Centre for Alternative Wastewater Treatment

2012 CFS Alert Constructed Wetland Assessment Report

Gordon C. Balch, Brent C. Wootton, Marcus Sheppard, Heather Broadbent, Robin Slawson, and Noreen Goodliff

February 2013

In association with Fleming College

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Executive Summary

The performance of the terraced wetland located at CFS Alert, Nunavut was monitored over the summer months (June to September) in 2012 by the Centre for Alternative Wastewater Treatment (CAWT), a research facility of Fleming College, Lindsay, Ontario. This wetland is used to treat the sanitary waste and grey water generated at this Canadian Forces Station. The wetland in its present location was commissioned in the summer of 2010. CFS Alert produces on average approximately 100 m^3 of wastewater per day that is directed to the terraced wetland for treatment. The current water licence (No. 3BC-ALT1015) issued in August 2010 to the Department of National Defence by the Nunavut Water Board stipulates that treated wastewater effluent from the station should be equal to or less than 80 mg L^{-1} BOD_5, 70 mg L^{-1} TSS, 5 mg L^{-1} oil and grease and have a pH between 6 and 9.

The four compliance parameters of the water licence mentioned above, along with an additional 14 water quality parameters, plus 32 trace elements within the wastewater were monitored to assess the performance and treatment efficiency of the terraced wetland. In addition soil samples from selected sites were also monitored for nutrients and trace elements and the characterization of physical parameters to aid in the assessment. The microbial community of the wetland was also extensively studied using molecular techniques to better characterize this population throughout the wetland. The assessment period began shortly after the initiation of the spring melt in late June and continued until the start of freeze up in early September. Samples were collected weekly from a defined set of sample 22 locations strategically placed throughout the wetland to ensure adequate monitoring at all major regions within the wetland.

Physical filtration and or entrapment of organic matter appears to be the major treatment process occurring within this wetland. This means that the organic portion of the wastewater is being retained in the upper portions of the wetland with the result that the wastewater exiting the wetland is lower in BOD_5, volatile suspended solids (the organic fraction of TSS), and organic nitrogen. This is also supported by a higher organic content within the soil sediments from the upper portions of the wetland. The molecular characterization of the microbial population also suggests that the greatest metabolic activity of the microorganisms is also occurring in this region. Dissolved phosphorus (e.g., ortho-phosphate) appears to be significantly removed from the wastewater, likely through the process of adsorption onto particle and rock surfaces within the wetland.

The averaged summer time values of the treated effluent exiting the wetland indicates that although BOD_5 is reduced significantly, the final concentrations were around 111 mg BOD_5 per L, which is above the compliance value of 80 mg BOD_5 per L. The summer time average of total suspended solids (TSS) exiting the wetland was 124 mg L^{-1}, a concentration above the compliance value of 70 mg TSS per L. However, it appears that the majority of the TSS burden is likely related to the resuspension of inorganic particles originating from the wetland itself and not from the wastewater. The summer time average of oil and grease was approximately 37 mg L^{-1} and well above the compliance criteria of 5 mg L^{-1}. pH was however, well within in compliance with an average of approximately 7.5.

The wetland suffered erosional damage to berms 4 and 5 early in 2012 which may have contributed to the poor performance observed during the 2012 summer monitoring period. Late in August of 2012 the wetland underwent extensive modifications to repair damaged berms, to strengthen existing berms, and to install various forms of earthworks designed to prevent further erosional damage, to slow the rate of water flow and to enhance the overall detention (retention) of the wastewater for better treatment. In addition some of these earthworks involved French drains and scree slopes that are intended to promote the development of biofilms to enhance microbial treatment. These modifications were completed by the end of August 2012, just two weeks before the start of freeze up. The CAWT was able to monitor wetland performance during the initial two weeks after the modifications, however, the wetland had not stabilized by that point and further monitoring is recommended in the summer of 2013 to better assess the impact that these modification have had on the performance of the wetland. It is believed that the modifications made in August 2012 should significantly improve the overall treatment performance of the terraced wetland, but this needs to be confirmed through future monitoring.

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1.0 Introduction

This document provides a review of the terrace wetland located at the Canadian Forces Station (CFS)-Alert, Nunavut and its performance in the treatment of domestic wastewater generated at the base in the summer of 2012. The report summarizes the data collected at specified sampling points within the wetland between the dates of June 13th and September 13th. The performance of the wetland was assessed by monitoring the changes in water quality and biological parameters of the wastewater as it traversed the wetland. Treated wastewater exiting the wetland was then compared to the compliance parameters stipulated in CFS-Alert's water licence issued by the Nunavut Water Board (see below). Additional water quality parameters along with physical and chemical properties of wetland soil were also analyzed to provide greater insight into performance of the treatment wetland. Results from a similar study in 2011 were also compared with this current data to assess yearly differences. This report also documents the physical modification made to the wetland in late August 2012 and provides a list of recommendations intended to enhance the overall performance in future years.

1.1 Nunavut Water Board licenced water quality parameters

The Nunavut Water Board licence (No. 3BC-ALT1015) issued in August 2010 to the Department of National Defence stipulates that treated wastewater effluent from the station should meet the flowing criteria:

Parameter	Maximum Concentration of any Grab Sample
BOD_5	80 mg L^{-1}
Total Suspended Solids	70 mg L^{-1}
Oil and grease	5 mg L^{-1} and no visible sheen
pH	between 6 and 9

1.2 Background

This study was undertaken by the Centre for Alternative Wastewater Treatment (CAWT) at the request of the Canadian Department of National Defence (DND). The CAWT is an applied research facility of Fleming College, Lindsay, Ontario, Canada and has extensive expertise in the monitoring and assessment of treatment wetlands located in Canada's far north. Of note was a research grant from the Canadian government through the International Polar Year program (IPY award: 2007 – 2011) to investigate the efficacy of northern treatment wetlands and to document efficiencies in the treatment of municipal sewage received from six hamlets in the Kivalliq region of Nunavut. Subsequently, Environment Canada (Aquatic Ecosystem Management Research Division) contracted the CAWT to investigate the performance of seven additional wetlands because of the CAWT's prior IPY experience and its demonstrated capacity to conduct this type of research.

In December of 2008, DND contacted FSC Architects and Engineers (now Stantec) to investigate options that could be implemented for the treatment of the domestic wastewater generated at CFS

Alert. It was decided that the wastewater could be treated by an overland flow system that utilized terraces to trap and delay the wastewater prior to entering Parr Inlet of the Arctic Ocean bounding CFS Alert. It was assumed that water quality of the wastewater would be improved through the removal of suspended material and by biological mechanisms as the wastewater flowed over biofilms that had developed on the substrate of this site. For the purposes of this document, the treatment area is referred to as a terraced wetland.

In 2010, the Nunavut Water Board, on behalf of the Nunavut Territorial government, issued DND a water licence (No. 3BC-ALT1015) establishing the water quality compliance criteria that must be met by DND in the management of the terraced wetland. The water quality parameters stipulated in the licence include the five day biochemical oxygen demand (BOD_5), total suspended solids (TSS), oil and grease and pH. DND in preparation for this licence expressed the difficulty in having BOD_5 analyzed within the short time frame required by this test since these samples need to be shipped to larger centres in the south for analysis. DND expressed interest in determining if a consistent relationship exists between BOD_5 and the chemical oxygen demand (COD) of the wastewater. If a consistent relationship was found, then DND would like to present this evidence to the NWB with the hope that the more easily analyzed COD may be used as a surrogate for the more commonly used BOD_5 water quality parameter.

The terrace wetland was established in the summer of 2010 and has operated since. The daily volume of wastewater can range from approximately 70 cubic metres per day during winter months to a high of approximately 120 cubic metres per day in the summer time; reflective of the fluctuation in the number of personnel stationed at the base. Water is constantly allowed to bleed through the collection and distribution systems to prevent freezing. Therefore wastewater is constantly flowing to the terraced wetland. This wastewater is a combination of bleed water, garburated food wastes along with grey water and sanitary sewer waste. This means that the consistency of the wastewater can be quite variable and range in strength from very dilute to moderately strong depending on the time of day.

Late in the summer of 2010, the CAWT spent a week at the newly constructed terraced wetland mapping the site, establishing sample collection sites and performing a limited number of analyses on the wastewater. In 2011, the CAWT visited the terraced wetland for approximately one month to monitor its performance in the treatment of the wastewater. In this past year (2012) the CAWT visited the wetland for an extended period of time (June to September) to once again monitor wetland performance. Portions of the terraces (often called berms in this report) were eroded between the 2011 and 2012 site visits and most likely occurred in the early spring of 2012 during freshet. Because of erosion, a major reconstruction / modification of the terraced system was undertaken in late August of 2012. This report summarizes the findings from the 2012 field season; most of which occurred prior to the reconstruction efforts. The impact to the treatment performance of the terraced wetland by the reconstruction efforts can only be assessed during a field study in the summer months of 2013.

1.3 Overview of treatment processes operative in wetlands

Many of the processes (biochemical, chemical, physical) operating in the treatment of municipal sewage / effluents are common to both wastewater treatment plants and to treatment wetlands. In brief, the treatment of municipal sewage and effluents can be summarized as: i) oxidizing organic and chemical constituents to harmless products, ii) the removal of viable pathogens, and iii) removal of suspended solids along with inorganic and or organic contaminants associated with the solids. Performance standards for wastewater effluents are currently in transition within Canada as the federal government is developing national performance standards (NPS) for municipal wastewater effluent. In 2009, the Canadian Council of Ministers of the Environment (CCME) released the final draft of the *Canada-wide Strategy for the Management of Municipal Wastewater Effluent* which details regulatory changes to be implemented through the Canadian Fisheries Act. The intent of the strategy is to ensure there are no deleterious effects to the water bodies receiving the treated effluent, particularly with regard to fish health and or fish habitat. This strategy has identified specific national performance standards for effluent of Canadian wastewater treatment facilities at 25 mg L^{-1} for the parameters of carbonaceous biochemical oxygen demand (cBOD) and total suspended solids (TSS), 1.25 mg L^{-1} for un-ionized ammonia expressed as NH_3-N @ 15°C±1°C and a standard of 0.02 mg L^{-1} of total residual chlorine (TRC) (Canadian Council of Ministers of the Environment, 2009). The Federal Government recognizes that conditions in portions of Canada's Far North (Nunavut, Northwest Territories, and regions located north of the 54th parallel in Quebec and Newfoundland and Labrador) are unique and as such national performance standards have not yet been determined for these areas. A five-year research period was initiated in 2009 to determine what NPS (treated effluent concentration levels) would be appropriate in the Canadian north (Canadian Council of Ministers of the Environment, 2009).

BOD refers to the amount of oxygen that is consumed during the microbial degradation of organic matter within the sewage or effluent. The underlying concern is related to the potential for significant oxygen depletion to occur in receiving waters when sewage or effluent is poorly treated before its release to the environment and thus has the potential to significantly reduce oxygen levels in the receiving environment as microbial degradation continues. If the oxygen depletion in the receiving environment is significant and occurs for an extended period of time, then there is the potential to negatively affect the biota of that region. The ability of the wetland to mediate this process before effluents are released to the environment can be influenced by several factors. Microbial action is known to be influenced by temperature. In addition, BOD is also influenced by the contact time between the microorganisms and the effluent's organic constituents. If the contact time is too short or too long, this treatment process can be impeded. To date, little is known about the rate that effluent flows through the Alert terraced wetland. This rate is linked to the hydraulic retention time (HRT) of the wetland and it is a function of both the rate of flow and the water holding capacity of the wetland. The HRT provides an estimate of the volume of water that the wetland can hold at any one time and how quickly that defined volume of water changes over. HRT is therefore a measure of how long the microbial population is in contact with a unit of wastewater.

It is generally known that municipal sewage and effluent have the potential to contain pathogens in significant quantity and virulence to cause harm to humans if released to the environment through the contamination of drinking water or country foods or to biota directly or through a reduction of habitat quality. Several indicator organisms exist that provide an indication that human pathogens potentially exist within municipal effluents with *E. coli* generally being the organism most often used for surveillance purposes along with the surveillance of fecal coliforms which is an indicator of fecal contamination (animal or human). In conventional municipal wastewater treatment plants, strong oxidants such as chlorine (or its various forms) are used as a disinfection technique designed to significantly reduce the number of harmful organisms. Wetlands can often achieve disinfection levels similar to what is achieved through chlorination or other chemical means. The mechanisms of action are, however, more through the entrapment of harmful organisms on biofilms within the wetland or through the filtration of suspended particles which the pathogens have attached themselves. Once trapped, these microorganisms are often eliminated through a variety of mechanisms such as bacteriophages or consumption by nematodes. Once again, many of the pathogen elimination processes operative in treatment wetlands can be influenced by temperature, HRT and other biological/chemical/physical processes which can be both unique to the site and easily influenced by natural and human events.

Wetlands can be effective in the removal of suspended solids contained within municipal effluents. The removal process is usually one of entrapment within the matrices of the wetlands substrate or attachment to biofilms and the force of gravitational pull causing solids to fall out of solution. Some of the prime factors affecting a wetland's effectiveness in reducing the concentration of total suspended solids (TSS) are water velocity, HRT, and the size and volume of the interstitial spaces through which the effluent flows. The release of high concentrations of suspended solids to the receiving environment can have deleterious effects on natural habitats or biota through the burial of vital habitat components or through the co-transport of other harmful contaminants or pathogens. The potential for wetlands to reduce TSS provides a surrogate measure for the removal of other potentially more harmful contaminants attached to suspended solids such as trace elements, pathogens, nutrients like phosphorus and other chemicals. Thus removal of the suspended solids often correlates to a reduction in the concentration of these contaminants within the treated effluent.

Nitrogen constituents are often monitored during the treatment process since some nitrogenous forms like un-ionized ammonia (NH_3-N) can be quite toxic to certain aquatic biota, while other nitrogen forms can also consume oxygen during transformation of nitrogen species and eventual atmospheric release of nitrogen in a gaseous form. As with the other water quality parameters, treatment efficiencies are often influenced by many factors intrinsic to the individual wetland.

1.4 Study location

CFS Alert is a weather / military station located on the northeastern tip of Ellesmere Island in Nunavut (82º30'05''N 062º20'20''W), approximately 817 km from the geographic North Pole (Figure I-1). The topography is characterized by rocky hills and valleys composed of shale and slate. The station is bounded to the east and south east by the Arctic Ocean. The mean daily temperature is -33°C in January and 3° in July and pack ice is present year round.

The terraced wetland is located to the south east of the main buildings on a rocky hill side with a moderate slope to the ocean. The landscape has been altered by the placement of five berms to create a terraced area where wastewater is diverted in a zigzag fashion as it travels to Parr Inlet of the

Arctic Ocean. The berms were created from the local gravel / rock overburden and are intended to retard the velocity of the wastewater as it is forced to travel a winding path between the berms. The purpose of this pattern was to enhance the settling of larger particles in the wastewater and to also function as a mechanical sieve as a portion of wastewater permeates through the detention berms. The wastewater is delivered from the main building of the station to the wetland via a heated pipe (utilidor) where the wastewater is allowed to discharge into a collection depression lined with larger rock (Figure I-2). A series of sampling stations have been geo-referenced to the site. These stations follow the primary flow path of the wastewater. Additional ephemeral flow paths have developed at different times in response to increased volumes during the spring freshet and in erosional areas where berms have been temporarily breached. Additional stations have been added to some of these ephemeral flow paths, however the number of times they were sampled depended on times they had a significant flow through them. The down slope portion of the wetland flattens out in the shore zone of the inlet. In this shore zone area a silt fence has been installed between the last of the berms (berm #5) and the final two sampling stations in the shore zone (SH-2 and SH-3). The purpose of this silt fence is to aid in the retention of any fines that may be carried by the flow of the wastewater.

Figure 1.1. CFS-Alert located on northern tip of Ellesmere Island

In 2010 at the time of the wetland's construction a weir box was installed near the shoreline of Parr Inlet. The weir box was positioned in such a manner as to intercept a significant portion of the flow as it left the treatment wetland and discharged into the ocean. The weir box was considered in the NWB licence as the final sampling point of the wetland and was to provide a designated site from which wastewater samples could be taken and analyzed to assess the performance of the wetland. Unfortunately, the bulk of the wastewater flow changed direction within that first year, moving more to the east leaving the weir box. Sample site SH-3 (shoreline, site 3) has been considered by the CAWT to be a more representative discharge location for analyzing the wastewater as it exited the terraced wetland. This location was used in both the 2011 and 2012 field seasons.

Figure 1.2. The discharge pipe delivering wastewater to the wetland

1.5 Purpose

The purpose of this report is to:

- Assess the performance of the terrace wetland during the summer of 2012 in reference to the NWB licence compliance values for BOD_5, TSS, Oil & Grease, and pH
- Compare the performance of the terrace wetland in the summer of 2012 with its performance in 2011.
- Review the data to determine if there is a consistent relationship between COD and BOD_5 which would allow COD to be used as a surrogate for BOD_5
- Provide recommendations on how the wetland could be modified or operated to enhance overall treatment

2.0 Methodology

2.1 Site reconnaissance

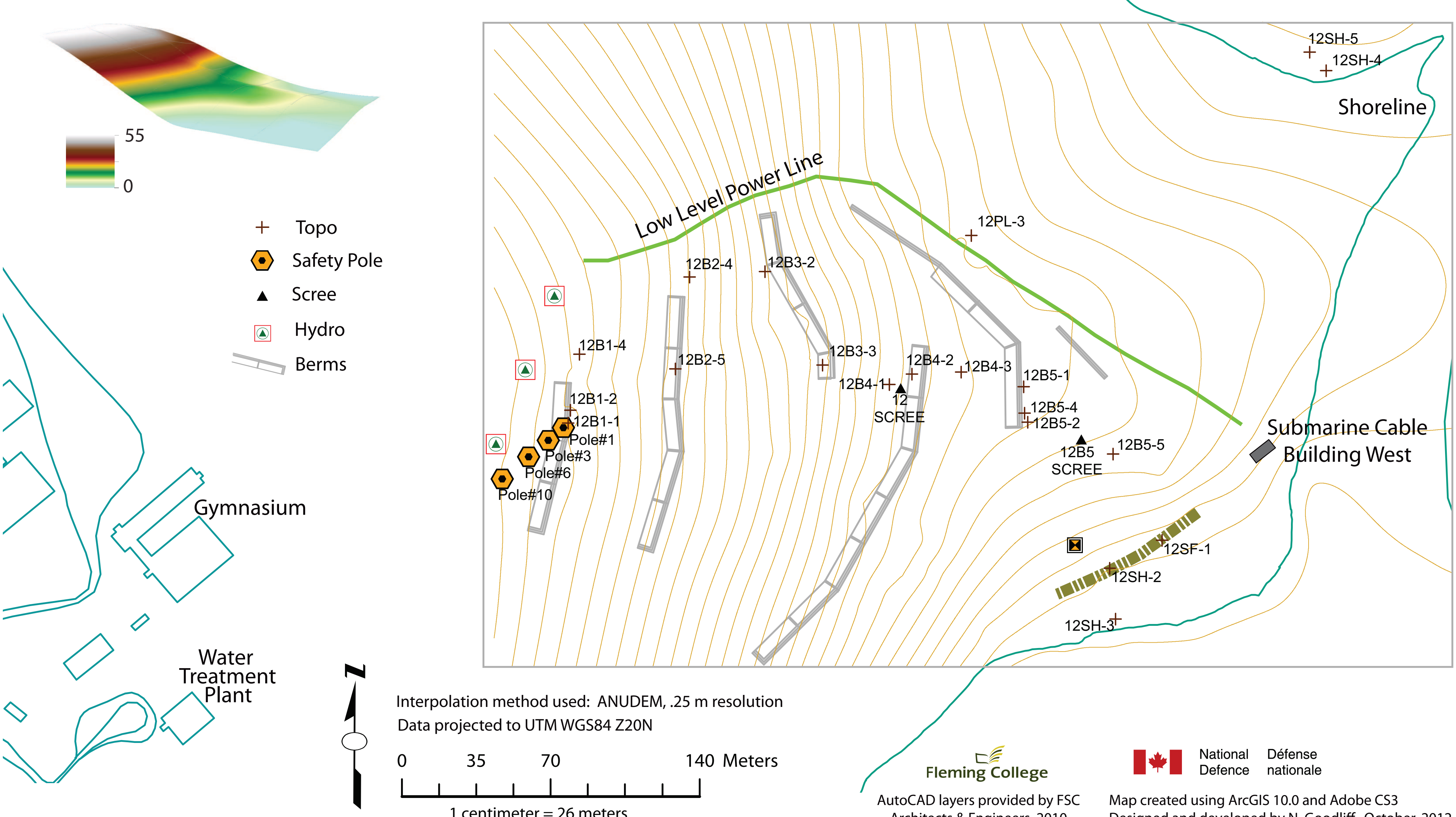
The start of the CAWT field season at the Alert terraced wetland began in late May of 2012. At this time much of the winter's wastewater that had accumulated as ice was still frozen and most of the wetland was covered in ice and snow. The frozen accumulated wastewater had already started to melt by the start of the field season in late May. Much of the melted wastewater however, flowed along the ground underneath the ice and was therefore difficult to access. The wetland was walked by foot to observe and record how the wetland had changed from the previous year. The most frequently encountered changes involve the formation of new preferential flow paths, development of erosional areas, the toppling of the silt fence and in some cases the breaching of the berms. The team also located the sampling sites that were used in the 2011 field station and found that most of these sites could still be used as the primary sampling sites for the 2012 field station, thus allowing greater sampling consistency between the two years. Additional sampling sites were established on an as needed basis to capture preferential flows that were ephemeral and often disappeared later in the season as the wetland became drier. These additional sampling sites are identified in Figure M-1 as are the primary sampling sites that followed the dominant flow path of the wastewater.

Figure 1.3 (Overleaf). Location of sampling sites at the Alert terraced wetland during the 2012 field season

Treatment Wetland Performance and Physical Characterization
Alert, Nunavut August 2012

Sampling Protocol

From location of preferential flow pathways and estimation of the effective treatment area determined from initial site walk through, a series of transects were established; commencing near the point of influence and completed near the point of effluence. Transects expand the latitudinal width of the expected effective treatment.



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AutoCAD layers provided by FSC Architects & Engineers, 2010

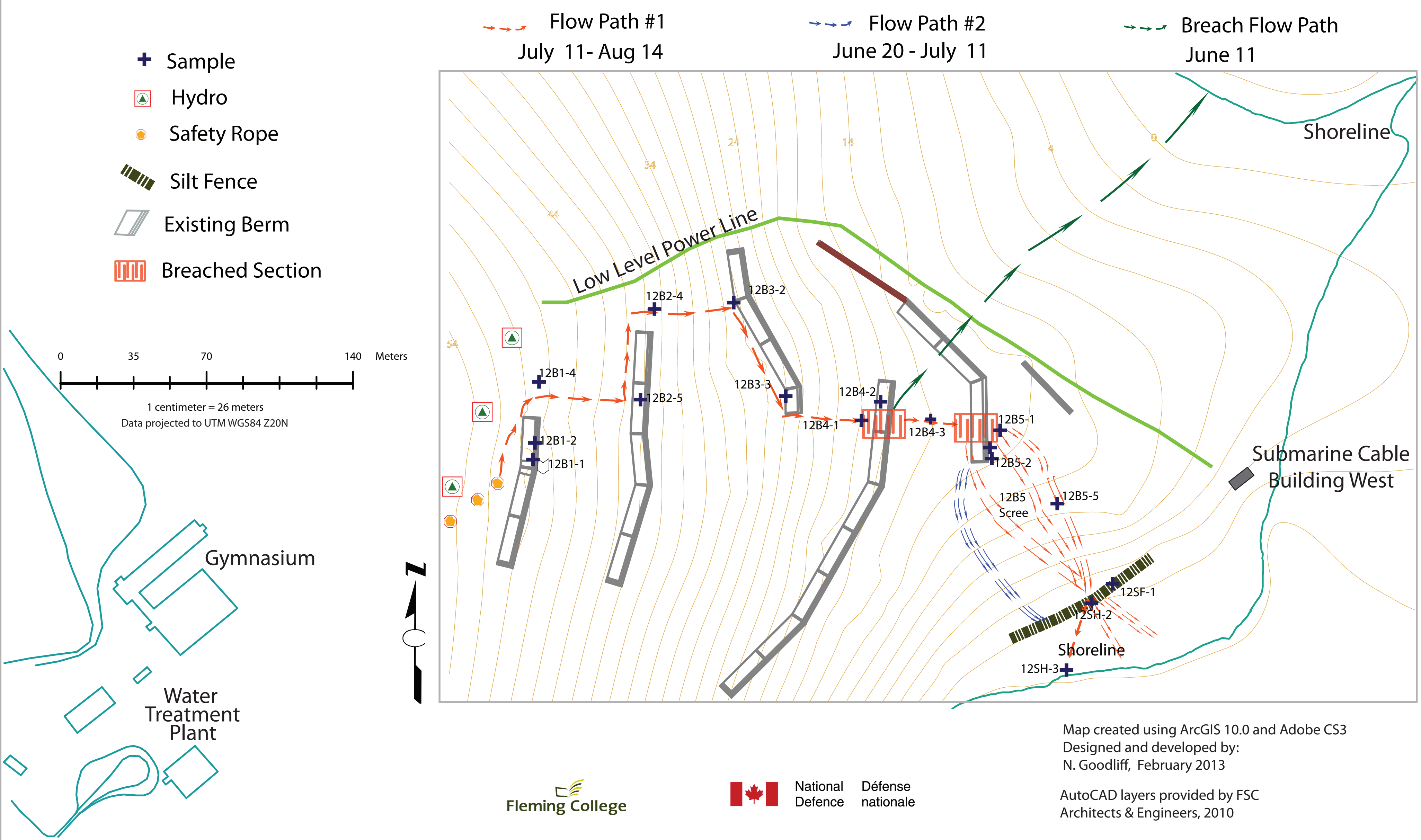
National Defence / Défense nationale

Map created using ArcGIS 10.0 and Adobe CS3
Designed and developed by N. Goodliff, October, 2012

Once the snow and ice cover had melted, it became apparent that portions of some berms (terraces) had been eroded away by the melt waters. In particular, sections of berm 4, berm 5 been breached by the melt waters. Much of the winter's wastewater appears to have accumulated as ice at the northern end of berm 3. Because of the rapid melting of this accumulated wastewater, a portion of berm 3 became saturated allowing a preferential flow path to travel eastwards under the low level power line and into the ocean near the sample locations of 12SH-5 and 12SH-4. This flow path from berm 3 was relatively short lived and dried up once the accumulated ice had melted. This flow was for a time augmented by a preferential flow originating from a breach in the northern end of berm 4. Figure M-2 illustrates the preferential flow paths that had developed. Although it was logistically difficult to determine the percentage of flow that travelled in a north-easterly direction under the low level power line, it did appear that the majority of the flow was still to the south east, exiting into Parr Inlet.

Figure 1.4 (Overleaf). Location of preferential flow paths at the Alert wetland in 2012 field season

Treatment Wetland Performance and Physical Characterization
Alert, Nunavut — August 2012



Map created using ArcGIS 10.0 and Adobe CS3
Designed and developed by:
N. Goodliff, February 2013

AutoCAD layers provided by FSC
Architects & Engineers, 2010

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2.2 Primary flow path

The primary flow path throughout the summer was directed to Parr Inlet and because of this all observations used to assess the functioning of the terraced wetland utilized the following collection sites in the sequential order presented below:

Berm 1:
- 12B1-1 (Influent), 12B1-2, 12B1-4

Berm 2:
- 12B2-5, 12B2-4

Berm 3:
- 12B3-2, 12B3-3

Berm 4:
- 12B4-1, 12B4-2, 12B4-3

Berm 5:
- 12B5-1
- 12B5-2
- 12B5-4
- 12B5-5

Shoreline
- 12SH-2
- 12SH-3 (Effluent) and exit to Parr Inlet

Even though most of the flow was still being directed to Parr Inlet, the breaching of the berms reduced the overall detention of the wastewater and most likely significantly increased the rate of travel through the terraced wetland and exit into Parr Inlet. It is believed that the decreased retention time contributed to the overall poorer performance observed during the 2012 field season in comparison to the wetland's performance of 2011. It should also be noted that sample sites 12B4-2 and 12B4-3 were in areas of high erosion. Samples were taken only once at these locations during the study period.

2.3 Surface water sampling

The surface water samples were collected from surface flow or preferential flow locations. Surface samples were often collected into the sample bottle by submerging the sampling container below the water surface. However, in cases where water depth is shallow, syringes were used. The use of syringes minimized the disturbance of sediment that could have been collected inadvertently in the sample bottle

The chemical and biochemical water quality parameters surveyed in surface waters are summarized in Table 1.1. Likewise physical and ionic parameters of surface water samples are summarized in Table 1.2 with the trace elemental parameters identified in Table 1.3. In addition, surface water temperature was recorded during the site visit with the placement of a hobo tidbit data logger into the surface water of the wetland in one location. Likewise, air temperature was also logged during this time by the suspension of one hobo tidbit data logger at one location in the wetland.

Table 1.1. Chemical and biochemical water quality parameters surveyed in surface waters collected from the CFS Alert wetland (2012)

Ammonia (NH_3-N)	Total Phosphorus (TP)
Nitrite (NO_2-N)	Phosphate (PO_4)
Nitrate (NO_3-N)	Dissolved Organic Carbon (DOC)
Total Kjeldahl Nitrogen (TKN-N)	Dissolved Oxyen (DO)
Total Coliforms (TC)	Chemical Oxygen Demand (COD
Escherichia coli (EC)	Carbonaceous Biochemical Oxygen Demand - 5 Day (cBOD5)
	Fat, Oil & Grease (FOG)

Table 1.2. Physical chemistry and ionic parameters surveyed in surface water samples collected from the CFS Alert wetland (2012)

Temperature	Total Suspended Solids (TSS)
Conductivity	Volatile Suspended Solids (VSS)
pH	

Table 1.3. Trace elements surveyed in surface water samples collected from the CFS-Alert wetland (2012)

Aluminum (Al)	Copper (Cu)	Selenium (Se)
Antimony (Sb)	Iron (Fe)	Silver (Ag)
Arsenic (As)	Lead (Pb)	Sodium (Na)
Barium (Ba)	Lithium(Li)	Strontium (Sr)
Beryllium (Be)	Magnesium (Mg)	Thallium (Tl)
Boron (B)	Manganese (Mn)	Tin (Sn)
Calcium (Ca)	Mercury (Hg)	Titanium (Ti)
Cadmium (Cd)	Molybdenum (Mo)	Uranium (U)
Cesium (Cs)	Nickel (Ni)	Vanadium (V)
Chromium (Cr)	Potassium (K)	Zinc (Zn)
Cobalt (Co)	Rubidium (Rb)	

2.4 Wetland soil sampling

Approximately half a litre of soil was collected from the surface of wetland at each sampling site adjacent to the location where the water sample was collected. Individual soil samples were placed in a new plastic self-locking bag. The soil was collected with the aid of a small trowel. Samples were not taken directly in the preferential flow path but beside the water sampling site. It was believed that soils collected in this manner would be representative of the preferential flow areas since most soils were porous and had been repeatedly wetted by the wastewater. Soil samples were collected only once in late August of 2012. A larger composite sample (1 to 2 L volume) was prepared by mixing equal portions of samples collected from the individual sample locations to generate one soil sample that was representative of the entire wetland. In addition, larger sample volumes (1 to 2 L volume) were collected at the site where the wastewater entered the wetland (12B1-1) and exited the wetland (12SH-3).

Soils were stored frozen until analysis to prevent microbial action and degradation of nutrients. Thawed, wet samples were analyzed for nutrient parameters and thus concentration values are expressed on a wet weight basis. For all other parameters soil samples were air dried and later oven dried overnight at 60°C. Therefore all concentration values (except for nutrient parameters) are expressed on a dry weight basis. Soil clumps were gently broken apart with the use of a mortar and pestle making sure not to decrease the natural grain size of the soil. All analyses were conducted on particle sizes less than 38 mm in diameter for loss on ignition, porosity and bulk density, hydraulic conductivity and grain size analysis were conducted on the whole sample. Hydraulic conductivity was analyzed only for the three large volume soil samples (composite, 12B1-1, 12SH-3). Not all soil samples sites were analyzed. Only selected sites were analyzed for soil parameter, however, it was felt that this subset provided the interpretive information needed. Table 1.4 to 1.6 summarizes the nutrient, trace elemental and physical parameters analyzed on these soils.

Loss on ignition (percent organic matter) was conducted by measuring ~1g of oven dried soil, and ashing the organic component in a muffle furnace at 550°C for 10hrs. Samples were then reweighed obtaining the mineral component. The change in weight constitutes the organic portion.

Porosity was estimated by measuring a known volume of dried soil and noting the volume of water required to reach saturation. The volume of water occupying the void spaces in the soil was equated as the soil porosity.

Grain size analysis was conducted on composite samples by sieving dried soils through a series of soil sieves of decreasing screen size (e.g., 2360, 1180, 600, 300, 150, 75 microns). After sieving the different size fractions were collected and weighed and corresponding size fractions were expressed as a percentage of the original soil mass.

Hydraulic conductivity was determined using a static head permeameter. Hydraulic conductivity tests were conducted on only the three larger sample volumes. The static head permeameter method monitors the mass of water flowing through a known mass of soil under static head conditions. The hydraulic conductivity was estimated by the rate (m/day) at which the water passes through the soil.

Table 1.4. Nutrient parameters surveyed in soil samples collected from the CFS-Alert wetland (2012)

Total Kjeldahl Nitrogen (TKN-N)	Nitrate (NO_3-N)
Total Ammonia	Total Phosphorus (TP)
Nitrite (NO_2-N)	

Table 1.5. Trace elements surveyed in soil samples collected from the CFS-Alert wetland (2012)

Aluminum (Al)	Cobalt (Co)	Potassium (K)
Antimony (Sb)	Copper (Cu)	Selenium (Se)
Arsenic (As)	Iron (Fe)	Silver (Ag)
Barium (Ba)	Lead (Pb)	Sodium (Na)
Beryllium (Be)	Lithium(Li)	Strontium (Sr)
Calcium (Ca)	Magnesium (Mg)	Titanium (Ti)
Cadmium (Cd)	Mercury (Hg)	Uranium (U)
Cesium (Cs)	Molybdenum (Mo)	Vanadium (V)
Chromium (Cr)	Nickel (Ni)	Zinc (Zn)

Table 1.6. Physical and organic characteristics of soil samples from the CFS-Alert wetland

Grain size analysis
Soil porosity
Bulk density
Hydraulic conductivity
Percent organic content measured as Loss-on-Ignition (LOI)

2.5 Microbial community analysis

The microbial community within the CFS Alert terraced wetland was investigated during three separate periods early spring (June 26-29, 2012), mid-summer (August 7-11, 2012) and late summer after repair of the wetland (September 10-14, 2012). During each sampling period a 500 mL volume of wastewater was collected at selected sampling locations which included representation from all five berms and the shoreline area where the wastewater exited from the wetland. Collected samples were packaged on ice and shipped to Dr. Robin Slawson at Wilfrid Laurier University, Waterloo, Ontario. Dr. Slawson investigated the community structure of the wetland's microbial populations using: a) Heterotrophic Plate Count (HPC) method, b) an isolation method for the enumeration of *E. coli*, fecal coliforms and *Enterococcus spp.*, c) a Community-Level Physiological Profiling method (CLPP), d) molecular protocols including Denaturing Gradient Gel Electrophoresis (DGGE).

2.5.1 Heterotrophic Plate Count (HPC)

The Heterotrophic Plate Count (HPC) is a method used to estimate the number of live bacteria using organic carbon for growth (heterotrophic) that are presently living within the wetland at the points sampled. The HPC however cannot differentiate between pathogens and non-pathogens (Allen et al., 2004). The procedure (HPC) was performed using R2A agar (BD Difco, Fisher Scientific, Whitby, ON) after creation of a dilution series from 10^0 to 10^6 using 9 mL dilution blanks containing sodium-free dilution buffer (APHA, 1998) of which 100 µL from each dilution was spread, in duplicate, onto R2A plates. HPCs were enumerated after 5 to 7 days of incubation at 25°C in accordance with the standard method (APHA, 1998). Five day counts were used in all samples as no change was observed from any counts taken on the 5th day by the 7th day. Countable plates were considered those with 30-300 colonies. The number of colonies counted indicates the amount of bacteria present in each millilitre of sample (Allen et al., 2004; Reasoner, 2004). Because of the conditions of the method (medium, temperature, etc.) the HPC method enumerates only a fraction of the heterotrophic bacteria (Allen et al., 2004). HPC results are generally reported as CFU/mL, and it is assumed that each CFU represents an initial single, live bacterium that was capable of multiplying (Lazarova and Manem, 1995).

2.5.2 Isolation method for the enumeration of *E. coli*, fecal coliforms and *Enterococcus spp*.

Enterococcus spp. and *E.coli* and fecal coliforms were the fecal indicator bacteria (FIB) isolated from the wastewater samples using the standard membrane filtration methods outlined by the American Public Health Association (APHA, 1998). Dilutions of 10^{-1} and 10^{-2} were made, and these, as well as 1mL and 10mL of the samples were filtered through 0.45 µm, 47mm mixed cellulose ester filters (Difco, Fisher Scientific, Ottawa, ON). Following filtration, filters were then placed onto selective agar plates; m-Enterococcus agar and mFC-BCIG agar for the quantitative recovery of *Enterococcus* spp. and *E. coli* respectively (Difco, Fisher Scientific). The preparation of mFC-BCIG agar was prepared by supplementing mFC basal agar with 100µg/L of 5-bromo-4-chloro-3-indolyl β-D-glucuronide cyclohexyl ammonium salt (Medox Diagnostics, Ottawa, ON, Canada) for the chromogenic differentiation of *E. coli* from other fecal coliforms in the sample . mFC-BCIG agar plates were incubated at 44± 0.5°C for 24hrs in a water bath incubator and m-Enterococcus agar plates were incubated at 35±2°C for 48hrs. Colonies obtained from the m-Enterococcus agar plates were confirmed by transferring the filter to pre-warmed bile esculin agar (Difco, Fisher Scientific) and incubating at 44°C for 2hrs. Dark brown colonies on BEA were considered presumptive *Enterococcus* spp. and blue colonies on mFC-BCIG agar plates were considered presumptive *E. coli*. Individual colonies of *Enterococcus* spp. and *E. coli* were then plated onto prepared brain heart infusion (BHI) and LB agar respectively for storage at 4 ºC. All non-blue, beige to grey colonies on mFC-BCIG were enumerated as fecal coliforms.

2.5.3 Community-Level Physiological Profiling (CLPP)

CLPP, another useful tool for comparative investigations, can be achieved using the BIOLOG® EcoPlates™ method (Weber and Legge, 2009). This method is used to identify microbial populations based on the type of carbon substrate the bacteria utilizes (Weber et al., 2007). Community-level Physiological profiling (CLPP) was performed using Biolog™ ECOplates™ (Biolog Inc., Hayward, CA), inoculated following considerations presented in Garland (1997), Garland *et al.* (2007), Calbrix *et al.* (2005), Weber *et al.*, (2007) and Weber and Legge (2010). Prior to inoculation, samples were spectrophotometrically analyzed at a wavelength of 420 nm as a means to assess background carbon levels (Weber & Legge, 2010). If the value was greater than 0.2, the sample was diluted one order of magnitude and analyzed again. This procedure was repeated until the OD measurement were equal or less than 0.2. Biolog™ ECOplates™ were inoculated with 150 µL of sample per well, using a multichannel pipette, with care taken not to cross-contaminate any wells; incubated at 22ºC in the dark; analyzed using a SpectaMax 190 (Molecular Devices, Sunnyvale, CA) spectrophotometer and data collected using SoftMax Pro ver. 3.1.2 (Molecular Devices) every 24 h at a defined wavelength of 590nm. CLPP data from the 96 h time point was analyzed for all sample events, based on assessment of standard deviations and number of observed absorbance values greater than 1.99.

2.5.4 Denaturing Gradient Gel Electrophoresis (DGGE)

DGGE, an excellent tool for comparative investigations, is a method widely utilized to obtain profiles, and to describe microbial community structures and/or genetic diversity of complex microbial communities over time or in response to environmental changes (Hastings, 1999; Muyzer, 1999; Tourlomousis et al., 2010). DGGE is a molecular fingerprinting method based on the separation of polymerase chain reaction (PCR). Using denaturing gels and taking advantage of the electrophoretic mobility decrease of the partially melted DNA molecules DGGA allows the analysis of separated DNA fragments individually and hence allows for the identification of the main bacteria groups present in the biofilm (Muyzer, 1999; Tourlomousis et al., 2010).

For DNA extraction 250 mL of swab, wipe or coupon suspension solution was filtered onto a sterile 0.22 µm-47 mm polycarbonate filter (Millipore), soaked in un-buffered PCR-grade Milli-Q (Millipore) water. Each filter was placed into a PowerSoil (Mo Bio Laboratories Inc., Solana Beech, CA) bead tube using sterile forceps, ensuring the surface containing the filtrand was facing the middle of the tube and accessible to the tube contents. The filter was then cut into small pieces using a new, sterile No. 11 blade (Feather, Fischer Scientific, Whitby, ON) on a sterilized No. 3 handled scalpel for approximately 5 minutes in the bead tube. DNA was subsequently extracted following the protocol supplied by the manufacturer.

The polymerase chain reaction (PCR) protocol was performed using 5 µL of template DNA with the primers 357f (5'-CCTACGGGAGGCAGCAG-3') with a GC-clamp (5'-CGCCCGCCGCGCCCCGCG CCCGTCCCGCCGCCCCCGCCCG-3') added to the 5' end, and 518r (5'-ATTACCGCGGCTGCTGG-3'), modeled after Ogino *et al.* (2001) and obtained from Sigma-Aldrich. The primer set used is considered a universal set and targets the hyper-variable

V3 region of bacterial 16S rDNA (Muyzer *et al*., 1993). PCR mastermix for this universal primer set was prepared such that each 50 µL reaction contained 1x Go-Taq™ Flexi (Promega) Green PCR Buffer, 0.5 µM of each primer, 1.5 µM MgCl, 1.5U Go-Taq™ Flexi (Promega), 200 µM dNTP (Promega) and 21.3 µL of Milli-Q (Millipore) water. PCR was performed using a BioRad™ I-cycler iQ PCR machine (Bio-Rad Laboratories). Touch-down PCR conditions were based on those described in Muyzer *et al.* (1993) and consisted of an initial denaturation step of 94ºC for 5 min, followed by 20 cycles of 94ºC, 65ºC and 72ºC for 1 min each, in which the annealing temperature of 65ºC was decreased by 1ºC every 2 cycles to a temperature of 56ºC on the 20^{th} cycle. Ten additional cycles of 94ºC, 55ºC and 72ºC for 1 min each followed. PCR concluded with a 7 min, 72ºC extension step and was held at 4ºC until storage at -10ºC. PCR reaction success was measured by loading 10 µL PCR product into 1.5% agarose gel in 1x TAE buffer. Gels were run for 60 min at 100 V, stained with ethidium bromide solution for 15 min and visualized using BioRad™ GelDoc™ XR (Bio-Rad Laboratories) with amber filter to confirm the presence of only a 233 base-pair band in sample wells and absence of any bands in the blank, which consisted of the 5 µL of the same Milli-Q water used in creation of the mastermix instead of template DNA.

The DGGE was performed following the methods and rationale presented by Green *et al.* (2009) with slight modification. 8% (w/v) acrylamide gels containing a linear denaturant gradient ranging from 40 to 65%, with 100% denaturant defined as a solution of 7M urea and 40% formamide. Gels were run for 17 hrs at 70 V (1190 V·h) using a CBS Scientific™ DGGE-2401 machine (CBS Scientific Inc., Del Mar, CA) set to a constant temperature of 60ºC. 15 µL of sample PCR product was added to each lane, allowing free lanes for the DGGE ladder.

DGGE Ladder Creation: At this time the DGGE ladder is currently under re-construction in Dr. Slawson's laboratory so as to best represent the field site in Alert, Nunavut. This ladder is being created using 8 cloned sequences from various environmental samples known to move distinctly and consistently through the DGGE gel. These cloned and purified sequences were obtained from Dr. Josh Neufeld (University of Waterloo) and amplified individually using the 357f-gc and 518r primer set with PCR reaction conditions as described, modified to include 3 µL of template instead of 5 µL. The remaining 2 µL volume was replaced by increasing Milli-Q water to 23.3 µL. The ten PCR reactions were pooled post-PCR to create 500 µL of DGGE ladder and this was used in all DGGE gels, which was diluted by adding 500 µL 10 mM Tris-HCl (pH 8.0; Sigma-Aldrich). 7 µL of the ladder was added to a central lane and both outside lanes.

The DGGE image acquisition and data analysis will be as follows: Gels will be stained with 1x SYBR Gold solution (10,000x stock diluted in 1x TAE; Invitrogen, Burlington, ON) for approximately 1 h. Gels will then be placed in a BioRad™ Gel Doc™ XR (Bio-Rad Laboratories) and flooded with deionized water before being photographed using a BioRad™ SYBR Gold filter (Bio-Rad Laboratories). The resulting image will be captured using Quantity One® software (Bio-Rad Laboratories), ensuring the gel is exposed for less than the time required to produce saturated pixels. The image will then be exported to an 8-bit .tif file, excluding overlays, and saved at the scan resolution (2879 dpi) and size of 1360 x 1024.

DGGE images will be loaded into GelComparII (Applied Maths, Austin, TX) software following the manufacturer's instructions. Bands will be detected using the automated band detection algorithm provided in the program, set to the minimum cut-off that detected only the expected bands in the ladder-containing lanes. The resulting band detection output will be examined using the original image to ensure only bands clearly visible to the unaided eye in the original picture are selected and that bands will not be placed in areas which contained peaks due to dust or other image inconsistencies. Bands that appeared to the unaided eye but were overlooked by the band search algorithm will be excluded to ensure consistency regarding the treatment of background intensity. Densiometric peaks for each banding pattern in each lane will be exported into text files conferring both band movement (i.e. number of pixels from the top of the gel; R_f) and relative band intensities (i.e. intensity of each band compared to total intensity of each lane, for each separate lane). Densiometric peaks will be translated numerically by the software and analysed using Shannon Index.

2.6 Quality Assurance / Quality Control

HDPE bottles were used for the collection of all water samples. Each sample bottle was labeled with the sample location and Fleming College and packed with ice packs in appropriate coolers together with a chain of custody form identifying each bottle and the analyses required were shipped to the appropriate lab for analysis. On average the shipment of samples took approximately 24 to 48.

A series of measures were adopted to ensure that all water samples collected in the wetland had not been contaminated by poor handling, or pre-assessment contamination of sampling bottles.

Nutrient parameters were also preserved with acid at the site of collection prior to being shipped for analysis.

2.7 Statistical analysis

Water quality parameters were analysed using a two tailed student t-test ($p < 0.05$) assuming non-homogeneity of the variance. Comparisons were made between only the influent flowing into the wetland (e.g., site 12B1-1) and the effluent leaving the wetland (e.g., site 12SH-3). No statistical analysis was performed on soil samples since there was only one sample per site (n=1).

2.8 Analytical Laboratories Utilized

The City of Peterborough Environmental Protection Laboratory (EPL) was contracted to analyze the influent and effluent of the CFS Alert wetland for BOD5, cBOD5, oil and grease, TC, EC and all wastewater samples for TSS, VSS, COD, dissolved organic carbon (DOC), TKN, NH3, NO2, NO3, TP, PO4, and trace elements. The EPL is ISO 17025 certified and has been accredited with the Association for Laboratory Accreditation (CALA) since 2004 and is licenced by the Ontario Ministry of the Environment for drinking water testing.

The CAWT performed additional testing at the Alert site for QA/QC purposes and to augment the number of samples tested to increase the understanding of the wetland's performance. Test conducted by the CAWT at the CFS Alert site included dissolved oxygen, conductivity, pH, BOD5, cBOD5, TC and EC. Physical parameters of soil samples sent to the CAWT laboratory in Lindsay, Ontario were analyzed for porosity, hydraulic conductivity, grain size analysis, bulk density and organic content (e.g., loss-on-ignition.

All other soil analyses were conducted sent to Caduceon Environmental Laboratories. The tests included the analysis of total nitrogen, total ammonia nitrogen, total Kjeldahi nitrogen, total phosphorus and trace metals.

Wastewater samples were sent to Dr. Robin Slawson, Wilfrid Laurier University for analysis of the microorganisms community profile.

3.0 Results

3.1 NWB Licences Parameters

The water licence issued to CFS-Alert by the Nunavut Water Board stipulates that the effluent exiting the treatment wetland should meet the following criteria: BOD_5 = 80 mg L^{-1}; TSS = 70 mg L^{-1}; Oil & Grease = 5 mg L^{-1} with no visible sheen and pH in the range of 6 to 9. Of the four criteria, pH was the only parameter that was in compliance. The summer time average BOD_5 concentration was 111 mg L^{-1} and therefore came close to the compliance value of 80 mg L^{-1}, and in fact the BOD_5 concentrations for the last two sampling days (Sept 10^{th} and 13^{th}) were 67 and 66 mg L^{-1} BOD_5, respectively and well below the criterion of 80 mg BOD_5 / L. Although the summer time average of TSS was elevated (e.g. TSS = 124 mg L^{-1}) above the limit of 70 mg L^{-1}, the volatile suspended solids (VSS) portion of TSS was only 52 mg L^{-1}. It is suspected that the inorganic portion of the TSS (e.g., 72 mg L^{-1}) was likely generated from within the wetland and does not reflect the suspended solids originating from the wastewater. Of the four licenced compliance parameters, it was oil & grease (e.g., summer time average = 37 mg L^{-1}) that appeared to be the parameter most out of compliance.

3.1.1 Biochemical Oxygen Demand (5 day)

The concentration of BOD_5 entering the wetland (Influent) fluctuated during the duration of the summer time collections. These fluctuations are illustrated in Figure 3.1 which captures the fluctuation of BOD_5 both entering the wetland (collection site 12B1-1) and at the last point of collection (12SH-3) prior to discharge into Parr Inlet. The data collected do not show a strong correlation between the concentration of BOD_5 entering the wetland and the progression of the field season. BOD_5 concentrations exiting the wetland (12SH-3) are however; significantly ($p < 0.05$) lower than the concentrations entering the wetland. The overall reduction in the concentration of BOD_5 is best illustrated in Figure 3.2 which illustrates the average summer time concentrations and the maximum and minimum concentration observed for each sample site. As shown in this figure, BOD_5 concentrations entering the wetland and persisting until near berm 2 were quite variable. The data points in Figure 3.2 represent the averaged (arithmetic mean) BOD_5 concentration measured during the field season. The vertical bars bracketing the data points represent the maximum and minimum BOD_5 concentrations recorded during this time period. BOD_5 concentrations tend to be less variable beyond berm 2; however, the average BOD_5 concentrations at these locations and those exiting the wetland are still elevated (111 mg BOD_5 / L) above the NWB compliance value of 80 mg BOD_5 / L effluent.

Of particular note is that the reconstruction of the wetland took place in the last two weeks of August (2012). The September 10th and 13th sampling occurred immediately after this reconstruction period. The wetland began to freeze after September 13th marking the end of the field season. The BOD_5 concentrations on these two dates were 67 and 66 mg BOD_5 / L, making them below the licenced criterion of 80 mg L^{-1}. Therefore, the wetland was in compliance during the last two weeks of the field season. It is difficult to interpret the meaning of these results and to know if the BOD_5 concentrations were artificially low because of the construction efforts or if the reconstruction has actually improved overall performance. It is believed however, that an extended period of time is needed for the wetland to stabilize from the reconstruction efforts and the best time to assess the impact of reconstruction would be during a summer 2013 field season.

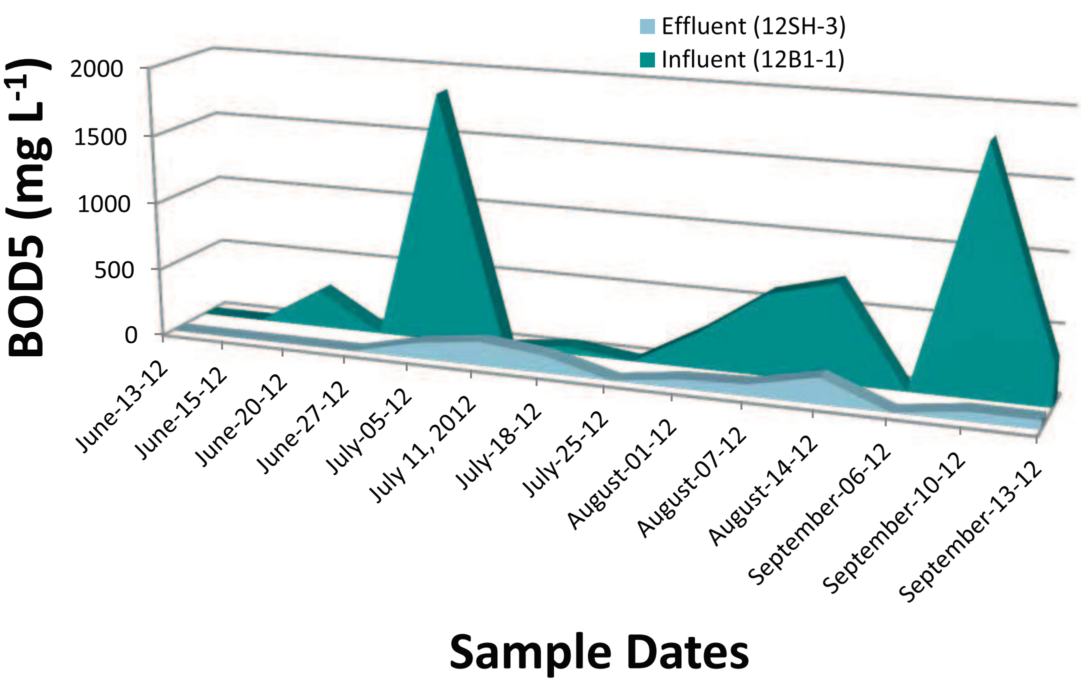

Figure 3.1. Weekly concentrations of the 5-day biochemical oxygen demand (BOD_5) within the influent and effluent sampled during the 2012 study period.

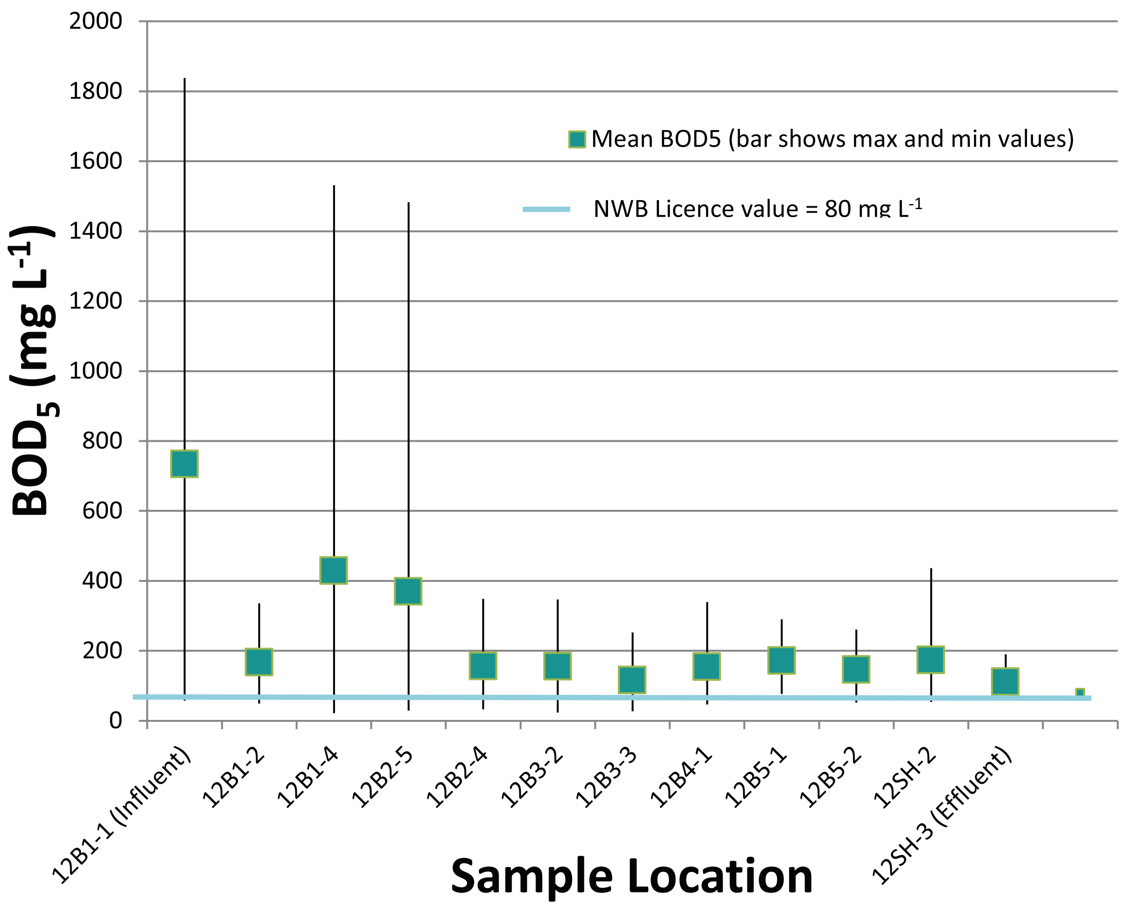

Figure 3.2. Mean concentrations of the 5-day biochemical oxygen demand (BOD_5) within wastewaters taken from sample sites within the Alert wetland during the 2012 study period. The blue horizontal line indicated the NWB compliance value of 80 mg BOD_5 per litre.

3.1.2 Total Suspended Solids

The concentration of TSS entering the wetland over the duration of the field visit is variable as shown in Figure 3.3. The concentrations of TSS exiting the wetland are less variable and tend to be lower in concentration however the removal of suspended material is not statistically significant ($p > 0.05$). This trend of reduced variability is also evident in the summer time averaged TSS concentrations (Figure 3.4); however, the TSS exiting the wetland (e.g., 124 mg L^{-1}) is still above the NWB compliance value of 70 mg TSS / L. A closer look at the composition of the TSS, does reveal, however, that a greater portion of the TSS sampled from the first three berms has an overall higher amount of organic matter (e.g., volatile suspended solids) suggesting that much of the turbidity in the upper portion of the wetland is likely related to domestic wastewater (sewage, garborated food, etc). In the lower half of the wetland the composition of the TSS changes, indicating that the majority of the TSS is inorganic and likely represents fine silts and clays generated from the rocky substrate of the wetland through the erosional forces of the wastewater. As shown in Figure 3.5, the organic, biodegradable portion of the TSS exiting the wetland (52 mg VSS / L) is well below the NWB compliance value of 70 mg L^{-1}.

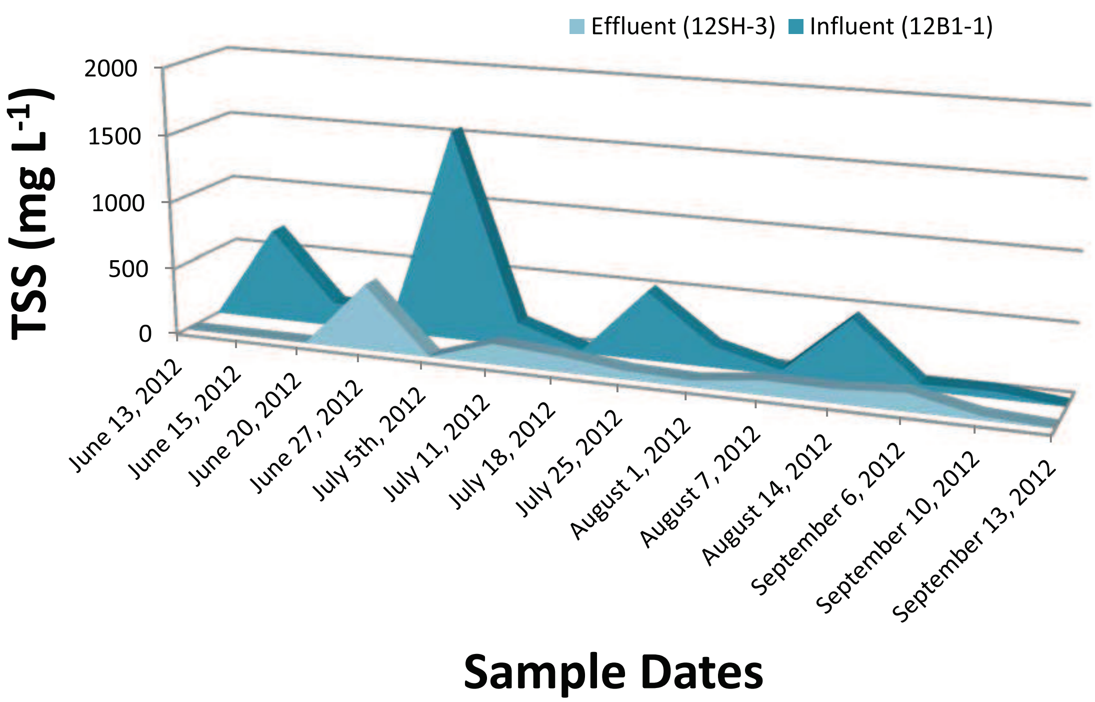

Figure 3.3. Weekly concentrations of total suspended solids (TSS) within the influent and effluent sampled during the 2012 study period.

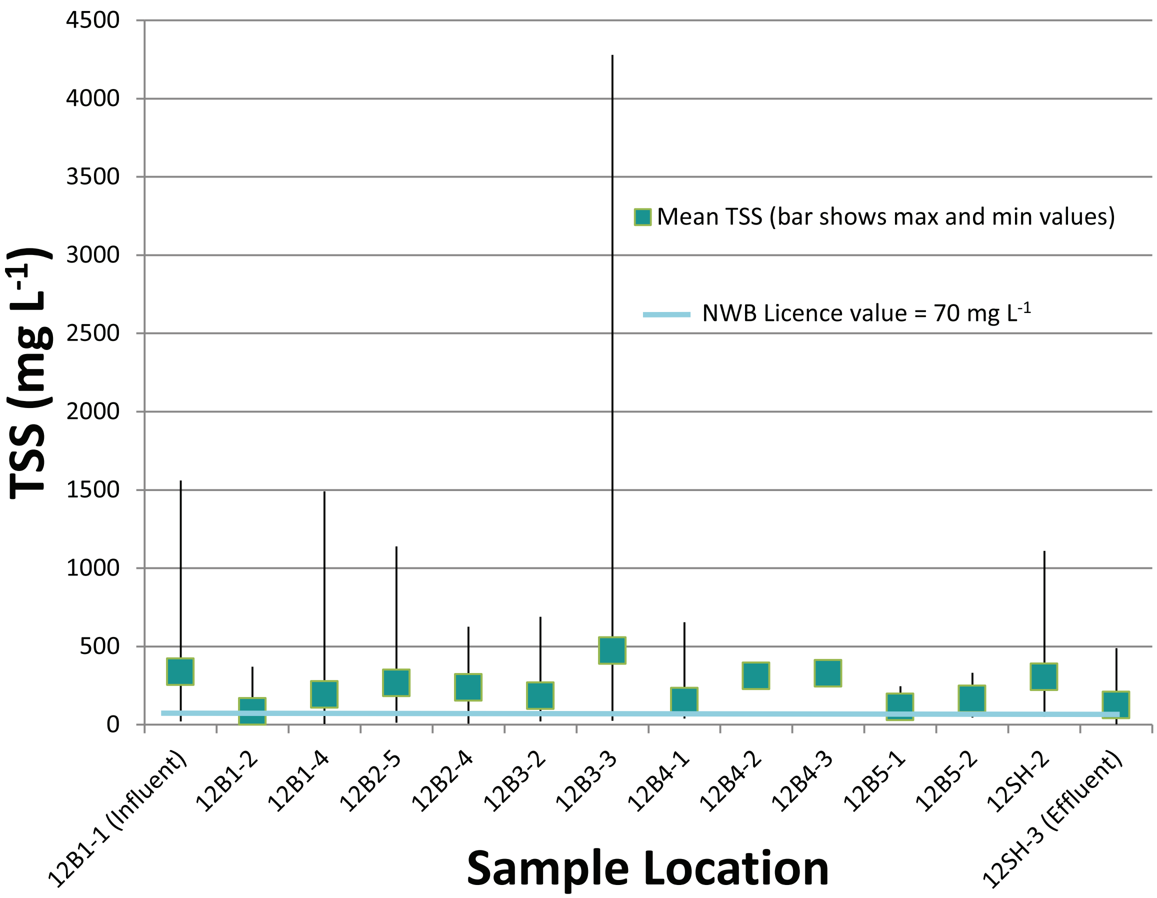

Figure 3.4. Mean concentrations of total suspended solids (TSS) within wastewaters taken from sample sites within the Alert wetland during the 2012 study period. The blue horizontal line represents the NWB compliance value of 70 mg TSS per litre.

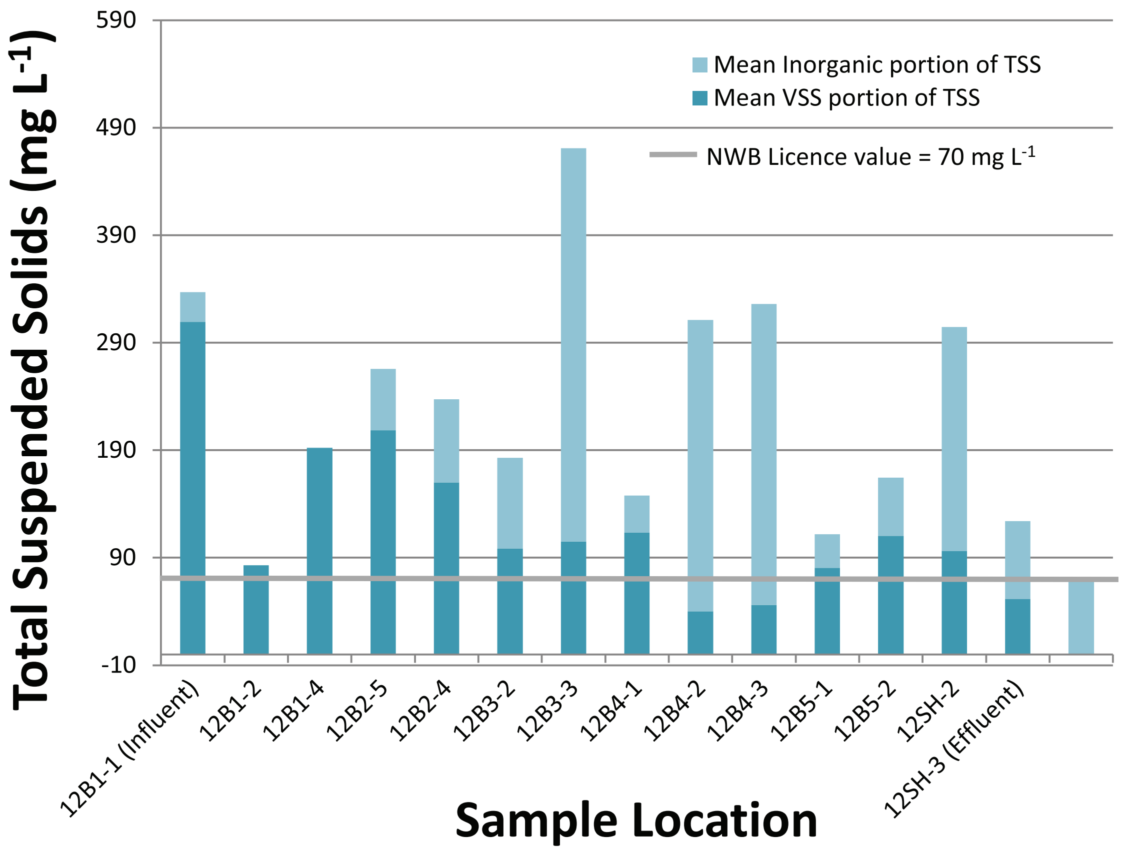

Figure 3.5. The proportion of total suspended solids composed of volatile suspended solids (VSS) and inorganic suspended solids within wastewater collected from sites within the Alert wetland during the 2012 study period. The gray horizontal line represents the NWB compliance value of 70 mg TSS per litre.

3.1.3 Oil and Grease

The influent (12B1-2) entering the wetland and the effluent (12BSH-3) exiting the wetland were monitored weekly for fats, oil and grease (FOG). The sample sites 12B1-4 and 12BSH-2 were monitored once and twice, respectively to provide additional information on the removal of FOG. Figure 3.6 illustrates how the concentration of FOG in the influent entering the wetland and the effluent exiting the wetland varied weekly over the course of the study period. In most cases the general trends entering and exiting the wetland were similar except for a general lowering of FOG in the wastewater as it traveled through the wetland. The concentrations of FOG varied widely (Figure 3.7) over the course of the sampling period with mean values exiting the wetland approximating 37 mg L^{-1}; a value above the NWB compliance value of 5 mg L^{-1} and not statistically different ($p > 0.05$) from the FOG concentration entering the wetland.

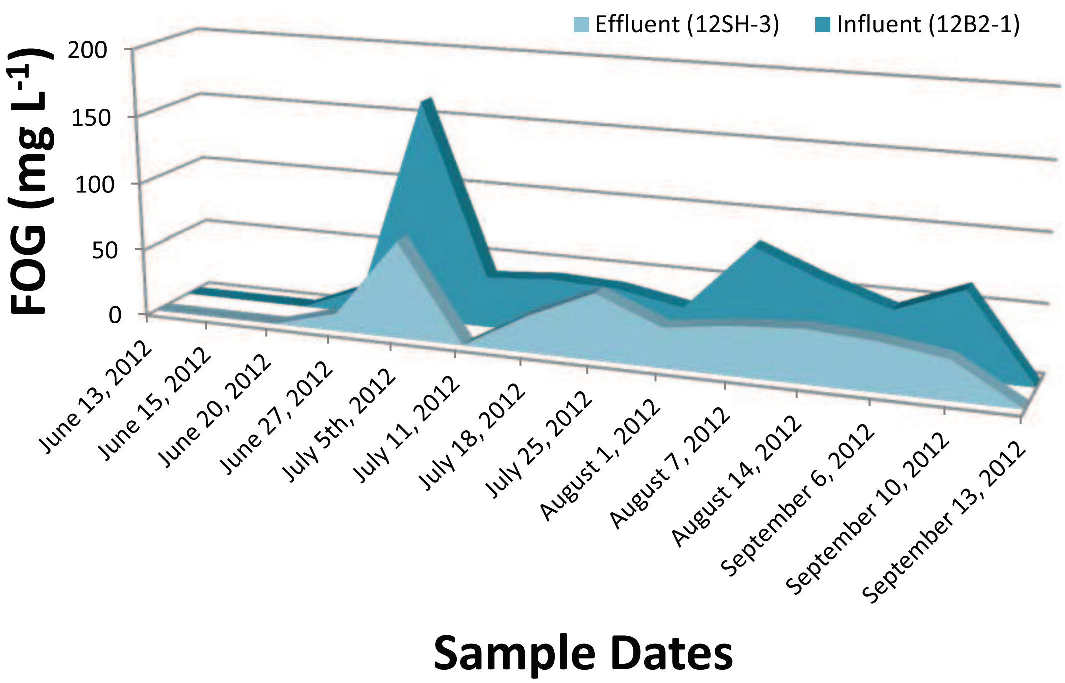

Figure 3.6. Weekly concentrations of fats, oils and grease (FOG) within the influent and effluent sampled during the 2012 study period.

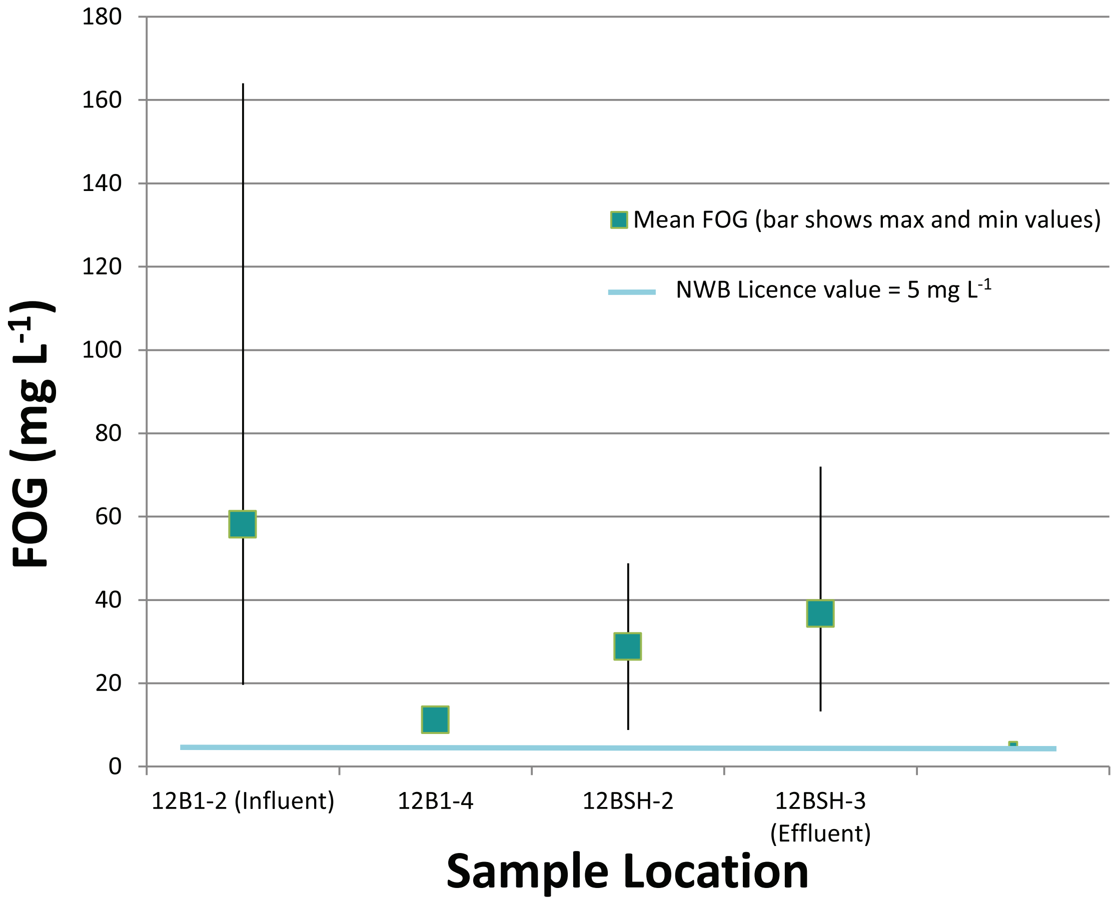

Figure 3.7. Mean concentrations of fats, oils and grease (FOG) within wastewaters taken from sample sites within the Alert wetland during the 2012 study period. The blue horizontal line represents the NWB compliance value of 5 mg FOG per litre.

3.1.4 pH

The pH of the wastewater entering the wetland (12B1-1) varied widely (range: 4.9 – 7.6) with a mean value of 7.0 while the pH of the wastewater exiting the wetland (12SH-3) was somewhat less variable with a mean value of 7.5 which was well within the NBW compliance range of 6 to 9 for pH (Figure 3.8). The pH difference between the influent in and effluent out of the wetland was not significant ($p > 0.05$).

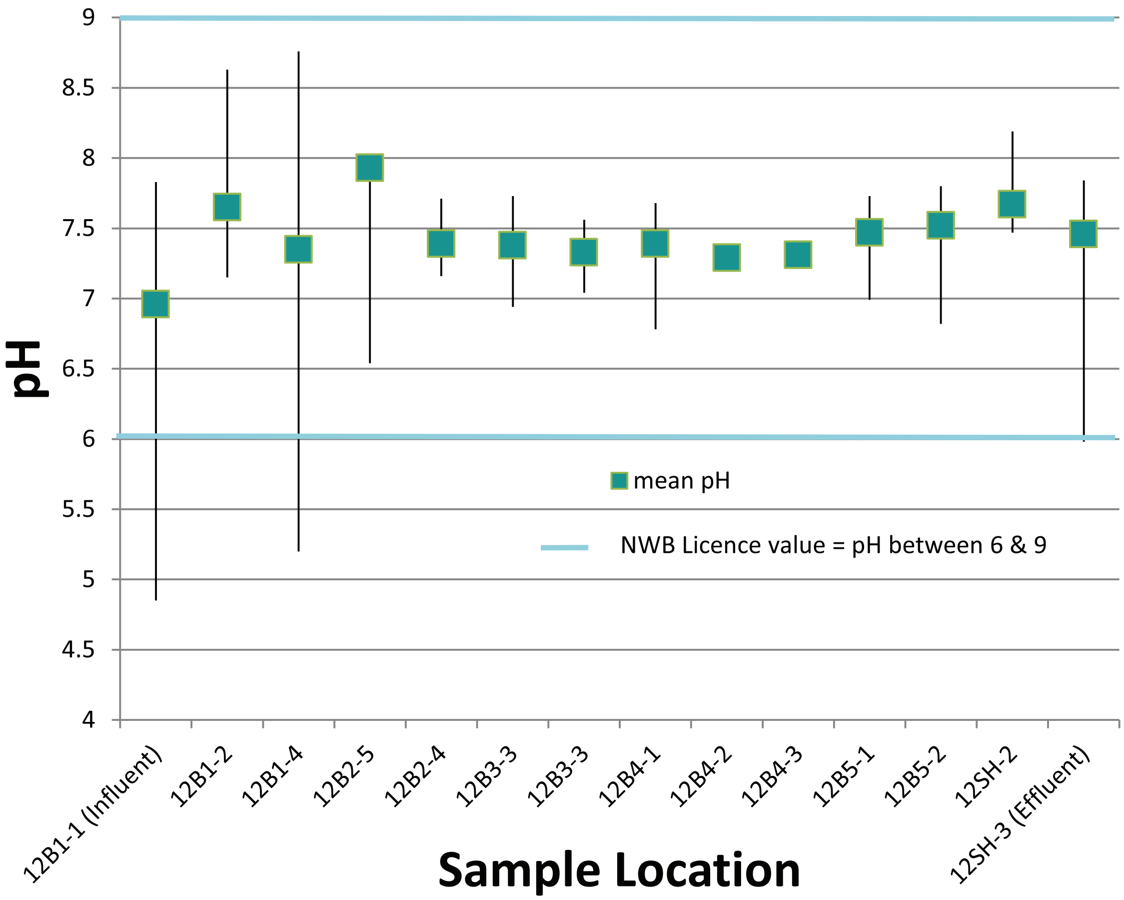

Figure 3.8. Mean pH values within wastewaters taken from sample sites within the Alert wetland during the 2012 study period. The two blue horizontal lines represents the NWB compliance value of for pH indicating that sample pH should be between a value of 6 and 9.

3.2 Additional water quality parameters measured for interpretive purposes

The following water quality parameters were not required by the NWB for compliant purposes. These parameters were monitored by the CAWT to provide additional information into the functioning and performance of the terraced wetland. Therefore there is no treatment requirement stipulated by the NWB that must be achieved. The list of additional water quality parameters monitored during this study period includes:

Nitrogen Compounds

- Total Kjeldahl Nitrogen (TKN)
- Total Ammonia Nitrogen (NH_3-N)
- Total Nitrogen (the sum of organic nitrogen + NH_3-N + oxidized nitrogen (NO_2 / NO_3)

Phosphorus

- Total Phosphorus (TP)
- Ortho-Phosphate (PO_4-P)

Chemical oxygen demand and carbonaceous biochemical oxygen demand

- Chemical Oxygen Demand (COD)
- 5-day Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)

Microbial indicator organisms

- Total Coliform (TC)
- *Escherichia coli* (*E. coli*)

Dissolved trace elements

- Al, Sb, As, Ba, Be, B, Cd, Cu, Cs, Cr, Co, Cu, Fe, Pb, Li, Mg, Mn, Mo, Ni, K, Rb, Ag, Se, Na, Sr, Ti, U, V, Zn

3.2.1 Total Kjeldahl Nitrogen

The weekly concentration of TKN entering the wetland (12B1-1) increased slightly over the course of the summer and while the weekly concentration exiting the wetland (12SH-3) generally remained lower and did not exhibit the same increasing trend (Figure 3.9). The change in the mean TKN concentration as the wastewater traveled through the wetland is best illustrated in Figure 3.10 which shows that the concentration of TKN varies between approximately 20 to 27 mg/L in the upper portion of the wetland (e.g., berm 1 &2) and decreases to around 10 mg L^{-1} when it exits the wetland (12SH-3), however these differences were not significant ($p > 0.05$).

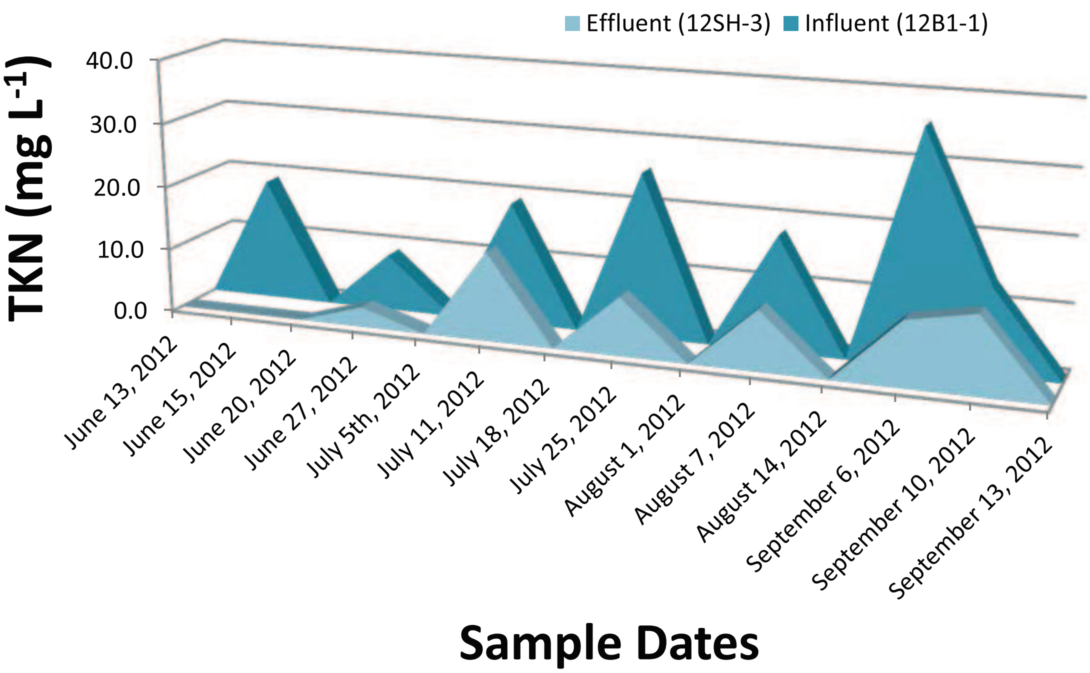

Figure 3.9. Weekly concentrations of total Kjeldahl nitrogen within the influent and effluent sampled during the 2012 study period

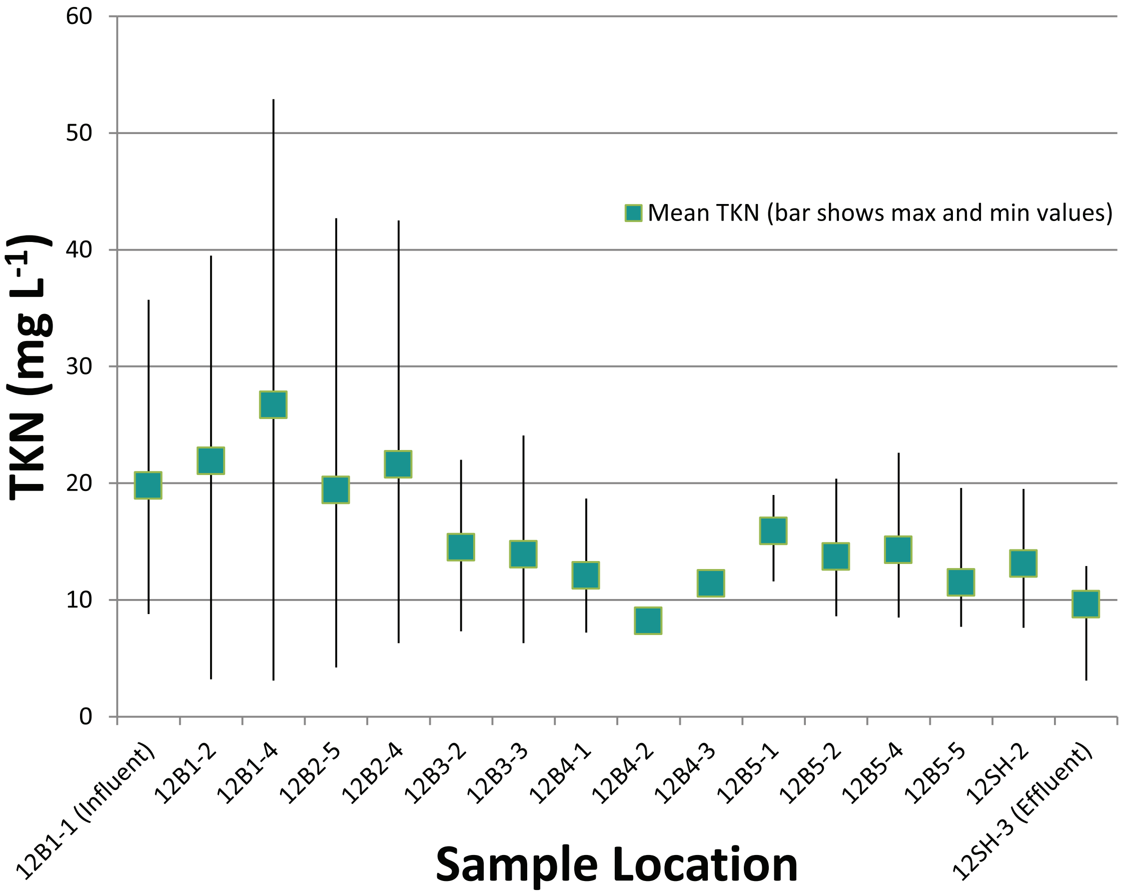

Figure 3.10. Mean concentration of total Kjeldahl nitrogen (TKN) within wastewaters taken from sample sites within the Alert wetland during the 2012 study period.

3.2.2 Total Ammonia Nitrogen (NH3-N)

Ammonia can exist in both an un-ionized form (NH_3) and an ionized form (ammonium NH_4^+). The proportion of these two forms is both pH and temperature dependant with higher percentages of NH_3 favoured with higher pH values. The un-ionized from (NH_3) is toxic to aquatic life forms and as such CCME has set a national performance standard (NPS) for the concentration NH_3 (measured as N) at 1.25 mg L^{-1} for southern treatment plants. A NPS guideline for northern communities is currently under review.

The ammonia concentrations expressed in this report are expressed as the concentration of total ammonia nitrogen expressed as NH_3-N. However the nitrogen measure from the NH_3 form does not accurately represent the toxic form of NH_3 found in the original environmental sample. The effluent sample in its natural state would contain a fraction of both the un-ionized form (NH_3) and the ionized form (NH_4^+). The effluent sample is analyzed under a basic environment which forces all of the NH_4^+ into the NH_3 form. Thus what is expressed in the value NH_3-N is actually the nitrogen from both the un-ionized and ionized forms. Thus a better expression of this value is a term called "total ammonia nitrogen" or TAN for short. In order to approach the NPS of 1.25 mg L^{-1} of the toxic un-ionized form (NH_3), a "total nitrogen ammonia" (TAN) concentration of approximately 100 mg L^{-1} in an environment with a pH of 8 and a temperature of 5°C would be needed.

The weekly TAN values for the influent (12B1-1) suggest a modest increase in concentrations nearing the end of the study period (Figure 3.11) similar to that observed for TKN. Likewise, the weekly concentrations of TAN exiting the wetland (12SH-3) shows no evidence of increasing with time, an observation reflective of the trends observed for TKN. The mean values of TAN in the upper portion of the wetland (Berms 1 & 2) range in concentration between 11 to 14 mg L^{-1} but decrease to approximately 7 mg L^{-1} at the last sampling point (12SH-3) were the wastewater exits the wetland (Figure 3.12) however these differences were not statistically significant ($p > 0.05$).

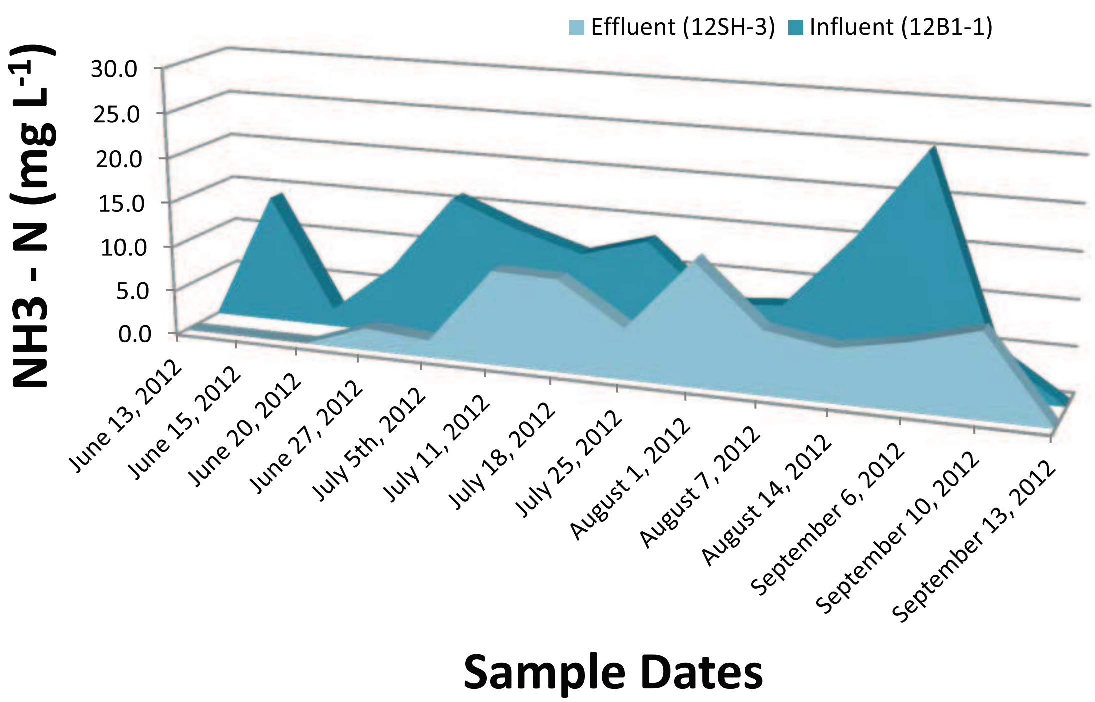

Figure 3.11. Weekly concentrations of total ammonia nitrogen (NH_3-N) within the influent and effluent sampled during the 2012 study period.

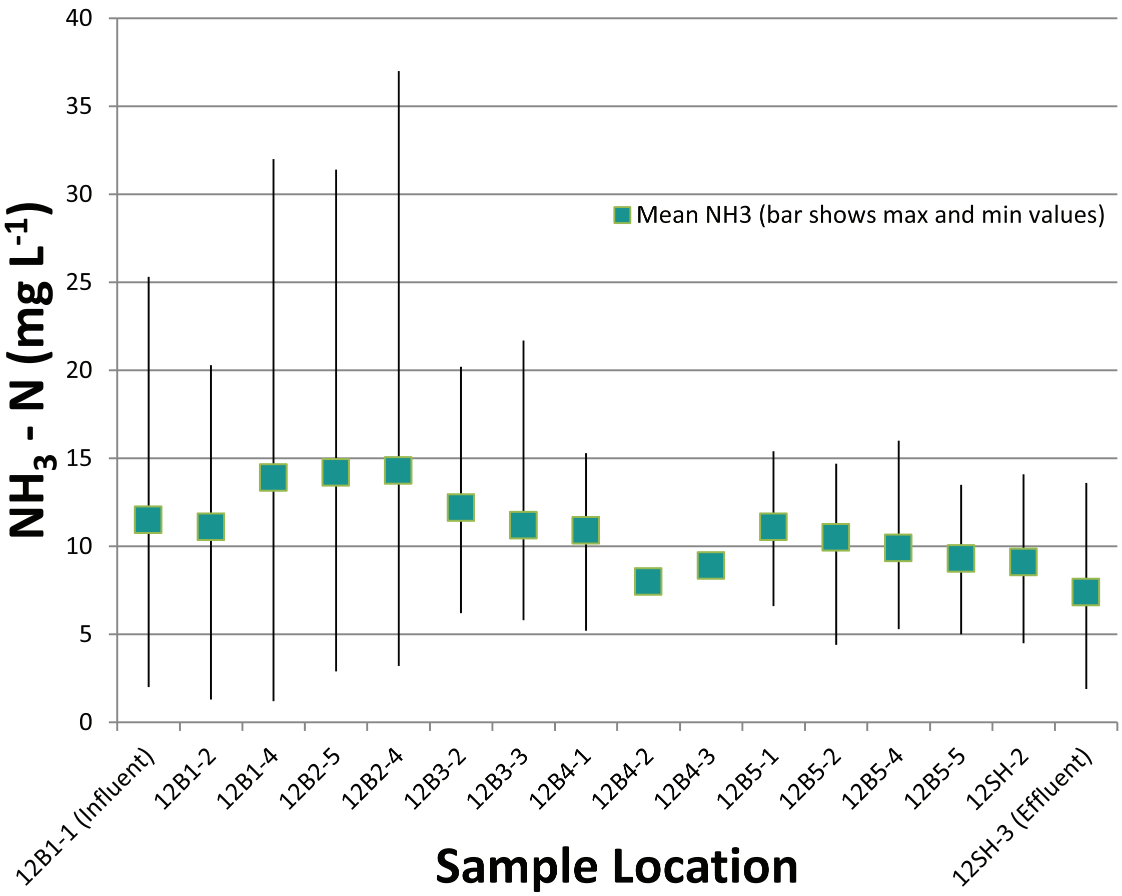

Figure 3.12. Mean concentrations of ammonia (e.g. total ammonia nitrogen) within wastewater collected at sample sites within the Alert wetland during the 2012 study period.

3.2.3 Total Nitrogen

Total nitrogen (TN) is the sum of organic nitrogen, ammonia (i.e., TAN) and oxidized nitrogen (e.g., NO_2-N + NO_3-N). Organic nitrogen was derived by subtracting NH_3-N from TKN. The averaged concentrations of total nitrogen at each sampling location are presented in Figure 3.13. As shown in this figure, the average concentration of total nitrogen decreases modestly as the wastewater travels through the wetland. A closer look at the changing composition of the total nitrogen values suggests that most of the TN loss may be attributed to an overall decline in the concentration of organic nitrogen. Ammonia levels appear to change relatively little as the wastewater traversed the wetland (Figures 3.12 & 3.13). Near the exit of the wetland (e.g., sites 12SH-2 & 12SH-3) the presence of oxidized nitrogen was observed (Figure 3.13), however, the overall concentration of these compounds is minimal and is attributable primarily to NO_3-N, with very little NO_2-N present.

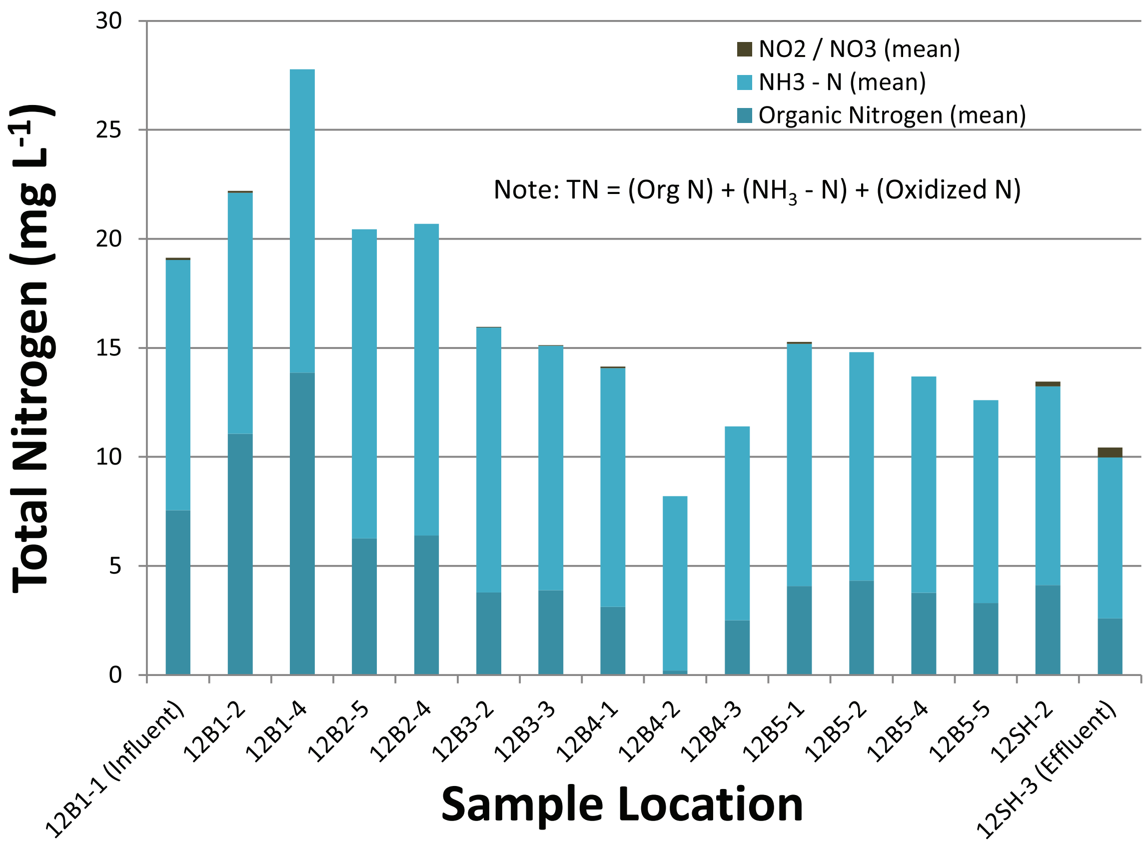

Figure 3.13. The mean concentrations of total nitrogen within wastewaters collected at sampling sites within the Alert wetland showing the proportion of organic nitrogen, ammonia nitrogen and oxidized nitrogen that contribute to the total nitrogen concentration during the 2012 study period.

3.2.4 Phosphorus

The weekly changes in the concentration of total phosphorus (TP) are illustrated in Figure 3.14. As evident in this figure, the overall concentration of total phosphorus entering the wetland (12B1-1) shows a modest increase in concentration over the duration of the study period, while this increase is less obvious in the effluent exiting the wetland (12SH-3). A closer look at the values for TP (Figure 3.15) indicate that although quite variable, the mean TP concentration entering the wetland is approximately 4 mg L^{-1} and declines to around 1.5 mg L^{-1} as it exits the wetland. The difference between the TP entering and exiting the wetland is statistically significant ($p < 0.05$).

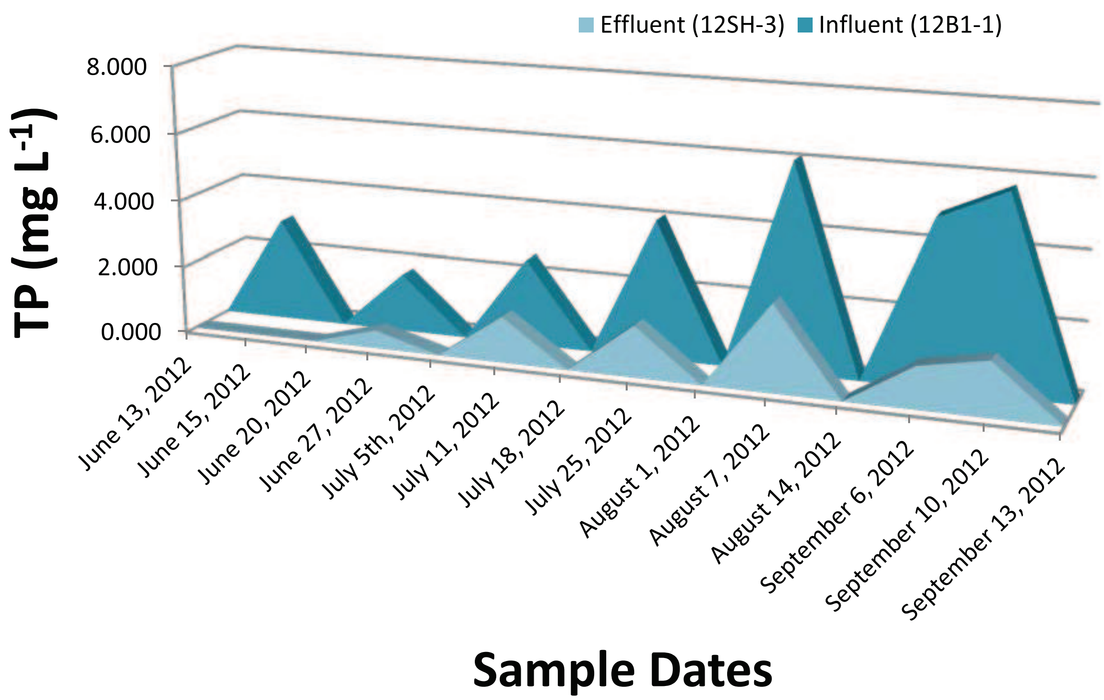

Figure 3.14. Weekly concentrations of total phosphorus (TP) within the influent and effluent sampled during the 2012 study period.

Total phosphorus includes both particle bound and dissolved forms. While there are several dissolved forms of phosphorus can exist, most often the greatest portion of dissolved phosphorus is in the form of ortho-phosphate (PO_4-P). Figure 3.16 illustrates the proportion of total phosphorus that was measured in the dissolved form of PO_4-P and the non ortho-phosphate form which is most likely phosphorus that is particle - bound or incorporated into particulate matter. As seen in Figure 3.16, the dissolved PO_4-P is the dominate constituent of the total phosphorus concentration in the upper portion of the wetland (e.g., berms 1 & 2). However, the overall proportion of ortho-phosphate decreases as the wastewater traverses the wetland, while the non ortho-phosphate fraction remains relatively unaltered between entry into the wetland (12B1-1: conc. of PO_4-P ≈ 1.5 mg L^{-1}) and as it exists the wetland (12SH-3: conc. of PO_4-P ≈ 1.2 mg L^{-1}).

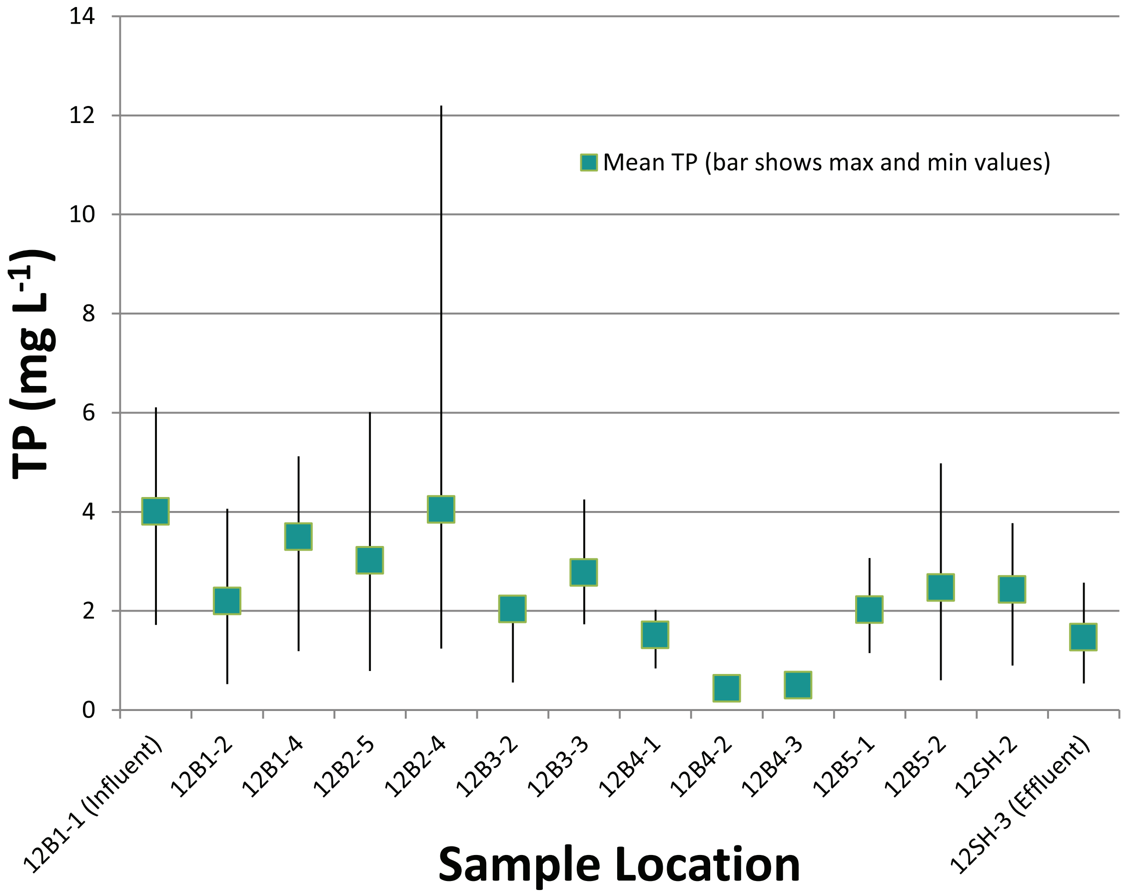

Figure 3.15. Mean concentrations of total phosphorus (TP) within wastewaters collected at sample sites within the Alert wetland during the 2012 study period.

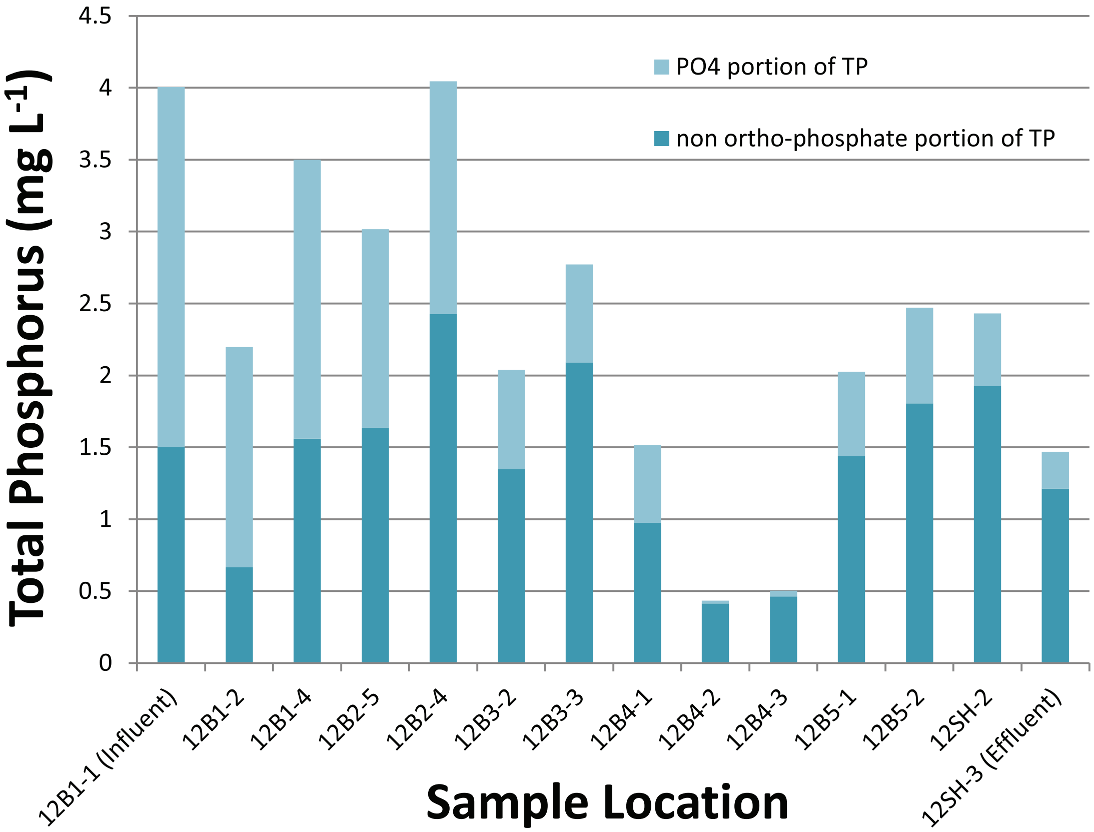

Figure 3.16. The mean concentrations of total phosphorus in wastewater at sampling sites within the Alert wetland showing the proportion of ortho-phosphate (PO_4-P) and non ortho-phosphate that contribute to the total phosphorus concentration during the 2012 study period.

3.2.5 Chemical oxygen demand and carbonaceous biochemical oxygen demand

The analysis of the carbonaceous biochemical oxygen demand is a five-day test. Water samples collected for $cBOD_5$ must be analyzed within 24 h after collection. Laboratories certified for the analysis of cBOD5 or BOD_5 do not exist in Nunavut and therefore samples must be flown south to larger centres such as Calgary, Winnipeg or Ottawa. The biochemical oxygen demand is a measure of the microbially mediated oxidation of carbonaceous and nitrogenous compounds. In most cases, oxygen consumption from the oxidation of carbonaceous compounds exceeds the consumption from the oxidation of nitrogenous material. The oxygen demand from only the carbonaceous compounds can be achieved through the analysis of $cBOD_5$, which in essence is a BOD_5 test with the addition of a chemical additive that suppresses the oxidation of nitrogenous compounds present in the sample.

The chemical oxygen demand is also an indirect measure of the oxidizable compounds within the wastewater. In this test however, oxidation is accomplished through the addition of a strong chemical oxidant and does not involve microbial oxidation. This test can be used to provide a more complete understanding of all oxidizable compounds within the wastewater, including those that are not readily oxidized microbially. Since this test does not involve any microbially mediated processes, it can be accomplished within minutes, rather than days, and does not require the use of an incubator as do the BOD_5 and $cBOD_5$ tests and thus can be routinely performed in lesser equipped laboratories.

In this study, the relationship between COD and $cBOD_5$ was evaluated to determine if COD could be used as a surrogate for the biochemical oxygen demand test. Finding a consistent relationship may provide an indirect measure of BOD. If a relationship existed, then this might help with compliance testing at the Alert site and mitigate the challenges associated with finding a suitable location for the analysis of BOD. The NWB licence stipulates that BOD_5 be one of the treatment performance measurements, as do most other regulatory bodies.

A comparison of the COD results with the $cBOD_5$ values (Figure 3.17) generated from the same wastewater sample illustrates that there is a general lack of relationship between COD and $cBOD_5$, indicating that at this site, COD would not be a reliable surrogate for the measurement of BOD_5.

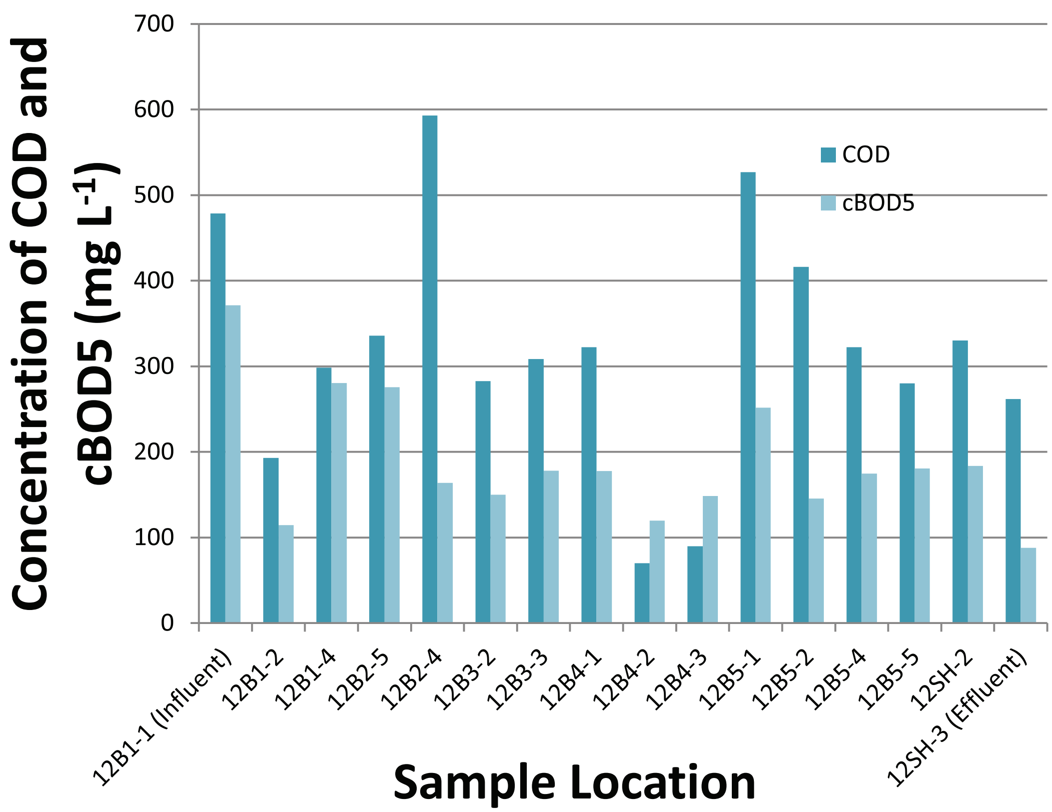

Figure 3.17. The concentration of COD compared to the concentration of $cBOD_5$, from wastewater collected at sites within the Alert wetland during the 2012 study period illustrating that the relationship is variable and not consistent.

3.2.6 Microbial

The density of microbial indicator organisms, expressed as the number of colony forming units per 100 mL of sample (e.g., cfu/100 mL) was monitored at the collections sites for both total coliforms and *E. coli*. Total coliforms (TC) are often used as an indicator of fecal contamination and although this indicator group can also contain genera which do not originate from fecal contamination it has been used in this study as a general indicator of microbial contamination originating from the discharge of wastewater to the wetland. *E. coli* (EC) does originate from fecal contamination and it has been used as an indicator for the possible presence of human pathogens. In both cases, these microbial groups are used primarily to monitor the change in the density of microbial organisms within the wastewater as it travels through the wetland.

Figures 3.18 and 3.19 illustrated the changing densities of total coliforms and *E. coli*, respectively. Total coliform densities were typically ten times greater than the densities of *E. coli*. In both cases the densities at the sample locations vary widely throughout the study period. Microbial population densities entering the wetland were approximately $4x10^7$ for TC and $3x10^6$ for EC. These densities declined over distance, but this reduction was around only one log unit for both TC and EC. Final densities exiting the wetland were approximately $4x10^6$ for TC and $3x10^5$ for EC. The decline in cfu / 100 mL was statistically significant ($p < 0.05$) for TC but not statistically significant ($p > 0.05$) for EC.

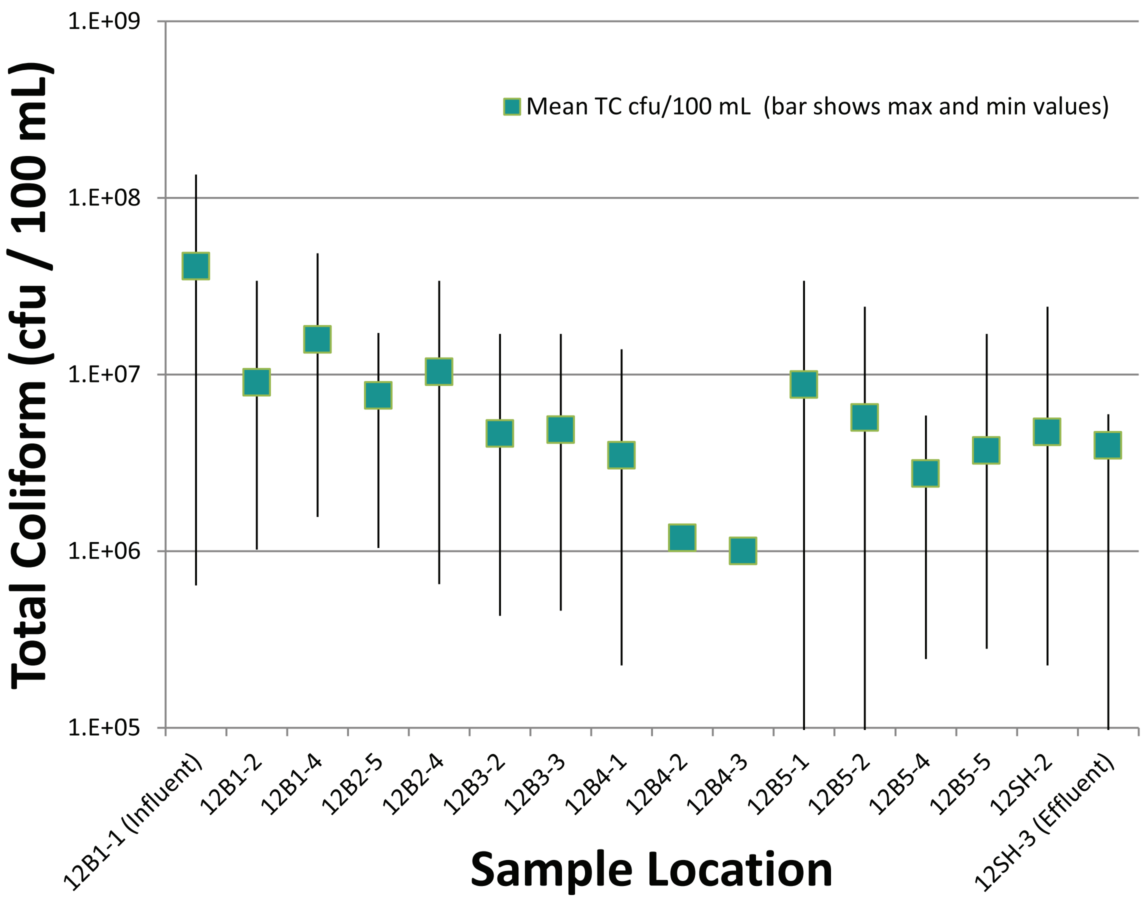

Figure 3.18. The mean concentration of total coliforms (expressed as colony forming units per 100 mL of wastewater) at sample sites within the Alert wetland during the 2012 study period.

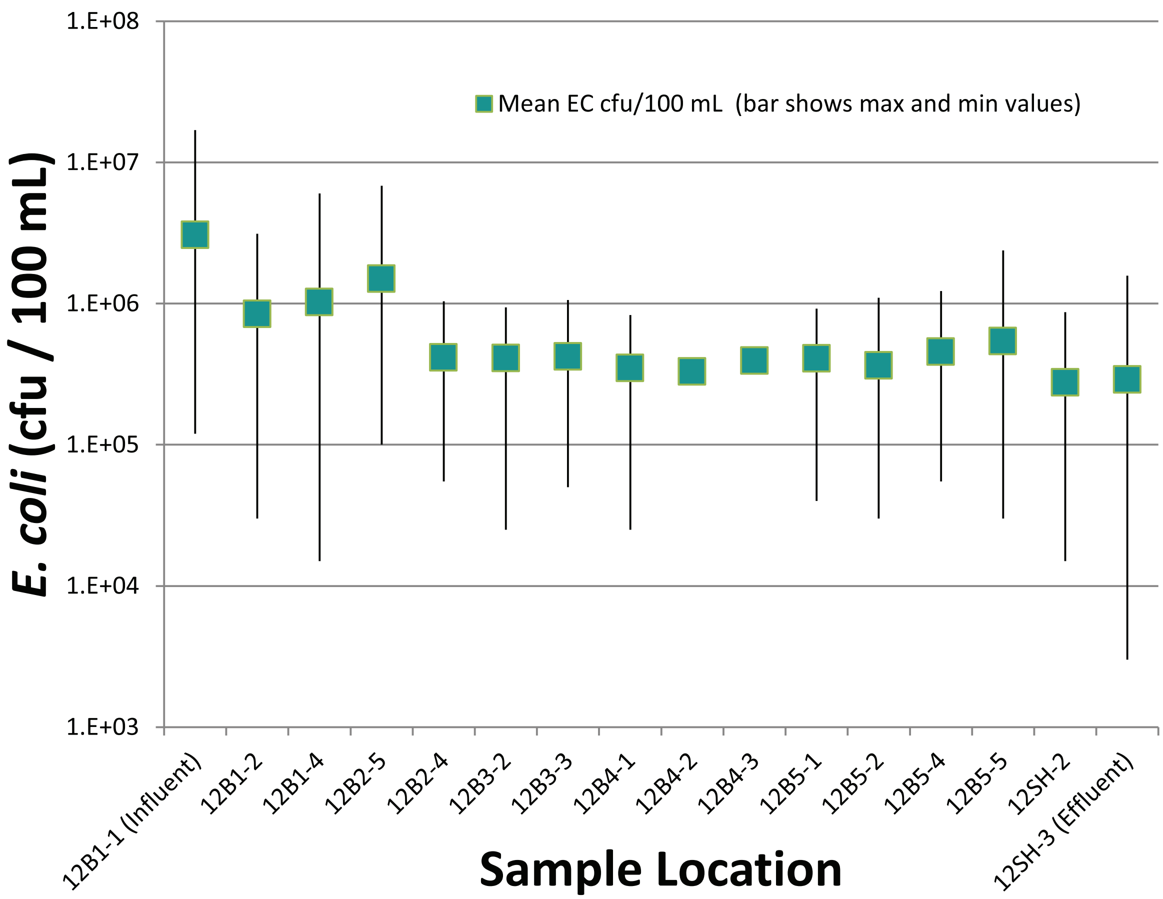

Figure 3.19. The mean concentrations of *Escherichia coli* (expressed as colony forming units per 100 mL of wastewater) at sample sites within the Alert wetland during the 2012 study period.

3.2.7 Dissolved trace elements

Calcium (Ca), magnesium (Mg), potassium (K), sodium (Na), aluminium (Al) and iron (Fe) were all found in mg L^{-1} (ppm) concentrations with all other elements in the range of µg L^{-1} (ppb). Of the six elements in the ppm range, Al and Fe are of greatest interest in terms of their potential impact upon biota since the remaining three elements Ca, Mg, K and Na are more easily tolerated by organisms.

Both the concentration of both Al and Fe increase as the wastewater travels through the wetland. As shown in Figure 3.20 the concentration of Al entering the wetland is approximately 0.3 mg L^{-1} (e.g., 307 µg L^{-1}) and exits the wetland at approximately 2.2 mg L^{-1} (e.g., 2197 µg L^{-1}) with a maximum mean concentration of 5.8 mg L^{-1} (e.g., 5803 µg L^{-1}) at sample site 12B3-3. Environment Canada does not provide a water quality guideline for the protection of marine health but does indicate that within freshwater environments the water quality guideline for Al is set at 0.10 mg L^{-1}. The trend is similar for Fe (Figure 3.21) in that the average concentration of Fe entering the wetland is 0.6 mg L^{-1} and 5.1 mg L^{-1} exiting the wetland with the highest mean value of 14.3 mg L^{-1} at site 12B3-3. The increase in Al and Fe between the inflow and outflow of the wetland was not significantly different for either trace element ($p > 0.05$). Note, for the ease of graphing the results shown in Figures 3.20 and 3.21 are expressed in units of µg L^{-1} or ppb. Likewise, there is no Environment Canada guideline for Fe within a marine environment; however, the value set for aquatic environments is 0.30 mg L^{-1}.

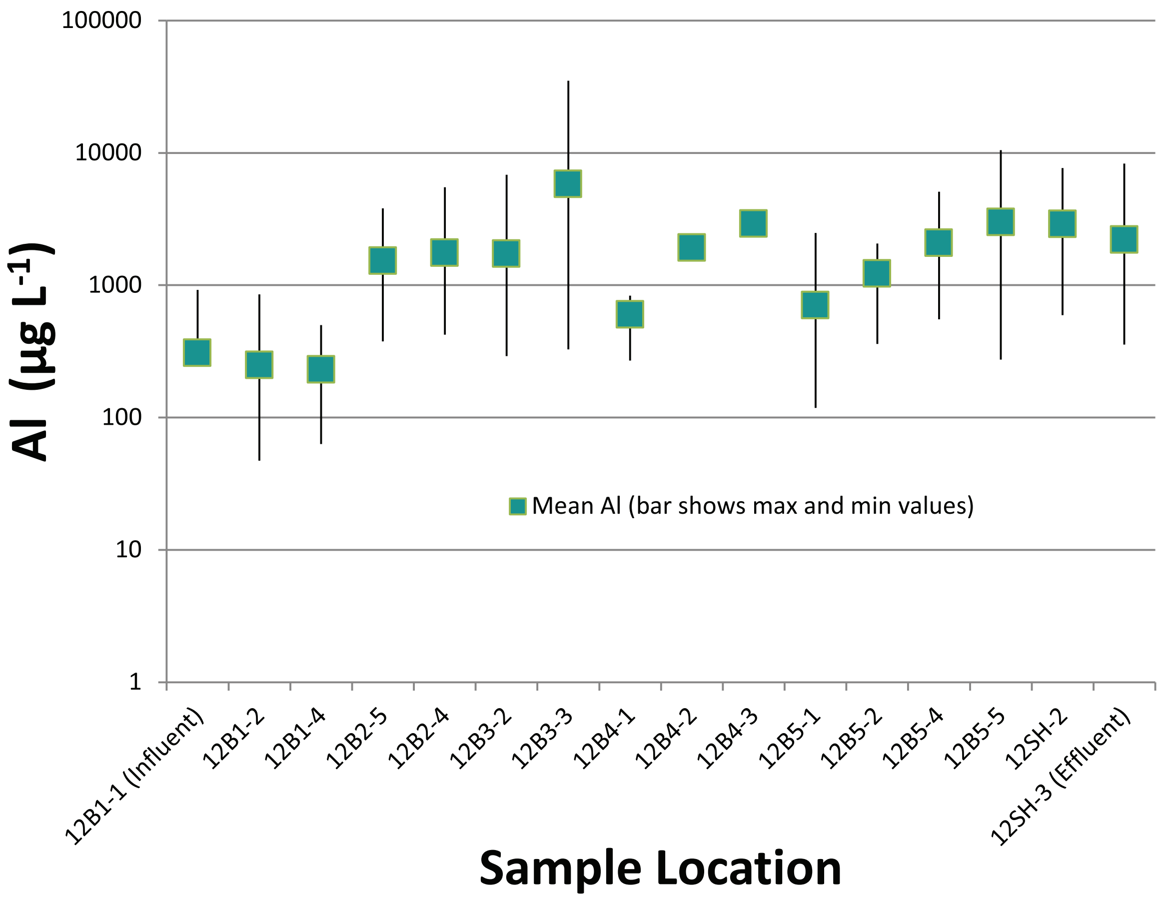

Figure 3.20. Mean concentrations (µg L^{-1}) of aluminium (Al) observed in wastewater collected at sample sites within the Alert wetland during the 2012 study period.

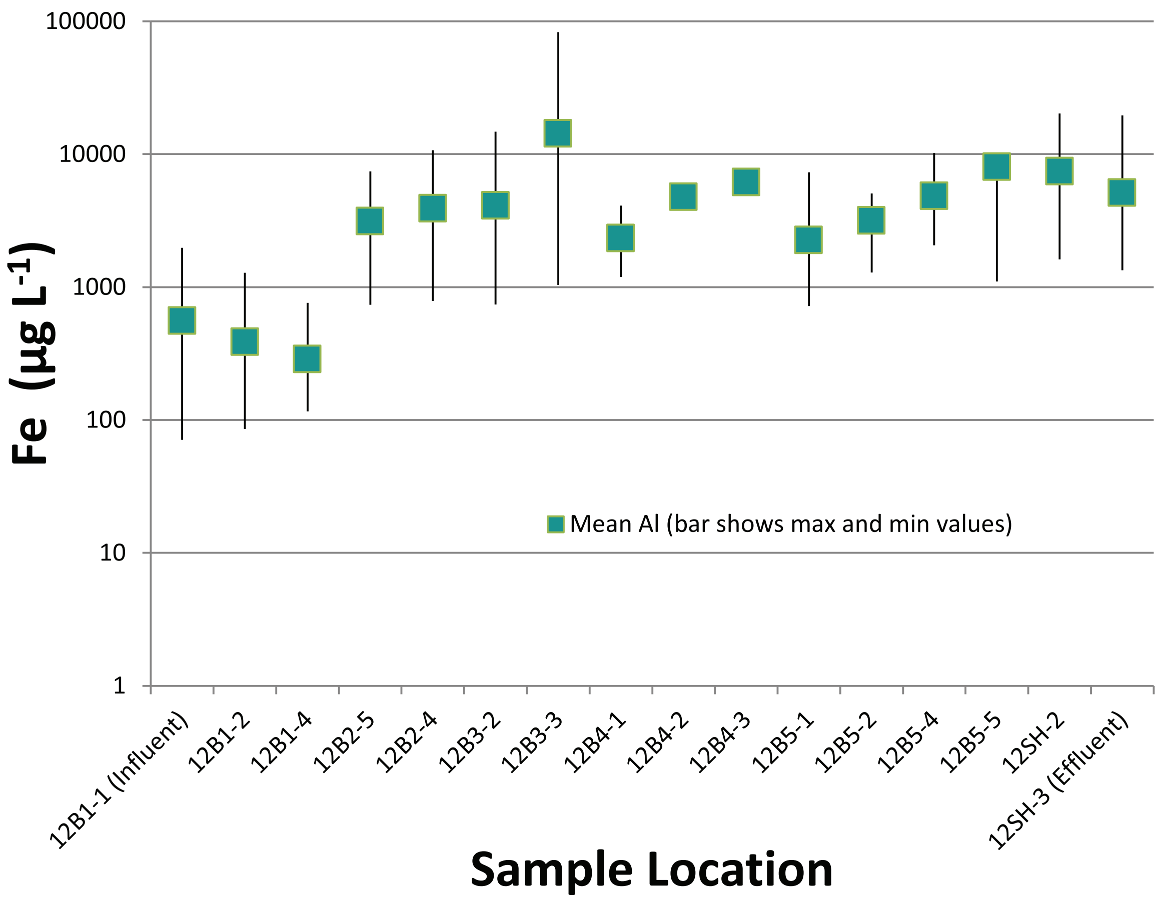

Figure 3.21. Mean concentrations (µg L^{-1}) of iron (Fe) observed in wastewater collected at sample sites within the Alert wetland during the 2012 study period.

3.3 Summary of soil sample results

The greatest nutrient content in terms of TKN, ammonia and phosphorus are found along berms 1 and 2 (Table 3.1) while the greatest organic content is found along berms two and three (Table 3.2). Nitrate levels in the soil remain very low until becoming elevated in the shoreline area; suggesting that nitrification is occurring in the soils near the exit of the wastewater from the wetland (Table 3.1). Aluminum is elevated (approx. 13 mg g^{-1} dry wt) in the soils (metals data found in appendix) similar to it being elevated in the wastewater. Data for the grain size analysis is appended.

Table 3.1. The concentration of nutrients in soil samples from selected sampling sites at the CFS Alert wetland 2012

Sample Description	Ammonia (NH_3-N)	Nitrite (NO_2-N)	Nitrate ($N0_3$-N)	Total Kjeldahl Nitrogen (TKN-N)	Total Nitrogen (TN)	Total Phosphorus (TP)
Units	(µg g-1 wet weight as NH3-N)	(µg g-1 wet weight as NO2-N)	(µg g-1 wet weight as N03-N)	(µg g-1 wet weight as TKN-N)	(µg g-1 wet weight as N)	(µg g-1 wet weight as P)
Laboratory of Origin	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon
Method Detection Limit	0.01	1.00	1.00	0.05	1.00	0.01
12B1-1	195	1	1	7470	7470	8630
12B1-4	295	2	1	8270	8270	1650
12B1-B2	62.4	< 1	1	2340	2340	761
12B2-4	205	2	1	4930	4930	1590
12B2-B3	50	< 1	1	1660	1660	736
12B3-3	23.2	< 1	1	1020	1020	623
12B5-1	11.3	< 1	23	1020	1040	579
12FORESHORE-1	0.18	< 1	192	613	805	606
12FORESHORE-2	0.43	< 1	7	626	633	507
12SH-3	0.11	< 1	3	701	704	553
Average	84.3	0.85	23	2865	2887	1624
Min	0.11	<1	1	613	633	507
Max	295	2	192	8270	8270	8630

Table 3.2. Physical characteristic of soil samples from selected sampling sites at the CFS Alert wetland 2012

Sample Description	Moisture	Porosity	Bulk Density	Loss on Ignition	Hydraulic Conductivity	Hydraulic Conductivity
Units	%	% By Water Weight	(g/cm^3)	%	(K=m d^{-1})	Classification
Laboratory of Origin	CAWT Fleming College	CAWT Fleming College	CAWT Fleming College	CAWT Fleming College	CAWT Fleming College	
12B1-1	50.6	42	1.46	3.9	91.5	very fast
12B1-4	52.8	52	1.19	3.9	--	--
12B1-B2	41.6	43	1.48	2.4	--	--
12B2-4	42.7	54	1.12	7.8	--	--
12B2-B3	40.3	50	1.32	5.6	--	--
12B3-3	44.2	36	1.68	2.1	--	--
12B5-1	49.9	38	1.48	2.9	--	--
12FORESHORE-1	78.9	35	1.70	1.9	--	--
12FORESHORE-2	31.9	42	1.41	2.2	--	--
12SH-3	50.1	36	1.72	2.4	0.729	slow to moderate
Composite of all sites	--	--	--	--	11.2	fast
Average	48.3	42.6	1.5	3.5	34.5	
Min	31.9	34.5	1.1	1.9	0.7	
Max	78.9	54.0	1.7	7.8	91.5	

3.4 Microbial community analysis

3.4.1 Heterotrophic Plate Counts (HPCs)

Overall, total HPC loads were relatively low, in the range of 10E2 or lower over the course of the flow path and over the 3 sampling events (Figure 3.22). This reflects a relatively low heterotrophic diversity, which may be expected in low nutrient climates. This is further substantiated by the CLPP data presented later. There were no clear trends with respect to the topography of the flow path, which may indicate that this representative of the microbial population was less impacted by the microbial load contained within the discharge flow path. However, it is useful to represent the HPC data as additional evidence that the sampling and travel protocol was successful in preserving a good representation of the microbial load, which will be useful in future project planning.

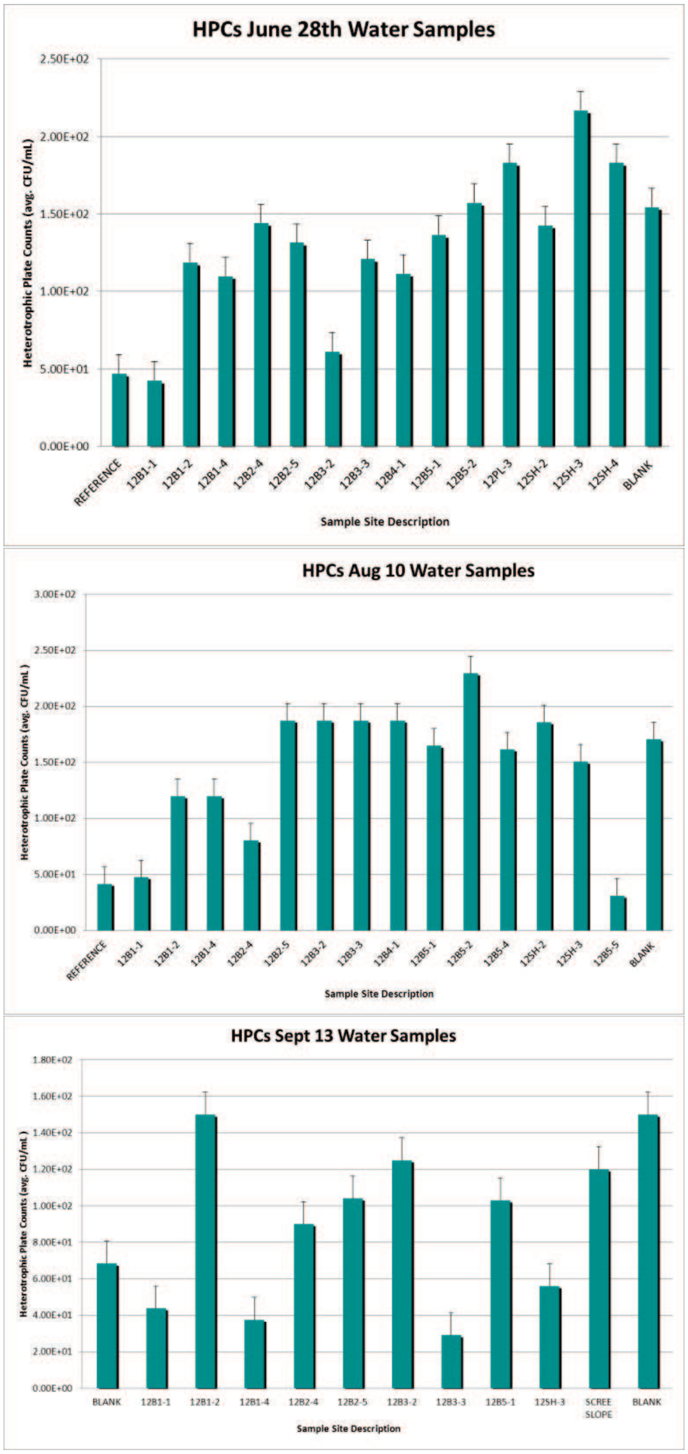

Figure 3.22. Total heterotrophic plate count of the culturable fraction of the microbial community for three sampling events June, August and September, 2012.

3.3.2 Total coliforms, *E. coli*, *Enterococcus spp*.

Fecal indicator tests were performed to assess treatment removal from waste effluent and to complement the community profile fingerprints over the flow path. During the initial sampling following thaw (June sampling), reduction in fecal coliform loads did not occur to any great extent until the flow reached Berm 5 (Figure 3.23). Initial reference levels were in the order of 10E5 and showed only a one log difference at Berm 1. Berm 2 represented an increase in fecal coliform loads to 10E6 which might be attributed to accumulation of fecal organisms in the region of the silt fence. Loads began to show some decrease at Berm 4 and an additional one log reduction at Berm 5. Loads reaching the shoreline were still as high as 10E4 in some locations. The second sampling event, mid-season (August, 2012) showed a similar removal profile of fecal coliforms over the flow path. Highest loads (10E6) were again situated in the region of Berm 2 and persisting in some areas of Berm 3. August loads following Berm 3 were reduced to loads in the range of 10E4, loads generally 2 orders of magnitude lower. As the flow path approached the shoreline, loads were still as high as 10E5 in some locations. In September, prior to freeze-up and after remodeling of the wetland (2 weeks earlier) loads were generally about one log lower overall compared to the earlier sampling events. A similar profile was observed with accumulation of fecal organisms in the area of both Berms 1 and 2, which persisted through to Berm 3. Shoreline loads were only reduced by about one order of magnitude, with counts in the range of 10E4.

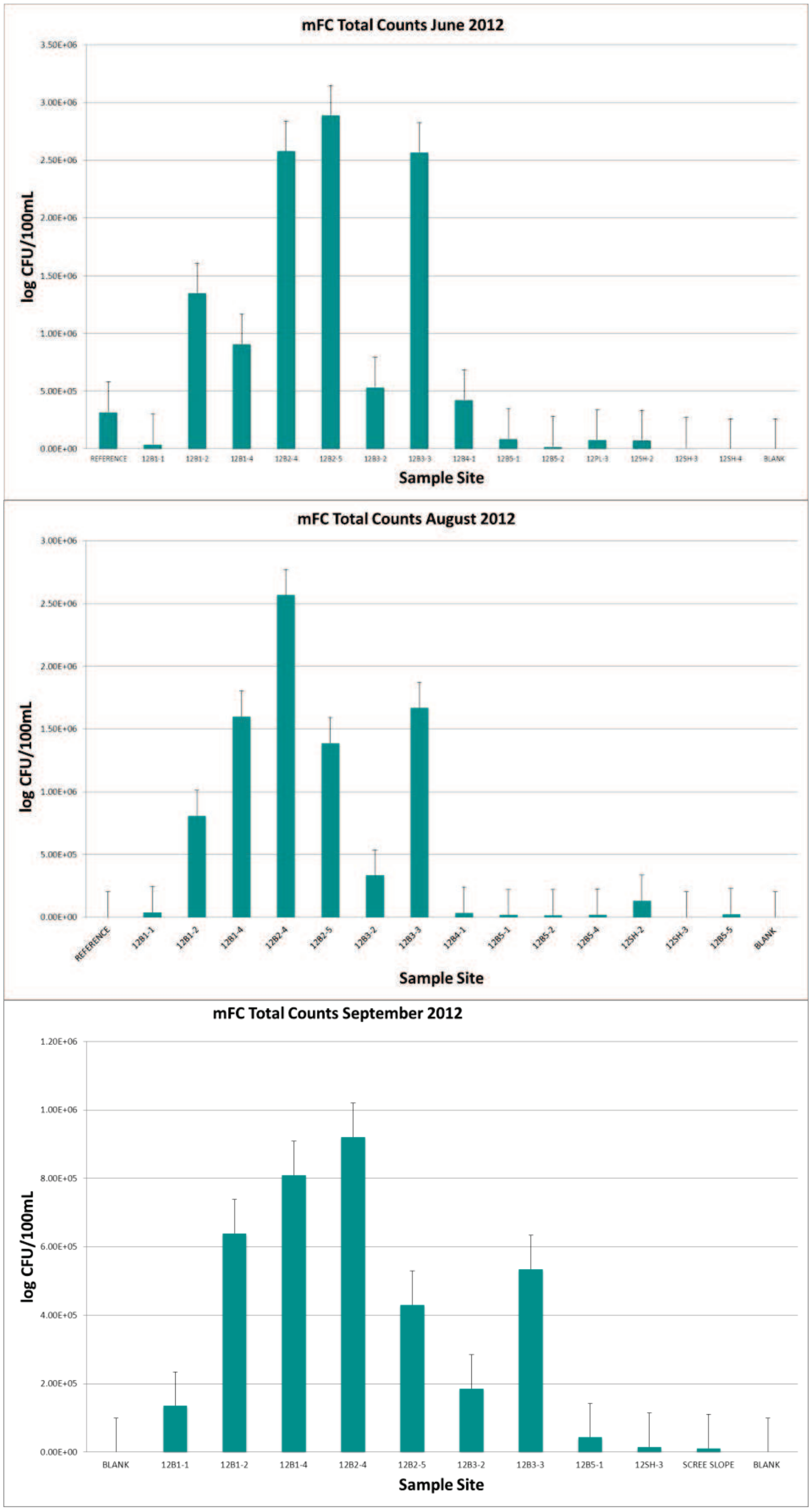

Figure 3.23. Total coliform profiles of the culturable fraction of the microbial community for three sampling events June, August and September, 2012.

Loads for *E. coli* showed a similar pattern in June with highest loads associated with accumulation around Berm 2 and to some extent Berm 3 (Figure 3.24). *E. coli* loads persisted beyond Berm 3 as high as 10E4 but most of the shoreline loads were reduced to non-detect levels.

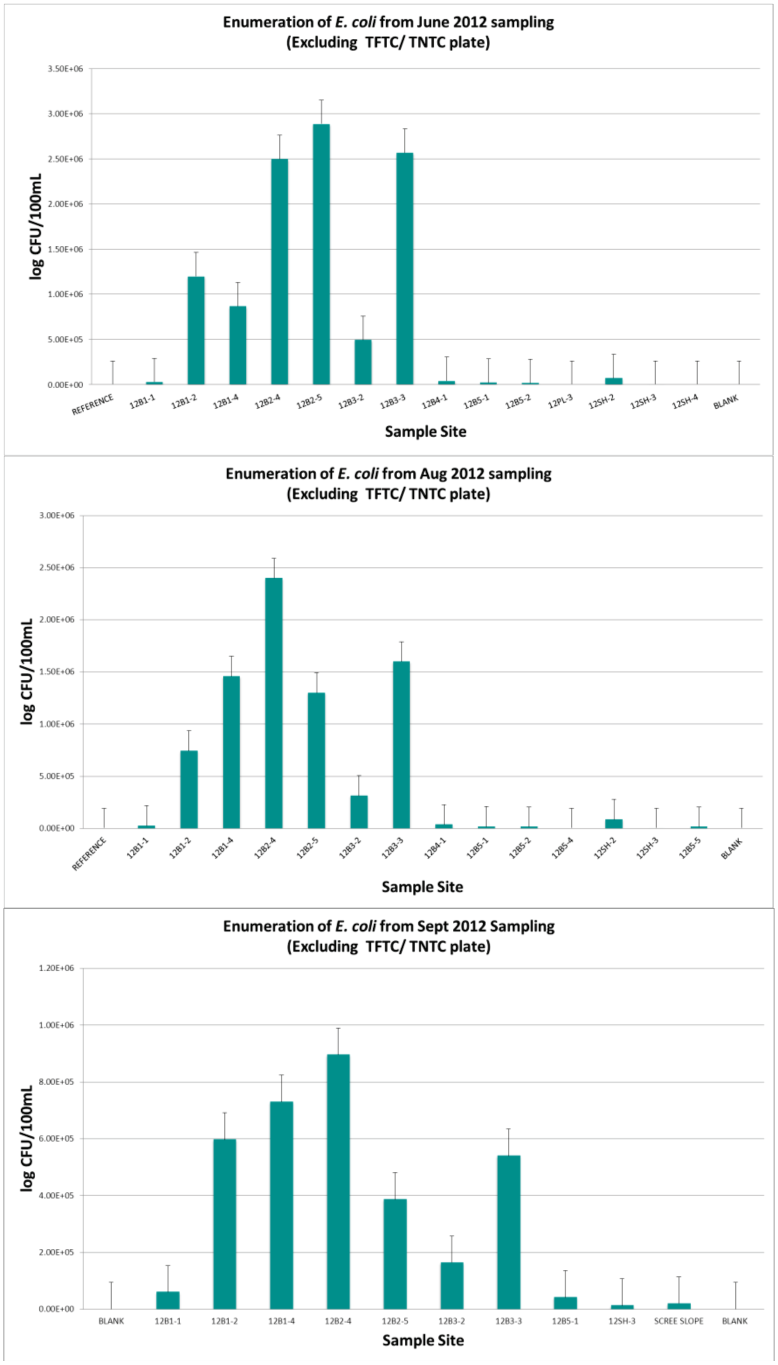

Figure 3.24. Total *E. coli* profiles based on the culturable fraction of the microbial community for three sampling events June, August and September, 2012.

During mid-season sampling *E. coli* loads were still in the range of 10E6 up to Berm 3. Loads were reduced approximately 2 orders of magnitude following Berm 3 and some shoreline samples carried 2 to 4 log values of culturable *E. coli*. During the final late season sampling, loads were generally one order of magnitude lower, although persisting at 10E5 levels as far as Berm 3. Shoreline loads were still maintaining a 4-log value in the single sample from that area.

The final FIB selected was *Enterococcus* spp. Overall, culturable loads of this organism were approximately one to two orders of magnitude lower than total fecal or *E. coli* loads. Again, there appeared to be evidence of an accumulation of the microbial load in the region of Berms 2 to 3 (Figure 3.25). Loads persisted in the range of 10E4 around Berm 5 but were reduced to low non-detectable levels for the most part by the time the flow path approached the shoreline. The mid-season sampling event showed comparable loads in the range of 10E4 with the highest loads evident in the areas around Berms 1, 2 and 3. Loads appeared to be reduced by about one to two orders of magnitude by the time the flow path approached Berms 4 and 5. Levels were again low to non-detectable as the flow path approached the shoreline. The final sampling showed reduced *Enterococci* presence overall but where culturable organisms were detected; loads were still in the 10E4 range. Beyond Berm 5 and in the single shoreline sample, loads were lowered to 2 or 3 log values.

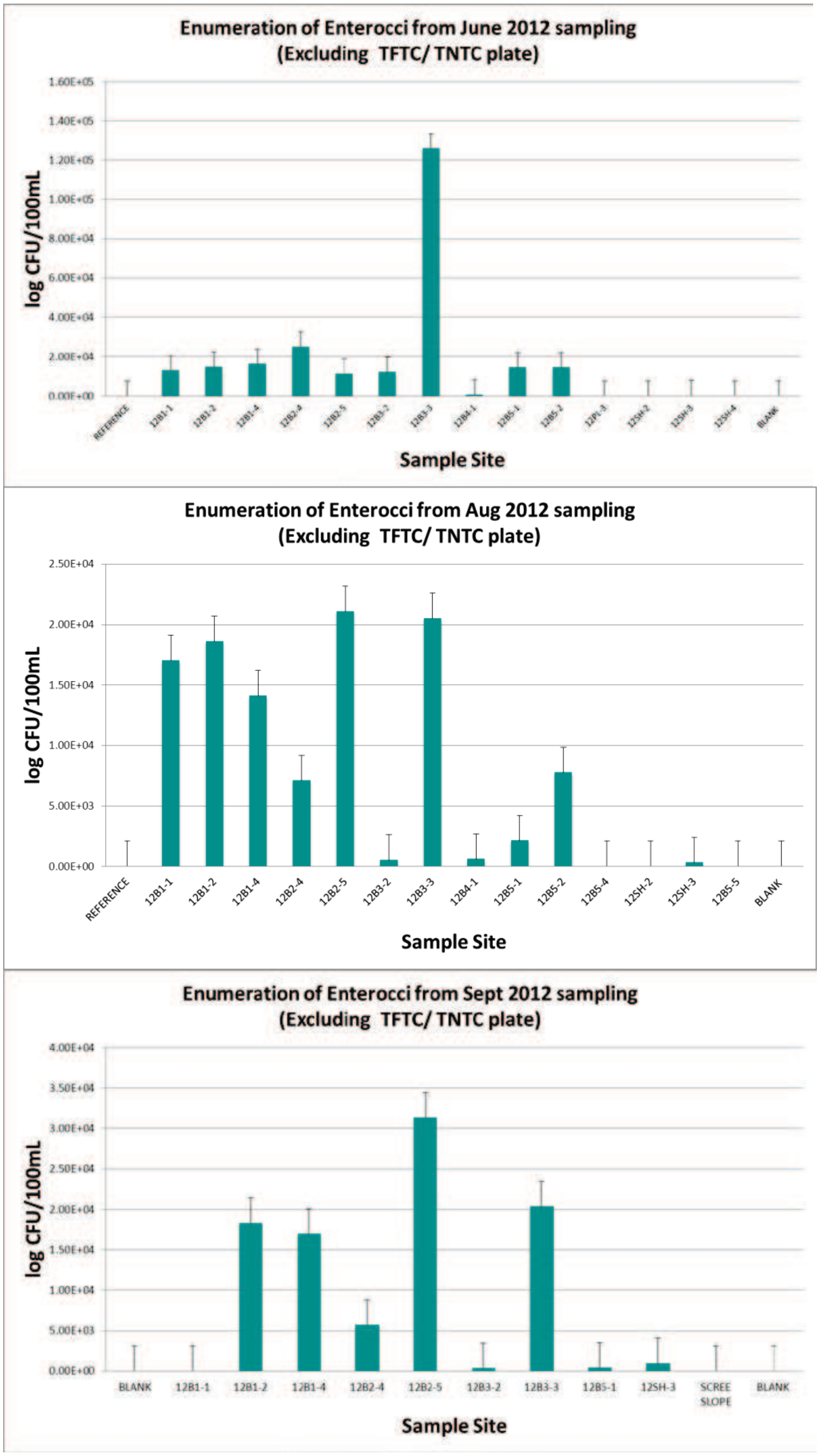

Figure 3.25. Total *Enterococcus* spp. profiles based on the culturable fraction of the microbial community for three sampling events June, August and September, 2012.

3.4.3 Community Level Physiological Profiling (CLPP)

A more detailed investigation of the microbial community effects is depicted below using a metabolic fingerprinting technique. Figure 3.26 depicts metabolic richness over the 3 sampling events, a reflection of the number of responsive parameters based on utilization of 31 different carbon sources. Those communities with higher richness profiles were able to utilize a greater number of carbon sources collectively. Examination of Figure 3.26 demonstrates the community profile was consistent throughout the flow path and was not noticeably affected by season. Richness levels were lowest outside the main flow path in the region of the power line, and somewhat lower as the flow path approached the shore line. This pattern is to be expected as the microbial community would be well adapted to the harsher climate and lack of variation in topography and plant life would dictate a consistent carbon utilization pattern. Figure 3.27 shows metabolic diversity, which takes into consideration both the number of carbon sources utilized, as well as the degree of utilization as measured spectrophotometrically in the development of well colour. Metabolic diversity (Figure 3.27) can be less distinct as well colour endpoints can be a less responsive indicator. Overall, a less varied profile may be expected from a community exposed to typically low nutrient conditions. However, more variation in diversity can be observed in the mid-season and late season sampling events when considering all 3 profiles. Lower community diversity can be observed as the flow path moves away from Berm 2, again expected as nutrient loads diminish. Which portion of the community that remains dominant will be reflected in the DGGE profile data following.

Figure 3.28 indicates the average well colour development from the community metabolism, which can be considered an overall estimate of the rate of community carbon metabolism (Garland *et al.*, 2007). This parameter is typically the most useful, so interpretation will focus on these data. The highest rates of community metabolism are generally associated with the same areas that reflected the highest culturable loads. It is important to note that while fecal organisms were accumulating in the area around Berms 2 and 3, Figure 3.28 indicates that these organisms were metabolically active, which may be a point of concern with regard to treatment removal strategies. Similarly, metabolically active community representatives were still visible beyond Berm 3, although to a somewhat lesser extent. Again, it is important to note that the area just outside the flow path, as reflected by the power line sample, as well as shoreline samples, were still demonstrating notable levels of metabolic activity.

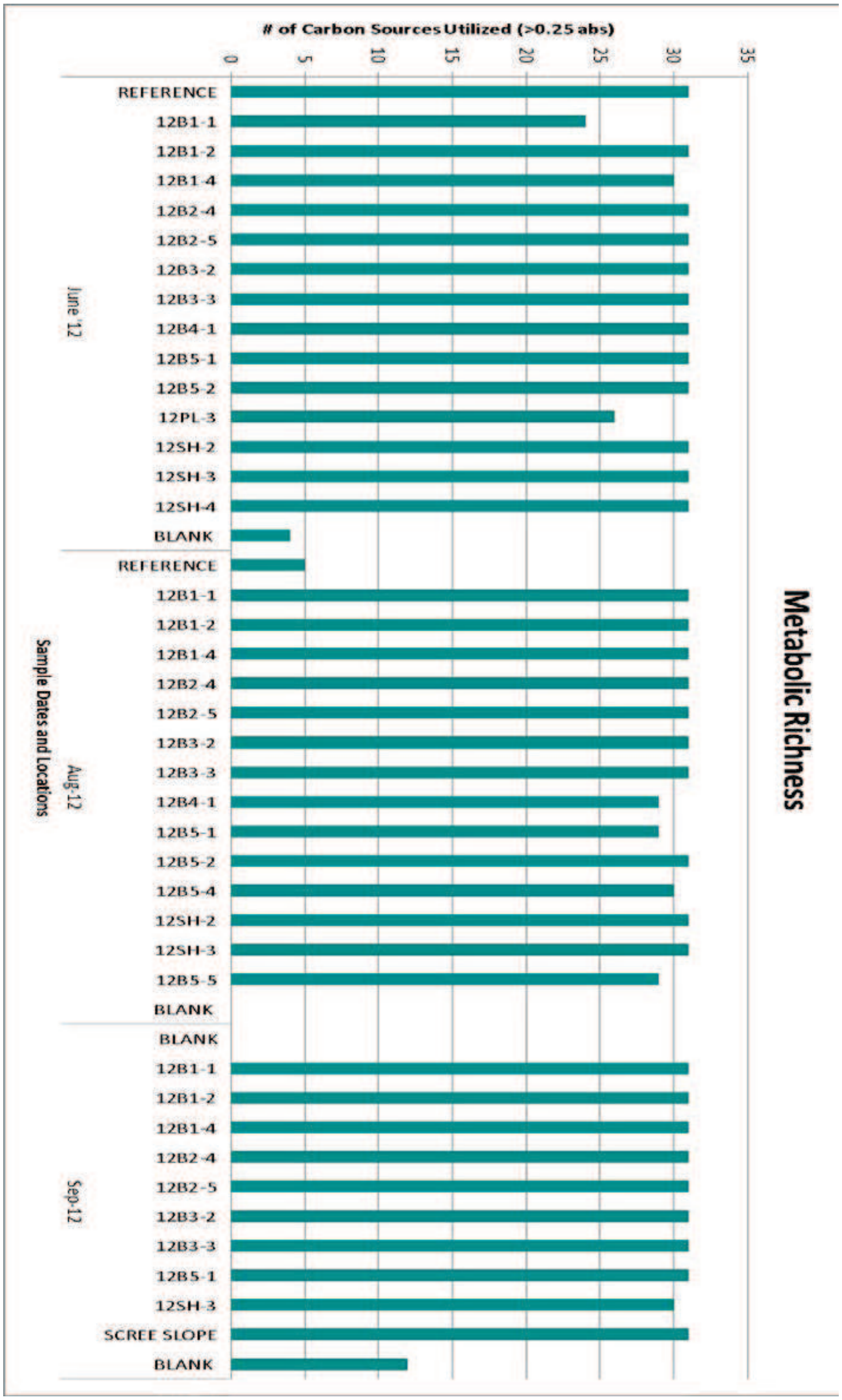

Figure 3.26: Metabolic richness profiles of microbial communities over the 3 sampling events.

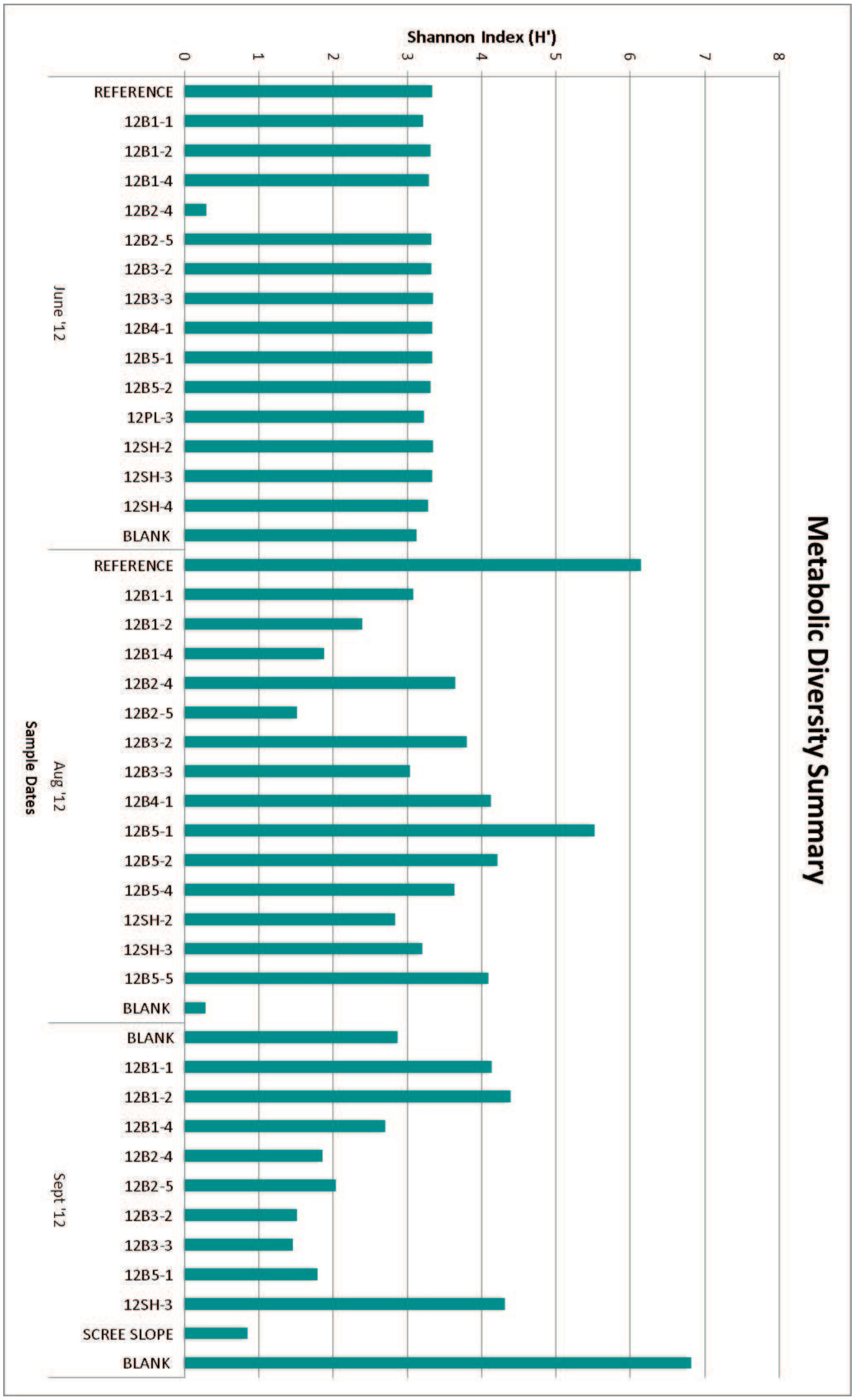

Figure 2.27. Metabolic diversity profiles of microbial communities over the 3 sampling events.

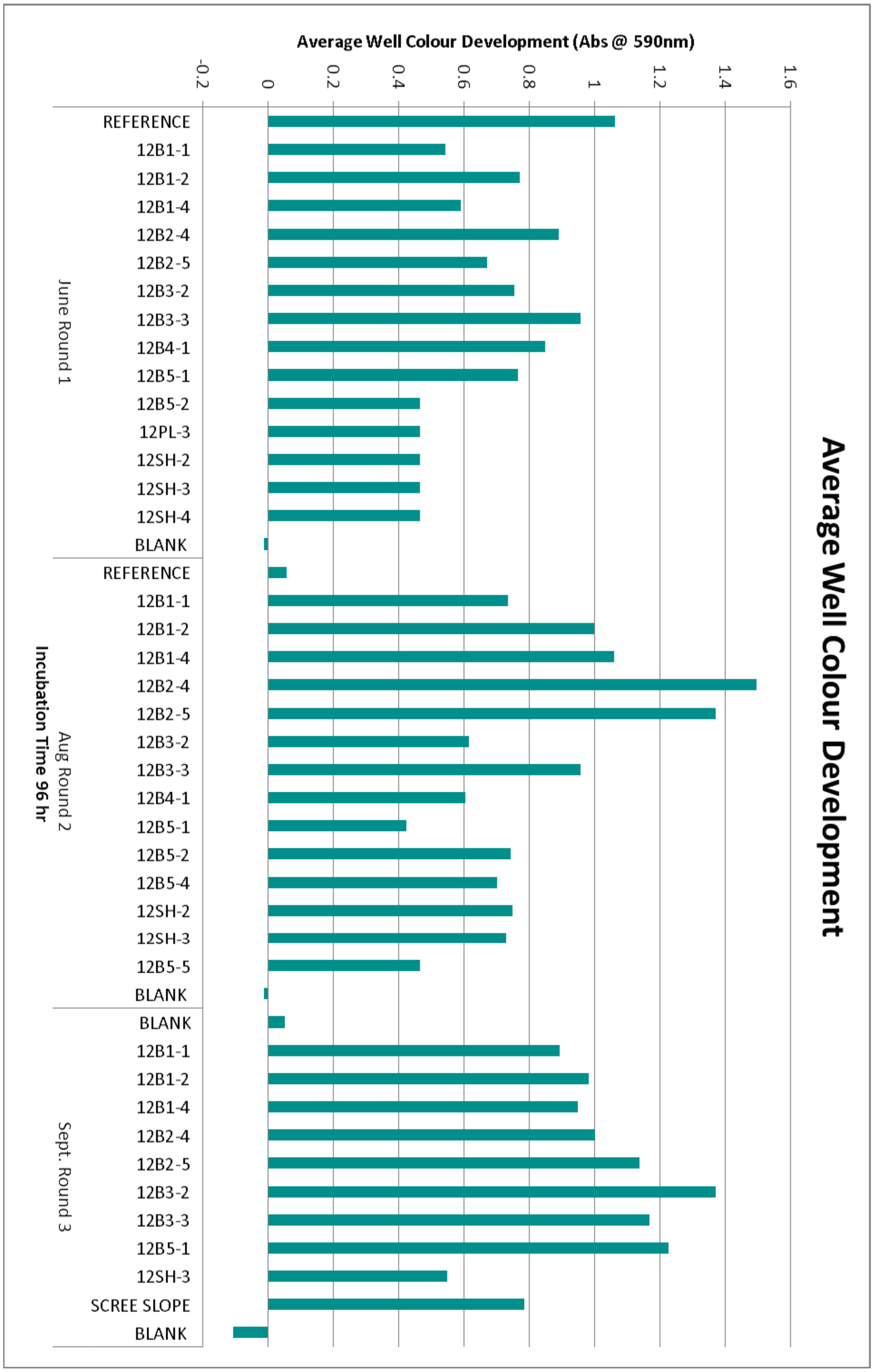

Figure 3.28: Average well colour development profiles showing an overall estimate of carbon metabolism by microbial communities over the 3 sampling events.

3.4.4 Denaturing gradient gel electrophoresis (DGGE)

The reference ladders for the DGGE data analysis are currently being developed and will be included in the final report along with a summary of the DGGE data and interpretation of the DGGE analysis.

4.0 Discussion

The wetland performed poorly during the 2012 study period. The NWB licence stipulates values for BOD_5, TSS, Oil and Grease, and pH; of which pH was the only parameter that was in compliance. The performance of the wetland in the previous year (2011) was better, with BOD_5, Oil and Grease, and pH in compliance while TSS was the only licenced parameter elevated above the compliance values. Table 4.1 provides a comparison of the licenced parameter values exiting the wetland (site SH-3) for the 2011 and 2012 study periods.

Table 4.1. Water quality of the treated wastewater exiting the Alert wetland in the 2011 and 2012 site visits for the licenced compliance parameters stipulated by the Nunavut Water Board.

	NWB Licenced Value mg L^{-1}	2011 mg L^{-1} (range)	2012 mg L^{-1} (range)
BOD_5	80	15 (10 to 23)	112 (64 to 190)
Total Suspended Solids	70	241 (12 to 742)	124 (2 to 490)
Oil and Grease	5	3.7 (<1 to 7.4)	36 (13 to 72)
pH	6 to 9	8.2 (8.0 to 8.2)	7.5 (6.0 to 7.9)

The hydraulic retention time (HRT) of the wetland is unknown. The HRT provides an estimate of the volume of water that the wetland can hold at any one time and how quickly that defined volume of water changes over. This is a measure of how much water is retained in the interstitial spaces of the substrate and the volume of surface water. Once the volume is defined, an estimate can be made of the HTR by dividing the water holding capacity of the wetland by the volume of water entering the wetland on a daily basis. For example if the wetland could held 600 m^3 and the daily volume entering the wetland was 200 m^3 d^{-1}, then the HRT would be 600 m^3 / 200 m^3 d^{-1} = 3 days.

The rocky nature of the wetland, changing preferential flow paths together with a changing porosity due to freezing of the substrate makes it difficult to estimate the water holding capacity of the wetland and in turn to calculate the HRT. Complicating this issue is the fact that much of the wastewater is retained in the upper portions of the wetland as ice during the winter months. The wastewater stored as ice undergoes a rapid melt during the early portions of summer, resulting in flow rates that would be much faster than the normal rate at which wastewater is generated. This melt of frozen wastewater in the early summer would inevitably shorten the HRT significantly within a wetland that, in all likelihood, already has a short HRT. The CFS Alert produces on average 100 m^3 of wastewater per day. During 2012 and in the months of January to May (inclusive) the facilities generated a total of 14,300 m^3 of wastewater. A significant portion of this volume accumulated in the wetland as ice. Most of this frozen wastewater was released over a period of 4 to

6 weeks which would have significantly increased the flow to the wetland above the typical 100 m^3 per day and have significantly reduced the HRT.

It is assumed the poorer performance of the wetland during the 2012 field season in comparison to the 2011 season was likely related to the breaching of the berms 4 and berm 5 which would have further shortened what was likely an already short hydraulic retention time within. The breaches would have reduced the detention of the wastewater and short-circuited the filtering capacity of the wetland. A more rapid flow of the wastewater through the wetland (e.g., a shorter hydraulic retention time) is consistent with a poorer removal of BOD_5 since the microbial oxidation of organic matter is time dependent. A shorter contact time between the organic matter and microorganisms would result in less material being microbially oxidized.

A rapid flow of wastewater through the wetland would also impact the ability of the wetland to remove oil and grease. This would be particularly true when berms are breached and the filtering capacity of the wetland is circumvented.

A review of the TSS data (Figure 3.5) suggests that the suspended solids entering the wetland are composed primarily of organic matter, most likely garburated food waste and sanitary waste. The organic portion of the TSS (e.g., VSS) dominates the composition of suspended solids around berm 3. From this point (e.g., 12B3-3) onwards the inorganic portion of TSS dominates and the prominence of VSS is less. This suggests the organic portion of the TSS (e.g., VSS) is retained in the upper portions of the wetland and it is this fraction that is likely a truer representation of the suspended solids attributable to the domestic waste of the CFS Alert. The majority of the inorganic portion of the suspended solids is probably generated within the wetland from the erosional forces of the wastewater as it flows through the wetland and in particular when the velocities through the breached areas are rapid. The average concentration of TSS at the last sample point (12SH-3) prior to Parr Inlet was 124 mg L^{-1}, of which 72 mg L^{-1} was composed of inorganic matter. The averaged concentration of the organic portion of the TSS was 52 mg L^{-1}, a value below the NWB compliance value of 70 mg L^{-1}. Therefore of the 124 mg TSS / L, approximately 52 mg L^{-1} originated from the domestic wastewater, with the remainder likely being generated within the wetland. The analysis of the soils data for percent organic matter (e.g., determined from loss-on-ignition) shows a higher percentage of organic matter in berm 1, 2 and the upper portion of berm 3 (mean = 4.7%, range = 2.4 to 7.8 %) than the lower half of the wetland where the average organic matter content of the soil drops to around 2%.

An analysis of the hydraulic conductivity of the soil at the site of wastewater entering the wetland (12B1-1) and at the point where the wastewater exits the wetland (12SH-3) indicates that the hydraulic conductivity in the upper portions of the wetland is fast to very fast with a value of approximately 90 m d^{-1}. In the lower portion of the wetland (e.g., 12SH-3) the hydraulic conductivity decreases to a slow to moderate rate of 0.7 m d^{-1}. The higher hydraulic conductivity in the upper portions of the wetland is consistent with a greater average porosity at berm 1 (47%) compared to the porosity at the final sample point (12SH-3 = 36% porosity).

The pH of the wastewater entering the wetland was not significantly different than the pH of the wastewater leaving the wetland. There was some variability in the average pH values in the upper portion of the wetland (e.g., berm 1 & 2) but these variations dampen and the final pH exiting the wetland was 7.5 which is a value well within the compliance limits set out by the NWB.

A review of the nitrogen data supports the suggestion that a significant fraction of the organic portion of the total suspended solids (e.g., VSS) is being retained at berm 1 and to a lesser extent at berm 2. The TKN data for wastewater (Figure 3.10) illustrates a trend of increasing concentration in the first three sample sites (12B1-1, 12B1-2, 12B1-4) with a decline at berm 2. A similar trend can also be seen in the results for total nitrogen (Figure 3.13) where the organic fraction of the total nitrogen is being retained in the first three sample sites. The organic fraction is likely associated with the particulate portion of the total nitrogen which is being either trapped or filtered out of solution. Interestingly, the ammonia fraction (Figure 3.13) does not show the same trend; likely since the ammonia portion is dissolved and therefore not selectively removed via filtration processes.

The ammonia concentrations in the wastewater (Figure 3.12) vary little over the course of the wetland; ranging from a summer time average of 11.5 mg L^{-1} at the inflow to the wetland (12B1-1) to 7.4 mg L^{-1} at the outflow (12SH-3) of the wetland. The relatively low loss of ammonia, together with low to non-detectable levels of oxidized nitrogen (e.g., nitrite, nitrate) suggest that neither nitrification of the ammonia (e.g., generation of oxidized nitrogen), nor ammonification of the organic nitrogen (generation of ammonia from organic nitrogen) is likely occurring, or if it is, the conversion rates are low. The apparent lack of ammonification and nitrification again suggests that a relatively rapid flow through of the wastewater (e.g., low HRT) may have impacted the efficiency of these treatment processes. Ammonia levels in the lower portion of the wetland are however somewhat lower and it is difficult to tell if this has resulted from a greater inhibition of ammonification in this section, or if the lower portion is better at volatilizing the ammonia. It is known that the rate of ammonia volatilization is affected by temperature, moisture, the organic content of the soil and pH. Low temperature, high soil moisture content, low soil organic content and soil pH below 8 all inhibit ammonia volatilization. Therefore is it is assumed that ammonia loss through volatilization is likely small.

The total nitrogen content of soils samples show similar results where the concentration of TN increases at the beginning of the wetland (e.g., 12B1-1 =7.5 mg g^{-1} (dry wt.) and 12B1-4 = 8.3 mg g^{-1} (dry wt.)). The concentration of TN starts to decline at berm 2 (e.g., 12B2-4 = 4.9 mg g^{-1} (dry wt.) and eventually to 0.70 mg g^{-1} (dry wt.) at the exit of the wetland (12SH-3) thus suggesting that nitrogen is being retained in the upper portions of the wetland. Ammonia levels also decline suggesting that ammonification (e.g., generation of ammonia from organic nitrogen) within the soils is not occurring. Interestingly the presence of nitrate can be seen to increase in the shoreline area. The sediment collection sites 12Foreshore 1 & 12Foreshore 2 (both located between 12B5-1 and 12SH-3) exhibit a nitrate soil concentration of 0.023 and 0.192 mg g^{-1} (dry wt.), respectively suggesting that some nitrification is occurring in the shoreline area. Nitrite levels are below detection limits; however, this is not surprising since nitrite is an intermediate and unstable compound in the process of nitrification.

The particulate portion of the phosphorus (e.g., TP minus PO_4-P) concentration in the wastewater varies little between inflow (12B1-1 = 1.5 mg L^{-1}) and the outflow from the wetland (12SH-3 = 1.2 mg L^{-1}). The concentration of the dissolved form (e.g., PO_4-P) decreases significantly ($p < 0.05$)

from a concentration of 2.5 mg L^{-1} (12B1-1) to a low of 0.26 mg L^{-1} (12SH-3). The dissolve PO_4 (unbound) is more reactive to binding sites within the wetland. These binding sites could be oxides on soil particles and rocks or other organic matter. It is suspected that adsorption of ortho-phosphate is the main mechanism responsible for removal, particularly since the scarcity of living vegetation would suggest that vegetative uptake is minimal. Interestingly, the phosphorus content of the soil is the highest at the site of inflow to the wetland (112B1-1 = 8.6 mg g^{-1} dry wt.) with a gradual decline to 0.55 mg g^{-1} dry wt. at the last sampling point (12SH-3).

The density of total coliforms was approximately ten times more abundant that *E. coli.* This is to be expected since *E. coli* is a subset of total coliforms. The decline in total coliforms was significant ($p < 0.05$) between the influent and effluent of the wetland; however the decline in *E. coli* was not significant. In both microbial groups the loss in the number of colony forming units was only about one log unit (e.g., ten times). This reduction value is lower than what has typically been observed by the CAWT in other northern wetlands where the log unit removal can be closer to 2 to 3 log units. However, the other northern wetlands investigated by the CAWT were tundra wetlands and different from the terraced wetland at CSF Alert. Filtration and entrapment is one of the main mechanisms for the removal of microorganisms from wastewater. It is suspected that the breaching of the berms, high flow rates, and preferential flow paths decreased the overall removal of these organisms.

Aluminium and iron were the two trace elements that were elevated to mg/L concentrations in the wastewater and to mg/g (dry wt) quantities within soils. Both elements show a trend of increasing concentration further into the wetland away from the influent of the wastewater. In the wastewater the Al increases from 0.31 mg L^{-1} at the inflow to 2.2 mg L^{-1} exiting the wetland, however, this increase is not statistically significant ($p > 0.05$) because of high sample variance. A similar trend was noticed in the soils where the Al concentration at the beginning of the wetland is 7.5 mg g^{-1} (dry wt) and doubles to 15.5 mg g^{-1} (dry wt) (n=1, so statistical differences could not be determined). Iron concentrations in the wastewater shows a similar trend to that of Al, however, the increase is not significant ($p > 0.05$). The increase in iron in soil samples taken at the beginning of the wetland also increase, but not as greatly as seen for Al (e.g., 12B1-1 = 22.1 mg Fe / g dry wt; 12SH-3 = 36.1 mg Fe / g dry wt). The rising levels further into the wetland do raise the question as to where the elements are originating. One possibility is that these elements could be originating in the wastewater and accumulating deeper into the wetland or they could be originating from the wetland itself. Legacy landfill material and soil contamination is a distinct possibility – barrels, legacy metal garbage and other materials have been uncovered during construction phases.

4.1 Comparison of wetland's performance in 2012 with performance in 2011

Table 4.2 summarizes the mean summer time water quality parameters monitored both the wastewater entering the wetland (influent) and exiting the wetland (effluent) during the summer of 2011 and 2012. The effluent leaving the wetland in 2012 tends to indicate that a poorer level of treatment was achieved in comparison to the values observed in 2011. However, a comparison of the water quality parameters of the raw wastewater flowing into the wetland (influent) reveals that strength of the 2012 influent was generally greater than the strength of the 2011 influent. Therefore the difference in wetland performance between the two years may not be as great as it would first appear and it may be more of a function of the strength of the raw wastewater entering the wetland.

There are many factors in addition the strength of the raw wastewater that can influence the performance of a treatment wetland. One of the main factors is the volume of wastewater being treated and the impact on the hydraulic retention time (HRT). Another factor that could impact performance is the erosional forces exerted on the wetland through the formation and melting of ice. These events appear to alter the flow path and rate of the wastewater as it travels through the wetland. In particular, berms 4 and 5 needed to be repaired during the wetland modification in late August 2012. Because of these disturbances, the wetland has likely not had a chance to fully stabilize in terms of its ability to trap and retain suspended solids and in some locations has not had the time required to fully develop the biofilms necessary for microbial treatment. Also of significant importance is the lack of vegetation. A mature plant community is expected to have a significant impact on overall wetland performance. Previous studies have shown that plant uptake of nutrients can play a bigger role than bacterial mediated processes (e.g. for NH3). In many ways the wetland is still young. Because the wetland is still young the historical record of its performance is correspondingly short. At this stage there is not enough information to understand the natural variability of the wetland's performance and so it is difficult to determine if the differences seen in performance between 2011 and 2012 are within the natural range of variability or if they are related to operational parameters such as yearly damage from ice and melt waters. In all likelihood it is probably a combination of the two, however, at this stage it is difficult to identify the dominant factor. It should be noted that the 2012 modifications to the wetland should greatly reduce future erosional problems and enhance the overall detention of the wastewater flow, all of which should improve the overall performance of the wetland.

Table 4.2. Comparison of influent and effluent values for 2011 and 2012

Parameter		2011 Influent	2011 Effluent	2012 Influent	2012 Effluent
BOD5	mg L^{-1}	471	15	734	111
cBOD5	mg L^{-1}	251	22	371	88
TSS	mg L^{-1}	49	241	337	124
VSS	mg L^{-1}	36	39	309	52
pH		7	8.2	7	7.5
FOG	mg L^{-1}	4.1	3.7	58	37
COD	mg L^{-1}	223	74	479	262
TN	mg L^{-1}			19.1	10.4
TKN	mg L^{-1}	14	6.5	19.1	10.4
TAN	mg L^{-1}	12.7	3.6	11.5	7.4
NO2	mg L^{-1}	0	0	0	0
NO3	mg L^{-1}	0.11	1.99	0.1	0.5
TP	mg L^{-1}	1.2	0.64	4	1.5
PO4	mg L^{-1}	0.15	0	2.5	0.26
TC	cfu/100mL	2.40E+05	4.50E+04	4.00E+07	3.90E+06
EC	cfu/100mL	3.30E+04	1.40E+05	3.00E+06	2.90E+05

4.2 Microbial community structure

Analysis of the microbial community structure performed by Dr. Slawson revealed that the metabolic richness and metabolic diversity was fairly uniform throughout the wetland. This suggests that there was no major segregation of microbial groups in any one particular section of the wetland. In other words, the major groups of organisms observed at the beginning of the wetland were also present at the end of the wetland. This may not be too surprising since the environmental conditions likely remained fairly constant throughout the wetland and not reflective of more southern vegetative wetlands were aerobic and anaerobic zones may develop. However, the DGGE results should shed further light on this assumption and provide a better understanding of the different types of microbial organisms are present and where they are located within the wetland.

Interestingly however, is that the greatest density of fecal indicator bacteria were generally associated with berms 2 and 3 which is the same area in the wetland where the rate of community carbon metabolism was also the highest. This may suggest that a significant filtration / entrapment process is occurring in this region where both organic carbon sources and microorganisms are being trapped.

4.3 Wetland modifications in August 2012

Significant modifications were made to the CFS Alert wetland in late august 2012. The purposes of the modifications were to:

- repair and strengthen berms and breached areas
- add radiators that would help to slow flow rates and trap particles and better protect the ends of the berms from erosion
- installation of an additional silt fences to trap sediments
- installation of scree slopes to protect areas prone to erosion and to divert flows and to create trickle filters for the growth of biofilms needed for microbial treatment processes
- relocate portions of selected berms to better deflect flow paths

The modifications were made in the last two weeks of August 2012. Samples were collected for analysis during the first two weeks of September immediately after completion of the modifications; however, the interpretive value of these two sample periods for evaluating the impact of the wetland modifications is limited and next summer (2013) would be a better time to make this assessment once the earthworks have stabilized and have been subjected to the spring freshet.

It appears that much thought went into the modifications and it is anticipated that these changes made should significantly improve the overall performance of the wetland. It is also encouraging to see the development of a maintenance management (MMS) program, which if implemented should identify and rectify any physical damage that had occurred over winter and during the spring freshet.

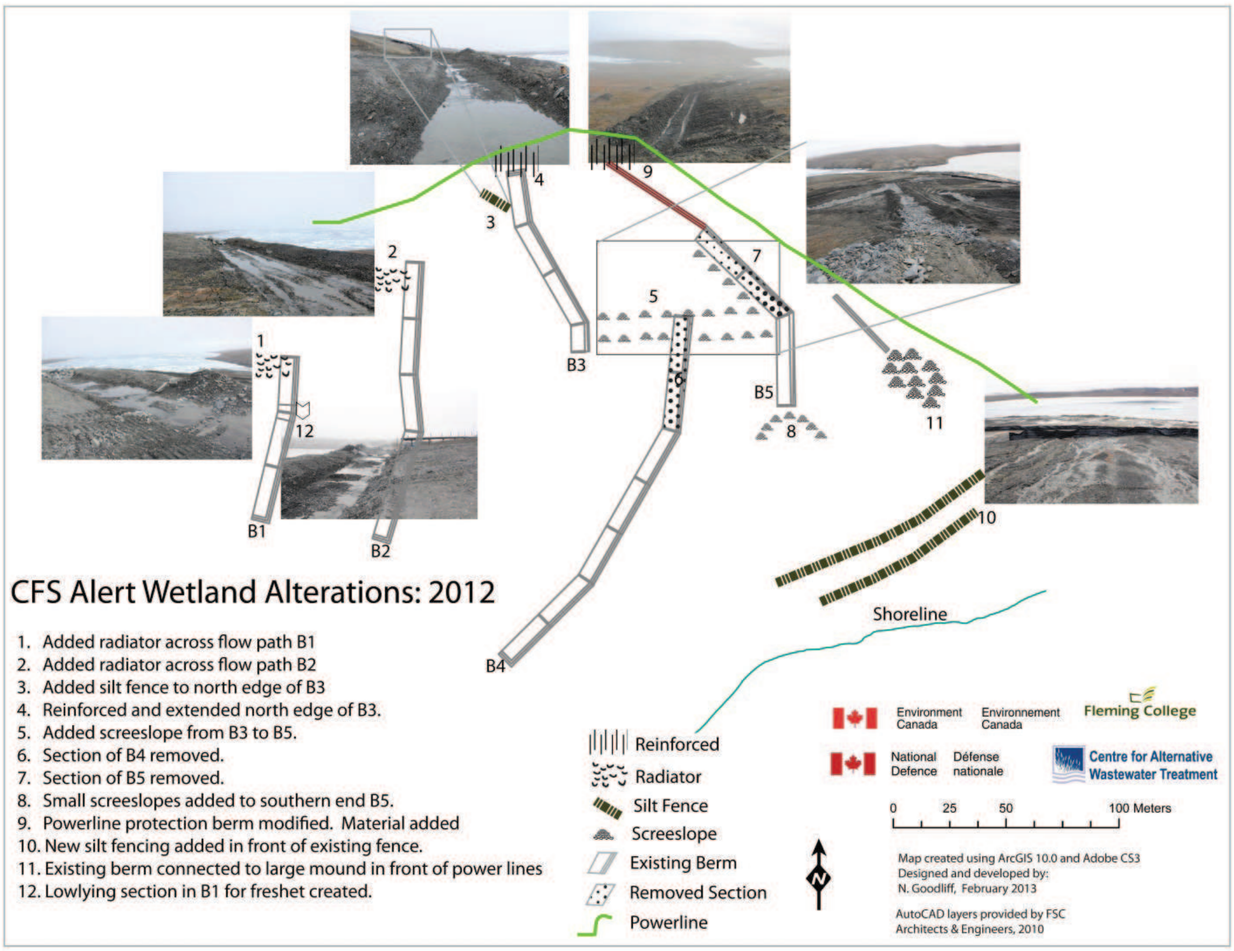

Figure 4.1. A schematic drawing of the CFS Alert site showing the major modifications to the wetland that were made in the last two weeks of August 2012.

4.4 Recommendations

The modifications made to the wetland in 2012 address what are likely the key factors that have the greatest chance at improving the overall performance of the CFS Alert wetland and therefore there are only a couple of recommendations to be made. The wetland performance should be monitored in the summer of 2013 to determine the impact from the 2012 modifications and to identify if any additional efforts could be implemented to further improve performance. Lastly developing a vegetative cover in the wetland should be attempted. The introduction of plants (most likely a locally available species of sedge (*Carex* spp.) or grass (*Poa* spp.) would improve soil stability, enhance the entrapment of suspended solids, and provide root mass to support microbial populations necessary for biological treatment. The production of a vegetative cover would likely take at least two to three years of repeated plantings before the cover was dense enough to be effective. Some initial scoping attempts have been made to transplant locally available plants in previous years. It appears that many of the transplants do not survive; however, enough do take root and grow to suggest that with a concerted effort it may be possible to vegetate portions of the wetland. More investigation would be needed to better determine how much of the wetland may be suitable for vegetation.

The recommendations are as follows:

1. Monitor the performance of the wetland in the summer of 2013 in order to be able to assess the impact of the 2012 wetland modifications. Information from this investigation may provide insight into what modifications performed well and which ones had little impact. Knowing this will help to determine if future modifications would be cost beneficial and which types of modifications would provide the greatest chance for enhance performance.

2. Survey the wetland in the spring of 2013 to assess how many of the previously transplanted plants survived and to assess which areas of the wetland may be suitable for future plantings. Based on these results it could be determined what portions of the wetland could be planted, the approximate cost for planting and an estimate of the cost for planting in terms of man hours and supplies.

3. Conduct a tracer study to better determine the rate at which the wastewater is travelling through the wetland. This will help to better assess the wastewater detention ability of the wetland, and in particular the impact of the August 2012 modifications to the wetland. A tracer test can be accomplished with the input of a known mass of potassium bromide and a composite sampler that samples hourly at the end of the wetland (this would require battery power).

5.0 Summary

Collectively, these results suggest that the one of the prime mechanisms of treatment operating in the wetland is the removal of suspended material through: i) detention of water velocities and physical filtration / entrapment of particulate matter. This was evident by higher concentrations in the upper portions of the wetlands (berm 1 and 2) of:

- the organic fraction of suspended solids (e.g., VSS),
- the particulate fraction of nitrogen (e.g., organic nitrogen),
- the organic fraction of soil particles (e.g., loss-on-ignition).

The data also suggest that little microbial oxidation of carbonaceous or nitrogenous compounds were occurring in the wetland. This was likely due to a relatively short hydraulic retention time which was insufficient for microbial action to occur, particularly in the cooler summer time conditions of this far north site. Factors supporting this observation include:

- a relatively poor reduction in BOD_5
- no or little evidence of ammonification of organic nitrogen and or nitrification of nitrogen compounds

It is believed that the breaching of the detention berms and the establishment of preferential flow paths hindered the ability of the wetland to filter or entrap microorganisms. This event would have also lowered the overall hydraulic retention time and negatively impacted microbial oxidation. This reduced filtration capacity is evident by:

- a relatively poor removal rate of both total coliforms and *E. coli*. (one log unit removal for both groups).

Lastly, aluminium and iron are elevated above other trace elements of concern in both the wastewater and soils. It is difficult to tell from the data whether the elevated levels are a result of metal accumulation originating from the wastewater or if the elevated levels are a result of these elements leaching from the wetland strata.

It is anticipated that the modifications made to the wetland in late August 2012 will improve the overall functioning of the wetland by enhancing filtration and trapping of suspended solids, detention of flow rates, better defined flow paths and improved production of biofilms through the stabilization of the berms, the armoring of erosion prone areas and the installation of scree slopes to enhance the growth of biofilms. All of these measures should enhance the overall performance. It is anticipated that these measures may bring the wetland back into compliance with the NWB water licence. This anticipation is based on the fact that the averaged water quality parameters of the effluent exiting the wetland in 2011 were in compliance for BOD_5, oil & grease and pH for the summer of 2011. The modifications made in 2012 should improve the retention of solids and detention of wastewater flow through the wetland and enhance the growth of biofilms and microbial treatment processes.

6.0 References

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7.0 Appendices

The raw data has been appended in the order listed below

Sample locations (2012)

BOD_5	Cs
$cBOD_5$	Cr
COD	Co
DOC	Cu
TSS	Fe
VSS	Pb
FOG	Li
pH	Mg
TKN	Mn
NH_3-N	Hg
NO_2	Mo
NO_3	Ni
TP	K
PO_4-P	Rb
TC	Ag
EC	Se
DO	Na
COND	Sr
Al	Tl
Sb	Sn
As	Ti
Ba	U
Be	V
Bo	Zn
Cd	metals in soils
Ca	soil grain size

2012 ALERT SAMPLE LOCATIONS

Sample Identification	Sample Location		Sample Description
	UTM Easting (0 in front of following)	*UTM Northing*	
12B1-1	509862	9160588	Pooling area with high amounts of food and organic waste South-East of outfall pipe (almost directly under pipe)
12B1-2	509858	9160591	Downstream from outfall pipe
12B1-4	509862	9160621	Corner of Berm 1, directly before flow turns East down slope towards Berm 2
12B2-4	509917	9160659	North corner of Berm 2, directly before flow travels down slope towards Berm 3
12B2-5	509912	9160619	where flow from Berm 1 reaches Berm 2 (actually comes before 12B2-4)
12B3-2	509962	9160658	where flow from Berm 2 reaches Berm 3, flow running South-East (parallel with Berm 3)
12B3-3	509986	9160611	South-East corner of Berm 3, just before flow travels downslope towards Berm 4
12B4-1	510031	9160611	Channel flow that breaches Berm 4, sample location at eroded area where flow breaches through
12B4-2	520020	9160606	Channel flow in between Berm 3 and 4, last physical place able to sample before ice coverage
12B4-3	510055	9160612	Channel flow on East side of Berm 4, first phsical place able to sample after ice coverage
12B5-1	510074	9160603	Where flow meets Berm 5
12B5-2	510082	9160580	Riffle stream at south end running parallel to Berm 5
12B5-4	510086	9160592	Stream that runs through eroded section of Berm 5
12B5-5	510125	9160567	Channel stream from 12B5-4 source
12PL-3	510061	9160668	Breach flow running under powerlines in meandering fashion towards Dumbell Bay
12SF-1	510153	9160539	Stream spillover Silt Fence (East of 12SH-2)
12SH-2	510125	9160520	Channel stream over Silt Fence towards Alert Inlet
12SH-3	510130	9160491	Channel flowing into Alert Inlet
12SH-4	510200	9160766	Stream flowing into Dumbell Bay
12SH-5	510225	9160768	Large pooling area that flows into Dumbell Bay (southeast of 12SH-4)
12SCREESLOPE	510020	9160611	Middle of Screeslope South, pref flow path from Berm 3 to Berm 5.
12B5-SCREE	510109	9160578	Screeslope running off the North East corner of Berm 5, slow trickle flow path
Blank	--	--	Ultrapure lab water
Reference	508557	9156045	Undisturbed natural stream, sampled before Alert bridge

LEGEND

12 - for 2012
B1 -BERM 1
B2 - BERM2
B3 - BERM 3
B4 - BERM 4
B5 - BERM 5
SH -SHORELINE
PL - POWERLINE
SF -SILTFENCE
SCREE- Screeslope/trickle filter
RED = no lfow (dry location) or not current sample location

Biochemical Oxygen Demand -5 Day (BOD5) (mg/L)

Detection Limits for CAWT Lab: 1 mg/L For values listed as <, 0.5 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	278	49	22	33	29	24	27	47	--	--	--	
June 27, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	1838	184	1531	173	236	347	124	340	--	--	--	156
July 11, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 18, 2012	58	87	104	109	83	61	87	65	--	--	--	77
July 25, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 1, 2012	270	173	226	99	107	80	96	141	--	--	--	163
August 7, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 14, 2012	725	219	483	349	1483	272	253	178	--	--	--	290
September 6, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	313	195	205	175	273	144	112	--	--	--	140	--
Average	580	151	429	156	369	155	116	154			140	172
Min	58	49	22	33	29	24	27	47			140	77
Max	1838	219	1531	349	1483	347	253	340			140	290

Sample Description	12B5-2	12B5-4	11B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	52	64	51	--	34	54	--	18	--	--	2	1
June 27, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	203	--	--	--	5	437	112	4	--	--	<1	1
July 11, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 18, 2012	79	66	104	--	--	134	125	--	--	--	<1	<1
July 25, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 1, 2012	137	87	71	--	--	64	64	--	--	--	1	1
August 7, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 14, 2012	261	890	160	--	--	176	190	--	--	--	4	1
September 6, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	66	--	--	--	--	<1
Average	146	277	96		19	173	112	11			2	1
Min	52	64	51		5	54	64	4			<1	<1
Max	261	890	160		34	437	190	18			4	1

Biochemical Oxygen Demand -5 Day (BOD5) (mg/L)

Detection Limits for City of Peterborough Lab: 2 mg/L For values listed as <, 1 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	336	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	--	93	--	--	--	--	--	--	--	--	--	--
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	596	--	--	--	--	--	--	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 10, 2012	1790	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	1193	214										
Min	596	93										
Max	1790	336										

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	33	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	--	--	--	--	--	--	175	--	--	--	--	--
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	--	--	--	--	--	--	84	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 10, 2012	--	--	--	--	--	--	67	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average							109			33		
Min							67			33		
Max							175			33		

Carbonaceous Biochemical Oxygen Demand -5 Day (cBOD5) (mg/L)

Detection Limits for CAWT Lab: 1 mg/L For values listed as <, 0.5 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	308	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	450	131	211	181	544	109	97	--	120	149	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	233	174	60	117	68	34	108	39	--	--	--	43
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	223	94	140	185	195	176	194	146	--	--	--	607
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	356	110	230	192	492	263	224	438	--	--	--	436
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	875	87	435	--	196	221	311	87	--	--	--	93
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	153	92	607	145	159	98	134	--	--	--	99	79
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	371	115	280	164	276	150	178	177	120	149	99	252
Min	153	87	60	117	68	34	97	39	120	149	99	43
Max	875	174	607	192	544	263	311	438	120	149	99	607

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	58	--	--
June 15, 2012	--	123	127	--	58	--	--	--	51	140	<1	<1
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	35			--	5	41	35	6	--	--	<1	<1
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	191	275	317	--	--	262	134	--	--	--	1	<1
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	247	204	207	--	--	324	128	--	--	--	3	3
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	175	96	71	--	--	107	60	--	--	--	<1	<1
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	81	--	--	85	--	--	84	--	--	--	--	<1
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	146	175	181	85	31	184	88	6	51	99	1	1
Min	35	96	71	85	5	41	35	6	51	58	<1	<1
Max	247	275	317	85	58	324	134	6	51	140	3	3

Carbonaceous Biochemical Oxygen Demand -5 Day (cBOD5) (mg/L)

Detection Limits for City of Peterborough Lab: 4 mg/L   For values listed as <, 2 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	222	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	138	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	--	80	--	--	--	--	--	--	--	--	--	--
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	408	--	--	--	--	--	--	--	--	--	--	--
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	520	--	--	--	--	--	--	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	464	147										
Min	408	80										
Max	520	222										

Sample Description	12B5-2	12B5-4	11B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	32	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	--	--	--	--	--	22	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	--	--	--	--	--	--	93	--	--	--	--	--
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	--	--	--	--	--	--	103	--	--	--	--	--
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	--	--	--	--	--	--	47	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average							66			32		
Min							22			32		
Max							103			32		

Chemical Oxygen Demand (COD) (mg/L)

Detection Limits for City of Peterborough Lab: 20 mg/L   For values listed as <, 10 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	560	220	120	160	310	230	330		70	90		
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	440	<20	100	170	70	<20	110	80	--	--	--	110
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	350	130	180	350	400	400	370	250	--	--	--	280
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	540	240	520	430	500	400	300	720	--	--	--	2260
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	700	220	420	2590	460	470	510	240	--	--	--	170
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	360	200	320	230	150	120	160	--	--	--	160	140
September 10, 2012	400	330	430	220	460	350	380	--	--	--	740	200
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	479	193	299	593	336	283	309	323	70	90	450	527
Min	350	<20	100	160	70	<20	110	80	70	90	160	110
Max	700	330	520	2590	500	470	510	720	70	90	740	2260

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012		80	120	--	180	--	--	--	280	190	<5	<5
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	60	--	--	--	90	130	90	60	--	--	<20	<20
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	1110	540	450	--	--	480	480	--	--	--	<20	<20
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	300	320	300	--	--	530	530	--	--	--	<20	<20
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	470	350	250	--	--	180	180	--	--	--	<20	<20
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	140	--	--	140	--		140	--	--	--	--	<20
September 10, 2012	--	--	--	--	--		150	--	--	--	--	<20
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	416	323	280	140	135	330	262	60	280	190	9	9
Min	60	80	120	140	90	130	90	60	280	190	<5	<5
Max	1110	540	450	140	180	530	530	60	280	190	<20	<20

Dissolved Organic Carbon (DOC) (mg/L)

Detection Limits for City of Peterborough Lab: 1 mg/L For values listed as <, 0.5 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	68	6	14	14	407	22	19	--	11	10	--	--
June 20, 2012	3	4	4	7	11	12	11	17	--	--	--	--
June 27, 2012	24	7	25	17	11	11	18	16	--	--	--	16
July 5th, 2012	106	34	3	28	34	39	38	30	--	--	--	33
July 11, 2012	27	29	22	30	33	28	37	27	--	--	--	38
July 18, 2012	10	12	26	15	18	14	16	11	--	--	--	17
July 25, 2012	118	39	87	34	35	52	55	182	--	--	--	681
August 1, 2012	26	14	51	23	11	12	12	14	--	--	--	25
August 7, 2012	99	38	62	368	58	48	64	16	--	--	--	20
August 14, 2012	50	31	64	55	137	33	25	25	--	--	--	33
September 6, 2012	60	34	48	41	34	17	16	--	--	--	20	24
September 10, 2012	71	57	52	37	53	38	72	--	--	--	201	39
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	55	25	38	56	70	27	32	38	11	10	111	92
Min	3	4	3	7	11	11	11	11	11	10	20	16
Max	118	57	87	368	407	52	72	182	11	10	201	681

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	12	10	--	6	--	--	--	8	12	3	<1.0
June 20, 2012	18	32	26	--	20	16	--	10	--	--	2	2
June 27, 2012	9	--	--	--	19	16	7	6	--	--	2	3
July 5th, 2012	66	--	--	--	59	7	5	12	--	--	2	54
July 11, 2012	140	47	56	--	--	34	20	--	--	--	1	2
July 18, 2012	13	16	21	--	--	19	22	--	--	--	<1.0	<1.0
July 25, 2012	42	30	48	--	--	93	36	--	--	--	<1.0	<1.0
August 1, 2012	20	15	16	--	--	18	15	--	--	--	<1.0	<1.0
August 7, 2012	23	18	12	--	--	13	14	--	--	--	<1.0	<1.0
August 14, 2012	26	76	20	--	--	24	38	--	--	--	<1.0	2
September 6, 2012	22	--	--	25	--	--	18	--	--	--	--	<1.0
September 10, 2012	--	--	--	--	--	--	36	--	--	--	--	<1.0
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	38	31	26	25	26	27	21	9	8	12	1	5
Min	9	12	10	25	6	7	5	6	8	12	<1	<1
Max	140	76	56	25	59	93	38	12	8	12	3	54

Total Suspended Solids (TSS) (mg/L)

Detection Limits for City of Peterborough Lab: 2 mg/L For values listed as <, 1 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	686	43	49	422	242	690	4280	--	311	326	--	--
June 20, 2012	180	3	5	6	12	22	26	40	--	--	--	--
June 27, 2012	146	48	40	338	186	58	286	82	--	--	--	208
July 5th, 2012	1560	370	1490	136	254	516	96	654	--	--	--	150
July 11, 2012	176	37	39	103	153	196	132	87	--	--	--	108
July 18, 2012	22	33	44	--	39	43	50	47	--	--	--	54
July 25, 2012	512	40	106	154	1140	158	136	130	--	--	--	148
August 1, 2012	159	66	24	30	37	26	60	49	--	--	--	56
August 7, 2012	36	84	76	626	162	96	136	89	--	--	--	67
August 14, 2012	466	128	188	598	638	104	314	152	--	--	--	246
September 6, 2012	47	106	197	83	173	51	46	--	--	--	46	34
September 10, 2012	54	38	51	114	152	234	88	--	--	--	89	48
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	337	83	192	237	266	183	471	148	311	326	68	112
Min	22	3	5	6	12	22	26	40	311	326	46	34
Max	1560	370	1490	626	1140	690	4280	654	311	326	89	246

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	526	956	--	1920	--	--	--	3120	1580	4	<2
June 20, 2012	171	20	17	--	174	1110	--	174	--	--	3	<2
June 27, 2012	146	--	--	--	326	502	490	748	--	--	34	<2
July 5th, 2012	220	--	--	--	334	206	2	58	--	--	<2	<2
July 11, 2012	332	150	204	--	--	306	153	--	--	--	<2	<2
July 18, 2012	66	73	93	--	--	99	117	--	--	--	<2	<2
July 25, 2012	186	200	112	--	--	262	62	--	--	--	<2	<2
August 1, 2012	69	48	22	--	--	49	48	--	--	--	<2	<2
August 7, 2012	230	115	49	--	--	73	105	--	--	--	<2	<2
August 14, 2012	178	1320	130	--	--	134	100	--	--	--	<2	<2
September 6, 2012	46	--	--	67	--	--	132	--	--	--	--	<2
September 10, 2012	--	--	--	--	--	--	30	--	--	--	--	<2
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	164	307	198	67	689	305	124	327	3120	1580	5	<2
Min	46	20	17	67	174	49	2	58	3120	1580	<2	<2
Max	332	1320	956	67	1920	1110	490	748	3120	1580	34	<2

Volatile Suspended Solids (VSS) (mg/L)

Detection Limits for City of Peterborough Lab: 10 mg/L For values listed as <, 5 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	554	35	40	80	83	114	260	--	40	46	--	--
June 20, 2012	122	<10	<10	<10	11	14	12	17	--	--	--	--
June 27, 2012	140	50	56	168	88	48	140	52	--	--	--	52
July 5th, 2012	1470	396	1500	118	226	384	78	506	--	--	--	132
July 11, 2012	130	38	41	70	92	106	86	55	--	--	--	73
July 18, 2012	25	35	46	51	36	38	42	41	--	--	--	47
July 25, 2012	502	56	112	132	1010	142	126	130	--	--	--	152
August 1, 2012	163	66	33	32	37	28	54	43	--	--	--	52
August 7, 2012	40	94	84	572	166	86	113	56	--	--	--	50
August 14, 2012	456	134	192	564	544	92	246	120	--	--	--	174
September 6, 2012	53	110	188	68	98	45	43	--	--	--	41	32
September 10, 2012	57	39	47	55	111	85	61	--	--	--	66	42
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	309	88	195	160	209	98	105	113	40	46	54	81
Min	25	<10	33	32	11	14	12	17	40	46	41	32
Max	1470	396	1500	572	1010	384	260	506	40	46	66	174

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	50	60	--	130	--	--	--	184	82	<10	<10
June 20, 2012	26	11	11	--	44	68	--	17	--	--	<10	<10
June 27, 2012	46	--	--	--	60	52	48	58	--	--	<10	<10
July 5th, 2012	176	--	--	--	246	132	<10	17	--	--	<10	<10
July 11, 2012	244	110	132	--	--	134	78	--	--	--	<10	<10
July 18, 2012	52	52	79	--	--	78	84	--	--	--	<10	<10
July 25, 2012	176	176	110	--	--	212	60	--	--	--	<10	<10
August 1, 2012	66	51	26	--	--	44	41	--	--	--	<10	<10
August 7, 2012	136	78	40	--	--	54	69	--	--	--	<10	<10
August 14, 2012	150	968	120	--	--	92	74	--	--	--	<10	<10
September 6, 2012	31	--	--	39	--	--	34	--	--	--	--	<10
September 10, 2012	--	--	--	--	--	--	25	--	--	--	--	<10
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	110	187	72	39	120	96	52	31	184	82	<10	<10
Min	26	11	11	39	44	44	25	17	184	82	<10	<10
Max	244	968	132	39	246	212	84	58	184	82	<10	<10

Fats Oils and Grease (FOG) (mg/L)

Detection Limits for City of Peterborough Lab: 10.0 mg/L   For values listed as <, 5.0 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	11.2	--	--	--	--	--	--	--	--	--
June 27, 2012	--	19.6	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	--	164	--	--	--	--	--	--	--	--	--	--
July 11, 2012	--	37.6	--	--	--	--	--	--	--	--	--	--
July 18, 2012	--	41.2	--	--	--	--	--	--	--	--	--	--
July 25, 2012	--	39.2	--	--	--	--	--	--	--	--	--	--
August 1, 2012	--	30.4	--	--	--	--	--	--	--	--	--	--
August 7, 2012	--	80.0	--	--	--	--	--	--	--	--	--	--
August 14, 2012	--	60.4	--	--	--	--	--	--	--	--	--	--
September 6, 2012	--	44.4	--	--	--	--	--	--	--	--	--	--
September 10, 2012	--	64.0	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average		58.1	11.2									
Min		19.6	11.2									
Max		164.0	11.2									

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	21.2	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	8.8	--	--	--	--	--	--
June 27, 2012	--	--	--	--	--	--	13.2	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	72.0	--	--	--	--	--
July 11, 2012	--	--	--	--	--	48.8	--	--	--	--	--	--
July 18, 2012	--	--	--	--	--	--	27.2	--	--	--	--	--
July 25, 2012	--	--	--	--	--	--	48.8	--	--	--	--	--
August 1, 2012	--	--	--	--	--	--	29.2	--	--	--	--	--
August 7, 2012	--	--	--	--	--	--	36.0	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	39.2	--	--	--	--	--
September 6, 2012	--	--	--	--	--	--	36.0	--	--	--	--	--
September 10, 2012	--	--	--	--	--	--	28.8	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average						28.8	36.7			21.2		
Min						8.8	13.2			21.2		
Max						48.8	72.0			21.2		

pH

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	5.00	7.15	6.72	7.16	6.54	7.24	7.19		7.29	7.31		
June 20, 2012	7.66	7.65	7.68	7.55	7.52	7.49	7.48	7.54	--	--	--	
June 27, 2012	7.07	7.42	7.29	7.22	7.38	7.13	7.37	7.47	--	--	--	7.26
July 5th, 2012	4.85	7.23	5.20	7.27	7.20	6.94	7.04	6.78	--	--	--	6.99
July 11, 2012	7.25	8.29	7.60	7.19	7.21	7.25	7.20	7.24	--	--	--	7.62
July 18, 2012	7.65	7.58	7.49	7.62	7.69	7.73	7.56	7.68	--	--	--	7.64
July 25, 2012	6.81	7.70	7.56	7.49	7.24	7.43	7.51	7.60	--	--	--	7.62
August 1, 2012	7.37	7.22	7.49	7.71	7.44	7.51	7.48	7.39	--	--	--	7.33
August 7, 2012	7.47	8.63	8.76	7.30	7.54	7.40	7.21	7.44	--	--	--	7.73
August 14, 2012	7.41	7.92	7.57	7.33	7.30	7.26	7.22	7.34	--	--	--	7.52
September 6, 2012	7.19	7.48	7.43	7.40	7.44	7.61	7.39	--	--	--	7.52	7.54
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	7.83	7.53	7.45	7.41	7.40	7.54	7.34	--	--	--	7.46	--
Average	6.96	7.65	7.35	7.39	7.33	7.38	7.33	7.39	7.29	7.31	7.49	7.47
Min	4.85	7.15	5.20	7.16	6.54	6.94	7.04	6.78	7.29	7.31	7.46	6.99
Max	7.83	8.63	8.76	7.71	7.69	7.73	7.56	7.68	7.29	7.31	7.52	7.73

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012		7.41	7.43	--	7.53	7.65	--	--	7.65	7.40	8.03	5.97
June 20, 2012	7.64	7.50	7.75	--	7.53	7.60	--	7.63	--	--	8.02	5.45
June 27, 2012	7.80	--	--	--	7.80	7.47	7.26	7.96	--	--	5.76	5.47
July 5th, 2012	6.82	--	--	--	8.02	8.19	5.98	6.87	--	--	7.95	5.92
July 11, 2012	7.63	7.63	7.60	--	--	7.71	7.70	--	--	--	8.01	5.89
July 18, 2012	7.68	7.67	7.63	--	--	7.76	7.75	--	--	--	8.12	--
July 25, 2012	7.71	7.68	7.71	--	--	7.55	7.84	--	--	--	8.14	--
August 1, 2012	7.46	7.40	7.53	--	--	7.50	7.37	--	--	--	8.05	--
August 7, 2012	7.43	7.69	7.71	--	--	7.71	7.61	--	--	--	8.18	--
August 14, 2012	7.58	7.13	7.62	--	--	7.60	7.58	--	--	--	8.13	--
September 6, 2012	7.40	--	--	7.63	--	--	7.80	--	--	--	--	--
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	7.73	--	--	--	--	--
Average	7.52	7.51	7.62	7.63	7.72	7.67	7.46	7.49	7.65	7.40	7.84	5.74
Min	6.82	7.13	7.43	7.63	7.53	7.47	5.98	6.87	7.65	7.40	5.76	5.45
Max	7.80	7.69	7.75	7.63	8.02	8.19	7.84	7.96	7.65	7.40	8.18	5.97

Total Kjeldahl Nitrogen as N (TKN-N) (mg/L)

Detection Limits for City of Peterborough Lab: 0.1 mg/L For values listed as <, 0.05 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	18.9	27.1	7.40	6.60	6.20	9.40	6.30	--	8.20	11.4	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	8.80	3.20	3.10	6.30	4.20	7.30	6.90	7.70	--	--	--	15.7
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	19.0	39.5	52.9	28.1	27.6	22.0	24.1	18.7	--	--	--	17.4
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	25.5	22.1	32.2	17.6	14.7	15.5	14.6	9.10	--	--	--	15.4
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	17.8	23.4	24.4	29.6	18.4	18.2	13.0	12.8	--	--	--	19.0
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	35.7	21.4	31.5	42.5	42.7	17.4	16.4	--	--	--	15.4	16.0
September 10, 2012	13.2	16.8	35.5	20.4	22.0	12.0	16.3	--	--	--	19.2	11.6
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	19.8	21.9	26.7	21.6	19.4	14.5	13.9	12.1	8.20	11.4	17.3	15.9
Min	8.80	3.20	3.10	6.30	4.20	7.30	6.30	7.70	8.20	11.4	15.4	11.6
Max	35.7	39.5	52.9	42.5	42.7	22.0	24.1	18.7	8.20	11.4	19.2	19.0

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	8.50	7.70	--	2.80	--	--	--	3.30	7.10	0.400	<0.1
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	12.3	--	--	--	16.8	7.60	3.10	2.60	--	--	0.100	<0.1
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	20.4	22.6	19.6	--	--	19.5	13.9	--	--	--	<0.1	<0.1
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	8.60	9.30	9.50	--	--	13.6	9.10	--	--	--	0.100	0.300
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	13.4	16.9	9.10	--	--	11.8	9.40	--	--	--	<0.1	0.200
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	13.8	--	--	13.9	--	--	10.1	--	--	--	--	0.100
September 10, 2012	--	--	--	--	--	--	12.1	--	--	--	--	<0.1
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	13.7	14.3	11.5	13.9	9.80	13.1	9.62	2.60	3.30	7.10	0.14	0.13
Min	8.60	8.50	7.70	13.9	2.80	7.60	3.10	2.60	3.30	7.10	<0.1	<0.1
Max	20.4	22.6	19.6	13.9	16.8	19.5	13.9	2.60	3.30	7.10	0.400	0.300

Ammonia as N (NH_3-N) (mg/L)

Detection Limits for City of Peterborough Lab: 0.1 mg/L   For values listed as <, 0.05 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	14.2	6.7	4.4	5.0	4.4	6.9	5.9		8.0	8.9		--
June 20, 2012	2.0	1.3	1.2	3.2	5.4	9.4	6.7	12.4	--	--	--	--
June 27, 2012	7.6	2.4	1.9	5.2	2.9	6.2	5.8	7.0	--	--	--	15.4
July 5th, 2012	16.0	9.3	21.6	18.1	21.8	14.8	6.9	14.4	--	--	--	10.9
July 11, 2012	13.2	14.5	12.8	18.1	18.9	15.5	17.6	13.1	--	--	--	12.5
July 18, 2012	11.1	20.3	32.0	15.7	23.3	20.2	16.9	8.8	--	--	--	9.2
July 25, 2012	13.2	8.3	9.8	12.3	9.8	10.3	9.9	5.2	--	--	--	8.4
August 1, 2012	7.1	6.9	8.9	15.2	9.8	12.6	11.9	11.8	--	--	--	13.7
August 7, 2012	7.7	19.3	21.7	18.5	12.2	11.8	8.1	10.5	--	--	--	13.9
August 14, 2012	15.5	18.7	13.3	13.0	17.9	13.5	21.7	15.3	--	--	--	6.6
September 6, 2012	25.3	18.0	25.2	37.0	31.4	16.4	14.0	--	--	--	13.1	11.9
September 10, 2012	4.8	6.9	14.1	10.2	12.3	8.2	9.1	--	--	--	9.3	8.5
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	11.5	11.1	13.9	14.3	14.2	12.2	11.2	10.9	8.0	8.9	11.2	11.1
Min	2.0	1.3	1.2	3.2	2.9	6.2	5.8	5.2	8.0	8.9	9.3	6.6
Max	25.3	20.3	32.0	37.0	31.4	20.2	21.7	15.3	8.0	8.9	13.1	15.4

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	7.8	7.3	--	2.3	--	--	--	2.5	6.7	0.1	0.3
June 20, 2012	13.5	9.6	9.1	--	10.7	4.5	--	3.1	--	--	<0.1	0.1
June 27, 2012	10.8	--	--	--	14.5	6.8	2.5	2.3	--	--	0.2	0.1
July 5th, 2012	9.8	--	--	--	10.5	9.8	1.9	3.0	--	--	<0.1	<0.1
July 11, 2012	11.4	16.0	13.5	--	--	13.7	10.4	--	--	--	<0.1	0.2
July 18, 2012	10.0	8.3	10.2	--	--	12.0	10.2	--	--	--	<0.1	<0.1
July 25, 2012	4.4	5.3	5.0	--	--	6.9	5.6	--	--	--	<0.1	<0.1
August 1, 2012	10.0	6.6	11.1	--	--	14.1	13.6	--	--	--	<0.1	<0.1
August 7, 2012	9.9	13.1	6.9	--	--	8.6	7.0	--	--	--	0.1	<0.1
August 14, 2012	14.7	12.6	11.3	--	--	5.6	5.9	--	--	--	<0.1	<0.1
September 6, 2012	10.4	--	--	9.9	--	--	7.3	--	--	--	--	0.1
September 10, 2012	--	--	--	--	--	--	9.3	--	--	--	--	<0.1
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	10.5	9.9	9.3	9.9	9.5	9.1	7.4	2.8	2.5	6.7	0.1	0.1
Min	4.4	5.3	5.0	9.9	2.3	4.5	1.9	2.3	2.5	6.7	<0.1	<0.1
Max	14.7	16.0	13.5	9.9	14.5	14.1	13.6	3.1	2.5	6.7	0.2	0.3

Nitrite as N ($N0_2$-N) (mg/L)

Detection Limits for City of Peterborough Lab: 0.05 mg/L   For values listed as <, 0.025 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05	--	--
June 20, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	--
June 27, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
July 5th, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
July 11, 2012	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
July 18, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
July 25, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
August 1, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
August 7, 2012	<0.05	0.09	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
August 14, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
September 6, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05	<0.05
September 10, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.06	--	--	--	0.08	0.05
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.05	0.03	<0.05	<0.05	<0.05	0.03	0.03	<0.05	<0.05	<0.05	<0.05	0.03
Min	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Max	<0.05	0.09	<0.05	<0.05	<0.05	0.06	0.06	<0.05	<0.05	<0.05	0.08	0.05

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.05	<0.05	--	<0.05	--	--	--	<0.05	<0.05	<0.05	<0.05
June 20, 2012	<0.05	<0.05	<0.05	--	<0.05	0.11	--	0.08	--	--	<0.05	<0.05
June 27, 2012	<0.05	--	--	--	<0.05	<0.05	<0.05	0.06	--	--	<0.05	<0.05
July 5th, 2012	<0.05	--	--	--	<0.05	<0.05	0.06	0.08	--	--	<0.05	<0.05
July 11, 2012	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	--	--	--	<0.05	<0.05
July 18, 2012	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	--	--	--	<0.05	<0.05
July 25, 2012	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	--	--	--	<0.05	<0.05
August 1, 2012	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	--	--	--	<0.05	<0.05
August 7, 2012	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	--	--	--	<0.05	<0.05
August 14, 2012	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	--	--	--	<0.05	<0.05
September 6, 2012	<0.05	--	--	<0.05	--	--	<0.05	--	--	--	--	<0.05
September 10, 2012	--	--	--	--	--	--	<0.05	--	--	--	--	<0.05
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.05	<0.05	<0.05	<0.05	<0.05	0.16	0.14	0.07	<0.05	<0.05	<0.05	<0.05
Min	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
Max	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	0.06	0.08	<0.05	<0.05	<0.05	<0.05

Nitrate as N (NO_3-N) (mg/L)

Detection Limits for City of Peterborough Lab: 0.05 mg/L   For values listed as <, 0.025 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.05	--	<0.05	<0.05	--	--
June 20, 2012	<0.05	0.07	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	--
June 27, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
July 5th, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
July 11, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
July 18, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
July 25, 2012	<0.05	0.08	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
August 1, 2012	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
August 7, 2012	0.11	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	--	--	--	<0.05
August 14, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05
September 6, 2012	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	<0.05	<0.05
September 10, 2012	0.09	0.07	0.21	0.13	0.21	0.30	0.30	--	--	--	<0.05	0.06
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.04	0.04	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	0.06
Min	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.30	<0.05	<0.05	<0.05	<0.05	<0.05
Max	0.11	0.08	0.21	0.13	0.21	0.30	0.30	0.07	<0.05	<0.05	<0.05	0.06

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.05	<0.05	--	<0.05	--	--	--	<0.05	<0.05	1.66	<0.05
June 20, 2012	<0.05	<0.05	<0.05	--	<0.05	1.28	--	1.22	--	--	1.24	<0.05
June 27, 2012	<0.05	--	--	--	<0.05	<0.05	1.12	1.44	--	--	0.93	<0.05
July 5th, 2012	<0.05	--	--	--	<0.05	<0.05	2.66	2.21	--	--	1.78	<0.05
July 11, 2012	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	--	--	--	0.70	<0.05
July 18, 2012	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	--	--	--	0.62	<0.05
July 25, 2012	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	--	--	--	<0.05	1.34
August 1, 2012	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	--	--	--	1.73	<0.05
August 7, 2012	<0.05	<0.05	0.06	--	--	<0.05	<0.05	--	--	--	<0.05	2.17
August 14, 2012	<0.05	<0.05	<0.05	--	--	<0.05	<0.05	--	--	--	<0.05	3.50
September 6, 2012	<0.05	--	--	<0.05	--	--	<0.05	--	--	--	--	0.05
September 10, 2012	--	--	--	--	--	--	0.26	--	--	--	--	<0.05
September 13, 2012	--		--	--	--	--	--	--	--	--	--	--
Average	<0.05	<0.05	<0.05	<0.05	<0.05	0.16	0.42	1.62	<0.05	<0.05	0.87	0.03
Min	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.26	1.22	<0.05	<0.05	<0.05	<0.05
Max	<0.05	<0.05	0.06	<0.05	<0.05	1.28	2.66	2.21	<0.05	<0.05	1.78	3.50

Total Phosphorus as P (TP) (mg/L)

Detection Limits for City of Peterborough Lab: 0.006 mg/L For values listed as <, 0.003 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	3.000	1.520	1.520	1.240	1.030	1.980	4.250	--	0.434	0.502	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	1.720	0.524	1.190	1.760	0.789	0.559	2.170	0.838	--	--	--	1.150
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	2.540	3.450	5.080	3.080	3.730	2.750	3.040	1.760	--	--	--	2.510
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	4.070	1.940	3.480	2.600	6.010	2.570	1.730	1.450	--	--	--	3.070
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	6.110	1.560	5.120	12.200	2.790	2.430	3.430	2.020	--	--	--	2.000
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	4.850	4.060	4.660	4.980	3.300	1.910	1.870	--	--	--	1.810	1.850
September 10, 2012	5.750	2.330	3.440	2.460	3.470	2.080	2.910	--	--	--	3.330	1.580
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	4.006	2.198	3.499	4.046	3.017	2.040	2.771	1.517	0.434	0.502	2.570	2.027
Min	1.720	0.524	1.190	1.240	0.789	0.559	1.730	0.838	0.434	0.502	1.810	1.150
Max	6.110	4.060	5.120	12.200	6.010	2.750	4.250	2.020	0.434	0.502	3.330	3.070

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.575	0.320	--	2.760		--	--	3.650	1.220	<0.006	<0.006
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.599	--	--	--	0.882	0.897	0.535	0.718	--	--	0.069	<0.006
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	4.980	3.570	2.440	--	--	3.150	1.360	--	--	--	<0.006	<0.006
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	1.830	1.960	1.530	--	--	3.770	1.520	--	--	--	<0.006	<0.006
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	3.270	3.210	1.360	--	--	1.910	2.570	--	--	--	<0.006	<0.006
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	1.680	--	--	1.680	--	--	1.230	--	--	--	--	<0.006
September 10, 2012	--	--	--	--	--	--	1.600	--	--	--	--	0.023
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	2.472	2.329	1.413	1.680	1.821	2.432	1.469	0.718	3.650	1.220	0.016	0.006
Min	0.599	0.575	0.320	1.680	0.882	0.897	0.535	0.718	3.650	1.220	<0.006	<0.006
Max	4.980	3.570	2.440	1.680	2.760	3.770	2.570	0.718	3.650	1.220	0.069	0.023

Dissolved Phosphate as P (PO_4-P) (mg/L)

Detection Limits for City of Peterborough Lab: 0.02 mg/L For values listed as <, 0.01 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	4.60	0.66	0.04	<0.02	0.04	<0.02	<0.02	--	<0.02	0.04	--	--
June 20, 2012	1.50	0.40	0.40	<0.02	0.16	0.16	0.19	0.21	--	--	--	--
June 27, 2012	<0.02	<0.02	0.65	0.08	<0.02	0.02	<0.02	0.10	--	--	--	0.25
July 5th, 2012	3.84	0.73	2.94	0.84	1.38	1.18	0.23	1.60	--	--	--	0.46
July 11, 2012	0.89	3.10	1.86	0.86	1.84	0.69	0.84	0.41	--	--	--	0.45
July 18, 2012	--	2.88	3.96	--	1.60	1.42	1.17	0.21	--	--	--	0.14
July 25, 2012	2.29	0.55	2.44	0.53	1.34	0.70	0.31	0.08	--	--	--	0.87
August 1, 2012	2.05	3.11	0.94	2.17	0.55	0.81	0.69	0.35	--	--	--	0.86
August 7, 2012	1.77	1.56	1.53	4.88	1.07	0.70	0.99	0.38	--	--	--	0.67
August 14, 2012	2.06	1.55	1.94	3.34	2.38	1.28	2.17	1.53	--	--	--	0.88
September 6, 2012	5.87	3.20	3.06	3.71	2.59	0.90	0.41	--	--	--	0.85	0.69
September 10, 2012	2.65	1.36	3.49	1.37	3.61	0.42	1.16	--	--	--	1.16	0.59
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	2.50	1.59	1.94	1.62	1.38	0.69	0.68	0.54	<0.02	0.04	1.01	0.59
Min	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	0.08	<0.02	0.04	0.85	0.14
Max	5.87	3.20	3.96	4.88	3.61	1.42	2.17	1.60	<0.02	0.04	1.16	0.88

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.05	<0.02	--	<0.02	--	--	--	<0.02	<0.02	0.04	0.04
June 20, 2012	0.20	<0.02	<0.02	--	0.30	<0.02	--	<0.02	--	--	<0.02	0.33
June 27, 2012	0.05	--	--	--	0.03	<0.02	<0.02	<0.02	--	--	<0.02	<0.02
July 5th, 2012	0.61	--	--	--	1.10	0.24	<0.02	<0.02	--	--	<0.02	<0.02
July 11, 2012	1.03	0.56	0.70	--	--	0.87	0.21	--	--	--	<0.02	<0.02
July 18, 2012	0.16	0.07	0.09	--	--	0.27	0.29	--	--	--	<0.02	<0.02
July 25, 2012	0.14	0.02	0.13	--	--	0.65	0.11	--	--	--	<0.02	<0.02
August 1, 2012	0.46	0.03	0.24	--	--	0.95	0.53	--	--	--	<0.02	<0.02
August 7, 2012	0.62	0.61	0.05	--	--	0.18	0.14	--	--	--	<0.02	<0.02
August 14, 2012	2.62	3.52	0.38	--	--	0.39	0.10	--	--	--	<0.02	<0.02
September 6, 2012	0.77	--	--	0.74	--	--	0.44	--	--	--	--	<0.02
September 10, 2012	--	--	--	--	--	--	0.72	--	--	--	--	<0.02
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.67	0.61	0.20	0.74	0.36	0.40	0.26	<0.02	<0.02	<0.02	0.07	0.04
Min	0.05	<0.02	<0.02	0.74	<0.02	0.18	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Max	2.62	3.52	0.70	0.74	1.10	0.95	0.72	<0.02	<0.02	<0.02	0.04	0.33

Total Coliforms (TC) (cfu/100mls)

Detection Limits for CAWT Lab: 3 CFU/100mL For values listed as <, 1.5 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	>48480000	4520000	24240000	13700000	>24240000	6850000	2550000	--	1190000	1000000	--	--
June 20, 2012	4400000	4690000	3390000	3970000	2710000	910000	460000	615000	--	--	--	--
June 27, 2012	26160000	2550000	1585000	3095000	2820000	550000	1640000	225000	--	--	--	1635000
July 5th, 2012	54800000	4260000	>48480000	11740000	33920000	13700000	1940000	13880000	--	--	--	>24240000
July 11, 2012	9780000	17160000	4380000	6940000	7400000	3170000	6940000	1710000	--	--	--	33920000
July 18, 2012	>96960000	9380000	>48480000	4380000	8580000	2980000	11740000	1410000	--	--	--	2800000
July 25, 2012	96960000	1020000	1940000	2540000	9020000	2550000	1560000	760000	--	--	--	1140000
August 1, 2012	640000	2400000	1560000	1040000	650000	430000	1460000	900000	--	--	--	10200000
August 7, 2012	135680000	33920000	17360000	17160000	11940000	3020000	16960000	3640000	--	--	--	2800000
August 14, 2012	13720000	18760000	23480000	13080000	9380000	3760000	4940000	2380000	--	--	--	2190000
September 6, 2012	2200000	1560000	5840000	1800000	1660000	600000	1380000	730000	--	--	730000	40000
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	2120000	8060000	24760000	11740000	11740000	16960000	6940000	12120000	--	--	12120000	--
Average	38024923	9023333	15807308	7598750	10338333	4623333	4875833	3488182	1190000	1000000	6425000	8773889
Min	640000	1020000	1560000	1040000	650000	430000	460000	225000	1190000	1000000	730000	40000
Max	135680000	33920000	>48480000	17160000	33920000	16960000	16960000	13880000	1190000	1000000	12120000	33920000

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	1535000	2550000	--	30000	--	--	--	30000	1940000	<3	<3
June 20, 2012	1275000	245000	280000	--	7500	830000	--	1900	--	--	39	<3
June 27, 2012	235000	2640000	--	--	<300	225000	147500	<300	--	--	30	<3
July 5th, 2012	24240000	4890000	--	--	79	>24240000	>24240000	490	--	--	3	<3
July 11, 2012	13080000	5870000	16960000	--	--	2260000	1740000	--	--	--	13	<3
July 18, 2012	2130000	1410000	2890000	--	--	1710000	2400000	--	--	--	3	<3
July 25, 2012	6540000	2120000	2130000	--	--	2890000	2630000	--	--	--	<3	<3
August 1, 2012	690000	3280000	620000	--	--	1320000	760000	--	--	--	28	<3
August 7, 2012	5870000	--	2380000	--	--	5970000	5960000	--	--	--	<3	<3
August 14, 2012	2890000	--	1880000	--	--	3070000	1800000	--	--	--	13	<3
September 6, 2012	30000	--	--	730000	--	--	43000	--	--	--	--	<3
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	12120000	--	--	19000	--	--	--	--	<3
Average	5698000	2748750	3711250	6425000	9432	4723889	3973950	847	30000	1940000	13	<3
Min	30000	245000	280000	730000	79	225000	19000	<300	30000	1940000	<3	<3
Max	24240000	5870000	16960000	12120000	30000	>24240000	5960000	1900	30000	1940000	39	<3

Total Coliforms (TC) (cfu/100mls)

Detection Limits for City of Peterborough Lab: 0 CFU/100mL

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	1740000	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	8900000	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	--	3500000	--	--	--	--	--	--	--	--	--	--
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	>3000000	--	--	--	--	--	--	--	--	--	--	--
August 1, 2012		--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	NDOGT	--	--	--	--	--	--	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 10, 2012	6800000	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	12260000	4713333										
Min	6800000	1740000										
Max	>24240000	8900000										

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	125000	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	--	--	--	--	--	178000	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	--	--	--	--	--	--	406000	--	--	--	--	--
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	--	--	--	--	--	--	1030000	--	--	--	--	--
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	--	--	--	--	--	--	NDOGT	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 10, 2012	--	--	--	--	--	--	80000	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average							638800			12182500		
Min							80000			125000		
Max							>1500000			>24240000		

E.coli (EC) (cfu/100mls)

Detection Limits for CAWT Lab: 3 CFU/100mL For values listed as <, 1.5 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	16960000	160000	1065000	390000	6850000	615000	435000	--	330000	395000	--	--
June 20, 2012	120000	30000	30000	140000	110000	25000	50000	25000	--	--	--	--
June 27, 2012	440000	390000	15000	55000	220000	95000	195000	47500	--	--	--	47500
July 5th, 2012	2760000	320000	860000	430000	260000	280000	360000	320000	--	--	--	390000
July 11, 2012	660000	2720000	380000	430000	5870000	940000	1060000	830000	--	--	--	920000
July 18, 2012	2360000	130000	380000	440000	490000	490000	550000	620000	--	--	--	790000
July 25, 2012	6440000	30000	30000	160000	600000	460000	250000	220000	--	--	--	520000
August 1, 2012	<120000	300000	50000	260000	100000	110000	80000	80000	--	--	--	190000
August 7, 2012	4960000	3120000	6040000	980000	1440000	440000	900000	440000	--	--	--	360000
August 14, 2012	1120000	2460000	380000	1040000	860000	600000	560000	560000	--	--	--	430000
September 6, 2012	320000	360000	1960000	160000	720000	60000	100000	--	--	--	165000	40000
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	520000	100000	1120000	490000	460000	830000	520000	--	--	--	1400000	--
Average	3060000	843333	1025833	414583	1498333	412083	421667	349167	330000	395000	782500	409722
Min	<120000	30000	15000	55000	100000	25000	50000	25000	330000	395000	165000	40000
Max	16960000	3120000	6040000	1040000	6850000	940000	1060000	830000	330000	395000	1400000	920000

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	470000	680000	--	30000	--	--	--	3000	595000	<3	<3
June 20, 2012	55000	55000	30000	--	<7500	15000	--	<300	--	--	<3	<3
June 27, 2012	62500	--	--	--	<300	27500	27500	<300	--	--	8	<3
July 5th, 2012	80000	--	--	--	5	330000	220000	30	--	--	3	<3
July 11, 2012	860000	100000	280000	--	--	250000	100000	--	--	--	5	<3
July 18, 2012	130000	1230000	220000	--	--	80000	160000	--	--	--	<3	<3
July 25, 2012	1100000	220000	130000	--	--	220000	250000	--	--	--	<3	<3
August 1, 2012	190000	130000	130000	--	--	80000	100000	--	--	--	11	<3
August 7, 2012	550000	980000	2380000	--	--	870000	1580000	--	--	--	<3	<3
August 14, 2012	590000	460000	490000	--	--	620000	440000	--	--	--	3	<3
September 6, 2012	30000	--	--	40000	--	--	22000	--	--	--	--	<3
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	<3
September 13, 2012	--	--	--	--	--	--	3000	--	--	--	--	<3
Average	364750	455625	542500	40000	8476	276944	290250	833	3000	595000	4	<3
Min	30000	55000	30000	40000	5	15000	3000	30	3000	595000	<3	<3
Max	1100000	1230000	2380000	40000	30000	870000	1580000	<300	3000	595000	11	<3

E.coli (EC) (cfu/100mls)

Detection Limits for City of Peterborough Lab: 0 CFU/100mL

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	220000	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	1500000	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	--	1100000	--	--	--	--	--	--	--	--	--	--
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	3000000	--	--	--	--	--	--	--	--	--	--	--
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	2600000	--	--	--	--	--	--	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 10, 2012	1000000	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	2200000	940000										
Min	1000000	220000										
Max	3000000	1500000										

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	46000	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	--	--	--	--	--	28000	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	--	--	--	--	--	--	134000	--	--	--	--	--
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	--	--	--	--	--	--	80000	--	--	--	--	--
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	--	--	--	--	--	--	840000	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 10, 2012	--	--	--	--	--	--	20000	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--		--	--	--	--	--
Average							220400			46000		
Min							20000			46000		
Max							840000			46000		

Dissolved Oxygen (DO) (mg/L)

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	0.47	--	--	--	--	--	--	--	--	--	--
June 15, 2012	7.18	9.69	9.20	8.94	8.97	9.25	10.31	--	10.36	10.25	--	--
June 20, 2012	5.08	6.67	6.48	7.07	7.22	8.15	8.08	8.83	--	--	--	--
June 27, 2012	3.89	6.97	5.30	4.64	6.58	6.01	3.50	5.19	--	--	--	6.26
July 5th, 2012	3.99	7.90	6.86	7.56	7.04	6.59	7.96	6.76	--	--	--	7.23
July 11, 2012	6.04	6.37	6.31	6.73	6.45	8.13	7.49	8.98	--	--	--	8.35
July 18, 2012	5.92	6.78	5.97	7.16	7.60	8.02	7.77	8.31	--	--	--	8.38
July 25, 2012	0.31	6.36	5.13	6.44	3.82	6.84	7.82	8.82	--	--	--	8.99
August 1, 2012	9.27	5.27	5.71	7.74	7.88	9.10	8.46	9.73	--	--	--	9.34
August 7, 2012	6.90	7.07	5.86	6.79	7.68	7.97	7.27	9.17	--	--	--	9.09
August 14, 2012	3.17	6.51	6.10	7.71	6.35	7.30	8.11	8.10	--	--	--	7.85
September 6, 2012	9.33	7.77	6.05	8.97	10.48	11.09	10.18	10.11	--	--	10.11	10.37
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	8.42	8.24	11.70	10.17	9.91	11.67	11.10	9.40	--	--	9.40	--
Average	5.79	6.62	6.72	7.49	7.50	8.34	8.17	8.49	10.36	10.25	9.76	8.43
Min	0.31	0.47	5.13	4.64	3.82	6.01	3.50	5.19	10.36	10.25	9.40	6.26
Max	9.33	9.69	11.70	10.17	10.48	11.67	11.10	10.11	10.36	10.25	10.11	10.37

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	9.72	10.38	--	13.00	--	--	--	12.75	10.06	13.16	--
June 20, 2012	9.48	6.38	9.36	--	10.39	--	--	9.79	--	--	12.82	--
June 27, 2012	6.79			--	10.15	6.58	6.70	9.51	--	--	12.89	--
July 5th, 2012	7.12			--	11.43	7.15	7.50	11.30	--	--	12.30	8.35
July 11, 2012	6.90	6.65	7.88	--	--	7.44	8.20	--	--	--	12.00	7.42
July 18, 2012	7.89	7.83	6.78	--	--	7.56	6.81	--	--	--	11.10	7.43
July 25, 2012	8.44	7.67	8.00	--	--	7.23	9.25	--	--	--	12.19	7.86
August 1, 2012	9.38	9.05	9.56	--	--	9.86	9.71	--	--	--	12.51	7.43
August 7, 2012	6.96	7.55	7.86	--	--	7.96	6.92	--	--	--	11.71	7.56
August 14, 2012	8.20	0.33	7.64	--	--	7.51	7.24	--	--	--	12.90	7.50
September 6, 2012	7.28	--	--	11.56	--	--	12.38	--	--	--	--	7.47
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	
September 13, 2012	--	--	--	--	--	--	9.41	--	--	--	--	7.42
Average	7.84	6.90	8.43	11.56	11.24	7.66	8.41	10.20	12.75	10.06	12.36	7.60
Min	6.79	0.33	6.78	11.56	10.15	6.58	6.70	9.51	12.75	10.06	11.10	7.42
Max	9.48	9.72	10.38	11.56	13.00	9.86	12.38	11.30	12.75	10.06	13.16	8.35

Conductivity (µS)

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	490	346	333	447	519	464	478	--	489	469	--	--
June 20, 2012	303	350	283	423	368	500	549	600	--	--	--	--
June 27, 2012	444	276	279	499	564	588	602	596	--	--	--	602
July 5th, 2012	588	776	610	683	775	716	526	687	--	--	--	559
July 11, 2012	418	490	403	1156	734	853	787	798	--	--	--	1017
July 18, 2012	485	472	679	666	627	775	742	788	--	--	--	769
July 25, 2012	432	320	380	598	664	859	651	720	--	--	--	986
August 1, 2012	913	358	345	626	619	754	734	812	--	--	--	736
August 7, 2012	365	344	537	1087	677	953	920	827	--	--	--	903
August 14, 2012	560	488	401	616	902	868	934	870	--	--	--	926
September 6, 2012	374	503	526	651	797	1061	1099	--	--	--	1105	1123
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	358	398	662	369	361	460	811	--	--	--	897	--
Average	478	427	453	652	634	738	736	744	489	469	1001	847
Min	303	276	279	369	361	460	478	596	489	469	897	559
Max	913	776	679	1156	902	1061	1099	870	489	469	1105	1123

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	386	630	--	--
June 15, 2012	--	495	531	--	349	--	--	--	--	--	97	2
June 20, 2012	612	776	744	--	1093	621	--	932	--	--	137	3
June 27, 2012	500	--	--	--	597	562	544	869	--	--	136	3
July 5th, 2012	597	--	--	--	976	641	600	1665	--	--	197	3
July 11, 2012	719	882	1151	--	--	883	713	--	--	--	160	3
July 18, 2012	804	785	913	--	--	823	981	--	--	--	159	2
July 25, 2012	558	610	711	--	--	662	720	--	--	--	226	2
August 1, 2012	729	1084	1077	--	--	755	803	--	--	--	292	2
August 7, 2012	833	850	877	--	--	933	896	--	--	--	386	2
August 14, 2012	955	991	780	--	--	730	808	--	--	--	13	3
September 6, 2012	1109	--	--	1093	--	--	1127	--	--	--	--	3
September 10, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	1230	--	--	--	--	2
Average	742	809	848	1093	754	734	842	1155	386	630	180	2
Min	500	495	531	1093	349	562	544	869	386	630	13	2
Max	1109	1084	1151	1093	1093	933	1230	1665	386	630	386	3

Aluminum (Al) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0006 mg/L For values listed as <, 0.0003 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.2580	0.4300	0.4990	5.5100	3.8100	6.8200	35.1000	--	1.9200	2.9100	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.9200	0.1090	0.1200	2.8400	2.2700	0.4420	2.5600	0.8320	--	--	--	2.4800
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.3080	0.8550	0.0631	0.7850	1.1600	1.3300	1.0000	0.6180	--	--	--	0.7660
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.2360	0.1800	0.4310	0.5260	1.8700	0.6410	0.3270	0.2690	--	--	--	0.2130
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.1890	0.0611	0.2040	1.1900	0.3760	0.4550	0.6520	0.6710	--	--	--	0.4230
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0619	0.0548	0.1930	0.4240	0.4600	0.2920	0.3690	--	--	--	0.3090	0.1180
September 10, 2012	0.1790	0.0471	0.0998	0.9820	0.7140	2.1100	0.6140	--	--	--	0.3080	0.2260
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.3074	0.2481	0.2300	1.7510	1.5229	1.7271	5.8031	0.5975	1.9200	2.9100	0.3085	0.7043
Min	0.0619	0.0471	0.0631	0.4240	0.3760	0.2920	0.3270	0.2690	1.9200	2.9100	0.3080	0.1180
Max	0.9200	0.8550	0.4990	5.5100	3.8100	6.8200	35.1000	0.8320	1.9200	2.9100	0.3090	2.4800

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	5.1000	10.5000	--	25.9000	--	--	--	34.3000	16.1000	0.0831	0.0062
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	1.6100	--	--	--	3.6100	7.6900	8.3100	12.0000	--	--	0.5560	0.0015
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	2.0700	1.6200	0.9370	--	--	2.2800	0.8900	--	--	--	0.0228	<0.0006
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.3600	0.5540	0.2740	--	--	1.0300	0.3570	--	--	--	<0.0006	0.0112
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	1.4100	0.8810	0.2840	--	--	0.5930	0.7650	--	--	--	<0.0006	0.0154
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.6430	--	--	0.5150	--	--	2.2400	--	--	--	--	0.0029
September 10, 2012	--	--	--	--	--	--	0.6220	--	--	--	--	<0.0006
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	1.2186	2.0388	2.9988	0.5150	14.7550	2.8983	2.1973	12.0000	34.3000	16.1000	0.1325	0.0054
Min	0.3600	0.5540	0.2740	0.5150	3.6100	0.5930	0.3570	12.0000	34.3000	16.1000	<0.0006	<0.0006
Max	2.0700	5.1000	10.5000	0.5150	25.9000	7.6900	8.3100	12.0000	34.3000	16.1000	0.5560	0.0154

Antimony (Sb) (mg/L)

Detection Limits for City of Peterborough Lab: 0.002 mg/L For values listed as <, 0.001 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.005	--	<0.002	<0.002	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	<0.002
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	0.002
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	<0.002
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	<0.002
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0019	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	<0.002	<0.002
September 10, 2012	0.007	<0.002	<0.002	0.006	<0.002	<0.002	<0.002	--	--	--	0.003	<0.002
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0018	0.0010	0.0010	0.0017	0.0010	0.0010	0.0016	0.0010	<0.002	<0.002	0.0022	0.0012
Min	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Max	0.0065	0.0000	0.0000	0.0058	0.0000	0.0000	0.0050	0.0000	<0.002	<0.002	0.0034	0.0020

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.002	<0.002	--	<0.002	--	--	--	<0.002	0.002	<0.002	<0.002
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.002	--	--	--	<0.002	<0.002	0.003	<0.002	--	--	<0.002	<0.002
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.004	<0.002	<0.002	--	--	<0.002	0.002	--	--	--	0.003	<0.002
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.002	<0.002	<0.002	--	--	<0.002	<0.002	--	--	--	<0.002	<0.002
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.002	<0.002	<0.002	--	--	<0.002	<0.002	--	--	--	<0.002	<0.002
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.002	--	--	<0.002	--	--	<0.002	--	--	--	--	<0.002
September 10, 2012	--	--	--	--	--	--	<0.002	--	--	--	--	<0.002
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0016	0.0010	0.0010	<0.002	<0.002	<0.002	0.0015	<0.002	<0.002	0.0020	0.0014	<0.002
Min	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Max	0.0040	0.0000	0.0000	0.0000	0.0000	0.0000	0.0030	<0.002	<0.002	0.0020	0.0030	<0.002

Arsenic (As) (mg/L)

Detection Limits for City of Peterborough Lab: 0.006 mg/L For values listed as <, 0.003 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.006	<0.006	<0.006	<0.006	<0.006	0.008	0.015	--	<0.006	<0.006	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.006	<0.006	<0.006	<0.006	0.008	<0.006	0.006	0.010	--	--	--	<0.006
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.006	0.007	<0.006	<0.006	<0.006	<0.006	<0.006	0.008	--	--	--	<0.006
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	--	--	--	<0.006
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.007	0.010	<0.006	<0.006	<0.006	<0.006	0.006	<0.006	--	--	--	<0.006
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.013	0.010	<0.006	0.011	<0.006	0.008	0.010	--	--	--	0.021	0.011
September 10, 2012	<0.006	<0.006	<0.006	<0.006	<0.006	<0.025	<0.006	--	--	--	<0.006	<0.006
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.005	0.006	<0.006	0.004	0.004	0.004	0.007	0.006	<0.006	<0.006	0.012	0.004
Min	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Max	0.013	0.010	<0.006	0.011	0.008	0.008	0.015	0.010	0.000	0.000	0.021	0.011

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.006	<0.006	--	0.020	--	--	--	0.019	<0.006	<0.006	<0.006
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.006	--	--	--	<0.006	<0.006	<0.006	0.010	--	--	<0.006	<0.006
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.006	<0.006	<0.006	--	--	<0.006	<0.006	--	--	--	<0.006	<0.006
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.006	<0.006	<0.006	--	--	<0.006	<0.006	--	--	--	<0.006	<0.006
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.02	0.007	0.007	--	--	0.010	<0.006	--	--	--	<0.006	<0.006
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.013	--	--	0.014	--	--	0.010	--	--	--	--	<0.006
September 10, 2012	--	--	--	--	--	--	<0.006	--	--	--	--	<0.006
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.006	0.004	0.003	0.014	0.012	0.005	0.004	0.010	0.019	<0.006	<0.006	<0.006
Min	<0.006	<0.006	<0.006	0.014	<0.006	<0.006	<0.006	0.010	0.019	<0.006	<0.006	<0.006
Max	0.013	0.007	0.007	0.014	0.020	0.010	0.010	0.010	0.019	<0.006	<0.006	<0.006

Barium (Ba) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0002 mg/L For values listed as <, 0.0001 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.0663	0.0053	0.0675	0.0690	0.0650	0.0936	0.1290	--	0.0616	0.0790	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0275	0.0044	0.0044	0.0187	0.0144	0.0129	0.0196	0.0136	--	--	--	0.0148
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0065	0.0099	0.0051	0.0118	0.0120	0.0152	0.0150	0.0138	--	--	--	0.0142
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0075	0.0084	0.0054	0.0089	0.0135	0.0141	0.0114	0.0109	--	--	--	0.0112
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0102	0.0058	0.0066	0.0160	0.0072	0.0110	0.0126	0.0125	--	--	--	0.0113
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0046	0.0051	0.0056	0.0093	0.0055	0.0157	0.0189	--	--	--	0.0183	0.0203
September 10, 2012	0.0074	0.0041	0.0049	0.0088	0.0065	0.0176	0.0176	--	--	--	0.0182	0.0174
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0186	0.0061	0.0142	0.0204	0.0177	0.0257	0.0320	0.0127	0.0616	0.0790	0.0183	0.0149
Min	0.0046	0.0041	0.0044	0.0088	0.0055	0.0110	0.0114	0.0109	0.0616	0.0790	0.0182	0.0112
Max	0.0663	0.0099	0.0675	0.0690	0.0650	0.0936	0.1290	0.0138	0.0616	0.0790	0.0183	0.0203

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.0718	0.0744	--	0.1100	--	--	--	0.1290	0.0762	0.0030	<0.0002
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0124	--	--	--	0.0161	0.0206	0.0207	0.0238	--	--	0.0054	<0.0002
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0179	0.0201	0.0186	--	--	0.0180	0.0132	--	--	--	0.0023	<0.0002
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0099	0.0117	0.0104	--	--	0.0136	0.0104	--	--	--	0.0002	0.0027
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0162	0.0138	0.0117	--	--	0.0130	0.0156	--	--	--	<0.0002	0.0052
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0199	--	--	0.0197	--	--	0.0228	--	--	--	--	0.0004
September 10, 2012	--	--	--	--	--	--	0.0177	--	--	--	--	<0.0002
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0153	0.0294	0.0288	0.0197	0.0631	0.0163	0.0167	0.0238	0.1290	0.0762	0.0022	0.0012
Min	0.0099	0.0117	0.0104	0.0197	0.0161	0.0130	0.0104	0.0238	0.1290	0.0762	<0.0002	<0.0002
Max	0.0199	0.0718	0.0744	0.0197	0.1100	0.0206	0.0228	0.0238	0.1290	0.0762	0.0054	0.0052

Beryllium (Be) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0002 mg/L For values listed as <, 0.0001 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	--	<0.0002	<0.0002	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	<0.0002
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	<0.0002
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	<0.0002
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	<0.0002
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	<0.0002	<0.0002
September 10, 2012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	<0.0002	<0.0002
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Min	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Max	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.0002	<0.0002	--	0.0007	--	--	--	0.0010	<0.0002	<0.0002	<0.0002
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.0002	--	--	--	<0.0002	0.0002	0.0002	0.0003	--	--	<0.0002	<0.0002
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.0002	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	--	0.0003	<0.0002
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.0002	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	--	<0.0002	<0.0002
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.0002	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	--	<0.0002	<0.0002
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0002	--	--	<0.0002	--	--	<0.0002	--	--	--	--	<0.0002
September 10, 2012	--	--	--	--	--	--	<0.0002	--	--	--	--	<0.0002
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.0002	<0.0002	<0.0002	<0.0002	0.0004	0.0001	0.0001	0.0003	0.0010	<0.0002	0.0001	<0.0002
Min	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	0.0010	<0.0002	<0.0002	<0.0002
Max	<0.0002	<0.0002	<0.0002	<0.0002	0.0007	0.0002	0.0002	0.0003	0.0010	<0.0002	0.0003	<0.0002

Boron (B) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0004 mg/L   For values listed as <, 0.0002 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0220	0.0211	0.0206	0.0772	0.0735	0.1020	0.1030	0.1200	--	--	--	0.1080
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0286	0.0321	0.2180	0.0973	0.0487	0.1290	0.1270	0.1250	--	--	--	0.1300
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0257	0.0164	0.0202	0.0649	0.0163	0.1440	0.2100	--	--	--	0.2250	0.1950
September 10, 2012	0.1440	0.0294	0.0193	0.0524	0.0221	0.1120	0.2010	--	--	--	0.1560	0.1780
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0551	0.0248	0.0695	0.0730	0.0402	0.1218	0.1603	0.1225			0.1905	0.1528
Min	0.0220	0.0164	0.0193	0.0524	0.0163	0.1020	0.1030	0.1200			0.1560	0.1080
Max	0.1440	0.0321	0.2180	0.0973	0.0735	0.1440	0.2100	0.1250			0.2250	0.1950

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0923	0.1120	0.1320	--	--	0.0958	0.1090	--	--	--	0.0012	0.0042
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.1130	0.1150	0.1200	--	--	0.1360	0.1550	--	--	--	0.0044	<0.0004
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.1800	--	--	0.1840	--	--	0.2030	--	--	--	--	0.0056
September 10, 2012	--	--	--	--	--	--	0.1610	--	--	--	--	0.0028
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.1284	0.1135	0.1260	0.1840		0.1159	0.1570				0.0028	0.0032
Min	0.0923	0.1120	0.1200	0.1840		0.0958	0.1090				0.0012	<0.0004
Max	0.1800	0.1150	0.1320	0.1840		0.1360	0.2030				0.0044	0.0056

Cadmium (Cd) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0003 mg/L   For values listed as <, 0.00015 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.0003	<0.0003	<0.0003	0.0007	0.0006	0.0008	0.0019	--	0.0003	0.0003	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	--	--	<0.0003
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	--	--	<0.0003
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0022	0.0009	<0.0003	0.0004	<0.0003	0.0005	0.0004	<0.0003	--	--	--	<0.0003
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.0003	<0.0003	0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	--	--	<0.0003
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	--	--	<0.0003	<0.0003
September 10, 2012	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0005	0.0003	--	--	--	<0.0003	<0.0003
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0004	0.0003	0.0002	0.0003	0.0002	0.0003	0.0005	<0.0003	0.0003	0.0003	<0.0003	<0.0003
Min	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0003	0.0003	<0.0003	<0.0003
Max	0.0022	0.0009	0.0003	0.0007	0.0006	0.0008	0.0019	0.0000	0.0003	0.0003	0.0000	0.0000

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.0006	0.0011	--	0.0024	--	--	--	0.0039	0.0014	<0.0003	<0.0003
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.0003	--	--	--	<0.0003	0.0006	0.0004	0.0015	--	--	<0.0003	<0.0003
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.0003	<0.0003	<0.0003	--	--	<0.0003	<0.0003	--	--	--	<0.0003	<0.0003
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.0003	<0.0003	<0.0003	--	--	<0.0003	0.0003	--	--	--	<0.0003	<0.0003
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.0003	<0.0003	<0.0003	--	--	<0.0003	<0.0003	--	--	--	<0.0003	<0.0003
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0004	--	--	0.0003	--	--	<0.0003	--	--	--	--	<0.0003
September 10, 2012	--	--	--	--	--	--	<0.0003	--	--	--	--	<0.0003
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0002	0.0003	0.0004	0.0003	0.0013	0.0003	0.0002	0.0015	0.0039	0.0014	<0.0003	<0.0003
Min	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Max	0.0004	0.0006	0.0011	0.0003	0.0024	0.0006	0.0004	0.0015	0.0039	0.0014	<0.0003	<0.0003

Calcium (Ca) (mg/L)

Detection Limits for City of Peterborough Lab: 0.004 mg/L For values listed as <, 0.002 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	37.5	36.8	37.0	71.8	59.8	90.8	430	--	67.2	67.1	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	40.3	32.3	33.6	57.9	48.4	47.6	62.5	51.9	--	--	--	66.1
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	37.1	44.7	36.9	48.8	46.7	53.8	50.6	49.9	--	--	--	49.9
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	34.8	32.5	33.3	40.0	50.2	50.5	44.8	44.7	--	--	--	48.2
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	41.9	29.6	30.8	57.1	39.0	45.1	47.5	46.2	--	--	--	45.5
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	33.7	37.1	38.4	44.9	38.8	50.0	52.0	--	--	--	54.3	55.0
September 10, 2012	34.7	30.6	32.4	44.4	38.4	70.1	51.4	--	--	--	55.5	49.6
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	37.1	34.8	34.6	52.1	45.9	58.3	106	48.2	67.2	67.1	54.9	52.4
Min	33.7	29.6	30.8	40.0	38.4	45.1	44.8	44.7	67.2	67.1	54.3	45.5
Max	41.9	44.7	38.4	71.8	59.8	90.8	430	51.9	67.2	67.1	55.5	66.1

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	97.6	165	--	237	--	--	--	317	210	27.4	<0.004
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	57.2	--	--	--	67.9	92.7	76.5	111	--	--	29.6	0.038
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	59.1	56.6	59.6	--	--	62.2	53.4	--	--	--	19.4	0.022
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	39.4	43.3	43.3	--	--	48.0	45.6	--	--	--	0.581	27.9
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	56.1	48.8	48.4	--	--	49.7	53.3	--	--	--	<0.004	50.2
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	53.2	--	--	52.5	--	--	63.1	--	--	--	--	1.24
September 10, 2012	--	--	--	--	--	--	52.8	--	--	--	--	0.121
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	53.0	61.6	79.1	52.5	152	63.2	57.5	111	317	210	15.4	11.4
Min	39.4	43.3	43.3	52.5	67.9	48.0	45.6	111	317	210	<0.004	<0.004
Max	59.1	97.6	165	52.5	237	92.7	76.5	111	317	210	29.6	50.2

Cesium (Cs) (mg/L)

Detection Limits for City of Peterborough Lab: 0.001 mg/L For values listed as <, 0.0005 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	--	<0.005	<0.001	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	--	<0.001
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.015	<0.001	<0.001	--	--	--	<0.001
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.001	<0.040	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	--	--	--	<0.001
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	--	<0.001
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.001	<0.005	<0.080	<0.010	<0.001	<0.060	<0.001	--	--	--	<0.120	<0.001
September 10, 2012	<0.001	<0.001	<0.015	<0.030	<0.001	<0.001	<0.200	--	--	--	<0.001	<0.001
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.001	0.000	0.006	0.003	<0.001	0.006	0.015	<0.001	<0.005	<0.001	0.030	<0.001
Min	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001
Max	<0.001	<0.040	<0.080	<0.030	<0.001	<0.060	<0.200	<0.001	<0.005	<0.001	<0.120	<0.001

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.001	<0.010	--	<0.050	--	--	--	<0.060	<0.001	<0.001	<0.001
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.001	--	--	--	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.025	<0.001	<0.001	--	--	<0.001	<0.001	--	--	--	<0.001	<0.010
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.001	<0.001	<0.001	--	--	<0.001	<0.001	--	--	--	<0.100	<0.001
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.001	<0.001	<0.001	--	--	<0.001	<0.001	--	--	--	<0.001	<0.001
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.001	--	--	<0.21	--	--	<0.300	--	--	--	--	<0.001
September 10, 2012		--	--	--	--	--	<0.050	--	--	--	--	<0.001
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.003	<0.001	<0.001	<0.210	0.013	<0.001	0.030	<0.001	<0.060	<0.001	<0.001	<0.001
Min	<0.001	<0.001	<0.001	<0.210	<0.001	<0.001	<0.001	<0.001	<0.060	<0.001	<0.001	<0.001
Max	<0.025	<0.001	<0.001	<0.210	<0.050	<0.001	<0.300	<0.001	<0.060	<0.001	<0.100	<0.010

Chromium (Cr) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0005 mg/L For values listed as <, 0.00025 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.0006	0.0009	0.0011	0.0098	0.0062	0.0116	0.0255	--	0.0024	0.0050	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0022	<0.0005	<0.0005	0.0061	0.0045	<0.0005	0.0051	0.0008	--	--	--	0.0042
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0006	0.0037	<0.0005	0.0022	0.0019	0.0024	0.0022	0.0010	--	--	--	0.0021
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0005	0.0025	0.0018	0.0010	0.0039	0.0011	<0.0005	0.0008	--	--	--	<0.0005
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0006	<0.0005	<0.0005	0.0023	0.0007	0.0011	0.0012	0.0007	--	--	--	<0.0005
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0005	0.0008	0.0006	0.0009	0.0007	0.0012	0.0005	--	--	--	<0.0005	0.0006
September 10, 2012	0.0010	<0.0005	<0.0005	0.0015	0.0012	0.0035	0.0013	--	--	--	0.0006	<0.0005
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0008	0.0012	0.0006	0.0034	0.0027	0.0030	0.0052	0.0008	0.0024	0.0050	0.0004	0.0015
Min	<0.0005	<0.0005	<0.0005	0.0009	0.0007	<0.0005	<0.0005	0.0007	0.0024	0.0050	<0.0005	<0.0005
Max	0.0022	0.0037	0.0018	0.0098	0.0062	0.0116	0.0255	0.0010	0.0024	0.0050	0.0006	0.0042

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.0043	0.0065	--	0.0407	--	--	--	0.0519	0.0093	0.0010	<0.0005
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	
June 27, 2012	0.0029	--	--	--	0.0072	0.0175	0.0188	0.0279	--	--	<0.0005	<0.0005
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	
July 11, 2012	0.0042	0.0029	0.0015	--	--	0.0044	0.0012	--	--	--	<0.0005	<0.0005
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0018	--	<0.0005	--	--	0.0017	<0.0005	--	--	--	<0.0005	<0.0005
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0034	0.0014	0.0008	--	--	0.0008	0.0013	--	--	--	<0.0005	<0.0005
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0013	--	--	0.0010	--	--	0.0033	--	--	--	--	<0.0005
September 10, 2012	--	--	--	--	--	--	<0.0005	--	--	--	--	<0.0005
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0027	0.0029	0.0023	0.0010	0.0240	0.0061	0.0042	0.0279	0.0519	0.0093	0.0004	<0.0005
Min	0.0013	0.0014	<0.0005	0.0010	0.0072	0.0008	<0.0005	0.0279	0.0519	0.0093	<0.0005	<0.0005
Max	0.0042	0.0043	0.0065	0.0010	0.0407	0.0175	0.0188	0.0279	0.0519	0.0093	0.0010	<0.0005

Cobalt (Co) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0004 mg/L For values listed as <, 0.0002 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.0004	<0.0004	<0.0004	0.0090	0.0057	0.0165	0.0302	--	0.0086	0.0135	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0006	<0.0004	<0.0004	0.0142	0.0064	0.0137	0.0162	0.0210	--	--	--	0.0169
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.0004	<0.0004	<0.0004	0.0070	0.0025	0.0109	0.0107	0.0114	--	--	--	0.0107
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.0004	<0.0004	<0.0004	0.0031	0.0019	0.0044	0.0048	0.0046	--	--	--	0.0055
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.0004	<0.0004	<0.0004	0.0030	<0.0004	0.0035	0.0043	0.0044	--	--	--	0.0036
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0004	<0.0004	<0.0004	0.0010	<0.0004	0.0055	0.0058	--	--	--	0.0056	0.0087
September 10, 2012	0.0006	<0.0004	<0.0004	0.0023	0.0014	0.0069	0.0059	--	--	--	0.0055	0.0082
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0003	<0.0004	<0.0004	0.0057	0.0026	0.0088	0.0111	0.0104	0.0086	0.0135	0.0056	0.0089
Min	<0.0004	<0.0004	<0.0004	0.0010	<0.0004	0.0035	0.0043	0.0044	0.0086	0.0135	0.0055	0.0036
Max	0.0006	0.0000	0.0000	0.0142	0.0064	0.0165	0.0302	0.0210	0.0086	0.0135	0.0056	0.0169

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.0064	0.0064	--	0.0277	--	--	--	0.0358	0.0080	<0.0004	<0.0004
June 20, 2012	--	--	--	--		--	--	--	--	--	--	--
June 27, 2012	0.0166	--	--	--	0.0165	0.0192	0.0152	0.0217	--	--	<0.0004	<0.0004
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0111	0.0127	0.0144	--	--	0.0109	0.0102	--	--	--	<0.0004	<0.0004
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0051	0.0052	0.0050	--	--	0.0062	0.0052	--	--	--	<0.0004	<0.0004
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0050	0.0042	0.0036	--	--	0.0045	0.0046	--	--	--	<0.0004	<0.0004
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0084	--	--	0.0085	--	--	0.0083	--	--	--	--	<0.0004
September 10, 2012	--	--	--	--	--	--	0.0075	--	--	--	--	<0.0004
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0092	0.0071	0.0074	0.0085	0.0221	0.0102	0.0085	0.0217	0.0358	0.0080	<0.0004	<0.0004
Min	0.0050	0.0042	0.0036	0.0085	0.0165	0.0045	0.0046	0.0217	0.0358	0.0080	<0.0004	<0.0004
Max	0.0166	0.0127	0.0144	0.0085	0.0277	0.0192	0.0152	0.0217	0.0358	0.0080	<0.0004	<0.0004

Copper (Cu) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0004 mg/L   For values listed as <, 0.0002 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.4730	0.1110	0.1140	0.0974	0.1010	0.1620	0.2300	--	0.0228	0.0260	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.3520	0.1550	0.1220	0.1460	0.0768	0.0388	0.1470	0.0604	--	--	--	0.0578
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.1550	0.1490	0.2710	0.1650	0.2310	0.1420	0.1580	0.0996	--	--	--	0.0981
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.6420	0.2170	0.3640	0.5840	3.1600	0.5460	0.3230	0.2130	--	--	--	0.2570
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.2750	0.1320	0.2180	0.3740	0.1260	0.1150	0.1600	0.1230	--	--	--	0.1000
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.2240	0.1590	0.1700	0.1100	0.1120	0.0618	0.0571	--	--	--	0.0536	0.0389
September 10, 2012	0.7060	0.1500	0.3030	0.3240	0.2840	0.4960	--	--	--	--	0.0498	0.0375
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.4039	0.1533	0.2231	0.2572	0.5844	0.2231	0.1792	0.1240	0.0228	0.0260	0.0517	0.0982
Min	0.1550	0.1110	0.1140	0.0974	0.0768	0.0388	0.0571	0.0604	0.0228	0.0260	0.0498	0.0375
Max	0.7060	0.2170	0.3640	0.5840	3.1600	0.5460	0.3230	0.2130	0.0228	0.0260	0.0536	0.2570

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.0268	0.0358	--	0.1360	--	--	--	0.1480	0.0488	<0.0004	<0.0004
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0371	--	--	--	0.0446	0.0465	0.0278	0.0374	--	--	0.0023	0.0015
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.2340	0.1610	0.1080	--	--	0.2920	0.0816	--	--	--	0.0007	0.0015
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.4440	0.6450	0.5090	--	--	1.1000	0.8500	--	--	--	0.0043	<0.0004
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.2090	0.1720	0.0953	--	--	0.1300	0.1380	--	--	--	0.0017	0.0006
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0354	--	--	0.0343	--	--	0.0304	--	--	--	--	0.0037
September 10, 2012	--	--	--	--	--	--	0.0362	--	--	--	--	0.0012
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.1919	0.2512	0.1870	0.0343	0.0903	0.3921	0.1940	0.0374	0.1480	0.0488	0.0018	0.0013
Min	0.0354	0.0268	0.0358	0.0343	0.0446	0.0465	0.0278	0.0374	0.1480	0.0488	<0.0004	<0.0004
Max	0.4440	0.6450	0.5090	0.0343	0.1360	1.1000	0.8500	0.0374	0.1480	0.0488	0.0043	0.0037

Iron (Fe) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0004 mg/L For values listed as <, 0.0002 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.4310	0.6050	0.7590	10.70	7.420	14.80	82.90	--	4.790	6.160	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	1.970	0.3330	0.2930	8.560	5.490	2.590	8.880	4.110	--	--	--	7.280
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.506	1.280	0.1160	2.030	2.780	3.360	2.820	2.320	--	--	--	2.480
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.3700	0.2030	0.2340	1.210	3.260	2.040	1.360	1.190	--	--	--	1.140
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.2860	0.0966	0.2100	2.230	0.734	1.180	1.650	1.730	--	--	--	1.220
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0708	0.1110	0.2290	0.785	0.881	0.741	1.040	--	--	--	1.010	0.721
September 10, 2012	0.2810	0.0856	0.1720	1.810	1.350	4.110	1.440	--	--	--	0.997	0.746
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.5593	0.3877	0.2876	3.904	3.131	4.117	14.30	2.338	4.790	6.160	1.004	2.265
Min	0.0708	0.0856	0.1160	0.7850	0.7340	0.7410	1.040	1.190	4.790	6.160	0.9970	0.7210
Max	1.970	1.280	0.759	10.70	7.420	14.80	82.90	4.110	4.790	6.160	1.010	7.280

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	10.20	8.03	--	52.30	--	--	--	71.00	38.80	0.1400	0.0017
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	5.060	--	--	--	9.70	20.20	19.60	26.70	--	--	1.270	0.0042
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	4.790	5.010	3.600	--	--	5.290	2.800	--	--	--	0.0393	0.0007
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	1.290	2.060	1.330	--	--	2.650	1.340	--	--	--	0.0011	0.0014
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	3.240	2.200	1.100	--	--	1.620	2.130	--	--	--	<0.0004	0.0030
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	1.460	--	--	1.190	--	--	3.720	--	--	--	--	0.0020
September 10, 2012		--	--	--	--	--	1.350	--	--	--	--	0.0014
September 13, 2012		--	--	--	--	--	--	--	--	--	--	--
Average	3.168	4.868	3.515	1.190	31.00	7.440	5.157	26.70	71.00	38.80	0.2901	0.0021
Min	1.290	2.060	1.100	1.190	9.700	1.620	1.340	26.70	71.00	38.80	<0.0004	0.0007
Max	5.060	10.20	8.030	1.190	52.30	20.20	19.60	26.70	71.00	38.80	1.270	0.0042

Lead (Pb) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0015 mg/L For values listed as <, 0.00075 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.0080	0.0023	0.0037	0.0058	0.0054	0.0093	0.0478	--	0.0016	<0.0015	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0105	0.0028	<0.0015	0.0071	0.0044	0.0023	0.0057	0.0037	--	--	--	0.0047
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.0015	0.0044	<0.0015	<0.0015	0.0036	<0.0015	0.0016	<0.0015	--	--	--	<0.0015
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0021	0.0029	0.0038	<0.0015	0.0157	<0.0015	<0.0015	<0.0015	--	--	--	<0.0015
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0030	0.0022	<0.0015	0.0056	<0.0015	<0.0015	0.0032	0.0017	--	--	--	<0.0015
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	--	--	--	<0.0015	<0.0015
September 10, 2012	0.0063	<0.0015	<0.0015	0.0052	<0.0015	0.0046	<0.0015	--	--	--	<0.0015	0.0019
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0045	0.0023	0.0016	0.0037	0.0045	0.0027	0.0087	0.0017	0.0016	<0.0015	<0.0015	0.0016
Min	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.0016	<0.0015	<0.0015	<0.0015
Max	0.0105	0.0044	0.0038	0.0071	0.0157	0.0093	0.0478	0.0037	0.0016	0.0000	0.0000	0.0047

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.0037	0.0046	--	0.0405	--	--	--	0.0489	0.0082	<0.0015	<0.0015
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0021			--	0.0021	0.0125	0.0120	0.0231	--	--	0.0017	<0.0015
July 5th, 2012	--			--	--	--	--	--	--	--	--	--
July 11, 2012	0.0040	0.0022	<0.0015	--	--	0.0055	<0.0015	--	--	--	<0.0015	<0.0015
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.0015	0.0024	<0.0015	--	--	0.0025	<0.0015	--	--	--	<0.0015	<0.0015
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0029	<0.0015	0.0022	--	--	<0.0015	0.0019	--	--	--	0.0025	<0.0015
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0015	--	--	0.0016	--	--	0.0017	--	--	--	--	<0.0015
September 10, 2012	--	--	--	--	--	--	<0.0015	--	--	--	--	<0.0015
September 13, 2012	--	--	--	--	--	--		--	--	--	--	--
Average	0.0021	0.0023	0.0021	0.0016	0.0213	0.0053	0.0034	0.0231	0.0489	0.0082	0.0013	<0.0015
Min	<0.0015	0.0022	<0.0015	0.0016	0.0021	<0.0015	<0.0015	0.0231	0.0489	0.0082	<0.0015	<0.0015
Max	0.0040	0.0037	0.0046	0.0016	0.0405	0.0125	0.0120	0.0231	0.0489	0.0082	0.0025	<0.0015

Lithium (Li) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0014 mg/L For values listed as <, 0.0007 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.0014	<0.0014	<0.0014	0.0054	0.0030	0.0084	0.0458	--	<0.0014	<0.0014	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.0014	<0.0014	<0.0014	0.0019	<0.0014	<0.0014	0.0022	<0.0014	--	--	--	0.0024
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	
July 11, 2012	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	--	--	--	<0.0014
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	
July 25, 2012	<0.0014	<0.0014	<0.005	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	--	--	--	<0.0014
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	
August 7, 2012	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	--	--	--	<0.0014
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	
September 6, 2012	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	--	--	--	<0.0014	<0.0014
September 10, 2012	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	--	--	--	<0.0014	<0.0014
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.0014	<0.0014	0.0007	0.0015	0.0010	0.0018	0.0074	<0.0014	<0.0014	<0.0014	<0.0014	0.0010
Min	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014
Max	<0.0014	<0.0014	0.0000	0.0054	0.0030	0.0084	0.0458	<0.0014	<0.0014	<0.0014	<0.0014	0.0024

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.0032	0.0095	--	0.0620	--	--	--	0.0867	0.0121	<0.0014	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.0014	--	--	--	0.0046	0.0128	0.0147	0.0255	--	--	<0.0014	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.0014	<0.0014	<0.0014	--	--	0.0025	<0.0014	--	--	--	<0.0014	<0.0014
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.0014	<0.0014	<0.0014	--	--	<0.0014	<0.0014	--	--	--	<0.0014	<0.0014
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.0014	<0.0014	<0.0014	--	--	<0.0014	<0.0014	--	--	--	<0.0014	<0.0014
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	<0.0014
September 6, 2012	<0.0014	--	--	<0.0014	--	--	<0.0014	--	--	--	--	<0.0014
September 10, 2012	--	--	--	--	--	--	<0.0014	--	--	--	--	--
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.0014	0.0013	0.0029	<0.0014	0.0333	0.0042	0.0030	0.0255	0.0867	0.0121	<0.0014	<0.0014
Min	<0.0014	<0.0014	<0.0014	<0.0014	0.0046	<0.0014	0.0147	0.0255	0.0867	0.0121	<0.0014	<0.0014
Max	<0.0014	0.0032	0.0095	<0.0014	0.0620	0.0128	0.0147	0.0255	0.0867	0.0121	<0.0014	<0.0014

Magnesium (Mg) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0003 mg/L For values listed as <, 0.00015 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	5.66	6.13	7.11	14.3	12.2	17.5	71.4	--	14.2	14.8	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	7.19	6.24	6.03	14.8	14.4	13.9	17.5	14.4	--	--	--	15.1
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	5.56	6.01	5.59	9.59	10.9	12.4	12.3	12.7	--	--	--	12.0
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	5.56	4.60	5.06	8.14	8.21	9.84	9.41	9.16	--	--	--	9.7
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	6.90	5.03	5.59	13.5	10.5	13.1	12.9	13.1	--	--	--	13.3
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	4.66	5.13	5.28	9.38	5.06	14.0	15.9	--	--	--	16.2	16.3
September 10, 2012	5.22	4.69	5.06	8.08	6.02	14.6	14.4	--	--	--	15.1	14.0
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	5.82	5.40	5.67	11.1	9.61	13.6	22.0	12.3	14.2	14.8	15.7	13.4
Min	4.66	4.60	5.06	8.08	5.06	9.84	9.41	9.16	14.2	14.8	15.10	9.70
Max	7.19	6.24	7.11	14.8	14.4	17.5	71.4	14.4	14.2	14.8	16.2	16.3

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012		19.9	30.6	--	42.3	--	--	--	57.9	39.9	5.62	<0.0003
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	13.9	--	--	--	17.0	23.4	33.2	33.6	--	--	4.80	0.020
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	13.9	16.4	17.8	--	--	13.9	13.2	--	--	--	4.80	0.021
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	8.6	10.7	10.9	--	--	11.8	11.6	--	--	--	0.202	6.41
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	14.5	12.8	14.1	--	--	14.4	15.7	--	--	--	<0.0003	12.30
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	15.5	--	--	15.8	--	--	19.8	--	--	--	--	0.476
September 10, 2012	--	--	--	--	--	--	15.2	--	--	--	--	0.053
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	13.3	15.0	18.4	15.8	29.7	15.9	18.1	33.6	57.9	39.9	3.08	2.75
Min	8.60	10.7	10.9	15.8	17.0	11.8	11.6	33.6	57.9	39.9	<0.0003	<0.0003
Max	15.5	19.9	30.6	15.8	42.3	23.4	33.2	33.6	57.9	39.9	5.62	12.3

Manganese (Mn) (mg/L)

Detection Limits for City of Peterborough Lab: 0.001mg/L For values listed as <, 0.0005 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.019	0.015	0.023	0.289	0.205	0.511	1.820	--	0.518	0.516	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.047	0.009	0.012	0.387	0.252	0.447	0.574	0.564	--	--	--	0.609
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.022	0.033	0.009	0.144	0.119	0.321	0.320	0.367	--	--	--	0.332
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.023	0.009	0.013	0.078	0.081	0.195	0.179	0.176	--	--	--	0.176
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.033	0.010	0.016	0.098	0.040	0.113	0.148	0.156	--	--	--	0.156
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.006	0.019	0.022	0.070	0.036	0.217	0.264	--	--	--	0.250	0.293
September 10, 2012	0.018	0.008	0.010	0.091	0.051	0.251	0.236	--	--	--	0.235	0.265
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.024	0.015	0.015	0.165	0.112	0.294	0.506	0.316	0.518	0.516	0.243	0.305
Min	0.006	0.008	0.009	0.070	0.036	0.113	0.148	0.156	0.518	0.516	0.235	0.156
Max	0.047	0.033	0.023	0.387	0.252	0.511	1.820	0.564	0.518	0.516	0.250	0.609

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.558	0.761	--	1.120	--	--	--	1.48	0.932	0.008	<0.001
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.618	--	--	--	0.690	0.774	0.495	0.703	--	--	0.073	<0.001
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.338	0.565	0.572	--	--	0.385	0.398	--	--	--	0.002	<0.001
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.164	0.238	0.244	--	--	0.205	0.204	--	--	--	<0.001	<0.001
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.190	0.165	0.180	--	--	0.172	0.199	--	--	--	<0.001	<0.001
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.298	--	--	0.307	--	--	0.317	--	--	--	--	<0.001
September 10, 2012	--	--	--	--	--	--	0.324	--	--	--	--	<0.001
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.322	0.382	0.439	0.307	0.905	0.384	0.323	0.703	1.48	0.932	0.017	<0.001
Min	0.164	0.165	0.180	0.307	0.690	0.172	0.199	0.703	1.48	0.932	<0.001	<0.001
Max	0.618	0.565	0.761	0.307	1.120	0.774	0.495	0.703	1.48	0.932	0.073	<0.001

Mercury (Hg) (ug/L)

Detection Limits for City of Peterborough Lab: 0.1 ug/L   For values listed as <, 0.05 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	--	<0.1	<0.1		--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	--	<0.1
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	--	<0.1
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	--	<0.1
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	--	<0.1
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	--	<0.1	<0.1
September 10, 2012	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	--	<0.1	<0.1
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Min	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Max	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.1	<0.1	--	<0.1	--	--	--	0.1	<0.1	<0.1	<0.1
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.1	--	--	--	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	<0.1
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.1	<0.1	<0.1	--	--	<0.1	<0.1	--	--	--	<0.1	<0.1
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.1	<0.1	<0.1	--	--	<0.1	<0.1	--	--	--	<0.1	<0.1
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.1	<0.1	<0.1	--	--	<0.1	<0.1	--	--	--	<0.1	<0.1
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.1	--	--	<0.1	--	--	<0.1	--	--	--	--	<0.1
September 10, 2012		--	--	--	--	--	<0.1	--	--	--	--	<0.1
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Min	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Max	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Molybdenum (Mo) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0007mg/L For values listed as <, 0.00035 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.0011	0.0025	0.0007	0.0015	0.0009	<0.0007	0.0010	--	0.0017	0.0014	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.0007	<0.0007	<0.0007	0.0017	0.0020	0.0021	0.0017	0.0016	--	--	--	<0.0007
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.0007	<0.0007	<0.0007	<0.0007	0.0024	0.0011	<0.0007	<0.0007	--	--	--	<0.0007
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0011	0.0014	0.0008	0.0035	0.0025	0.0016	0.0019	0.0017	--	--	--	0.0012
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0062	0.0014	0.0019	0.0041	0.0016	0.0026	0.0031	0.0018	--	--	--	0.0020
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	0.0019	0.0021	--	--	--	0.0025	0.0032
September 10, 2012	0.0061	<0.0007	<0.0007	0.0020	<0.0007	0.0015	0.0018	--	--	--	0.0019	0.0018
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0022	0.0010	0.0007	0.0017	0.0014	0.0016	0.0017	0.0014	0.0017	0.0014	0.0022	0.0015
Min	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	0.0017	0.0014	0.0019	<0.0007
Max	0.0062	0.0025	0.0019	0.0041	0.0025	0.0026	0.0031	0.0018	0.0017	0.0014	0.0025	0.0032

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.0007	0.0008	--	0.0014	--	--	--	0.0008	0.0020	0.0020	0.0098
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0020	--	--	--	0.0014	0.0009	0.0038	0.0017	--	--	<0.0007	0.0009
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0008	<0.0007	0.0008	--	--	<0.0007	<0.0007	--	--	--	<0.0007	0.0021
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0022	0.0016	0.0007	--	--	0.0020	0.0039	--	--	--	<0.0007	<0.0007
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0034	0.0021	0.0021	--	--	0.0027	0.0034	--	--	--	0.0017	0.0007
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0023	--	--	0.0020	--	--	0.0022	--	--	--	--	<0.0007
September 10, 2012	--	--	--	--	--	--	0.0020	--	--	--	--	<0.0007
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0021	0.0011	0.0011	0.0020	0.0014	0.0015	0.0026	0.0017	0.0008	0.0020	0.0010	0.0021
Min	0.0008	<0.0007	0.0007	0.0020	0.0014	<0.0007	<0.0007	0.0017	0.0008	0.0020	<0.0007	<0.0007
Max	0.0034	0.0021	0.0021	0.0020	0.0014	0.0027	0.0039	0.0017	0.0008	0.0020	0.0020	0.0098

Nickel (Ni) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0008 mg/L   For values listed as <, 0.0004 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.0021	<0.0008	0.0016	0.0261	0.0160	0.0414	0.1410	--	0.0293	0.0312	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0040	<0.0008	0.0016	0.0265	0.0158	0.0237	0.0349	0.0279	--	--	--	0.0335
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0010	0.0048	<0.0008	0.0088	0.0082	0.0186	0.0164	0.0175	--	--	--	0.0172
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0010	0.0018	<0.0008	0.0048	0.0052	0.0077	0.0076	0.0068	--	--	--	0.0080
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.0008	<0.0008	<0.0008	0.0079	0.0019	0.0081	0.0090	0.0086	--	--	--	0.0084
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0008	<0.0008	0.0010	0.0058	0.0023	0.0190	0.0188	--	--	--	0.0192	0.0220
September 10, 2012	<0.0008	<0.0008	<0.0008	0.0056	0.0028	0.0212	0.0168	--	--	--	0.0182	0.0195
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0013	0.0011	0.0008	0.0122	0.0075	0.0200	0.0349	0.0152	0.0293	0.0312	0.0187	0.0181
Min	<0.0008	<0.0008	<0.0008	0.0048	0.0019	0.0077	0.0076	0.0068	0.0293	0.0312	0.0182	0.0080
Max	0.0040	0.0048	0.0016	0.0265	0.0160	0.0414	0.1410	0.0279	0.0293	0.0312	0.0192	0.0335

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.0247	0.0579	--	0.0929	--	--	--	0.1230	0.0708	<0.0008	<0.0008
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0304	--	--	--	0.0370	0.0496	0.0519	0.0659	--	--	0.0019	<0.0008
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0209	0.0220	0.0205	--	--	0.0215	0.0180	--	--	--	<0.0008	<0.0008
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0074	0.0076	0.0069	--	--	0.0113	0.0085	--	--	--	<0.0008	<0.0008
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0124	0.0091	0.0086	--	--	0.0088	0.0109	--	--	--	<0.0008	<0.0008
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0219	--	--	0.0223	--	--	0.0257	--	--	--	--	<0.0008
September 10, 2012	--	--	--	--	--	--	0.0202	--	--	--	--	<0.0008
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0186	0.0159	0.0235	0.0223	0.0650	0.0228	0.0225	0.0659	0.1230	0.0708	0.0007	<0.0008
Min	0.0074	0.0076	0.0069	0.0223	0.0370	0.0088	0.0085	0.0659	0.1230	0.0708	<0.0008	<0.0008
Max	0.0304	0.0247	0.0579	0.0223	0.0929	0.0496	0.0519	0.0659	0.1230	0.0708	0.0019	<0.0008

Potassium (K) (mg/L)

Detection Limits for City of Peterborough Lab: 0.002 mg/L   For values listed as <, 0.001 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	5.61	3.28	4.56	5.25	5.89	6.07	3.16	--	6.56	8.33	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	3.04	1.31	1.86	7.07	5.94	7.93	8.21	8.20	--	--	--	9.31
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	6.45	14.8	11.7	11.5	11.2	14.0	13.1	13.1	--	--	--	14.7
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	12.9	9.11	12.3	19.1	18.9	22.2	12.3	12.4	--	--	--	20.7
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	8.16	3.58	14.2	50.6	14.9	16.9	17.7	13.8	--	--	--	17.0
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	19.5	9.89	12.7	17.8	9.68	16.2	18.1	--	--	--	18.2	19.4
September 10, 2012	11.0	6.81	9.36	9.23	8.73	12.8	17.6	--	--	--	20.6	15.0
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	9.52	6.97	9.53	17.2	10.7	13.7	12.9	11.9	6.56	8.33	19.4	16.0
Min	3.04	1.31	1.86	5.25	5.89	6.07	3.16	8.20	6.56	8.33	18.2	9.31
Max	19.5	14.8	14.2	50.6	18.9	22.2	18.1	13.8	6.56	8.33	20.6	20.7

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--		--	--	--	--	--		
June 15, 2012	--	6.63	7.80	--	6.02	--	--	--	8.12	8.44	0.208	0.002
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	8.64	--	--	--	9.10	8.75	12.2	10.2	--	--	0.295	0.008
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	24.1	16.2	20.4	--	--	14.80	12.0	--	--	--	0.127	0.017
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	11.2	12.8	15.7	--	--	17.80	13.3	--	--	--	0.088	0.151
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	14.7	15.0	14.9	--	--	14.60	16.3	--	--	--	0.028	0.231
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	17.7		--	18.7	--	--	19.7	--	--	--	--	0.350
September 10, 2012	--	--	--	--	--	--	15.4	--	--	--	--	0.136
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	15.3	12.7	14.7	18.7	7.56	14.0	14.8	10.2	8.12	8.44	0.149	0.128
Min	8.64	6.63	7.80	18.7	6.02	8.75	12.0	10.2	8.12	8.44	0.028	0.002
Max	24.1	16.2	20.4	18.7	9.10	17.8	19.7	10.2	8.12	8.44	0.295	0.350

Rubidium (Rb) (mg/L)

Detection Limits for City of Peterborough Lab: 0.001 mg/L   For values listed as <, 0.0005 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.010	0.002	<0.010	<0.010	<0.010	<0.010	<0.005	--	<0.005	<0.005	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.005	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	<0.010
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.005	<0.015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--	--	--	<0.010
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.015	<0.010	<0.015	<0.015	<0.015	<0.020	<0.010	<0.015	--	--	--	<0.020
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.005	<0.005	<0.020	<0.050	<0.010	<0.010	<0.010	<0.005	--	--	--	<0.010
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.020	<0.010	<0.015	<0.015	<0.010	<0.010	<0.010	--	--	--	<0.010	<0.010
September 10, 2012	<0.015	<0.005	<0.010	<0.010	<0.010	<0.010	<0.015	--	--	--	<0.015	<0.010
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.005	0.003	0.006	0.008	0.005	0.005	0.005	0.004	<0.005	<0.005	0.013	0.006
Min	<0.005	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.015	<0.005	<0.005	<0.010	<0.010
Max	<0.020	<0.015	<0.020	<0.010	<0.010	<0.010	<0.010	<0.005	<0.005	<0.005	<0.015	<0.020

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.005	<0.005	--	<0.010	--	--	--	<0.020	<0.005	<0.001	<0.001
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.010	--	--	--	<0.010	<0.010	<0.010	<0.010	--	--	<0.001	<0.001
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.020	<0.010	<0.015	--	--	<0.010	<0.010	--	--	--	<0.001	<0.001
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.010	<0.010	<0.010	--	--	<0.015	<0.010	--	--	--	<0.001	<0.001
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.005	<0.01	<0.010	--	--	<0.010	<0.010	--	--	--	<0.001	<0.001
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.010	--	--	<0.010	--	--	<0.010	--	--	--	--	<0.001
September 10, 2012	--	--	--	--	--	--	<0.010	--	--	--	--	<0.001
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.006	0.004	0.005	<0.010	<0.010	0.006	<0.010	<0.010	<0.020	<0.005	<0.001	<0.001
Min	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.005	<0.001	<0.001
Max	<0.020	<0.010	<0.010	<0.010	<0.010	<0.015	<0.010	<0.010	<0.020	<0.005	<0.001	<0.001

Silver (Ag) (mg/L)

Detection Limits for City of Peterborough Lab: 0.002 mg/L   For values listed as <, 0.001 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	<0.002
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	<0.002
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	<0.002
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	<0.002	<0.002
September 10, 2012	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	<0.002	<0.002
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Min	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Max	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.002	<0.002	--	<0.002	--	--	--	<0.002	<0.002	<0.002	<0.002
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.002	--	--	--	<0.002	<0.002	<0.002	<0.002	--	--	<0.002	<0.002
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.002	<0.002	<0.002	--	--	<0.002	<0.002	--	--	--	<0.002	<0.002
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.002	<0.002	<0.002	--	--	<0.002	<0.002	--	--	--	<0.002	<0.002
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.002	--	--	<0.002	--	--	<0.002	--	--	--	--	<0.002
September 10, 2012	--	--	--	--	--	--	<0.002	--	--	--	--	<0.002
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Min	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Max	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

Selenium (Se) (mg/L)

Detection Limits for City of Peterborough Lab: 0.008 mg/L   For values listed as <, 0.004 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.012	--	<0.008	<0.008	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	--	--	--	<0.008
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.009	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	--	--	--	<0.008
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.008	<0.008	<0.008	<0.010	<0.008	<0.008	<0.008	<0.008	--	--	--	<0.008
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	--	--	--	<0.008
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.008	0.016	0.009	0.012	0.011	<0.008	0.009	--	--	--	0.009	0.013
September 10, 2012	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	--	--	--	<0.008	<0.008
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.005	0.006	0.005	0.005	0.005	<0.008	0.006	<0.008	<0.008	<0.008	0.007	0.006
Min	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.009	<0.008	<0.008	<0.008	<0.008	0.013
Max	0.009	0.016	0.009	0.012	0.011	<0.008	0.012	<0.008	<0.008	<0.008	0.009	0.013

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.008	<0.008	--	<0.008	--	--	--	<0.008	<0.008	<0.008	<0.008
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.008	--	--	--	<0.008	<0.008	<0.008	<0.008	--	--	0.010	<0.008
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.008	<0.008	<0.008	--	--	<0.008	<0.008	--	--	--	<0.008	<0.008
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.008	<0.008	<0.008	--	--	<0.008	<0.008	--	--	--	<0.008	<0.008
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.008	<0.008	<0.008	--	--	<0.008	<0.008	--	--	--	<0.008	<0.008
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.008	--	--	<0.008	--	--	<0.008	--	--	--	--	<0.008
September 10, 2012	--	--	--		--	--	<0.008	--	--	--	--	<0.008
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.005	<0.008
Min	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Max	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.010	<0.008

Sodium (Na) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0006 mg/L For values listed as <, 0.0003 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	11.7	12.2	13.5	31.8	20.6	40.4	37.1	--	28.4	29.4	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	7.48	8.92	5.54	25.2	26.3	31.9	35.0	35.9	--	--	--	36.9
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	20.1	214	25.5	159	62.3	76.0	47.4	72.2	--	--	--	65.9
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	26.0	73.5	18.6	45.9	58.4	89.1	49.3	64.2	--	--	--	108
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	16.1	7.10	29.9	116	58.4	92.3	99.8	71.3	--	--	--	81.0
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	19.3	17.1	20.7	44.9	17.6	99.5	121	--	--	--	122	135
September 10, 2012	53.9	10.9	15.2	26.0	14.0	69.4	92.7	--	--	--	90.4	89.5
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	22.1	49.1	18.4	64.1	36.8	71.2	68.9	60.9	28.4	29.4	106	86.1
Min	7.48	7.10	5.54	25.2	14.0	31.9	35.0	35.9	28.4	29.4	90.4	36.9
Max	53.9	214	29.9	159	62.3	99.5	121	72.2	28.4	29.4	122	135

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	29.6	37.1	--	23.1	--	--	--	35.0	41.1	0.956	0.0106
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	28.7	--	--	--	30.6	34.8	88.4	50.6	--	--	0.397	0.0430
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	73.0	79.6	159	--	--	87.4	53.4	--	--	--	0.584	0.141
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	39.7	43.9	67.5	--	--	53.9	61.4	--	--	--	0.742	0.617
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	78.8	69.4	89.0	--	--	95.8	87.3	--	--	--	<0.0006	0.742
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	121	--	--	124	--	--	132	--	--	--	--	3.88
September 10, 2012	--	--	--	--	--	--	95.1	--	--	--	--	0.320
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	68.2	55.6	88.2	124	26.9	68.0	86.3	50.6	35.0	41.1	0.536	0.822
Min	28.7	29.6	37.1	124	23.1	34.8	53.4	50.6	35.0	41.1	<0.0006	0.0106
Max	121	79.6	159	124	30.6	95.8	132	50.6	35.0	41.1	0.956	3.88

Strontium (Sr) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0002 mg/L   For values listed as <, 0.0001 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.0737	0.0737	0.0808	0.1300	0.1140	0.1640	0.5670	--	0.1410	0.1420	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0775	0.0645	0.0668	0.1390	0.1220	0.1340	0.1560	0.1390	--	--	--	0.1450
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0764	0.0769	0.0739	0.1130	0.1110	0.1330	0.1320	0.1370	--	--	--	0.1300
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0677	0.0611	0.0630	0.0924	0.0920	0.1170	0.1140	0.1120	--	--	--	0.1170
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0764	0.0606	0.0647	0.1300	0.1030	0.1320	0.1330	0.1340	--	--	--	0.1350
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0602	0.0645	0.0664	0.1020	0.0781	0.1440	0.1550	--	--	--	0.1580	0.1610
September 10, 2012	0.0654	0.0611	0.0646	0.0936	0.0740	0.1550	0.1450	--	--	--	0.1560	0.1460
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0710	0.0661	0.0686	0.1143	0.0992	0.1399	0.2003	0.1305	0.1410	0.1420	0.1570	0.1390
Min	0.0602	0.0606	0.0630	0.0924	0.0740	0.1170	0.1140	0.1120	0.1410	0.1420	0.1560	0.1170
Max	0.0775	0.0769	0.0808	0.1390	0.1220	0.1640	0.5670	0.1390	0.1410	0.1420	0.1580	0.1610

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.1670	0.2360	--	0.3300	--	--	--	0.4380	0.2820	0.0443	<0.0002
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.1390	--	--	--	0.1490	0.1810	0.1830	0.2150	--	--	0.0525	<0.0002
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.1420	0.1530	0.1640	--	--	0.1450	0.1400	--	--	--	0.0427	<0.0002
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.1030	0.1140	0.1160	--	--	0.1250	0.1220	--	--	--	0.0015	0.0555
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.1510	0.1350	0.1450	--	--	0.1430	0.1580	--	--	--	0.0003	0.1040
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.1520	--	--	0.1550	--	--	0.1790	--	--	--	--	0.0028
September 10, 2012	--	--	--		--	--	0.1550	--	--	--	--	0.0003
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.1374	0.1423	0.1653	0.1550	0.2395	0.1485	0.1562	0.2150	0.4380	0.2820	0.0283	0.0237
Min	0.1030	0.1140	0.1160	0.1550	0.1490	0.1250	0.1220	0.2150	0.4380	0.2820	0.0003	<0.0002
Max	0.1520	0.1670	0.2360	0.1550	0.3300	0.1810	0.1830	0.2150	0.4380	0.2820	0.0525	0.1040

Thallium (Tl) (mg/L)

Detection Limits for City of Peterborough Lab: 0.0035 mg/L For values listed as <, 0.00175 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	--	<0.0035	<0.0035	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	--	--	--	<0.0035
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	--	--	--	<0.0035
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	--	--	--	<0.0035
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	--	--	--	<0.0035
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	--	--	--	<0.0035	<0.0035
September 10, 2012	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	--	--	--	<0.0035	<0.0035
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Min	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Max	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.0035	<0.0035	--	<0.0035	--	--	--	<0.0035	<0.0035	<0.0035	<0.0035
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.0035	--	--	--	<0.0035	<0.0035	<0.0035	<0.0035	--	--	<0.0035	<0.01
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.0035	<0.0035	<0.0035	--	--	<0.0035	<0.0035	--	--	--	<0.0035	0.0052
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.0035	<0.0035	<0.0035	--	--	<0.0035	<0.0035	--	--	--	<0.0035	<0.0035
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.0035	<0.0035	<0.0035	--	--	<0.0035	<0.0035	--	--	--	<0.0035	<0.0035
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0035	--	--	0.0037	--	--	<0.0035	--	--	--	--	<0.0035
September 10, 2012	--	--	--	--	--	--	<0.0035	--	--	--	--	<0.0035
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	<0.0035	<0.0035	<0.0035	0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	0.0027
Min	<0.0035	<0.0035	<0.0035	0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Max	<0.0035	<0.0035	<0.0035	0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	0.0052

Tin (Sn) (mg/L)

Detection Limits for City of Peterborough Lab: 0.007 mg/L   For values listed as <, 0.0035 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	--	--	--	<0.020
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	--	--	--	<0.020
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	--	--	--	<0.007	<0.007
September 10, 2012	<0.010	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	--	--	--	<0.007	<0.007
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.007	0.007	0.007	0.007	0.007	0.007	0.007	<0.020			<0.007	0.007
Min	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.020			<0.007	<0.007
Max	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			<0.007	<0.020

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.020	<0.020	<0.020	--	--	<0.020	<0.020	--	--	--	<0.020	<0.020
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.020	<0.020	<0.020	--	--	<0.020	<0.020	--	--	--	<0.020	<0.020
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.007	--	--	<0.007	--	--	<0.007	--	--	--	--	<0.007
September 10, 2012	--	--	--	--	--	--	<0.007	--	--	--	--	<0.007
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.006	<0.020	<0.020	<0.007		<0.020	0.007				<0.020	0.007
Min	<0.007	<0.020	<0.020	<0.007		<0.020	<0.007				<0.020	<0.007
Max	<0.020	<0.020	<0.020	<0.007		<0.020	<0.020				<0.020	<0.020

Titanium (Ti) mg/L

Detection Limits for City of Peterborough Lab: 0.0002 mg/L For values listed as <, 0.0001 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.0044	0.0087	0.0057	0.0169	0.0127	0.0187	0.0670	--	0.0059	0.0115	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0114	0.0015	0.0021	0.0298	0.0275	0.0057	0.0191	0.0092	--	--	--	0.0145
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0112	0.0068	0.0025	0.0062	0.0122	0.0108	0.0094	0.0071	--	--	--	0.0065
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0095	0.0086	0.0093	0.0094	0.0217	0.0100	0.0065	0.0049	--	--	--	0.0048
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0022	0.0007	0.0029	0.0064	0.0026	0.0023	0.0032	0.0047	--	--	--	0.0042
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0031	0.0139	0.0123	0.0067	0.0048	0.0040	0.0052	--	--	--	0.0048	0.0032
September 10, 2012	0.0048	0.0040	0.0038	0.0086	0.0064	0.0097	0.0033	--	--	--	0.0021	0.0022
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0067	0.0063	0.0055	0.0120	0.0126	0.0087	0.0162	0.0065	0.0059	0.0115	0.0035	0.0059
Min	0.0022	0.0007	0.0021	0.0062	0.0026	0.0023	0.0032	0.0047	0.0059	0.0115	0.0021	0.0022
Max	0.0114	0.0139	0.0123	0.0298	0.0275	0.0187	0.0670	0.0092	0.0059	0.0115	0.0048	0.0145

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.0104	0.0153	--	0.0606	--	--	--	--	0.0418	0.0014	0.0005
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0100	--	--	--	0.0212	0.0208	0.0310	0.0382	--	--	0.0052	<0.0002
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0108	0.0116	0.0066	--	--	0.0136	0.0085	--	--	--	0.0002	0.0003
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0083	0.0080	0.0068	--	--	0.0120	0.0092	--	--	--	<0.0002	<0.0002
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0050	0.0038	0.0033	--	--	0.0035	0.0067	--	--	--	<0.0002	<0.0002
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0069	--	--	0.0100	--	--	0.0268	--	--	--	--	<0.0002
September 10, 2012	--	--	--	--	--	--	0.0030	--	--	--	--	<0.0002
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0082	0.0085	0.0080	0.0100	0.0409	0.0125	0.0142	0.0382		0.0418	0.0014	0.0002
Min	0.0050	0.0038	0.0033	0.0100	0.0212	0.0035	0.0030	0.0382		0.0418	<0.0002	<0.0002
Max	0.0108	0.0116	0.0153	0.0100	0.0606	0.0208	0.0310	0.0382		0.0418	0.0052	0.0005

Uranium (U) mg/L

Detection Limits for City of Peterborough Lab: 0.025 mg/L   For values listed as <, 0.0125 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.020	<0.020	<0.020	<0.05	<0.05	<0.05	<0.10	--	<0.020	<0.050	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.020	<0.015	<0.015	<0.030	<0.030	<0.020	<0.035	<0.030	--	--	--	<0.030
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.015	<0.020	<0.015	<0.020	<0.020	<0.020	<0.020	<0.020	--	--	--	<0.020
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.020	<0.015	<0.015	<0.020	<0.020	<0.020	<0.020	<0.020	--	--	--	<0.020
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	--	--	--	<0.020
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.015	<0.015	<0.015	<0.020	<0.020	<0.020	<0.020	--	--	--	<0.020	<0.020
September 10, 2012	<0.020	<0.015	<0.015	<0.020	<0.020	<0.03	<0.020	--	--	--	<0.020	<0.020
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.009	0.009	0.008	0.013	0.013	0.014	0.018	0.012	<0.020	<0.050	<0.020	0.011
Min	<0.015	<0.015	<0.015	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
Max	<0.020	<0.020	<0.020	<0.030	<0.05	<0.05	<0.10	<0.03	<0.020	<0.050	<0.020	<0.030

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	<0.020	<0.05	--	<0.150	--	--	--	<0.150	<0.05	<0.010	<0.010
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	<0.030	--	--	--	<0.035	<0.050	<0.050	<0.060	--	--	<0.015	<0.010
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.030	<0.030	<0.020	--	--	<0.030	<0.020	--	--	--	<0.010	<0.010
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.020	<0.020	<0.020	--	--	<0.020	<0.020	--	--	--	<0.010	<0.015
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	<0.020	<0.020	<0.020	--	--	<0.020	<0.020	--	--	--	<0.010	<0.020
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.020	--	--	<0.020	--	--	<0.020	--	--	--	--	<0.0011
September 10, 2012	--	--	--	--	--	--	<0.020	--	--	--	--	<0.0015
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.013	0.012	0.015	<0.020	0.0150	0.016	0.013	<0.060	<0.150	<0.050	0.006	0.004
Min	<0.020	<0.020	<0.020	<0.020	<0.035	<0.020	<0.020	<0.060	<0.150	<0.050	<0.010	<0.0011
Max	<0.030	<0.030	<0.050	<0.020	<0.150	<0.050	<0.050	<0.060	<0.150	<0.050	<0.015	<0.020

Vanadium (V) mg/L

Detection Limits for City of Peterborough Lab: 0.0004 mg/L For values listed as <, 0.0002 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	<0.0004	0.0005	0.0009	0.0062	0.0042	0.0075	0.0288	--	0.0014	0.0035	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0008	<0.0004	<0.0004	0.0035	0.0027	0.0006	0.0030	0.0014	--	--	--	0.0027
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	<0.0004	0.0007	<0.0004	0.0006	0.0014	0.0015	0.0009	0.0005	--	--	--	0.0007
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	<0.0004	<0.0004	0.0004	0.0010	0.0019	0.0009	0.0006	<0.0004	--	--	--	0.0006
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0006	<0.0004	<0.0004	0.0014	<0.0004	0.0004	0.0008	0.0008	--	--	--	0.0005
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	--	--	--	<0.0004	<0.0004
September 10, 2012	<0.0004	<0.0004	<0.0004	<0.0015	<0.0010	<0.003	<0.001	--	--	--	<0.0010	<0.001
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0003	0.0005	0.0006	0.0020	0.0014	0.0018	0.0050	0.0007	0.0014	0.0035	0.0004	0.0009
Min	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.0014	0.0035	<0.0004	<0.0004
Max	0.0008	0.0007	0.0009	0.0062	0.0042	0.0075	0.0288	0.0014	0.0014	0.0035	<0.0010	0.0027

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.0022	0.0041	--	0.0279	--	--	--	0.0374	0.0058	<0.0004	<0.0004
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0020	--	--	--	0.0044	0.0086	0.0093	0.0138	--	--	0.0008	<0.0004
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0023	0.0016	0.0011	--	--	0.0022	0.0011	--	--	--	<0.0004	<0.0004
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0005	0.0005	0.0005	--	--	0.0009	0.0005	--	--	--	<0.0004	<0.0004
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0014	0.0012	0.0005	--	--	0.0008	0.0012	--	--	--	<0.0004	<0.0004
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	<0.0004	--	--	<0.0004	--	--	0.0020	--	--	--	--	<0.0004
September 10, 2012	--	--	--	--	--	--	<0.001	--	--	--	--	<0.0004
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0013	0.0014	0.0016	<0.0004	0.0162	0.0031	0.0024	0.0138	0.0374	0.0058	0.0003	<0.0004
Min	<0.0004	0.0005	0.0005	<0.0004	0.0044	0.0008	<0.001	0.0138	0.0374	0.0058	0.0008	<0.0004
Max	0.0023	0.0022	0.0041	<0.0004	0.0279	0.0086	0.0093	0.0138	0.0374	0.0058	0.0008	<0.0004

Zinc (Zn) mg/L

Detection Limits for City of Peterborough Lab: 0.0017 mg/L   For values listed as <, 0.00085 mg/L was used to calculate mean

Sample Description	12B1-1	12B1-2	12B1-4	12B2-4	12B2-5	12B3-2	12B3-3	12B4-1	12B4-2	12B4-3	12 SCREE SLOPE	12B5-1
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	0.0771	0.0300	0.0554	0.0521	0.0436	0.0847	0.2040	--	0.0234	0.0357	--	--
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0841	0.0394	0.0294	0.0637	0.0354	0.0200	0.0658	0.0482	--	--	--	0.0314
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0406	0.0497	0.0353	0.0615	0.0764	0.0638	0.0564	0.0317	--	--	--	0.0564
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.2060	0.0576	0.0877	0.0689	0.2190	0.0812	0.0408	0.0374	--	--	--	0.0389
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.1330	0.0418	0.0677	0.1320	0.0410	0.0493	0.0624	0.0532	--	--	--	0.0321
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0640	0.0949	0.1100	0.0422	0.0277	0.0186	0.0248	--	--	--	0.0232	0.0151
September 10, 2012	0.0918	0.0298	0.0379	0.0440	0.0497	0.0568	0.0264	--	--	--	0.0241	0.0192
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0995	0.0490	0.0605	0.0663	0.0704	0.0535	0.0687	0.0426	0.0234	0.0357	0.0237	0.0322
Min	0.0406	0.0298	0.0294	0.0422	0.0277	0.0186	0.0248	0.0317	0.0234	0.0357	0.0232	0.0151
Max	0.2060	0.0949	0.1100	0.1320	0.2190	0.0847	0.2040	0.0532	0.0234	0.0357	0.0241	0.0564

Sample Description	12B5-2	12B5-4	12B5-5	12B5-SCREE	12PL-3	12SH-2	12SH-3	12SH-4	12SH-5	12SF-1	REFERENCE	BLANK
Sample Date												
June 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 15, 2012	--	0.0267	0.0632	--	0.1480	--	--	--	0.1900	0.0876	0.0018	0.0036
June 20, 2012	--	--	--	--	--	--	--	--	--	--	--	--
June 27, 2012	0.0207	--	--	--	0.0352	0.0589	0.0587	0.0908	--	--	0.0033	<0.0017
July 5th, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 11, 2012	0.0919	0.0611	0.0471	--	--	0.0719	0.0277	--	--	--	0.0036	<0.0017
July 18, 2012	--	--	--	--	--	--	--	--	--	--	--	--
July 25, 2012	0.0416	0.0613	0.0448	--	--	0.0887	0.0585	--	--	--	<0.0017	0.0047
August 1, 2012	--	--	--	--	--	--	--	--	--	--	--	--
August 7, 2012	0.0811	0.0753	0.0329	--	--	0.0454	0.0560	--	--	--	0.0021	0.0087
August 14, 2012	--	--	--	--	--	--	--	--	--	--	--	--
September 6, 2012	0.0156	--	--	0.0150	--	--	0.0186	--	--	--	--	<0.0017
September 10, 2012	--	--	--	--	--	--	0.0156	--	--	--	--	<0.0017
September 13, 2012	--	--	--	--	--	--	--	--	--	--	--	--
Average	0.0502	0.0561	0.0470	0.0150	0.0916	0.0662	0.0392	0.0908	0.1900	0.0876	0.0023	0.0029
Min	0.0156	0.0267	0.0329	0.0150	0.0352	0.0454	0.0156	0.0908	0.1900	0.0876	<0.0017	<0.0017
Max	0.0919	0.0753	0.0632	0.0150	0.1480	0.0887	0.0587	0.0908	0.1900	0.0876	0.0036	0.0087

Soils Metals Content

Sample Description	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Calcium (Ca)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Lithium (Li)
Units	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)
Laboratory of Origin	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon
Method Detection Limit	10	0.5	0.5	1	0.2	0.5	10	1	1	1	10	5	0.1
12B1-1	7480	3.1	9.3	46	< 0.2	< 0.5	76200	74	8	10400	22100	384	6.8
12B1-4	12700	0.6	6.4	11	< 0.2	< 0.5	72400	28	12	346	27600	18	14.3
12B1-B2	14100	< 0.5	7.0	11	< 0.2	< 0.5	89200	20	12	68	31900	11	17.2
12B2-4	13100	0.6	15.3	13	< 0.2	< 0.5	84100	19	11	140	30200	15	15.0
12B2-B3	15100	< 0.5	8.4	11	< 0.2	< 0.5	101000	21	14	39	34400	13	17.6
12B3-3	15300	0.5	8.6	10	< 0.2	< 0.5	107000	22	14	23	34400	12	19.1
12B5-1	15200	< 0.5	8.7	11	< 0.2	< 0.5	95900	22	14	17	35100	12	19.1
12FORESHORE-1	14800	< 0.5	12.1	9	< 0.2	< 0.5	117000	21	16	18	35300	14	17.8
12FORESHORE-2	14800	< 0.5	10.2	11	< 0.2	< 0.5	107000	21	14	15	34300	12	18.2
12SH-3	15500	0.6	10.7	11	< 0.2	< 0.5	108000	22	15	16	36100	14	18.6
Average	13808	0.7	9.7	14	<0.2	<0.5	95780	27	13	1108	32140	51	16.4
Min	7480	<0.5	6.4	9	<0.2	<0.5	72400	19	8	15	22100	11	6.8
Max	15500	3.1	15.3	46	<0.2	<0.5	117000	74	16	10400	36100	384	19.1

Sample Description	Magnesium (Mg)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Potassium (K)	Selenium (Se)	Silver (Ag)	Sodium (Na)	Strontium (Sr)	Titanium (Ti)	Uranium (U)	Vanadium (V)	Zinc (Zn)
Units	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)	(µg g^{-1} Dry Weight)
Laboratory of Origin	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon	Caduceon
Method Detection Limit	10	0.005	1	1	30	0.5	0.2	20	1	1	0.1	1	3
12B1-1	8700	0.099	2	38	450	1.6	< 0.2	170	94	34	0.6	5	273
12B1-4	13300	0.047	< 1	32	480	1.7	< 0.2	50	62	18	0.7	8	97
12B1-B2	14300	0.021	< 1	29	500	0.7	< 0.2	20	81	22	0.5	11	54
12B2-4	14100	0.037	< 1	29	510	0.7	< 0.2	30	74	18	0.7	9	77
12B2-B3	21800	0.023	< 1	33	460	0.7	< 0.2	< 20	88	20	0.6	11	55
12B3-3	22800	0.025	< 1	34	470	0.6	< 0.2	40	95	22	0.6	11	52
12B5-1	21900	0.021	< 1	32	460	0.6	< 0.2	470	84	22	0.5	11	50
12FORESHORE-1	15000	0.020	< 1	33	430	0.6	< 0.2	440	93	21	0.5	10	49
12FORESHORE-2	15100	0.021	< 1	31	460	0.6	< 0.2	290	93	22	0.6	10	49
12SH-3	21700	0.024	< 1	33	500	0.6	0.5	820	91	22	0.5	11	52
Average	16870	0.034	<1	32	472	0.84	<0.2	234	86	22	0.6	9.7	81
Min	8700	0.020	<1	29	430	0.6	<0.2	20	62	18	0.5	5	49
Max	22800	0.099	2	38	510	1.7	0.5	820	95	34	0.7	11	273

Soil Grain Size Analysis

Sample Description	Cumluative Percent Passing Through Screen										
Laboratory of Origin	*CAWT Fleming College*										
Screen Size (mm)	75	38.1	12.5	4.75	2.36	1.18	0.600	0.3	0.152	0.075	<0.075
12B1-1	100.0	66.5	26.1	12.0	8.5	6.8	5.8	5.1	4.5	4.3	4.1
12B1-4	100.0	85.1	54.3	23.0	15.2	11.4	9.0	7.3	5.8	4.6	4.2
12B1-B2	100.0	93.9	65.8	38.2	27.1	18.8	13.6	10.4	7.5	5.0	4.3
12B2-4	100.0	39.3	29.1	22.0	15.5	11.2	8.8	7.5	6.5	5.2	4.1
12B2-B3	100.0	100.0	62.7	41.9	31.5	25.0	20.2	16.9	11.9	6.2	4.4
12B3-3	100.0	100.0	70.0	50.8	38.6	27.7	21.5	16.6	13.3	9.3	4.2
12B5-1	100.0	83.1	69.6	56.3	50.1	42.8	34.2	27.9	23.1	11.0	4.2
12FORESHORE-1	100.0	100.0	86.1	58.2	48.7	41.0	33.9	28.6	15.5	8.1	4.2
12FORESHORE-2	100.0	100.0	92.2	78.9	65.8	54.3	43.9	33.9	26.2	8.5	4.1
12SH-3	100.0	100.0	67.0	51.4	42.2	34.1	28.7	22.6	11.5	5.3	4.2
Average	100.0	86.8	62.3	43.3	34.3	27.3	22.0	17.7	12.6	6.7	4.2
Min	100.0	39.3	26.1	12.0	8.5	6.8	5.8	5.1	4.5	4.3	4.1
Max	100.0	100.0	92.2	78.9	65.8	54.3	43.9	33.9	26.2	11.0	4.4

Centre for Alternative Wastewater Treatment

Vision

The Centre for Alternative Wastewater Treatment (CAWT) at the School of Environmental and Natural Resource Sciences, Frost Campus, Fleming College is an internationally recognized research institute committed to excellence in research and education.

The CAWT conducts research in the areas of water and wastewater treatment science and communicates results in high quality publications.

The Centre fosters collaborative research partnerships with universities, government agencies, non-governmental organizations, and the private sector; and engages in opportunities to enhance student learning through the integration of applied research activities in student curricula.

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