	--	<1	--
Magnesium	ug/l	--	--	21000	--
Manganese	ug/l	--	--	50	--
Molybdenum	ug/l	40	--	<5	--
Nickel	ug/l	25	--	<5	--
Potassium	ug/l	--	--	7000	--
Selenium	ug/l	100	--	<1	--
Silver	ug/l	0.1	--	<0.1	--
Sodium	ug/l	--	--	61000	--
Strontium	ug/l	--	--	3730	--
Thallium	ug/l	0.3 (18)	--	<0.1	--
Titanium	ug/l	--	--	<10	--
Vanadium	ug/l	6	--	3	--
Zinc	ug/l	30 (13)	--	20	--
Petroleum Hydrocarbons					
Benzene	ug/l	100 (18)	--	<0.5	--
Ethylbenzene	ug/l	8	--	<0.5	--
m,p-Xylenes	ug/l	--	--	<0.4	--
o-Xylene	ug/l	40 (18)	--	<0.4	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	--	<20	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	--	<20	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	--	<50	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	--	<50	--
Toluene	ug/l	0.8	--	<0.5	--
Xylenes, Total	ug/l	--	--	<0.5	--

Parameter	Unit	(2) (1) PWQO	SW-6	SW-6	SW-6
			24-Mar-2015 (5)	17-Jun-2015	27-Aug-2015 (5)
			6	W-7	6
Semi-VOCs					
1-Methylnaphthalene	ug/l	2 (18)	--	--	--
2-Methylnaphthalene	ug/l	2 (18)	--	--	--
Acenaphthene	ug/l	--	--	--	--
Acenaphthylene	ug/l	--	--	--	--
Anthracene	ug/l	0.0008 (15)	--	--	--
Benzo[a]anthracene	ug/l	0.0004 (15)	--	--	--
Benzo[a]pyrene	ug/l	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 (15)	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 (15)	--	--	--
Chrysene	ug/l	0.0001 (15)	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 (15)	--	--	--
Fluoranthene	ug/l	0.0008 (15)	--	--	--
Fluorene	ug/l	0.2 (15)	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	--	--	--
Naphthalene	ug/l	7 (15)	--	--	--
Phenanthrene	ug/l	0.03 (15)	--	--	--
Pyrene	ug/l	--	--	--	--
Styrene	ug/l	4 (18)	--	<0.5	--
VOCs					
1,1,1,2-Tetrachloroethane	ug/l	20 (15)	--	<0.5	--
1,1,1-Trichloroethane	ug/l	10 (18)	--	<0.4	--
1,1,2,2-Tetrachloroethane	ug/l	70	--	<0.5	--
1,1,2-Trichloroethane	ug/l	800	--	<0.4	--
1,1-Dichloroethane	ug/l	200	--	<0.4	--
1,1-Dichloroethylene	ug/l	40	--	<0.5	--
1,2-Dibromoethane	ug/l	5 (15)	--	<0.2	--
1,2-Dichlorobenzene	ug/l	2.5	--	<0.4	--
1,2-Dichloroethane	ug/l	100	--	<0.2	--
1,2-Dichloropropane	ug/l	0.7 (15)	--	<0.5	--
1,3,5-Trimethylbenzene	ug/l	--	--	<0.3	--
1,3-Dichlorobenzene	ug/l	2.5	--	<0.4	--
1,4-Dichlorobenzene	ug/l	4	--	<0.4	--
Bromodichloromethane	ug/l	200 (15)	--	<0.3	--
Bromoform	ug/l	60 (15)	--	<0.4	--
Bromomethane	ug/l	0.9 (20)	--	<0.5	--
Carbon Tetrachloride	ug/l	--	--	<0.2	--
Chlorobenzene	ug/l	15 (21)	--	<0.2	--
Chloroethane	ug/l	--	--	<0.2	--
Chloroform	ug/l	--	--	<0.5	--
Chloromethane	ug/l	700 (15)	--	<0.2	--
cis-1,2-Dichloroethene	ug/l	200 (22)	--	<0.4	--
cis-1,2-Dichloropropene	ug/l	--	--	<0.2	--
Dibromochloromethane	ug/l	40 (15)	--	<0.3	--
Dichlorodifluoromethane	ug/l	--	--	<0.5	--
Methylene Chloride	ug/l	100 (23)	--	<4	--
Tetrachloroethylene	ug/l	50 (24)	--	<0.3	--
trans-1,2-Dichloroethene	ug/l	200 (22)	--	<0.4	--
trans-1,3-Dichloropropene	ug/l	7 (15)	--	<0.2	--
Trichloroethene	ug/l	20	--	<0.3	--
Trichlorofluoromethane	ug/l	--	--	<0.5	--
Vinyl Chloride	ug/l	600 (15)	--	<0.2	--

Parameter	Unit	(a) (i) PWQO	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7
			12-Nov-2010	28-Feb-2011 (a)	07-Apr-2011 (a)	10-May-2012	14-Jun-2012 (a)	17-Sep-2012 (a)	18-Dec-2012	11-Apr-2013	05-Jul-2013	21-Oct-2013 (a)	03-Feb-2014 (a)	26-May-2014	09-Oct-2014
			SW-1	SW-7	W-7	W-1	w7	s7	W-1	W-2	W-1	w7	7	SW - 7	SW 7
General Chemistry															
Alkalinity (Total as CaCO3)	mg/l	-- (a)	371	--	326	294	--	--	255	315	396	--	--	372	314
Ammonia, unionized	ug/l	20	--	--	<20	<20	--	--	<20	<20	<20	--	--	<20	<20
Ammonia Nitrogen	ug/l	--	<20	--	20	<20	--	--	<20	40	<20	--	--	<20	70
Ammonium	ug/l	--	<20	--	--	<20	--	--	<20	40	<20	--	--	<20	70
Bicarbonate	ug/l	--	371000	--	326000	294000	--	--	255000	315000	396000	--	--	372000	314000
Bromide	ug/l	--	<250	--	<250	<250	--	--	<250	<250	330	--	--	<250	<250
Carbonate (CO3)	ug/l	--	<2000 (a)	--	<2000 (a)	<1000 (a)	--	--	<1000 (a)	<1000 (a)	<1000 (a)	--	--	<1000 (a)	<1000 (a)
Color	color unit	--	8	--	17	35	--	--	28	11	27	--	--	20	19
Conductivity	uS/cm	--	1540	--	1560	1360	--	--	1270	1360	1290	--	--	1070	1600
Conductivity (Field)	uS/cm	--	1467	--	1795	1466	--	--	1280	960	1250	--	--	890	810
Dissolved Oxygen (Field)	mg/l	-- (a)	6.88	--	5.34	2.98	--	--	3.11	5.88	2.60	--	--	3.91	3.70
Fluoride	ug/l	--	<100	--	<100	200	--	--	120	100	140	--	--	130	110
Hardness, Calcium Carbonate	ug/l	--	383000	--	420000	352000	--	--	315000	433000	411000	--	--	364000	520000
Nitrate as N	ug/l	--	<100	--	<100	<100	--	--	<100	<100	<100	--	--	<100	<100
Nitrite as N	ug/l	--	<100	--	<100	<100	--	--	<100	<100	<100	--	--	<100	<100
pH	-	8.5	8.14	--	8.09	7.84	--	--	8.17	8.00	8.15	--	--	8.13	8.13
pH (Field)	-	8.5	7.71	--	7.6	7.2	--	--	8.1	7.6	7.9	--	--	7.4	7.5
Phosphorus	ug/l	-- (a)	10	--	20	40	--	--	10	20	20	--	--	20	20
Sulfate	ug/l	--	46000	--	29000	88000	--	--	28000	36000	10000	--	--	28000	201000
Temperature (Field)	deg c	-- (a)	3.0	--	2	10	--	--	1	2	26	--	--	14	6
Total Organic Carbon	ug/l	--	3900	--	4200	7000	--	--	5800	3900	8700	--	--	5800	7600
Total Suspended Solids	ug/l	--	5000	--	7000	28000	--	--	<2000	13000	5000	--	--	4000	2000
Turbidity	ntu	-- (a)	0.4	--	1.0	3.6	--	--	1.3	0.9	2.0	--	--	3.4	1.3
Turbidity (Field)	ntu	-- (a)	--	--	--	64	--	--	4.8	13.8	3.8	--	--	5.40	11.8
Metals															
Aluminum, dissolved	ug/l	-- (a)	10	--	<10	20	--	--	<10	<10	<10	--	--	<10	<10
Arsenic	ug/l	100 (a)	<1	--	<1	<1	--	--	<1	<1	<1	--	--	<1	<1
Barium	ug/l	--	50	--	60	60	--	--	30	50	40	--	--	40	60
Beryllium	ug/l	-- (a)	<1	--	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	--	--	<0.5	<0.5
Boron	ug/l	200 (a)	<10	--	<10	50	--	--	<10	<10	20	--	--	<10	20
Cadmium	ug/l	0.2 (a)	<0.1	--	<0.1	<0.1	--	--	<0.1	<0.1	<0.1	--	--	<0.1	0.1
Calcium	ug/l	--	112000	--	132000	108000	--	--	98000	134000	125000	--	--	111000	162000
Chromium	ug/l	-- (a)	3	--	6	5	--	--	4	6	6	--	--	<1	<1
Cobalt	ug/l	0.9	0.3	--	0.2	0.5	--	--	<0.2	0.3	0.8	--	--	0.3	0.5
Copper	ug/l	5	1	--	2	2	--	--	2	1	2	--	--	<1	3
Iron	ug/l	300	70	--	<30	540	--	--	<30	100	660	--	--	160	600
Lead	ug/l	-- (a)	<1	--	<1	<1	--	--	<1	<1	<1	--	--	<1	<1
Magnesium	ug/l	--	25000	--	22000	20000	--	--	17000	24000	24000	--	--	21000	28000
Manganese	ug/l	--	70	--	30	130	--	--	<10	90	990	--	--	330	520
Molybdenum	ug/l	40	<5	--	<5	<5	--	--	<5	<5	<5	--	--	<5	<5
Nickel	ug/l	25	<5	--	<5	<5	--	--	<5	<5	<5	--	--	<5	<5
Potassium	ug/l	--	<1000	--	1000	3000	--	--	2000	2000	<1000	--	--	<1000	<1000
Selenium	ug/l	100	<1	--	<1	<1	--	--	<1	<1	<1	--	--	<1	<1
Silver	ug/l	0.1	<0.1	--	<0.1	<0.1	--	--	<0.1	<0.1	<0.1	--	--	<0.1	<0.1
Sodium	ug/l	--	124000	--	166000	127000	--	--	136000	144000	137000	--	--	102000	143000
Strontium	ug/l	--	707	--	1050	2490	--	--	456	814	676	--	--	671	925
Thallium	ug/l	0.3 (a)	<0.1	--	<0.1	<0.1	--	--	<0.1	<0.1	<0.1	--	--	<0.1	<0.1
Titanium	ug/l	--	<10	--	<10	<10	--	--	<10	<10	<10	--	--	<10	<10
Vanadium	ug/l	6	3	--	3	3	--	--	3	3	3	--	--	<1	<1
Zinc	ug/l	30 (a)	<10	--	<10	10	--	--	<10	<10	20	--	--	<10	<10
Petroleum Hydrocarbons															
Benzene	ug/l	100 (a)	<0.5	--	<1	<0.5	--	--	<0.5	<0.5	<0.5	--	--	<0.5	<0.5
Ethylbenzene	ug/l	8	<0.5	--	<1	<0.5	--	--	<0.5	<0.5	<0.5	--	--	<0.5	<0.5
m,p-Xylenes	ug/l	--	<1.0	--	<2.0	<0.5	--	--	<0.5	<0.5	<0.5	--	--	<0.5	<0.5
o-Xylene	ug/l	40 (a)	<0.5	--	<1	<0.5	--	--	<0.5	<0.5	<0.5	--	--	<0.5	<0.5
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	<100	--	<100	<100	--	--	--	<100	--	--	--	<100	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	<100	--	<100	<100	--	--	--	--	--	--	--	<100	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	<100	--	<100	<100	--	--	--	<100	--	--	--	<100	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	<200	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	<200	--	<200	<200	--	--	--	<200	--	--	--	<200	--
Toluene	ug/l	0.8	<0.5	--	<1	<0.5	--	--	<0.5	<0.5	<0.5	--	--	<0.5	<0.5
Xylenes, Total	ug/l	--	--	--	<3	<1.0	--	--	--	<1.0	<1.0	--	--	<1.0	--

Parameter	Unit	(2) (i) PWQOG	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7
			12-Nov-2010	28-Feb-2011 (2)	07-Apr-2011 (2)	10-May-2012	14-Jun-2012 (2)	17-Sep-2012 (2)	18-Dec-2012	11-Apr-2013	05-Jul-2013	21-Oct-2013 (2)	03-Feb-2014 (2)	26-May-2014	09-Oct-2014
			SW-1	SW-7	W-7	W-1	w7	s7	W-1	W-2	W-1	w7	7	SW - 7	SW 7
Semi-VOCs															
1-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
2-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Acenaphthylene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Anthracene	ug/l	0.0008 ⁽¹⁵⁾	<0.01	--	<0.01	<0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]anthracene	ug/l	0.0004 ⁽¹⁵⁾	<0.01	--	<0.01	<0.01	--	--	--	<0.1	--	--	--	--	--
Benzo[a]pyrene	ug/l	--	<0.01	--	<0.01	<0.01	--	--	--	<0.01	--	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Chrysene	ug/l	0.0001 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.05	--	--	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Fluoranthene	ug/l	0.0008 ⁽¹⁵⁾	0.12	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Fluorene	ug/l	0.2 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Naphthalene	ug/l	7 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Phenanthrene	ug/l	0.03 ⁽¹⁵⁾	<0.02	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Pyrene	ug/l	--	0.16	--	<0.02	<0.02	--	--	--	<0.1	--	--	--	--	--
Styrene	ug/l	4 ⁽¹⁸⁾	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	<0.5	--
VOCs															
1,1,1,2-Tetrachloroethane	ug/l	20 ⁽¹⁵⁾	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	<0.5	--
1,1,1-Trichloroethane	ug/l	10 ⁽¹⁸⁾	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	<0.4	--
1,1,2,2-Tetrachloroethane	ug/l	70	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	<0.5	--
1,1,2-Trichloroethane	ug/l	800	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	<0.4	--
1,1-Dichloroethane	ug/l	200	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	<0.4	--
1,1-Dichloroethylene	ug/l	40	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	<0.5	--
1,2-Dibromoethane	ug/l	5 ⁽¹⁵⁾	<1.0	--	<2.0	<0.2	--	--	--	<0.2	--	--	--	<0.2	--
1,2-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	<0.4	--
1,2-Dichloroethane	ug/l	100	<0.5	--	<1	<0.2	--	--	--	<0.2	--	--	--	<0.2	--
1,2-Dichloropropane	ug/l	0.7 ⁽¹⁵⁾	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	<0.5	--
1,3,5-Trimethylbenzene	ug/l	--	<0.3	--	<0.6	<0.3	--	--	--	<0.3	--	--	--	<0.3	--
1,3-Dichlorobenzene	ug/l	2.5	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	<0.4	--
1,4-Dichlorobenzene	ug/l	4	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	<0.4	--
Bromodichloromethane	ug/l	200 ⁽¹⁵⁾	<0.3	--	<0.6	<0.3	--	--	--	<0.3	--	--	--	<0.3	--
Bromoform	ug/l	60 ⁽¹⁵⁾	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	<0.4	--
Bromomethane	ug/l	0.9 ⁽²⁰⁾	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	<0.5	--
Carbon Tetrachloride	ug/l	--	<0.5	--	<1	<0.2	--	--	--	<0.2	--	--	--	<0.2	--
Chlorobenzene	ug/l	15 ⁽²¹⁾	<0.2	--	<0.4	<0.2	--	--	--	<0.2	--	--	--	<0.2	--
Chloroethane	ug/l	--	<1.0	--	<2.0	<0.2	--	--	--	<0.2	--	--	--	<0.2	--
Chloroform	ug/l	--	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	<0.5	--
Chloromethane	ug/l	700 ⁽¹⁵⁾	<1.0	--	<2.0	<0.2	--	--	--	<0.2	--	--	--	<0.2	--
cis-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	<0.4	--
cis-1,2-Dichloropropene	ug/l	--	<0.2	--	<0.4	<0.2	--	--	--	<0.2	--	--	--	<0.2	--
Dibromochloromethane	ug/l	40 ⁽¹⁵⁾	<0.3	--	<0.6	<0.3	--	--	--	<0.3	--	--	--	<0.3	--
Dichlorodifluoromethane	ug/l	--	--	--	--	<0.5	--	--	--	<0.5	--	--	--	<0.5	--
Methylene Chloride	ug/l	100 ⁽²³⁾	<4.0	--	<8.0	<4.0	--	--	--	<4.0	--	--	--	<4.0	--
Tetrachloroethylene	ug/l	50 ⁽²⁴⁾	<0.3	--	<0.6	<0.3	--	--	--	<0.3	--	--	--	<0.3	--
trans-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	<0.4	--	<0.8	<0.4	--	--	--	<0.4	--	--	--	<0.4	--
trans-1,3-Dichloropropene	ug/l	7 ⁽¹⁵⁾	<0.2	--	<0.4	<0.2	--	--	--	<0.2	--	--	--	<0.2	--
Trichloroethene	ug/l	20	<0.3	--	<0.6	<0.3	--	--	--	<0.3	--	--	--	<0.3	--
Trichlorofluoromethane	ug/l	--	<0.5	--	<1	<0.5	--	--	--	<0.5	--	--	--	<0.5	--
Vinyl Chloride	ug/l	600 ⁽¹⁵⁾	<0.2	--	<0.4	<0.2	--	--	--	<0.2	--	--	--	<0.2	--

Parameter	Unit	(2) (1) PWQO	SW-7	SW-7	SW-7
			24-Mar-2015 (6)	17-Jun-2015	27-Aug-2015 (6)
			7	W-1	7
General Chemistry					
Alkalinity (Total as CaCO ₃)	mg/l	-- (6)	--	400	--
Ammonia, unionized	ug/l	20	--	<50	--
Ammonia Nitrogen	ug/l	--	--	50	--
Ammonium	ug/l	--	--	50	--
Bicarbonate	ug/l	--	--	400000	--
Bromide	ug/l	--	--	<250	--
Carbonate (CO ₃)	ug/l	--	--	<1000 (7)	--
Color	color unit	--	--	34	--
Conductivity	uS/cm	--	--	1550	--
Conductivity (Field)	uS/cm	--	--	1750	--
Dissolved Oxygen (Field)	mg/l	-- (6)	--	2.04	--
Fluoride	ug/l	--	--	150	--
Hardness, Calcium Carbonate	ug/l	--	--	389000	--
Nitrate as N	ug/l	--	--	<100	--
Nitrite as N	ug/l	--	--	<100	--
pH	-	8.5	--	8.12	--
pH (Field)	-	8.5	--	7.8	--
Phosphorus	ug/l	-- (6)	--	<50	--
Sulfate	ug/l	--	--	40000	--
Temperature (Field)	deg c	-- (10)	--	14	--
Total Organic Carbon	ug/l	--	--	7200	--
Total Suspended Solids	ug/l	--	--	16000	--
Turbidity	ntu	-- (11)	--	4.9	--
Turbidity (Field)	ntu	-- (11)	--	6.6	--
Metals					
Aluminum, dissolved	ug/l	-- (12)	--	<10	--
Arsenic	ug/l	100 (13)	--	<1	--
Barium	ug/l	--	--	60	--
Beryllium	ug/l	-- (14)	--	<0.5	--
Boron	ug/l	200 (15)	--	20	--
Cadmium	ug/l	0.2 (13)	--	<0.1	--
Calcium	ug/l	--	--	123000	--
Chromium	ug/l	-- (16)	--	<1	--
Cobalt	ug/l	0.9	--	0.3	--
Copper	ug/l	5	--	2	--
Iron	ug/l	300	--	550	--
Lead	ug/l	-- (17)	--	<1	--
Magnesium	ug/l	--	--	20000	--
Manganese	ug/l	--	--	280	--
Molybdenum	ug/l	40	--	<5	--
Nickel	ug/l	25	--	<5	--
Potassium	ug/l	--	--	1000	--
Selenium	ug/l	100	--	<1	--
Silver	ug/l	0.1	--	<0.1	--
Sodium	ug/l	--	--	193000	--
Strontium	ug/l	--	--	1040	--
Thallium	ug/l	0.3 (18)	--	<0.1	--
Titanium	ug/l	--	--	<10	--
Vanadium	ug/l	6	--	<1	--
Zinc	ug/l	30 (13)	--	<10	--
Petroleum Hydrocarbons					
Benzene	ug/l	100 (18)	--	<0.5	--
Ethylbenzene	ug/l	8	--	<0.5	--
m,p-Xylenes	ug/l	--	--	<0.4	--
o-Xylene	ug/l	40 (18)	--	<0.4	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	--	<20	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	--	<20	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	--	<50	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	--	<50	--
Toluene	ug/l	0.8	--	<0.5	--
Xylenes, Total	ug/l	--	--	<0.5	--

Parameter	Unit	(2) (1) PWQO	SW-7	SW-7	SW-7
			24-Mar-2015 (5)	17-Jun-2015	27-Aug-2015 (5)
			7	W-1	7
Semi-VOCs					
1-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	--	--	--
2-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	--	--	--
Acenaphthene	ug/l	--	--	--	--
Acenaphthylene	ug/l	--	--	--	--
Anthracene	ug/l	0.0008 ⁽¹⁵⁾	--	--	--
Benzo[a]anthracene	ug/l	0.0004 ⁽¹⁵⁾	--	--	--
Benzo[a]pyrene	ug/l	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 ⁽¹⁵⁾	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 ⁽¹⁵⁾	--	--	--
Chrysene	ug/l	0.0001 ⁽¹⁵⁾	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 ⁽¹⁵⁾	--	--	--
Fluoranthene	ug/l	0.0008 ⁽¹⁵⁾	--	--	--
Fluorene	ug/l	0.2 ⁽¹⁵⁾	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	--	--	--
Naphthalene	ug/l	7 ⁽¹⁵⁾	--	--	--
Phenanthrene	ug/l	0.03 ⁽¹⁵⁾	--	--	--
Pyrene	ug/l	--	--	--	--
Styrene	ug/l	4 ⁽¹⁸⁾	--	<0.5	--
VOCs					
1,1,1,2-Tetrachloroethane	ug/l	20 ⁽¹⁵⁾	--	<0.5	--
1,1,1-Trichloroethane	ug/l	10 ⁽¹⁸⁾	--	<0.4	--
1,1,2,2-Tetrachloroethane	ug/l	70	--	<0.5	--
1,1,2-Trichloroethane	ug/l	800	--	<0.4	--
1,1-Dichloroethane	ug/l	200	--	<0.4	--
1,1-Dichloroethylene	ug/l	40	--	<0.5	--
1,2-Dibromoethane	ug/l	5 ⁽¹⁵⁾	--	<0.2	--
1,2-Dichlorobenzene	ug/l	2.5	--	<0.4	--
1,2-Dichloroethane	ug/l	100	--	<0.2	--
1,2-Dichloropropane	ug/l	0.7 ⁽¹⁵⁾	--	<0.5	--
1,3,5-Trimethylbenzene	ug/l	--	--	<0.3	--
1,3-Dichlorobenzene	ug/l	2.5	--	<0.4	--
1,4-Dichlorobenzene	ug/l	4	--	<0.4	--
Bromodichloromethane	ug/l	200 ⁽¹⁵⁾	--	<0.3	--
Bromoform	ug/l	60 ⁽¹⁵⁾	--	<0.4	--
Bromomethane	ug/l	0.9 ⁽²⁰⁾	--	<0.5	--
Carbon Tetrachloride	ug/l	--	--	<0.2	--
Chlorobenzene	ug/l	15 ⁽²¹⁾	--	<0.2	--
Chloroethane	ug/l	--	--	<0.2	--
Chloroform	ug/l	--	--	<0.5	--
Chloromethane	ug/l	700 ⁽¹⁵⁾	--	<0.2	--
cis-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	--	<0.4	--
cis-1,2-Dichloropropene	ug/l	--	--	<0.2	--
Dibromochloromethane	ug/l	40 ⁽¹⁵⁾	--	<0.3	--
Dichlorodifluoromethane	ug/l	--	--	<0.5	--
Methylene Chloride	ug/l	100 ⁽²³⁾	--	<4	--
Tetrachloroethylene	ug/l	50 ⁽²⁴⁾	--	<0.3	--
trans-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	--	<0.4	--
trans-1,3-Dichloropropene	ug/l	7 ⁽¹⁵⁾	--	<0.2	--
Trichloroethene	ug/l	20	--	<0.3	--
Trichlorofluoromethane	ug/l	--	--	<0.5	--
Vinyl Chloride	ug/l	600 ⁽¹⁵⁾	--	<0.2	--

Parameter	Unit	(2) (1) PWQO	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8
			12-Nov-2010	28-Feb-2011 (2)	10-Jun-2012 (2)	14-Jun-2012 (2)	17-Sep-2012 (2)	18-Dec-2012 (2)	11-Apr-2013 (2)	05-Jul-2013 (2)	21-Oct-2013 (2)	03-Feb-2014 (2)	26-May-2014 (2)	09-Oct-2014 (2)
			SW-5	SW-6	W-8	w8	s8	8	w8	8	w8	8	s8	s8
General Chemistry														
Alkalinity (Total as CaCO3)	mg/l	-- (6)	347	--	--	--	--	--	--	--	--	--	--	--
Ammonia, unionized	ug/l	20	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia Nitrogen	ug/l	--	<20	--	--	--	--	--	--	--	--	--	--	--
Ammonium	ug/l	--	<20	--	--	--	--	--	--	--	--	--	--	--
Bicarbonate	ug/l	--	347000	--	--	--	--	--	--	--	--	--	--	--
Bromide	ug/l	--	<250	--	--	--	--	--	--	--	--	--	--	--
Carbonate (CO3)	ug/l	--	<2000 (7)	--	--	--	--	--	--	--	--	--	--	--
Color	color unit	--	16	--	--	--	--	--	--	--	--	--	--	--
Conductivity	uS/cm	--	1040	--	--	--	--	--	--	--	--	--	--	--
Conductivity (Field)	uS/cm	--	1210	--	--	--	--	--	--	--	--	--	--	--
Dissolved Oxygen (Field)	mg/l	-- (6)	2.11	--	--	--	--	--	--	--	--	--	--	--
Fluoride	ug/l	--	120	--	--	--	--	--	--	--	--	--	--	--
Hardness, Calcium Carbonate	ug/l	--	350000	--	--	--	--	--	--	--	--	--	--	--
Nitrate as N	ug/l	--	<100	--	--	--	--	--	--	--	--	--	--	--
Nitrite as N	ug/l	--	<100	--	--	--	--	--	--	--	--	--	--	--
pH	-	8.5	8.27	--	--	--	--	--	--	--	--	--	--	--
pH (Field)	-	8.5	7.90	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	ug/l	-- (6)	40	--	--	--	--	--	--	--	--	--	--	--
Sulfate	ug/l	--	58000	--	--	--	--	--	--	--	--	--	--	--
Temperature (Field)	deg c	-- (10)	2.0	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	ug/l	--	4300	--	--	--	--	--	--	--	--	--	--	--
Total Suspended Solids	ug/l	--	14000	--	--	--	--	--	--	--	--	--	--	--
Turbidity	ntu	-- (11)	2.5	--	--	--	--	--	--	--	--	--	--	--
Turbidity (Field)	NTU	-- (11)	--	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum, dissolved	ug/l	-- (12)	<10	--	--	--	--	--	--	--	--	--	--	--
Arsenic	ug/l	100 (13)	<1	--	--	--	--	--	--	--	--	--	--	--
Barium	ug/l	--	50	--	--	--	--	--	--	--	--	--	--	--
Beryllium	ug/l	-- (14)	<1	--	--	--	--	--	--	--	--	--	--	--
Boron	ug/l	200 (15)	10	--	--	--	--	--	--	--	--	--	--	--
Cadmium	ug/l	0.2 (13)	<0.1	--	--	--	--	--	--	--	--	--	--	--
Calcium	ug/l	--	109000	--	--	--	--	--	--	--	--	--	--	--
Chromium	ug/l	-- (16)	2	--	--	--	--	--	--	--	--	--	--	--
Cobalt	ug/l	0.9	0.3	--	--	--	--	--	--	--	--	--	--	--
Copper	ug/l	5	4	--	--	--	--	--	--	--	--	--	--	--
Iron	ug/l	300	230	--	--	--	--	--	--	--	--	--	--	--
Lead	ug/l	-- (17)	3	--	--	--	--	--	--	--	--	--	--	--
Magnesium	ug/l	--	19000	--	--	--	--	--	--	--	--	--	--	--
Manganese	ug/l	--	20	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	ug/l	40	<5	--	--	--	--	--	--	--	--	--	--	--
Nickel	ug/l	25	<5	--	--	--	--	--	--	--	--	--	--	--
Potassium	ug/l	--	1000	--	--	--	--	--	--	--	--	--	--	--
Selenium	ug/l	100	<1	--	--	--	--	--	--	--	--	--	--	--
Silver	ug/l	0.1	<0.1	--	--	--	--	--	--	--	--	--	--	--
Sodium	ug/l	--	86000	--	--	--	--	--	--	--	--	--	--	--
Strontium	ug/l	--	1560	--	--	--	--	--	--	--	--	--	--	--
Thallium	ug/l	0.3 (18)	<0.1	--	--	--	--	--	--	--	--	--	--	--
Titanium	ug/l	--	<10	--	--	--	--	--	--	--	--	--	--	--
Vanadium	ug/l	6	3	--	--	--	--	--	--	--	--	--	--	--
Zinc	ug/l	30 (13)	50	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons														
Benzene	ug/l	100 (18)	<0.5	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	ug/l	8	<0.5	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	ug/l	--	<1.0	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	ug/l	40 (18)	<0.5	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	<100	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	<100	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	<100	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	<200	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	<200	--	--	--	--	--	--	--	--	--	--	--
Toluene	ug/l	0.8	<0.5	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--

Parameter	Unit	(2) (1) PWQO	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8
			12-Nov-2010	28-Feb-2011 (2)	10-Jun-2012 (2)	14-Jun-2012 (2)	17-Sep-2012 (2)	18-Dec-2012 (2)	11-Apr-2013 (2)	05-Jul-2013 (2)	21-Oct-2013 (2)	03-Feb-2014 (2)	26-May-2014 (2)	09-Oct-2014 (2)
			SW-5	SW-8	W-8	w8	s8	8	w8	8	w8	8	s8	s8
Semi-VOCs														
1-Methylnaphthalene	ug/l	2 (18)	<0.02	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/l	2 (18)	<0.02	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/l	--	<0.02	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/l	--	<0.02	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/l	0.0008 (15)	<0.01	--	--	--	--	--	--	--	--	--	--	--
Benzo[a]anthracene	ug/l	0.0004 (15)	<0.01	--	--	--	--	--	--	--	--	--	--	--
Benzo[a]pyrene	ug/l	--	<0.01	--	--	--	--	--	--	--	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	<0.02	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 (15)	<0.02	--	--	--	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 (15)	<0.02	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/l	0.0001 (15)	<0.02	--	--	--	--	--	--	--	--	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 (15)	<0.02	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/l	0.0008 (15)	<0.02	--	--	--	--	--	--	--	--	--	--	--
Fluorene	ug/l	0.2 (15)	<0.02	--	--	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	<0.02	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	ug/l	7 (15)	<0.02	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/l	0.03 (15)	<0.02	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/l	--	<0.02	--	--	--	--	--	--	--	--	--	--	--
Styrene	ug/l	4 (18)	<0.5	--	--	--	--	--	--	--	--	--	--	--
VOCs														
1,1,1,2-Tetrachloroethane	ug/l	20 (15)	<0.5	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	ug/l	10 (18)	<0.4	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	ug/l	70	<0.5	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	ug/l	800	<0.4	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	ug/l	200	<0.4	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethylene	ug/l	40	<0.5	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	ug/l	5 (15)	<1.0	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	ug/l	2.5	<0.4	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	ug/l	100	<0.5	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	ug/l	0.7 (15)	<0.5	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	ug/l	--	<0.3	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	ug/l	2.5	<0.4	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	ug/l	4	<0.4	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	ug/l	200 (15)	<0.3	--	--	--	--	--	--	--	--	--	--	--
Bromoform	ug/l	60 (15)	<0.4	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	ug/l	0.9 (20)	<0.5	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	ug/l	--	<0.5	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	ug/l	15 (21)	<0.2	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	ug/l	--	<1.0	--	--	--	--	--	--	--	--	--	--	--
Chloroform	ug/l	--	<0.5	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	ug/l	700 (15)	<1.0	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	ug/l	200 (22)	<0.4	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloropropene	ug/l	--	<0.2	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	ug/l	40 (15)	<0.3	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	ug/l	100 (23)	<4.0	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethylene	ug/l	50 (24)	<0.3	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	ug/l	200 (22)	<0.4	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	ug/l	7 (15)	<0.2	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene	ug/l	20	<0.3	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	ug/l	--	<0.5	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	ug/l	600 (15)	<0.2	--	--	--	--	--	--	--	--	--	--	--

Parameter	Unit	(2) (1) PWQO	SW-8	SW-8	SW-8
			24-Mar-2015 ⁽⁶⁾	17-Jun-2015 ⁽⁶⁾	27-Aug-2015 ⁽⁶⁾
			8	8	8
General Chemistry					
Alkalinity (Total as CaCO ₃)	mg/l	-- ⁽⁶⁾	--	--	--
Ammonia, unionized	ug/l	20	--	--	--
Ammonia Nitrogen	ug/l	--	--	--	--
Ammonium	ug/l	--	--	--	--
Bicarbonate	ug/l	--	--	--	--
Bromide	ug/l	--	--	--	--
Carbonate (CO ₃)	ug/l	--	--	--	--
Color	color unit	--	--	--	--
Conductivity	uS/cm	--	--	--	--
Conductivity (Field)	uS/cm	--	--	--	--
Dissolved Oxygen (Field)	mg/l	-- ⁽⁶⁾	--	--	--
Fluoride	ug/l	--	--	--	--
Hardness, Calcium Carbonate	ug/l	--	--	--	--
Nitrate as N	ug/l	--	--	--	--
Nitrite as N	ug/l	--	--	--	--
pH	-	8.5	--	--	--
pH (Field)	-	8.5	--	--	--
Phosphorus	ug/l	-- ⁽⁶⁾	--	--	--
Sulfate	ug/l	--	--	--	--
Temperature (Field)	deg c	-- ⁽¹⁰⁾	--	--	--
Total Organic Carbon	ug/l	--	--	--	--
Total Suspended Solids	ug/l	--	--	--	--
Turbidity	ntu	-- ⁽¹¹⁾	--	--	--
Turbidity (Field)	NTU	-- ⁽¹¹⁾	--	--	--
Metals					
Aluminum, dissolved	ug/l	-- ⁽¹²⁾	--	--	--
Arsenic	ug/l	100 ⁽¹³⁾	--	--	--
Barium	ug/l	--	--	--	--
Beryllium	ug/l	-- ⁽¹⁴⁾	--	--	--
Boron	ug/l	200 ⁽¹⁵⁾	--	--	--
Cadmium	ug/l	0.2 ⁽¹³⁾	--	--	--
Calcium	ug/l	--	--	--	--
Chromium	ug/l	-- ⁽¹⁶⁾	--	--	--
Cobalt	ug/l	0.9	--	--	--
Copper	ug/l	5	--	--	--
Iron	ug/l	300	--	--	--
Lead	ug/l	-- ⁽¹⁷⁾	--	--	--
Magnesium	ug/l	--	--	--	--
Manganese	ug/l	--	--	--	--
Molybdenum	ug/l	40	--	--	--
Nickel	ug/l	25	--	--	--
Potassium	ug/l	--	--	--	--
Selenium	ug/l	100	--	--	--
Silver	ug/l	0.1	--	--	--
Sodium	ug/l	--	--	--	--
Strontium	ug/l	--	--	--	--
Thallium	ug/l	0.3 ⁽¹⁸⁾	--	--	--
Titanium	ug/l	--	--	--	--
Vanadium	ug/l	6	--	--	--
Zinc	ug/l	30 ⁽¹³⁾	--	--	--
Petroleum Hydrocarbons					
Benzene	ug/l	100 ⁽¹⁹⁾	--	--	--
Ethylbenzene	ug/l	8	--	--	--
m,p-Xylenes	ug/l	--	--	--	--
o-Xylene	ug/l	40 ⁽¹⁸⁾	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	--	--	--	--
Petroleum Hydrocarbons - F1 (C6-C10)-BTX	ug/l	--	--	--	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	--	--	--	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	--	--	--	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	--	--	--	--
Toluene	ug/l	0.8	--	--	--
Xylenes, Total	ug/l	--	--	--	--

Parameter	Unit	(2) (1) PWQO	SW-8	SW-8	SW-8
			24-Mar-2015 ⁽⁵⁾	17-Jun-2015 ⁽⁵⁾	27-Aug-2015 ⁽⁵⁾
			g	g	g
Semi-VOCs					
1-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	--	--	--
2-Methylnaphthalene	ug/l	2 ⁽¹⁸⁾	--	--	--
Acenaphthene	ug/l	--	--	--	--
Acenaphthylene	ug/l	--	--	--	--
Anthracene	ug/l	0.0008 ⁽¹⁵⁾	--	--	--
Benzo[a]anthracene	ug/l	0.0004 ⁽¹⁵⁾	--	--	--
Benzo[a]pyrene	ug/l	--	--	--	--
Benzo[b]fluoranthene	ug/l	--	--	--	--
Benzo[g,h,i]perylene	ug/l	0.00002 ⁽¹⁵⁾	--	--	--
Benzo[k]fluoranthene	ug/l	0.0002 ⁽¹⁵⁾	--	--	--
Chrysene	ug/l	0.0001 ⁽¹⁵⁾	--	--	--
Dibenzo[a,h]anthracene	ug/l	0.002 ⁽¹⁵⁾	--	--	--
Fluoranthene	ug/l	0.0008 ⁽¹⁵⁾	--	--	--
Fluorene	ug/l	0.2 ⁽¹⁵⁾	--	--	--
Indeno[1,2,3-cd]pyrene	ug/l	--	--	--	--
Naphthalene	ug/l	7 ⁽¹⁵⁾	--	--	--
Phenanthrene	ug/l	0.03 ⁽¹⁵⁾	--	--	--
Pyrene	ug/l	--	--	--	--
Styrene	ug/l	4 ⁽¹⁸⁾	--	--	--
VOCs					
1,1,1,2-Tetrachloroethane	ug/l	20 ⁽¹⁵⁾	--	--	--
1,1,1-Trichloroethane	ug/l	10 ⁽¹⁸⁾	--	--	--
1,1,2,2-Tetrachloroethane	ug/l	70	--	--	--
1,1,2-Trichloroethane	ug/l	800	--	--	--
1,1-Dichloroethane	ug/l	200	--	--	--
1,1-Dichloroethylene	ug/l	40	--	--	--
1,2-Dibromoethane	ug/l	5 ⁽¹⁵⁾	--	--	--
1,2-Dichlorobenzene	ug/l	2.5	--	--	--
1,2-Dichloroethane	ug/l	100	--	--	--
1,2-Dichloropropane	ug/l	0.7 ⁽¹⁵⁾	--	--	--
1,3,5-Trimethylbenzene	ug/l	--	--	--	--
1,3-Dichlorobenzene	ug/l	2.5	--	--	--
1,4-Dichlorobenzene	ug/l	4	--	--	--
Bromodichloromethane	ug/l	200 ⁽¹⁵⁾	--	--	--
Bromoform	ug/l	60 ⁽¹⁵⁾	--	--	--
Bromomethane	ug/l	0.9 ⁽²⁰⁾	--	--	--
Carbon Tetrachloride	ug/l	--	--	--	--
Chlorobenzene	ug/l	15 ⁽²¹⁾	--	--	--
Chloroethane	ug/l	--	--	--	--
Chloroform	ug/l	--	--	--	--
Chloromethane	ug/l	700 ⁽¹⁵⁾	--	--	--
cis-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	--	--	--
cis-1,2-Dichloropropene	ug/l	--	--	--	--
Dibromochloromethane	ug/l	40 ⁽¹⁵⁾	--	--	--
Dichlorodifluoromethane	ug/l	--	--	--	--
Methylene Chloride	ug/l	100 ⁽²³⁾	--	--	--
Tetrachloroethylene	ug/l	50 ⁽²⁴⁾	--	--	--
trans-1,2-Dichloroethene	ug/l	200 ⁽²²⁾	--	--	--
trans-1,3-Dichloropropene	ug/l	7 ⁽¹⁵⁾	--	--	--
Trichloroethene	ug/l	20	--	--	--
Trichlorofluoromethane	ug/l	--	--	--	--
Vinyl Chloride	ug/l	600 ⁽¹⁵⁾	--	--	--

Footnotes:

Tables should be read in conjunction with the accompanying document.

< value = Indicates parameter not detected above laboratory method detection limit.

> value = Indicates parameter detected above equipment analytical range.

-- Chemical not analyzed or criteria not defined.

Grey background indicates exceedances.

(1) Provincial Water Quality Objectives (July 1994, reprinted February 1999)

(2) Bold Font = Parameter concentration greater than PWQO

(3) Monitoring location was frozen during this sampling event. No sample was collected.

(4) Due to matrix interference 2x dilution factor required for VOCs.

(5) Monitoring location was dry during this sampling event. No sample was collected.

(6) Alkalinity should not be decreased by more than 25% of the natural concentration.

(7) Not available - pH < 8.3

(8) Objective depends on water temperature and biota. Dissolved oxygen concentrations should not be less than the values specified in the PWQO document for cold water biota (e.g. salmonid fish communities) and warm water biota (e.g. centrarchid fish communities).

(9) Current scientific evidence is insufficient to develop a firm Objective at this time. Accordingly, the following phosphorus concentrations should be considered as general guidelines which should be supplemented by site-specific studies: To avoid nuisance concentrations of algae in lakes, average total phosphorus concentrations for the ice-free period should not exceed 20 ug/L; A high level of protection against aesthetic deterioration will be provided by a total phosphorus concentration for the ice-free period of 10 ug/L or less. This should apply to all lakes naturally below this value; Excessive plant growth in rivers and streams should be eliminated at a total phosphorus concentration below 30 ug/L.

(10) (1) General: The natural thermal regime of any body of water shall not be altered so as to impair the quality of the natural environment. In particular, the diversity, distribution and abundance of plant and animal life shall not be significantly changed. (2) Waste Heat Discharge: (a) Ambient Temperature Changes: The temperature at the edge of a mixing zone shall not exceed the natural ambient water temperature at a representative control location by more than 10°C (18°F). However, in special circumstances, local conditions may require a significantly lower temperature difference than 10°C (18°F).

Potential dischargers are to apply to the MOEE for guidance as to the allowable temperature rise for each thermal discharge. This ministry will also specify the nature of the mixing zone and the procedure for the establishment of a representative control location for temperature recording on a case-by-case basis. (b) Discharge Temperature Permitted: The maximum temperature of the receiving body of water, at any point in the thermal plume outside a mixing zone, shall not exceed 30°C (86°F) or the temperature of a representative control location plus 10°C (18°F) or the allowed temperature difference, whichever is the lesser temperature. These maximum temperatures are to be measured on a mean daily basis from continuous records. (c) Taking and Discharging of Cooling Water: Users of cooling water shall meet both the Objectives for temperature outlined above and the "Procedures for the Taking and Discharge of Cooling Water" as outlined in the MOEE publication Deriving Receiving-Water Based, Point-Source Effluent Requirements for Ontario Waters(1994).

(11) Suspended matter should not be added to surface water in concentrations that will change the natural Secchi disc reading by more than 10 percent.

(12) At pH 4.5 to 5.5 the Interim PWQO is 15 µg/L based on inorganic monomeric aluminum measure in clay-free samples; At pH > 5.5 to 6.5, no condition should be permitted which would increase the acid soluble inorganic aluminum concentration in clay-free samples to more than 10% above natural background concentrations for waters representative of that geological area of the Province that are unaffected by man-made inputs. At pH > 6.5 to 9.0, the Interim PWQO is 75 µg/L based on total aluminum measured in clay-free samples. If natural background aluminum concentrations in water bodies unaffected by man-made inputs are greater than the numerical Interim PWQO (above), no condition is permitted that would increase the aluminum concentration in clay-free samples by more than 10% of the natural background level. Note: pH values of < 6.5 and > 8.5 are outside the range considered acceptable by the PWQO for pH. See the Scientific Criteria Document for Development of Provincial Water Quality Objectives and Guidelines - Aluminum for a discussion of analytical procedures.

(13) An Interim PWQO also exists for this parameter. See Section 1.10 of the PWQO - Where both a PWQO and an Interim PWQO exist.

(14) If hardness as CaCO₃ < 75 mg/L, PWQO = 11 µg/L; if hardness as CaCO₃ > 75 mg/L, PWQO = 1100 µg/L.

(15) See Section 1.2.3. of PWQO. This Interim PWQO was set for emergency purposes based on the best information readily available. Employ due caution when applying this value.

(16) PWQO values exist for Cr(III) and Cr(VI)

(17) If alkalinity as CaCO₃ < 20 mg/L, PWQO = 5 µg/L; if alkalinity as CaCO₃ from 20 to 40 mg/L, PWQO = 10 µg/L; if alkalinity as CaCO₃ from 40 to 80 mg/L, PWQO = 20 µg/L; if alkalinity as CaCO₃ > 80 mg/L, PWQO = 25 µg/L. An Interim PWQO also exists for this parameter. See Section 1.10 of the PWQO - Where both a PWQO and an Interim PWQO exist.

(18) See Section 1.2.2. of PWQO. This Interim PWQO is currently under development. The value is subject to change upon publication by MOEE.

(19) See Section 1.2.3. This Interim PWQO was set for emergency purposes based on the best information readily available. Employ due caution when applying this value.

(20) synonym - methyl bromide. See Section 1.2.3. This Interim PWQO was set for emergency purposes based on the best information readily available. Employ due caution when applying this value.

(21) Common synonym - monochlorobenzene.

(22) Interim PWQO applies to both the cis & trans 1,2-dichloroethylene.

(23) Common synonym - dichloromethane. See Section 1.2.3. of PWQO. This Interim PWQO was set for emergency purposes based on the best information readily available. Employ due caution when applying this value.

(24) Synonym-perchloroethylene or perc.

(25) Arsenic MRL elevated due to matrix interference.

(26) Monitoring location was damaged and could not be sampled.

(27) Arsenic MRL elevated due to matrix interference (dilution was done). All samples were subcontracted for DOC analysis. Holding time for DOC analysis was exceeded for the entire report.

(28) TP MRL elevated due to sample turbidity.

(29) Holding time for turbidity analysis was exceeded. Due to matrix interference 2x dilution factor required for VOCs.



APPENDIX D

Reports of Analyses – Post-Construction Monitoring (Data CD)

Post-Construction I Monitoring Session - Lab Report No. 1421992 and 1421996

Post-Construction II Monitoring Session - Lab Report No. 1504488

Post-Construction III Monitoring Session - Lab Report No. 1510967 and 1510968

Post-Construction IV Monitoring Session - Lab Report No. 1517106

LEGEND

<u>Post-Construction I</u>	<u>Post-Construction II</u>	<u>Post-Construction III</u>	<u>Post-Construction IV</u>
MW 1 = MW 01	S-1 = MW 03	S-1 = MW 04	S-1 = MW 03
MW 1D = MW 01 duplicate	S-2 = MW 04	S-2 = MW 03	S-2 = MW 04
MW 2 = MW 02	S-3 = MW 06	S-3 = MW 03 duplicate	S-3 = MW 01
MW 3 = MW 03	S-4 = MW 02	S-4 = MW 06	S-4 = MW 01 duplicate
MW 4 = MW 04	S-5 = MW 01	S-5 = MW 02	S-5 = MW 02
MW 5 = MW 05	S-6 = MW 01 duplicate	S-6 = MW 05	PL-1 = PL3
SW 6 = SW 06	PL-1 = PL3	S-7 = MW 01	PL-2 = PL3
SW 7 = SW 07	PL-2 = PL3	P-1 = PL3	PL-3 = PL2
SW 7D = SW 07 duplicate	PL-3 = PL2	P-2 = PL3	
PL-2 = PL2		P-3 = PL2	
PL-3 = PL3		W-1 = SW 07	
PL-3D = PL3 duplicate		W-2 = SW 03	
		W-3 = SW 02	
		W-4 = SW 01 duplicate	
		W-5 = SW 01	
		W-6 = SW 04	
		W-7 = SW 06	

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