Town of Laurentian Hills Chalk River Wastewater Treatment Plant Phases 1 & 2 (Schedule B) Class Environmental Assessment Report

1634-01125

FINAL REPORT

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Sign-off Sheet

This document entitled Town of Laurentian Hills Chalk River Wastewater Treatment Plant Phases 1 & 2 (Schedule B) Class Environmental Assessment Report was prepared by Stantec Consulting Ltd. for the account of Town of Laurentian Hills. The material in it reflects Stantec's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Stantec Consulting Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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Executive Summary

The Town of Laurentian Hills retained Stantec Consulting Ltd. to review and complete the environmental planning process for implementation of corrective measures to reduce the hydraulic stress at the Chalk River Wastewater Treatment Plant (WWTP). When the WWTP is experiencing hydraulic stress from high influent flows the risk of non-compliant effluent materializes and excessive quantities of solids can be carried out in the final effluent.

The community of Chalk River, in the Town of Laurentian Hills, has been serviced by the communal WWTP since the early 1970's. After a plant upgrade in 1989, the plant can operate in two modes, namely, extended aeration mode with a capacity to treat an average daily flow of 363 m^3, and contact stabilization mode, with a capacity to treat an average daily flow of 545 m^3. Increased process wastewater flows from the Chalk River Water Treatment Plant (WTP), along with groundwater infiltration and stormwater inflows discharging into the sanitary sewers, contribute to hydraulic stress at the WWTP particularly with wet weather and snowmelt. Reducing or controlling high influent flows, or upgrading the WWTP, will reduce the risk of solids carryover at the existing clarifier into the receiving stream (Pumphouse Creek).

Five options to address the aforementioned problem were evaluated. The options included Option 1: Do Nothing, Option 2: Reduce Flows to the WWTP, Option 3: Add an Equalization Tank upstream of the WWTP, Option 4: Add a Secondary Clarifier, Option 5: Expand WWTP at Present Location. The criteria for evaluation address the environments that could be affected by the work. These environments have been grouped into three categories: Natural Environment, Social/Economic Environment, and Financial/Technical Environment.

Option 4: Add a Secondary Clarifier is the preferred option. This option will relieve the hydraulic stress at the WWTP immediately with relatively minimal impact on the natural environment and can be incorporated into future WWTP expansion and lifecycle replacement plans.

This Phase 1 & 2 Class Environmental Assessment (EA) Report is intended to satisfy the legislative requirements of the *Environmental Assessment Act* (EAA) by following the planning process set out in a document published by the Municipal Engineers Association entitled "Municipal Class Environmental Assessment" dated 2011. The WWTP plant upgrades are considered to be "Schedule B" activities according to the categories defined by the Municipal Class EA. Schedule B was selected because the contemplated work will not expand the existing WWTP beyond its rated capacity and will not require land acquisition. This Phases 1 & 2 report represents the initial stages of the Schedule B planning process. Subsequent phases would be documented in additional reports.

A Notice of Study Commencement was distributed to review agencies in October 2012 to notify them of the planning process. Phase 1, Problem Definition, was issued by letter in November 2012. Phase 2 (herein) is expected to be finalized during the second quarter of 2013. Phase 5, Design and Construction, could commence as early as the fall of 2013. Phases 3 and 4 of the planning process are not required for Schedule B activities.

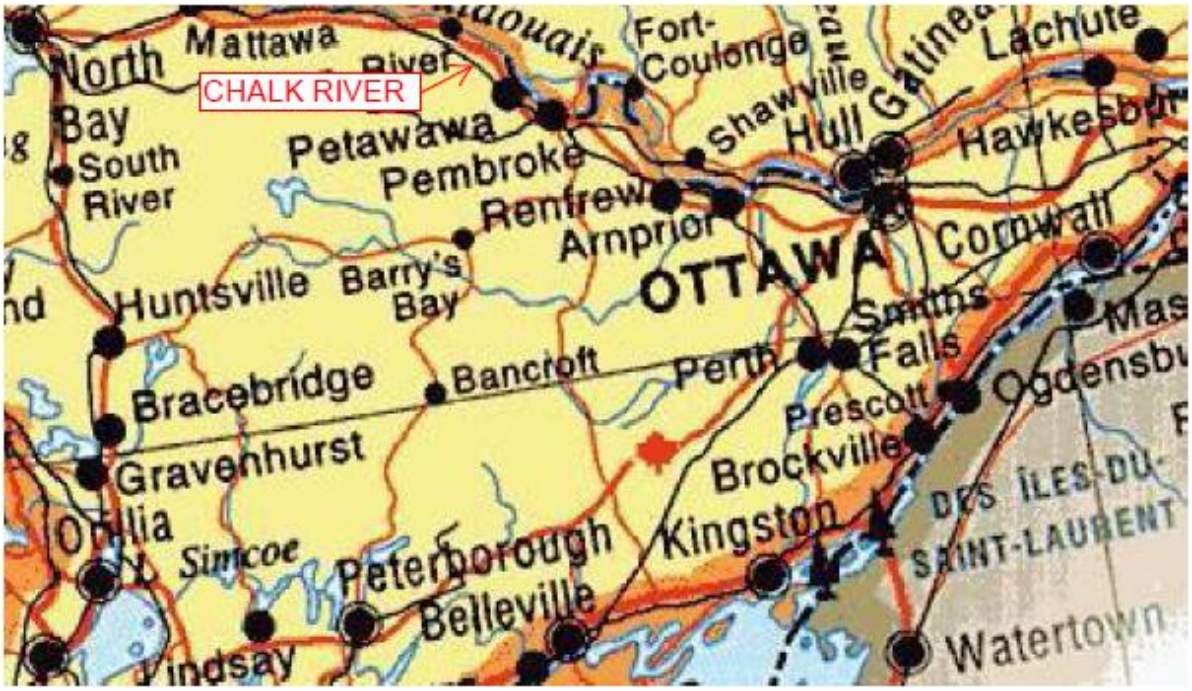
1.0 Introduction

1.1 BACKGROUND

The Town of Laurentian Hills retained Stantec Consulting Ltd. to review and complete the environmental planning process for implementation of corrective measures to reduce the hydraulic stress at the Chalk River wastewater treatment plant (WWTP).

The Town of Laurentian Hills is situated in the County of Renfrew and surrounds the Community of Chalk River (refer to **Figure 1-1**). It is accessed by Provincial Highway #17, about two and a half hours west of Ottawa. Laurentian Hills has a population of 2,693 (2011 Ontario Municipal Directory) with 1,379 households. Chalk River (refer to **Figure 1-2**) has a population of approximately 930 with about 400 households, serviced mostly by municipal water and sanitary services. Corry Lake serves as the source of raw water to the Chalk River Water Treatment Plant (WTP) for the production of the municipal drinking water supply, while Pumphouse Creek is the receiving stream for the final effluent produced by the Chalk River (WWTP).

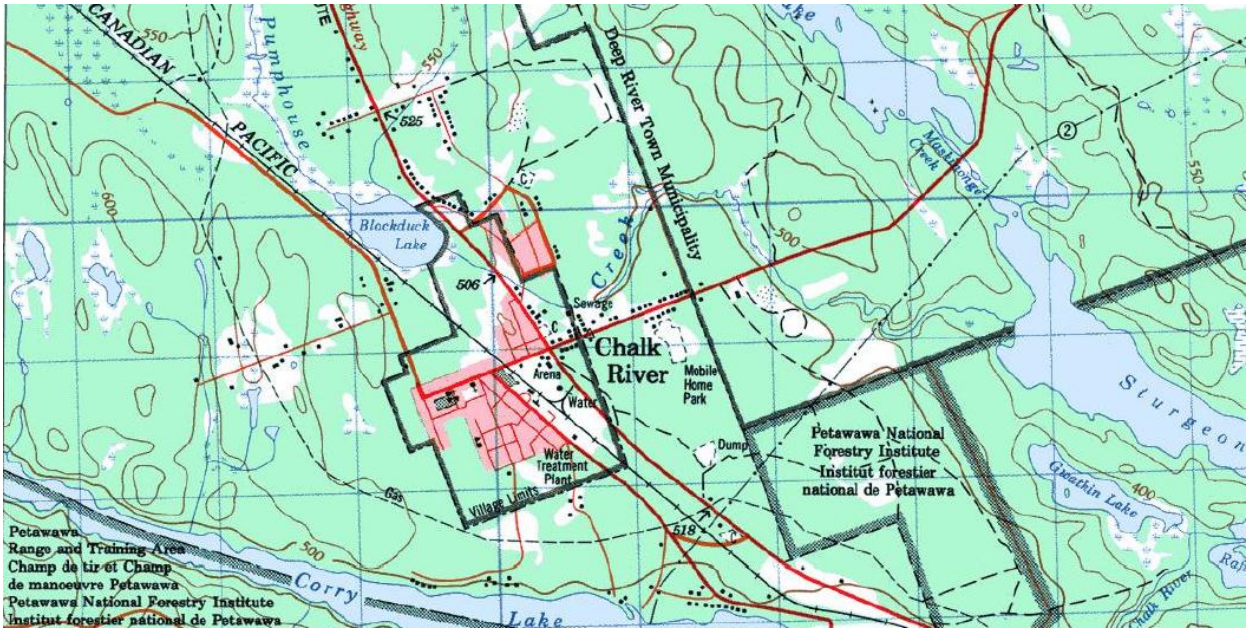
Figure 1-1: Map of Eastern Ontario



Recent annual inspection reports on the Chalk River WWTP prepared by the Eastern Ontario Branch of the Ministry of the Environment (MOE) indicate that the WWTP has experienced hydraulic stress particularly during wet weather and snowmelt events. Such events can lead the

WWTP to exceed the effluent contaminant criteria as stipulated under Condition 14 of the prevailing Environmental Compliance Approval (ECA) (formerly known as a Certificate of Approval or "CofA") (**Appendix A**).

Figure 1-2: Map of Chalk River and Surrounding Area



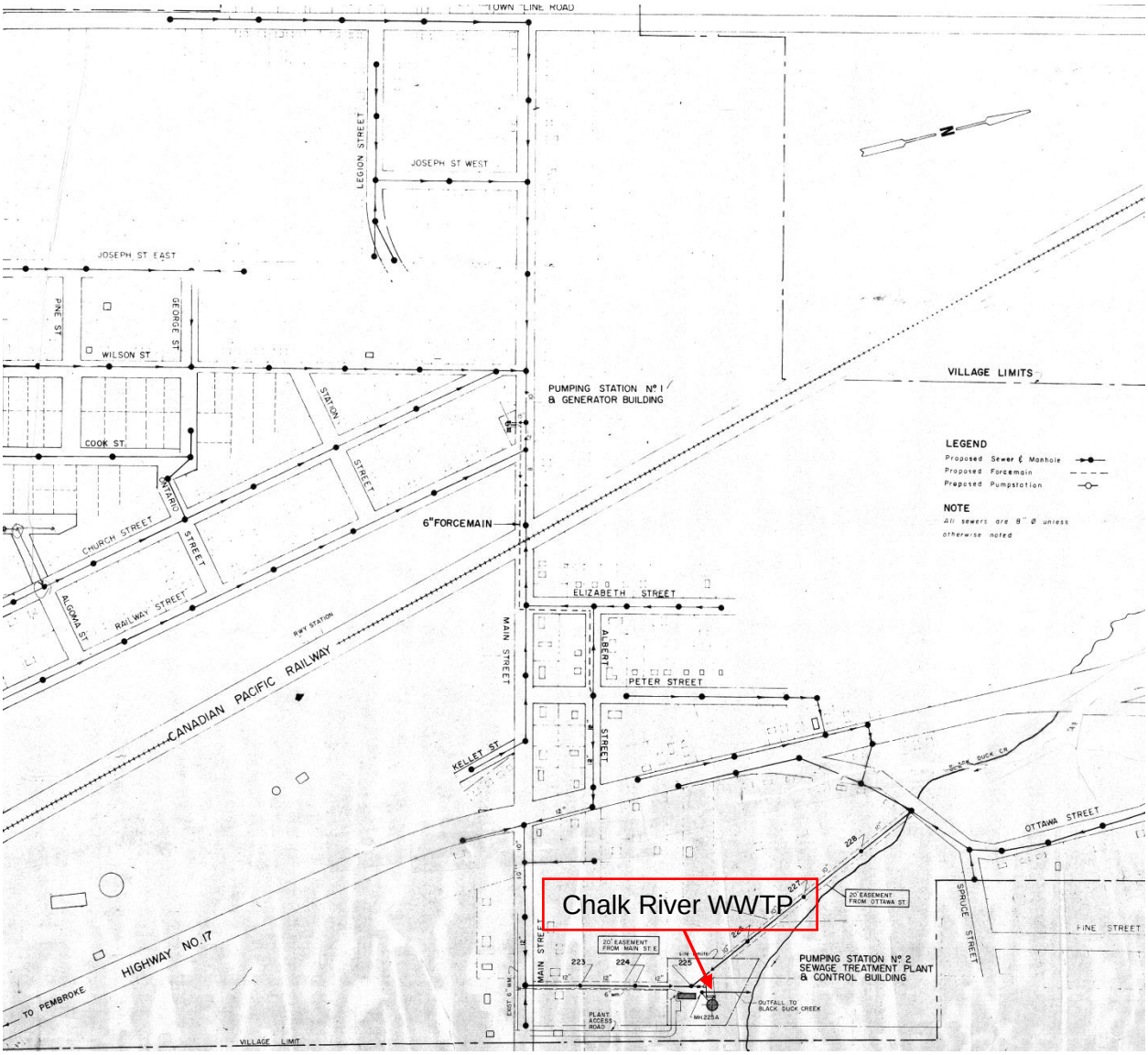
As the size of the serviced community of Chalk River grows, the flows to the WWTP are expected to increase. This report represents the beginning of the planning process to review the capacity of the WWTP and to review options to reduce the hydraulic stress currently being reported.

This Phases 1 & 2 (Schedule B) Class Environmental Assessment (EA) Report is intended to satisfy the legislative requirements of the *Ontario Environmental Assessment Act* (EAA). This report follows the planning process set out in a document prepared by the Municipal Engineers Association (MEA) entitled "Municipal Class Environmental Assessment" dated October 2000 as amended in 2007 and 2011. The Class EA process is further explained in **Section 1.5** herein.

1.2 STUDY AREA

The study area for the purposes of this Phases 1 & 2 Class EA Report is defined as the existing Chalk River WWTP site and any area that could reasonably be expected to be impacted by the work contemplated in this report. The Chalk River WWTP is located on Blimkie Street off of Plant Road (refer to **Figure 1-3** below). These streets are identified as Plant Access Road and Main Street in **Figure 1-3**. The location plan is taken from the WWTP as-built drawing (Wyllie & Ufnal Ltd, 1973).

Figure 1-3: Location Plan of Chalk River WWTP (Wylie & Ufnal, 1973)



The as-built drawing above shows the receiving stream as Black Duck Creek however MNR refers to it as Pumphouse Creek. MNR is responsible for naming geographic features in Ontario; therefore, the name “Pumphouse Creek” will be used herein for the receiving stream.

The study area is not limited to land area but is also inclusive of air and water, as well as environments defined by social and economic boundaries in the community. The financial and technical environments at the WWTP will also be considered. **Section 2.0** “Description of the Environment” provides a catalogue of the environments considered by this study.

1.3 DESCRIPTION OF THE CHALK RIVER WASTEWATER TREATMENT PLANT

The Chalk River WWTP is owned by the Town of Laurentian Hills and is operated by American Water Canada (AWC). The civic address of the WWTP is 7 Blimkie Street East, Laurentian Hills, Ontario, K0J 1J0. The sewage works number is 110001587.

The Chalk River WWTP treats wastewater collected by the sanitary sewer system from approximately 954 persons in 400 households in Chalk River. The WWTP was first approved in 1972 under the authority of the MOE issued ECA #52/5/134 and then modified in 1989. The plant currently operates in accordance with ECA #3-0210-87-896 (**Appendix A**).

The WWTP provides secondary treatment. The process consists of a circular "Ecodyne" package sewage treatment plant that can operate in two different modes, namely,

a) extended aeration mode for average daily flows up to a capacity of 363 m^3, and

b) contact stabilization mode for average daily flows up to a capacity of 545 m^3.

The WWTP can operate in either mode (extended aeration or contact stabilization) however due to current raw sewage influent flows the plant runs in contact stabilization mode. The average day flow in 2010 was 414m^3, in 2011 was 451m^3, and in 2012 was 396m^3 which is approximately 73%, 83% and 74% of the plant's rated treatment capacity respectively.

The WWTP includes the following processes:

- manually cleaned bar screen,
- twin grit removal channels,
- comminutor (grinder),
- aeration/re-aeration tank,
- aerobic digester,
- sludge holding tank,
- sludge settling tank (clarifier), and
- chlorine contact tank.

The sludge stabilization method is aerobic. Sludge is stored in a holding tank (available volume 159 m^3). The retention time is 90 days. Sludge is disposed off-site at the Pembroke WWTP and then land applied at a location under ECA #S-4131-33.

Final treated effluent discharges to Pumphouse Creek, which drains to the Ottawa River.

There are two pumping stations in the municipal wastewater system: one off the WWTP property and one on the WWTP property. The pumping station located on the WWTP property is equipped with a variable speed pump.

The off-site pumping station, referred to as the Main Street pump station, has two fixed speed pumps. The locations of the pump station are shown above in **Figure 1-3**.

The Town does not have any combined sewers and has by-laws in place restricting the connection of sump pumps and roof drains to the sanitary sewers.

Site photos and as-built drawings containing descriptive and relevant information on the Chalk River WWTP have been inserted herein under **Appendix B**.

For information on the performance of the WWTP refer to the annual inspection reports in **Appendix C**. These inspection reports also assess the collection of wastewater and conveyance to the WWTP.

The average daily flow rates and maximum daily flow rates, established on an annual basis, are presented later under **Sections 1.6.1 and 3.2**.

1.4 PROJECT ORGANIZATION

There are a number of key stakeholders included in the project organization. The primary contacts for the project are:

- Mr. Wayne Kirby, Chief Administrative Officer / Clerk, Town of Laurentian Hills
- Mr. Dave Robertson, C.E.T., Senior Associate, Water Division, Stantec Consulting Ltd.

The responsibilities of the parties involved in the study are briefly described in **Table 1.1**.

Table 1.1: Organizational Responsibilities

Ministry of the Environment	• Provides technical input during document review
Town of Laurentian Hills (Owner)	• Proponent of the study • Responsible for overall conduct of the study • Provides background information on existing facilities, systems, and review comments
American Water Canada (Operating Authority)	• Provides operational input during entire process
Public	• Provides input at meetings and review comments on published reports
Agencies	• Provides input during document review
Stantec Consulting Ltd	• Consultant responsible for completing the study

1.5 CLASS ENVIRONMENTAL ASSESSMENT PROCESS

1.5.1 General

In Ontario, the EAA provides for the protection, conservation and prudent management of the environment by providing a responsible and accountable decision-making process.

This cost effective and streamlined process is available to municipalities, and is referred to as the Municipal Class EA. The Municipal Class EA process evaluates projects based on their "Class", while meeting the requirements of the EAA. The process was developed and is maintained by the MEA to simplify the process for municipalities to comply with the EAA. The Municipal Class EA provides a process that municipalities follow while planning most sewer, water, roads and transit projects. For this assignment Stantec used the most recent version of the Class EA (October 2000, as amended in 2007 and 2011).

For projects to be evaluated under the Class EA process, they must meet the following:

- Be recurring,
- Usually similar in nature,
- Usually limited in scale,
- Have a predictable range of environmental effects, and
- Be responsive to mitigative measures.

The Class EA provides for the implementation of the following five key principles of planning:

1. Early consultation with affected parties (includes public, landowners, stakeholders, etc.).

2. Consideration of a reasonable range of options.

3. Identification and consideration of the effects of each option on any or all aspects of the environment.

4. Evaluation of options to determine their net environmental effect.

5. Clear and complete documentation to allow tracking of the decision-making process.

The Class EA process provides for the planning and implementation of municipal projects. Since projects undertaken by municipalities vary in their environmental impact, such projects are classified in terms of Schedules. In brief these Schedules can be summarized as follows:

Schedule A Projects in this classification are limited in scale and have minimal adverse effects. These projects include the majority of municipal operations and maintenance activities, such as water main and sewer extensions within existing road allowances, and can proceed to implementation without further approvals under the EAA.

Schedule B Projects in this classification have the potential for some adverse environmental effects. The proponent is therefore required to undertake a screening process, involving mandatory contact with the directly affected public, stakeholders, and with relevant government agencies, to ensure that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns then the proponent may proceed to implementation. If the screening process raises a concern that cannot be resolved the project may be "bumped-up" (Part II Order) to an individual EA.

Projects under this schedule must, as a minimum requirement, comply with Phases 1, 2 and 5 of the Municipal Class EA process, as shown in and as described below.

Schedule C Projects in this classification have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Municipal Class EA. If concerns are raised that cannot be resolved, the "bump-up" (Part II Order) procedure to an individual EA may be invoked.

Projects under this schedule must, as a minimum requirement, comply with Phases 1 through 5, inclusively, in compliance with the Municipal Class EA process, as shown in and as described below. Such projects may include the construction or expansion of treatment facilities beyond their rated capacities.

Figure 1-4 illustrates the process followed in the planning and design of projects covered by the Municipal Class EA. The steps considered essential for compliance with the requirements of the EAA are summarized as follows:

Phase 1 This stage consists of identifying the problems or deficiencies with the current municipal water and/or sewage systems.

Phase 2 This stage consists of identifying optional solutions to the problems and establishing the preferred solution after taking into account public and review agency input. In this phase identification of the approval requirements and the determination of the appropriate schedule for the project is confirmed.

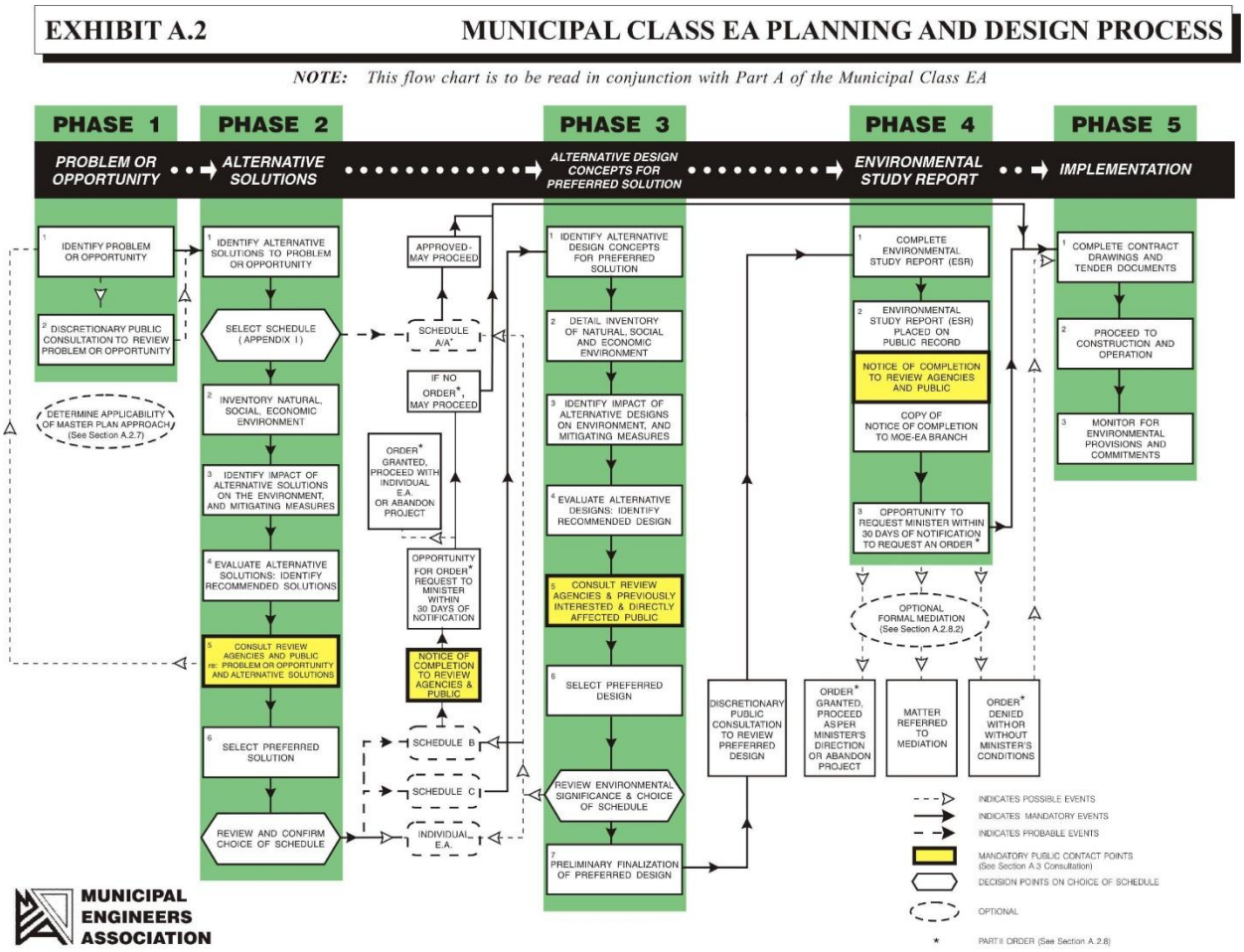
Phase 3 For projects classified as Schedule C activities, this stage consists of examining optional methods of implementing the preferred solution in accordance with the Class EA requirements and includes a mandatory public consultation and review process.

Phase 4 For projects classified as Schedule C activities, Phase 4 consists of documenting in an environmental study report (ESR) the rationale, planning, design and consultation process of the project as established through the preceding phases. The ESR is subject to scrutiny by review agencies and the public.

Phase 5 Once the above phases have been successfully completed, this stage consists of completing the contract documents and proceeding to construction, operation and monitoring of the project.

Consultation is a key element of EA planning. The principal aim of consultation is to promote public participation and to achieve resolution of differences in points of view. **Section 6.0 Consultation** of this report describes how the proponent has responded to feedback from the public during the initial stages of this study. These steps will ensure that concerns are met and impacts are well understood.

Figure 1-4: Municipal EA Planning and Design Process



1.5.2 Determination of Class EA Category

The hydraulic stress issue recorded in recent MOE inspection reports for the WWTP will be corrected if the Town implements a WTP plant optimization program combined with the design and construction of WWTP tankage to eliminate the current effects of high influent flows during wet weather and snowmelt conditions. When the improvements to the WWTP have been commissioned, the WWTP will likely be able to accommodate modest growth.

The evaluation of the above mentioned modifications and improvements at the Chalk River WWTP must be compliant with the EAA for municipal wastewater projects. The proposed project or activities contemplated herein are subject to the categorization governed by the amended Class EA. The Class EA, Appendix 1 - Project Schedule (MEA, 2011), confirms that "sewage flow equalization tankage at existing sewage treatment plants for influent and/or effluent control" are "Schedule B" projects. Therefore this project is being planned as a Schedule B activity subject to the screening process. The Schedule B activities have been retained since the contemplated work will not expand the existing WWTP beyond the current rated capacity. This report will document the project specifics. Phase 1, Problem or Opportunity, and Phase 2, Evaluation of Options, are subject to formal review by appropriate agencies and the public.

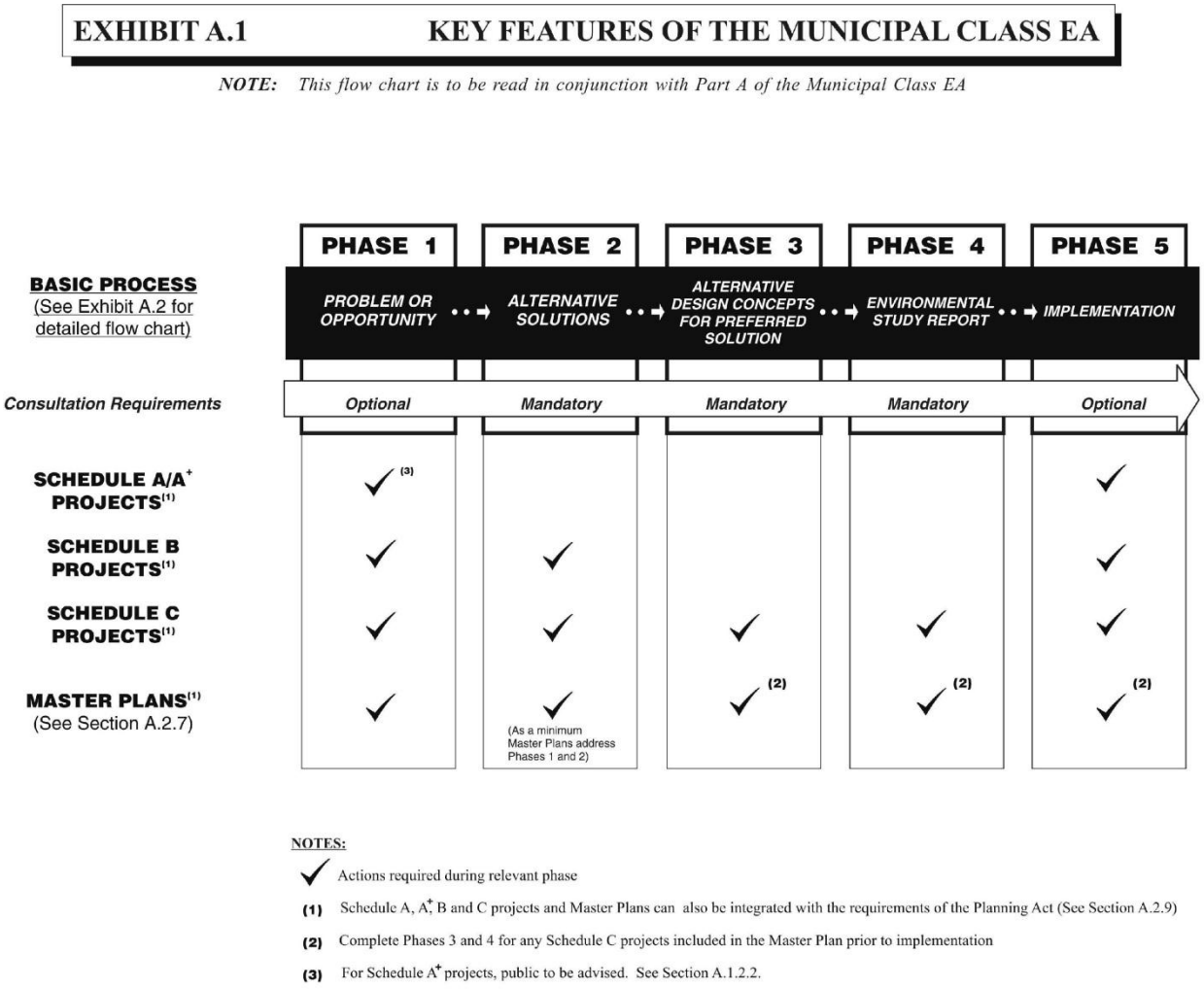
Upon approval of Phase 1 and Phase 2 for Schedule B projects the Owner may proceed directly to Phase 5 and implement the preferred solution.

The key features of the Class EA process are summarized below in **Figure 1-5**.

1.5.3 Project Schedule

A Notice of Study Commencement was published in local newspapers and distributed to review agencies in September and October of 2012 to notify them of the planning process. Phases 1 and 2, Schedule B, are expected to be completed by the second quarter of 2013. The design, construction and commissioning projects, are referred to as Phase 5, Implementation, per the Class EA. The Town will proceed to Phase 5 and implement the works if they are issued an order to proceed to construction or when they have the appropriate funding in place for the proposed capital works.

Figure 1-5: Key Features of the Municipal Class EA



1.6 PROBLEM OVERVIEW

Stantec submitted a Problem Definition letter to the Town in November 2012 (see **Appendix D**).

In order to plan for future needs, evaluate the possible courses of action, and consider the impacts on the environment, the Town has begun the environmental planning process well in advance of the requirement for a system upgrade. The Town has recognized that high influent flow during wet weather and snowmelt events are causing hydraulic stress at the WWTP thereby exhausting treatment capacity and resulting in reduced plant performance.

The Town intends to develop an efficient strategy for implementing upgrades to the WWTP for the purpose of improving performance at the WWTP, in a logically staged approach. This will allow for a gradual implementation of construction upgrades as needed.

On an annual basis, the WWTP operates within its rated capacity of 545m^3/day. During occasional high influent flows, particularly during wet weather and snowmelt events, the WWTP sees reduced treatment capacity and poorer effluent quality. The MOE annual reports in **Appendix C** indicate that when the WWTP is under hydraulic stress it is at risk of exceeding the effluent criteria stipulated in the prevailing Environmental Compliance Approval.

As the community grows, the sanitary sewage flows are expected to increase at the WWTP. The Town is in the process of reducing flows to the WWTP by reducing and/or diverting the process wastewater from the Chalk River WTP that is discharged to the sanitary sewers. The residual capacity after implementation of the WTP wastewater reduction may not be sufficient to accommodate future growth and enable improved treatment of the high flows that occur during wet weather and snowmelt events.

The MOE inspection reports in **Appendix C** state that the Town must continue to prevent groundwater infiltration and stormwater inflows from entering the sewage collection system. The Town conducted camera inspections of the entire collection system in 2007 to locate problem areas. Since then about one third of the sewage collection system was inspected for a second time. Despite inspections and repairs, the plant continues to operate in high flow contact stabilization mode. Stantec recommends that the Town continue the camera inspection program to identify problem areas. The results of the camera inspection program will support the Town's efforts in the reduction of infiltration and inflows into the collection system.

Other observations reported by the MOE include:

- The sewage treatment plant and the two pumping stations in the Town do not have any means to by-pass.
- There is no SCADA system in place.

1.6.1 Wastewater Treatment Plant Influent Flow History

Influent flows, including annual average daily and maximum day, at the Chalk River WWTP from 2003 to 2012 are shown below in **Table 1.2**. The influent flow history is plotted in **Figure 1-6**.

Table 1.2: Historical Flow Rates at the Chalk River WWTP (2003-2012)

Year	Average Daily Flow (m^3/day)	Capacity Utilized (%)	Maximum Daily (m^3/day)	Annual Peak Factor
2003	308.3	57	500.0	1.62
2004	271.3	50	389.0	1.43
2005	382.0	70	600.0	1.57
2006	515.3	94	749.0	1.45
2007	458.0	84	552.0	1.21
2008	472.0	87	850.0	1.80
2009	493.7	91	1251.0	2.53
2010	414.0	76	622.0	1.50
2011	451.1	83	885.0	1.96
2012	396.0	73	731.0	1.82

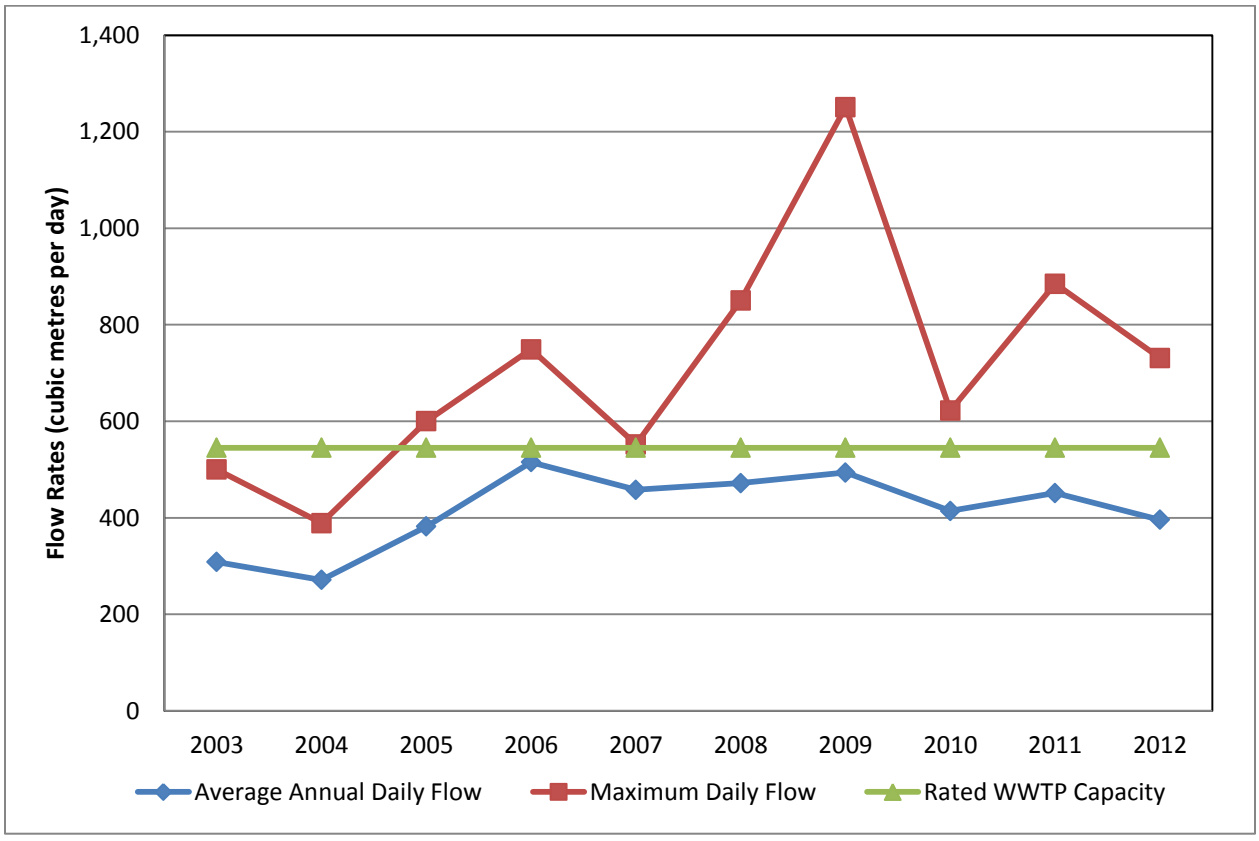


Figure 1-6: Historical Flow Rates at the Chalk River WWTP (2003-2012)

In summary, the annual average daily flows have not been increasing since 2006 and the annual maximum day flows are normally less than then twice the average day flow for a given year except for 2009 when the maximum day flow was 2.5 times the annual average daily flow. Most annual maximum day flows occurred in March and April during snowmelt while the others occurred in June likely during an intense rainfall event.

1.6.2 Project Objective

The project objective is to provide the Town with a plan to reduce the hydraulic stress at the WWTP. Achieving this objective will defer growth related wastewater treatment plant expansion requirements and the associated capital and operating costs. This project requires a review of sources of hydraulic stress at the WWTP and confirmation of treatment capacity of the existing WWTP. The plan may recommend solutions such as reduction of wet weather inflows and groundwater infiltration (I&I), modifications to the WWTP within its rated capacity, or upgrades at the WWTP.

Short term objectives:

- To mitigate hydraulic stress during high influent flow events

Long term objectives

- To meet future regulatory compliance
- To meet future growth demands

2.0 Description of the Environment

This section of the report is divided in three categories: Natural Environment, Social/Economic Environment and Financial/Technical Environment. The descriptions are intended to provide a generic overview while highlighting the potential features that could be impacted by the proposed options. Each of the topics will be an element of comparison for the overall evaluation process in **Section 4.0**.

2.1 NATURAL ENVIRONMENT

Because the anticipated works will be executed on lands that are already developed, the impact on the natural environment will be minimal. The potential impacts will be mitigated by imposing restrictions on the General Contractor regarding working hours and other environmental protection measures.

2.1.1 Air and Birds

Climate

The study area experiences a cold, continental-type climate. According to Environment Canada climate data recorded at the Chalk River, Ontario climate station from 1971 to 2000, the average daily temperature in Chalk River ranges from –12.1^{o}C in January to +20^{o}C in July. Below freezing temperatures (as defined by the daily minimum) are usually experienced for five months out of the year (November through March). The average annual total precipitation is 860 mm. During the average year, measurable precipitation occurs on 163 days.

The annual average wind speed measured at the nearest station, Petawawa (about 22km southeast of Chalk River), is 10.7km/hr. The predominant wind direction is from the west from December to February and from the east from March to November.

Appendix F contains climate data pertinent to Chalk River.

Air Quality

The Ontario MOE monitors air quality for this region. The closest monitoring station to the project site is Petawawa. The air quality rating system has five levels: very good, good, moderate, poor, and very poor. The 2010 history for Petawawa recorded no day with “poor” or “very poor” air quality. In fact, air quality was considered good or very good quality 96.7% of the time in 2010.

Construction of works associated with upgrades at the WWTP site may affect air quality on a temporary basis, by generating noise, vibration and/or odours.

Appendix G contains the MOE air quality information for Petawawa.

Bird Species at Risk

The bird species at risk (SAR) either living permanently in the Pembroke District, or being identified as possibly present or migrant for Renfrew County, have been listed by the Ontario Ministry of Natural Resources (MNR).

The Natural Heritage Information Centre database that is maintained by MNR identified four endangered bird species in the general area of Pembroke District; those are the Barn Owl (*Tyto alba*), the Golden Eagle (*Aquila chrysaetos*), the Kirtland's Warbler (*Setophaga kirtlandii*), and the Loggerhead Shrike (*Lanius ludovicianus migrans*).

The Species at Risk list from MNR is given in **Appendix H**.

2.1.2 Surface Water and Aquatic Animals

The Chalk River WWTP is located about 10km west of the Ottawa River. Pumphouse Creek, which flows from west to east into the Ottawa River, is the dominant water environment near the WWTP. Treated effluent from the WWTP is released to the natural environment by being discharged into Pumphouse Creek. The creek is located within 10m of the northeast section of the perimeter fencing at the WWTP.

MNR reviewed its files and provided information on the fisheries in Pumphouse Creek. Pumphouse Creek is characterized by a cool water regime. Fish species present include white sucker, brook stickleback, northern hog sucker, common shiner, northern redbelly dace, and central mudminnow. Trees provide cover along the shoreline.

Depending on the nature of the works under this project, surface water environment and associated aquatic life may be affected. No in-water works are anticipated regarding this project however appropriate setbacks and mitigation measures will be implemented during construction to ensure no impact to the fish or fish habitat will occur.

2.1.3 Groundwater

Groundwater at or near the WWTP property could be affected if there are no improvements to the plant and non-compliant effluent interacts with the groundwater. No impacts to groundwater are foreseen with the projects or activities described herein.

2.1.4 Land and Terrestrial Animals

Chalk River is located in the Middle Ottawa Section of the Great Lakes – St. Lawrence Forest Region, which is characterized by mixed forest that is well represented by both coniferous and deciduous species. The Town of Laurentian Hills is generally heavily forested with limited agricultural capability due to a combination of cold climate, hilly topography and poor soil conditions. Chalk River is built over well-drained sandy soils. Human activity, such as logging of white pine in the 1800s and early 1900s, and forest fires, has heavily impacted the vegetation

cover. The nearby forests are largely deciduous or mixed forest dominated by red maple, trembling and large-toothed aspens, and white pine with the presence of cedar and pine.

Natural environment features are limited within the perimeter fence surrounding the WWTP. Most of the WWTP property is grassed and open having been cleared for the WWTP. That open space will provide enough room to implement an equalization tank or a secondary clarifier, as discussed below; there would be no need to cut any trees. Pumphouse Creek is located on the north side of the WWTP property. Land towards the east and west is remnant mixed forest. Blimkie Street, a parking lot and what appears to be a works yard and residential development are located south of the WWTP.

Photos taken at the WWTP site in 2012 shows that the forest adjacent to the WWTP property appears to be a mix of uneven aged trees including coniferous, deciduous and boreal trees such as red pines, spruce, birch and maple trees. The forest appears to contain various species of fungi, ferns, mosses and shrubs common for this area.

The WWTP and surrounding land are shown below in **Figure 2-1**.

Figure 2-1: Aerial Photograph of the WWTP and Surrounding Land

Schedule A1 of the Town of Laurentian Hill's prevailing Official Plan (OP) has designated Pumphouse Creek as an "Environmental Protection" area. Black Duck Lake wetland, also an Environmental Protection area, located upstream of the WWTP, is to be protected for its natural heritage value.

Stantec searched the provincial natural heritage features database and found no provincially designated natural heritage features at or near the study area. The nearest Area of Natural and Scientific Interest (ANSI) is located approximately 6km to the south. The nearest Significant Ecological Area (SEA) is located approximately 10km to the west. The nearest Conservation Area (CA) is located approximately 100km north-west.

None of the local water bodies have been evaluated by the Ontario Wetland Evaluation System (OWES) therefore there are no designated Provincially Significant Wetlands (PSW) in the area.

The MNR provided an updated list of Species At Risk identified in the Pembroke District as of November 2012, as wells as the list of possible or migrant species at risk for Renfrew County (refer to **Appendix H**).

The MNR provided a list of mitigation measures for prior to construction and during construction to protect wildlife. Prior to construction and during construction exclusion fencing and silt screen will be used. Vegetation clearance and site alteration will be minimized within the area closest to the stream north of the WWTP and adjacent lands (within 30 meters). Breeding windows will be respected. Protective fencing and silt screens will be removed once the project is complete.

2.2 SOCIAL / ECONOMIC ENVIRONMENT

2.2.1 Archaeology

Archaeological resources include artifacts, archaeological sites and marine archaeological sites. Eastern Ontario is susceptible to sites of archeological interest mostly along navigable watercourses. A search of MTCS archaeological sites data available through Archaeology Sites Ontario (archaeologicalsites@ontario.ca) found no reported archaeology sites within 1km of the area. The archaeological potential was further evaluated based on a check-list of screening criteria provided by the Ministry of Tourism, Culture and Sport (MTCS). Refer to **Appendix I** for the working check-list completed by Stantec in March 2013.

Despite the ground disturbance associated with the original plant construction, consultation with MTCS has determined that due to the proximity to Pumphouse Creek a Stage 1 Archaeological Assessment is recommended prior to construction for more certainty regarding the potential for archaeological resources on the subject land. A Stage 1 Archaeological Assessment includes a review of the geographic, land use and historical information for the project and the relevant surrounding area. The report must be completed by an *Ontario Heritage Act* (OHA) licensed archaeologist and forwarded to MTCS for review.

2.2.2 Built Heritage Resources and Cultural Heritage Landscapes

Built Heritage Resources and Cultural Heritage Landscapes refers to any building or site of heritage, cultural or historical value that may be affected by the proposed works. Since any works will likely be implemented within WWTP property limits, and since there will be no sites of heritage, cultural or historical significance at this location, this issue is likely not a crucial factor under this review. If works are completed outside of the WWTP, then there may be a potential impact.

The Ministry of Tourism, Culture and Sport (MTCS) provided a check sheet in February 2013 for environmental assessments as a screening tool to determine if the EA project may impact built heritage and cultural heritage landscapes. If the project impacts the cultural heritage resources then MTCS recommends doing a Heritage Impact Assessment.

The Registrar at MTCS confirmed that there are no provincial heritage properties identified adjacent to the study area. There is no heritage planner for Laurentian Hills therefore MCTS suggested contacting the County of Renfrew to identify any local heritage resources. The County of Renfrew (Bruce Howarth, Senior Planner) reported that there is no cultural heritage information for this area.

The Canadian Register of Historic Places (www.historicplaces.ca) is a database containing information about recognized historic places of local, provincial, territorial and national significance. Stantec searched the database in March 2013 and found no registered historic places located in the study area.

Stantec searched the Ontario Heritage Properties Database (www.hpd.mcl.gov.on.ca) in March 2013. No provincial heritage properties were found in the database in the study area. This database has not been updated since 2005 so it is not comprehensive or exhaustive. Stantec contacted Infrastructure Ontario to confirm the existence of provincial heritage properties in the study area. Infrastructure Ontario confirmed there are no heritage properties within the study area.

Stantec searched the Online Plaque Guide through Ontario Heritage Trust. No results were found within Chalk River. Stantec made contact with staff at Heritage Trust Ontario (HTO) who confirmed the Trust does not protect any properties in Chalk River with a conservation easement. HTO staff also confirmed that after their review of the Ontario Heritage Act (OHA) Register, they were not aware of any properties designated under Part IV or V of the OHA.

Stantec searched the Heritage Conservation Districts database (www.mtc.gov.con.ca). No heritage districts were found in Chalk River.

Stantec searched the Canadian Heritage River watersheds database (www.chrs.ca). The subject property is not within a heritage river watershed.

Stantec searched the Ottawa Valley Cultural Map at www.ottawavalleyculture.ca. No cultural heritage sites were found adjacent to the WWTP property on this map.

Proponents subject to the EAA are required to consult with interested aboriginal communities. Proponents are required to contact the Ministry of Aboriginal Affairs (MAA) and Aboriginal Affairs and Northern Development Canada (AANDC) to help identify which First Nation and Métis community may be impacted by the project. Stantec consulted with MAA at the Ontario Information Center for the Algonquin Land Claim (Shelly Dumouchel) and was advised to consult the Algonquins of Ontario Consultation Office as to aboriginal interest in this project. This should help determine if the site is recognized or valued by an Aboriginal community.

If there is an impact to Aboriginal or treaty right, accommodation may be required to avoid or minimize the adverse impacts. If a project may adversely affect an Aboriginal or treaty right, or if a Part II Order or an elevation request is anticipated, the Director of the MOE Approvals branch must be contacted to determine if the Crown has a duty to consult.

The MCTS working check-list for heritage potential and cultural landscapes is provided in **Appendix J**.

Stantec completed the working check-lists using the best available information in March 2013. Steps 1 and 2 of the lists were completed. Step 3 will only apply depending on the final results in Step 1. The completed heritage check-list contains unknowns. Further research to address unknowns prior to completing the preliminary design of the preferred option is recommended.

2.2.3 Aesthetics (visual, night lighting, noise, vibration, odour)

The aesthetic environment of the study area may incur visual impacts during construction plus others associated with noise, lighting, vibrations, and odours generated during the implementation of the works as well as during routine operation of any new facilities.

There have been few odour and noise complaints from local residents due to plant operations even though the WWTP is located at the edge of a residential area and an industrial zone. During construction noise levels will increase temporarily. Truck traffic is currently necessary for operating the WWTP and handling the sewage at the site. Aside from truck traffic, there is practically no noise released at the WWTP, because all electrical pumping equipment is underground. When noise emission does occur the noise comes from the existing plant standby power generator when operated for maintenance purposes or during an electrical power failure. Any new works such as an equalization tank or secondary clarifier will be located at near grade elevations or below grade elevations and will not generate significant noise or odour during normal operations.

Visual impact will be limited. The forest adjacent to the WWTP is the primary feature comprising the aesthetic environment. Existing trees currently provide a buffer for visual

impacts on the north, east and west sides of the property. The existing trees will not likely be affected by any upgrades on the current property.

Potential lighting impacts can be mitigated during the design phase. Temporary lighting impacts may occur during construction.

2.2.4 Community Health and Safety / Economic Development

According to the OP, Chalk River is defined as an urban and vital centre for residential, commercial and public service uses. The community of Chalk River has a well-established pattern of land use. A segment of Provincial Highway 17 corridor exists within the urban boundaries of Chalk River. Future development will likely take the form of infill, intensification, and highway commercial development on existing vacant serviced lots within its urban service limits. A business park of approximately 9.7 ha (24 acres) of vacant lands is located at the south east end of Chalk River, but it is not currently serviced with either communal watermain or sewage collection systems.

The major employment sectors in Laurentian Hills include government, education, and health services which together employ 21.5% of the population (1996). Business services and accommodation, food and beverage industries employ 33% of population. Transportation and communications industries employ 19.7% while wholesale trade employ 11.4%. Primary industries and manufacturing each employ 3.9%.

The distribution of employment reflects the service industry associated with the Provincial Highway 17 corridor and the specialized employment and related services of Atomic Energy of Canada Limited (AECL). Primary industrial employment is associated with the forest products industry. Changes to the employment pattern are not anticipated over the planning period unless there is a major restructuring of existing industry sectors.

According to Statistics Canada 2011 census, released on October 24th, 2012, the total population within the community of Chalk River was 954 people, a 3.9% decrease since the 2006 census. With 400 private dwellings, the average population per household is about 2.4 people. About 81% of the population is aged 15 years and over, which is a slightly lower proportion than the provincial average of 83%.

Section 8.4 of OP states that it is preferred to have all future development within Chalk River to include both municipal water and sewage services; private systems would be considered when municipal services are not available or cannot be provided. Land Use Plan A2 (not included in this report) defines areas serviced by the communal system.

Section 2.5 of the OP states that the population of Chalk River will continue to decrease. Therefore, the benefit of creating additional residual capacity at the sewage treatment plant will not represent a significant community development benefit. The only tangible social benefit of such activity, beyond its process related advantages, would be the possibility of connecting existing households that are currently on septic systems. Such solution would imply that an

entire street and not just a few households could be connected to the communal sewage system.

The risk of public health and safety increases with the potential for sanitary sewer surcharge and resulting basement flooding during high influent flow events at the existing WWTP.

If an option decreases the risk of sanitary sewer surcharging then it will reduce the associated community health and safety risk and receive a higher score in the evaluation process.

This criterion is used to assess the possibility of creating a negative or positive impact on community health and safety and on community development when implementing a given option. If an option supports community growth for the next twenty years, then such option would receive an elevated rating. But, since the relative weight of the economic development criterion is moderate and not high (refer to Section 4.2), options that create residual capacity will not be viewed as significantly more attractive than options that do not create residual capacity.

2.3 FINANCIAL / TECHNICAL ENVIRONMENT

2.3.1 Capital Costs

Financial assessment differs from the economic development criteria under the Social Economic Environment, as it addresses directly the municipal financial scheme, while the economic development criteria consider the entire community. For the purpose of comparison, Stantec considered the most costly option to have the largest negative impact, while the option having lower costs to have a lesser negative impact.

Current regulations ensure that water and sewer services are provided on a “user pay” basis. The costs of operating and maintaining the facilities that provide these services are to be entirely funded by those serviced by water and wastewater infrastructure.

The Town currently has no provincial or federal funding for capital upgrades or expansion.

2.3.2 Land Ownership / Legal / Approval

This criterion addresses all expenses and scheduling issues related to acquiring land or easement to implement new facilities and obtaining approval from the government.

The land ownership and the legal environment relates to the availability of land, the requirements to obtain land and using that land for the recommended WWTP modifications. The Town owns the land currently occupied by the WWTP.

The subject property is sufficient to accommodate the option that requires the largest area e.g. the construction of a new WWTP. No land purchase is anticipated for the completion and commissioning of the preferred works, provided that the preferred option is located at the existing WWTP site.

In order to proceed with the works, the Town will have to apply for an amendment to the ECA) (refer to **Appendix A**). Modifications to the plant would be subject to MNR and MOE review, and would not be reviewed by any Conservation Authority (CA), because it is outside of the CA jurisdiction.

2.3.3 Planning / Zoning Issues

The land use plan (Schedule 'A1') from the Town's OP is given below in **Figure 2-2**.

As shown below on **Figure 2-2**, the WWTP property is located within a residential zone. Since all proposed works would be within the boundaries of existing municipal infrastructure, no agricultural land, pit or quarry would be affected by this project. Therefore, there is no planning or zoning issue that would prevent implementation of new works at the existing WWTP site, or introduce incompatible land use under any of the proposed options.

The separation distance that defines an influence area, as set out by the MOE for Class I and Class II industrial uses, does not apply for works at the WWTP. Therefore, the influence area limit, shown in orange dotted lines on **Figure 2-2** below will not affect the anticipated works at the WWTP. However, MOE Guideline D-2, "*Compatibility between Sewage Treatment and Sensitive Land Use*" calls for a minimum separation distance of 100m between sensitive land and WWTPs with rated capacities that are greater than 500m^3/day but less than 25,000m^3/day. The works could be implemented beside the existing WWTP, within the property boundaries and not result in a reduction of the existing separation distances. The design of the works must consider the potential for noise and odour emissions and implement measures to mitigate potential impacts.

Proposed works at the plant may be required to comply with water body setbacks given in Table 1 in Section 4.25 (f) of the Zoning By-Law (Town of Laurentian Hills, 2012). Zone requirements for Community Facility (refer to

Figure 2-3) as defined in Section 5.17.2 of the Zoning By-law may also apply. The distance between the WWTP property line and Pumphouse Creek is approximately 6.5 m.

If a new building is constructed on the WWTP property, the limit of the floodplain hazard in Pumphouse Creek should be verified prior to design. As per Section 7.3 of the OP, permitted uses within the flood plain include "infrastructure incidental to a wastewater treatment plant such as the sewer outfall but not the main building". If the main building is replaced on the WWTP property it must be above the engineering flood elevation.

Figure 2-2: Chalk River Land Use Plan

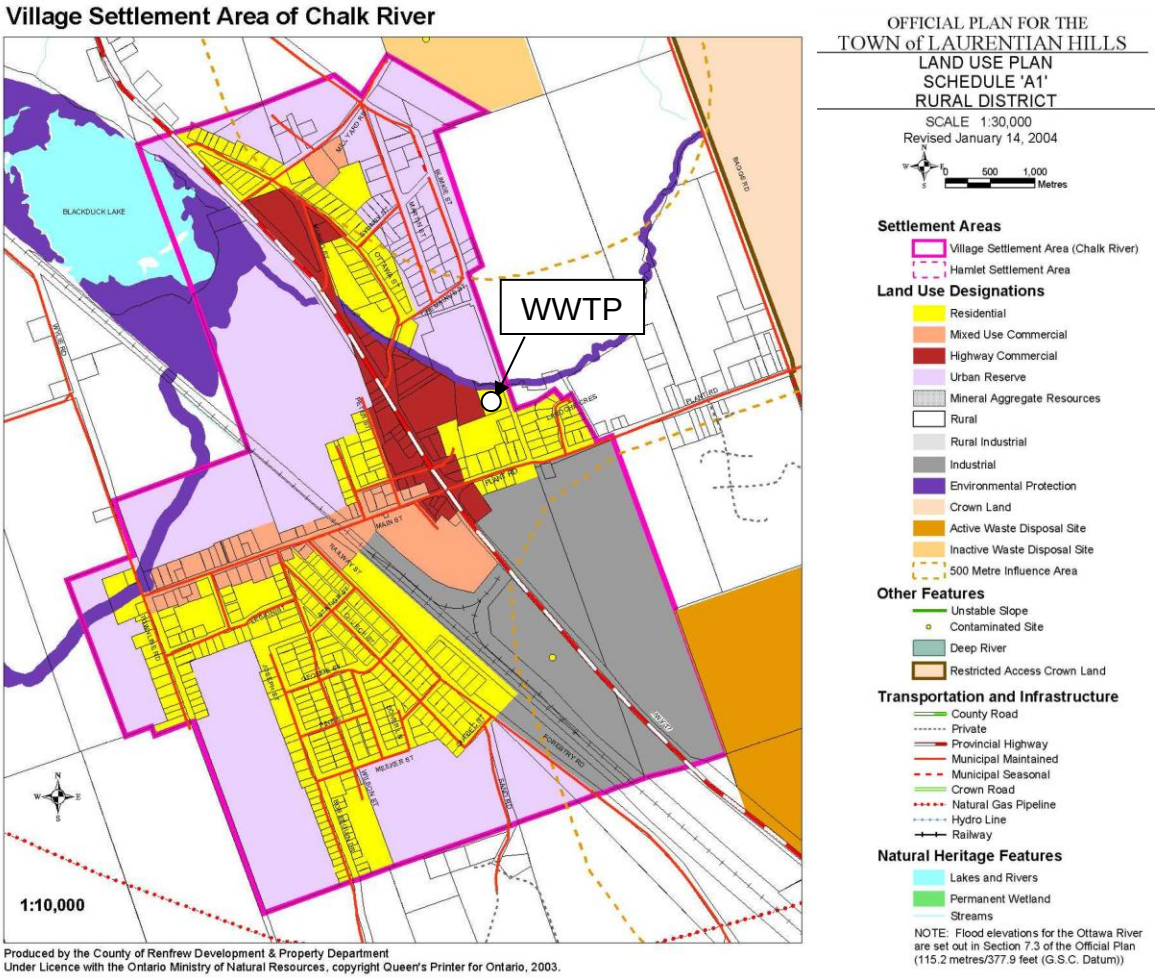
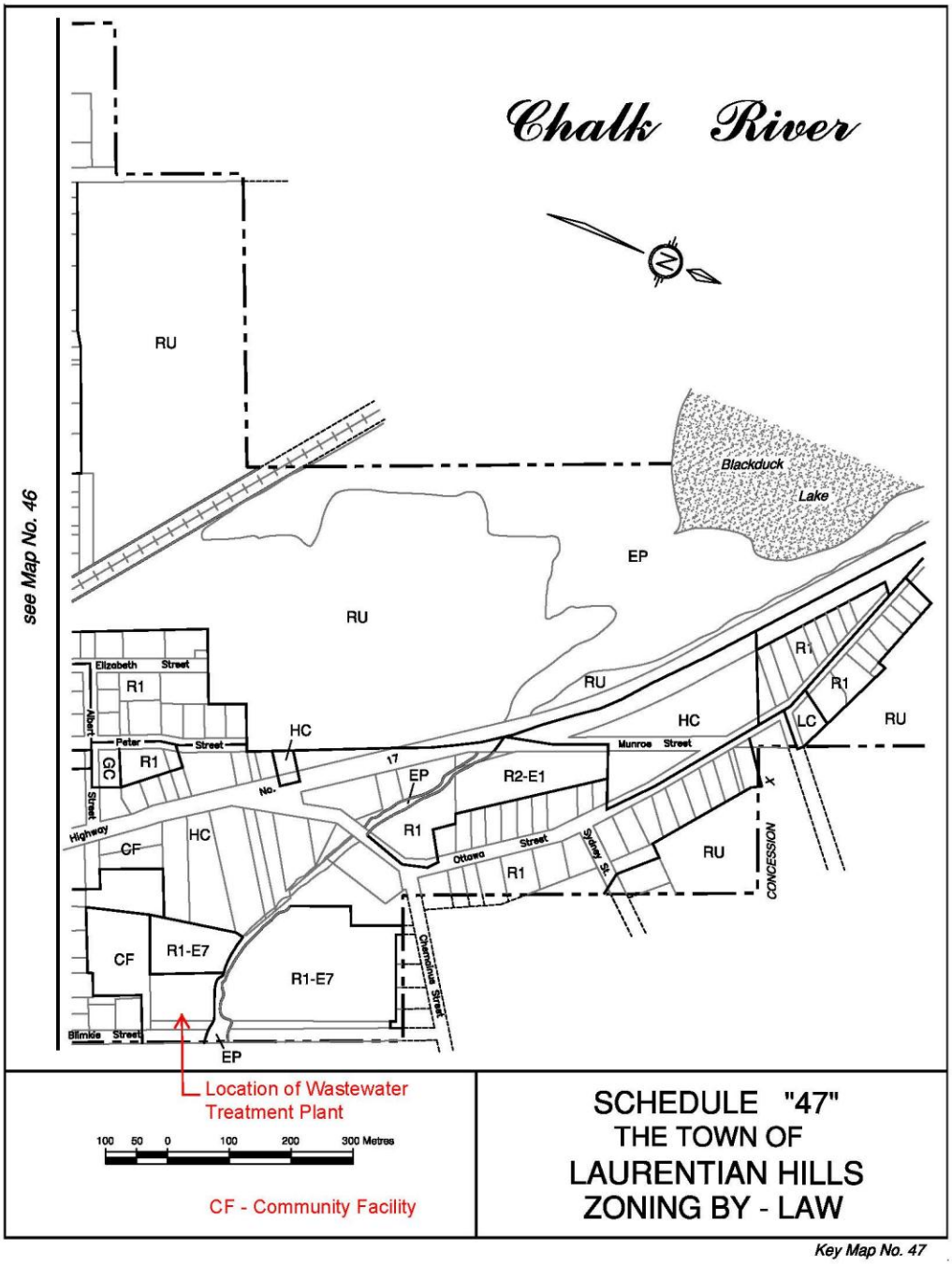


Figure 2-3: Chalk River WWTP Zoning (from June 2012 Zoning By-Law)



2.3.4 Physical Constraints

The physical constraints considered in this report include potential barriers to the implementation of the preferred option. This environment is linked to the economic environment (since with enough funding most barriers can be overcome), but it warrants its own category because of the time, difficulty and risk that these constraints often represent.

A major physical constraint regarding the WWTP expansion would be the existing sanitary sewer network. The sewage is currently collected throughout the Town by a series of gravity flow pipes and sewage pumping stations. The entire Town network has been built up over the years to direct sewage to the existing WWTP location. The WWTP facility represents a significant investment for the Town at the present site. To relocate the WWTP to another site would introduce a major physical constraint involving re-directing sewage flow and selecting another suitable site for a new WWTP that could be permitted to discharge to Pumphouse Creek.

A geotechnical investigation will be required prior to design of the preferred solution to determine the soils, subsurface conditions and depth to bedrock. Bedrock close to the ground surface is a potential constraint. The presence of fault-lines should be investigated as well.

The undefined flood plains and unstable slopes of Pumphouse Creek as well as contaminated sites may impose constraints on any work outside the existing treatment plant facilities from either within the current plant property limits or beyond if extra land is required. According to the OP there is no such constraint at the WWTP property. The plant property is outside the sensitive areas within the Laurentian Hills including flood plain limits along Ottawa River and unstable slopes on Lots 15 to 17, Range B, in the geographic Township of Rolph.

The location of the TransCanada Pipeline was also reviewed. As per the OP, any development within 200 m of TransCanada's facilities may affect the safety and integrity of the pipelines. As per Section 8.9.2 of the OP, the Town requires early consultation with TransCanada for major development proposals, such as those for a subdivision, commercial building or industrial facility, that include land within 200m of pipeline facilities. A setback of 10m shall be maintained from the limits of the TransCanada right-of-way to all permanent structures and associated excavation; a reduction in the 10m setback would be considered only in the case it can be demonstrated to TransCanada's satisfaction, that such work would not compromise the safety and integrity of their pipeline and if necessary all Municipal approvals are obtained.

Stantec reviewed the OP Land Use Plan (refer to **Figure 2-2**) and concluded that the distance from TransCanada natural gas main (shown in red dotted line) is more than 200m from the WWTP property limits. Therefore, this particular natural gas line would not be considered a physical constraint under this report.

2.3.5 Plant Operations & Maintenance

The Plant Operations and Maintenance factor considers ease of maintenance and additional operator workload attributable to the new facilities. New equipment would represent additional workload and new operational challenges.

Options that eliminate hydraulic stress will reduce operational burdens and have a positive impact.

The site is considered to be a safe environment with a health and safety program in place to control risk associated with the day-to-day operation of the facility. A wire perimeter fence limits access to the facility.

2.3.6 Hydraulic Stress at Wastewater Treatment Plant (WWTP)

Any option that improves the hydraulic efficiency at the WWTP and minimizes the risk of solids carryover at the existing clarifier into the receiving stream (Pumphouse Creek) will receive a higher score to reflect the net positive impact. Plant efficiency can be improved by;

- reducing high flows coming into the WWTP,
- by controlling the release of high flows into the WWTP, and/or
- by modifying the WWTP to treat the high flows.

3.0 Identification of Options

3.1 APPROACH

The purpose of this section is to consider reasonable solutions to the defined problem. Some solutions may be touched upon briefly, but not considered as options to be evaluated for one reason or another, as explained below. The criteria used to evaluate the options were based on generally accepted principles and previous experience. The criteria included the following:

- Application of current engineering practices and standards,
- Adherence to applicable laws and regulations,
- Economic considerations,
- Operation and maintenance issues,
- Health and safety,
- Acceptability to concerned stakeholders, and
- Feasibility of implementation.

3.2 WWTP OPERATING HISTORY

Review of recent MOE inspection reports (**Appendix C**) indicates that the WWTP has treated high influent flows while consistently meeting all final effluent quality criteria as required by the ECA. However, the MOE inspection reports also note that the municipality must continue to maintain the sewage collection system to reduce and control infiltration and inflow (I&I) and resultant high influent flow rates. High influent flows introduce a risk of reduced WWTP treatment effectiveness that may result in final effluent containing concentrations of contaminants that exceed the limits permitted by the ECA.

The MOE inspection reports also note that although the ECA is silent on the subject of disinfection performance, the municipality is required to maintain continuous disinfection of the final effluent for compliance with MOE Policy F-5-1. MOE Policy F-5-1 recommends the minimum treatment requirements for E.Coli be 200 Coliform Forming Units (CFU) per 100mL of final effluent. Currently disinfection is achieved by chlorination.

The operation of the WWTP has become very challenging during the high influent flow events that are caused by increases in the collection system I&I. The highest maximum daily flow observed from January 1, 2003 to December 31, 2012 was 1,251m^3. During the same period the maximum peak factor, which is represented by the maximum daily flow in a given year divided by the annual average daily flow for the same year, of 2.53 was experienced in 2009, the year the maximum daily flow was 1,251m^3. This suggests that when the WWTP annual average daily flow is equal to the design treatment capacity of 545m^3 the maximum daily flow would be as high as approximately 1,379m^3, or 16 litres per second (L/s). **Table 3.1** provides the recent annual average daily flows (AADF), the maximum daily flows and the calculated annual peak factor for this period.

Table 3.1: Annual Average Day Flow, Maximum Daily Flow and Annual Peak Factor

Year	AADF (m^3/day)	Maximum Daily (m^3/day)	Annual Peak Factor
2003	308.3	500	1.62
2004	271.3	389	1.43
2005	382.0	600	1.57
2006	515.3	749	1.45
2007	458.0	552	1.21
2008	472.0	850	1.80
2009	493.7	1251	2.53
2010	414.0	622	1.50
2011	451.1	885	1.96
2012	402.1	731	1.82

The WWTP operator reports that when the plant influent flow exceeds 545m^3/day (6.3L/s) the risk of washing solids from the WWTP clarifier materializes and final effluent contaminant limits can be exceeded. During high flow events the operator is forced to operate the sewage pump stations in manual mode to control the WWTP influent flow rate so as to not wash out solids from the WWTP to the natural environment in the final effluent and release non-compliant final effluent. To accomplish this, the operator must utilize the available "storage" capacity of the sewer pipes and wet wells of the pump stations by reducing pump station output. This tactic increases risk because a sewer pipe that is excessively surcharged to temporarily store sewage or a wet well that operates at too high a level could result in flooded buildings that are connected to the sanitary sewer system or spills to the natural environment.

The operator's experience indicates that when the WWTP influent flow rate is maintained at 9L/s or less, settled solids will not be washed out of the plant by the final effluent.

Influent flow rates that exceed 9L/s will result in settleable solids being washed out of the WWTP by the final effluent. This experience suggests that the plant maximum daily treatment capacity is 9L/s (778m^3/day) for reliable and compliant performance.

3.2.1 Assessment of WWTP Process Capacity

An assessment of the current WWTP process capacity was completed by Stantec (see **Appendix E**). Recognizing the WWTP was designed in the 1970's and many criteria for the design of sewage treatment plants have changed since the WWTP was designed and constructed, the individual process system attributes were evaluated and compared to the Design Guidelines for Sewage Works (MOE, 2008). This comparison was made to determine which processes meet the current MOE design guidelines to evaluate the suitability of the existing plant for future wastewater treatment service. In summary the grit removal chamber and contact and stabilization tank meet the design criteria recommended by the MOE design guidelines.

The hydraulic residence time of the existing chlorine contact tank was found to fall slightly short of the MOE design guidelines. The aerobic digester and biosolids storage are also inadequate to meet the MOE design guidelines. The secondary clarifier design meets the MOE design guidelines for the surface overflow rate, sludge loading and weir loading but the side wall depth of the clarifier is more shallow than recommended. Refer to **Appendix E** for the Chalk River Wastewater Treatment Plant Process Capacity Evaluation technical memo (process capacity TM), which summarizes the details of the WWTP treatment capacity assessment and comparison to the MOE design guidelines.

The shallow clarifier could reduce plant performance under high influent flows. The clarifier side wall depth is 2.5m. The MOE design guidelines recommend primary and secondary clarifiers have a side wall depth of 3.6m to 4.6m.

Reports provided by the WWTP operators indicate that during high influent flow conditions the solids from the plant clarifier are washed out with the plant effluent. This creates a risk of the effluent being non-compliant due to a high total suspended solids concentration. The washout of solids under high flow conditions and the shallow clarifier side wall depth are related. Stantec will investigate this further and address this issue as the preferred solution is developed.

Further, the process capacity assessment produced the following findings:

- The existing chlorine contact tank is slightly short of hydraulic residence time. Minor tank modifications or weir elevation adjustment may be required to provide more chlorine contact time.
- The existing aerobic digester is too small to provide adequate destruction of volatile suspended solids at temperatures of 10 degree C and lower. Expansion of the aerobic digester should be considered.
- There is no dedicated sludge storage tank. Depending on the approach to sludge disposal, additional sludge storage capacity may be required.

The solids washout from the WWTP is attributed to the shallow side wall depth of the clarifier. As discussed in the process capacity TM and based on the side wall depth of the existing clarifier, the clarifier has an estimated maximum daily flow treatment capacity of 700m^3/day (8.1L/s). This is consistent with the operating conditions observed by the WWTP operators.

To alleviate the consequences of hydraulic stress on the WWTP the Town must implement:

a) a plan to either eliminate a significant amount of the I&I,

b) capture and temporarily store the flow that exceeds 9L/s and pump the stored sewage into the plant when the normal influent flow rate is less than 9L/s, or

c) modify the existing plant processes to effectively treat higher influent flows.

Any upgrade to the WWTP must consider future requirements to produce a final effluent with more restrictive levels of contaminants and compliance with current and future regulations.

3.3 DEVELOPMENT OF OPTIONS

When developing options it is helpful to look at the factors contributing to the problem. The MOE environmental officer has reported that the WWTP experiences hydraulic stress during high influent flow events. This reported condition could be caused by one or more underlying problems including:

- the treatment plant is at or approaching its original or rated design capacity and cannot accommodate increased volumes of sewage,
- infiltration of groundwater into the sewer system,
- illegal connections (inflow) into the sewer system,
- greater than expected per capita flows (lack of consumer conservation), and
- treatment of excessive process wastewater generated by the Chalk River Water Treatment Plant.

The existing WWTP was designed for a specific rated capacity that included anticipated flows resulting from growth and allowed for limited inflows resulting for storm events. Although all problems listed above can have an impact, the primary consideration impacting the WWTP performance is the WWTP capacity to provide an acceptable level treatment when influent flow rates exceed 778m^3/day (9L/s), which is only 1.43 times the design annual average daily flow rate. Typically, WWTPs are designed to treat peak flow rates that are more than 2 times the annual average daily flow. This undesirable condition is exacerbated during periods of time when the WWTP receives high influent flows due to wet weather and snowmelt events and when WTP process wastewater is discharged to the sanitary sewer system. Thus, the existing WWTP is likely incapable of handling any additional flows that would be created by growth.

Recently enacted Provincial Drinking Water Regulations imposed mandatory modifications and expansions at the Chalk River WTP. The recently commissioned works at the WTP included the provision of a new process treatment system that ensured that safe drinking water is always available to the residents of Chalk River in case one of the two treatment units fails. As a result of this WTP expansion the WTP processes generate and discharge more wastewater to the sanitary sewers. The WTP expansion has created negative impacts at the WWTP by reducing residual treatment capacity and at times contributes to the hydraulic stress at the WWTP.

The Town is working to address sanitary sewer infiltration issues (leaks) in an attempt to decrease WWTP influent flow rates. Circa 2007 the Town completed a camera inspection of the entire sewer system to identify locations were sewer system maintenance and repair were required. Since then approximately 33% of the sewer system has been inspected a second

time. Although the camera inspection and sewer repair program has produced limited positive impacts regarding WWTP influent flow rates the Town continues to use camera inspection to identify locations within the sewer system that require repair to mitigate inflow and infiltration.

3.4 OPTIONS FOR EVALUATION

3.4.1 Option 1: Do Nothing

The "Do Nothing" option provides a benchmark for the evaluation and is a required component of the environmental assessment process. This option assumes that nothing is done to address the stated problem. In this particular case, if nothing is done to increase the WWTP's capacity or to reduce the volumes of infiltration and inflow into the treatment process, the Town cannot connect new users to the sanitary sewage system.

If nothing is done to reduce the hydraulic stress at the WWTP, the risk of releasing non-compliant effluent to the natural environment will not be effectively controlled, particularly during periods of high influent flow.

3.4.2 Option 2: Reduction of Flows

Option 2 is to reduce the volume of influent flows entering the WWTP and thus reduce the hydraulic stress. Influent flows to the WWTP could be reduced by:

- Reducing flows coming from the Water Treatment Plant,
- Reducing groundwater infiltration into the sanitary sewers, and/or
- Reducing stormwater inflows into the sanitary sewers.

The following sub-section discusses the different components that will contribute to overall WWTP influent flow reduction.

3.4.2.1 Reduction of Flows Leaving the Water Treatment Plant

The normal operation of the Chalk River WTP results in the production of process wastewater that is discharged to the sanitary sewer system regularly. Since 2011 operators have worked to optimize the filter backwash and filter-to-waste processes and reduce the process wastewater produced by the WTP. Their efforts have resulted in a significant reduction in the volume of process wastewater generated by the WTP. However when the WTP does discharge the process wastewater it does so at 3.8L/s. The discharge of WTP process wastewater creates a short term increase in sewage flow to the pump station, which in turn will increase the influent flows to the plant. An additional 3.8L/s during high influent flow events caused by wet weather or snowmelt is a significant increase given the WWTP operates reliably at a maximum of 9L/s.

If new pumps are installed at the WTP, the peak flow rate at the WTP could change from 3.8 L/s to 1 L/s and the peak flows to the WWTP could decrease by 2.8 L/s. The maximum daily flow at

the WWTP in 2009 was 14.5 L/s (equivalent to maximum daily flow of 1251 m^3/d). If the instantaneous flows to the WWTP are reduced by 2.8 L/s, then a repeat of the 2009 condition would result in flows of approximately 11.7 L/s, which is still too high for the WWTP.

The installation of new pumps that discharge WTP process wastewater at reduced flow rates over an extended period of time will lower the WWTP peak instantaneous influent flows but will not lower the peak instantaneous flows enough to control the risk of WWTP poor performance.

3.4.2.2 Reduction of Groundwater Infiltration into Sanitary Sewers

High influent flows to the WWTP will be reduced if groundwater infiltration into the sanitary sewers is reduced. Groundwater infiltration in the sewers can be reduced by replacing or lining sewers that leak. The amount of groundwater infiltration in the sanitary system is unknown at this time.

Reducing groundwater infiltration can be onerous and expensive and is a long-term solution.

The Town continues to perform CCTV inspection and sewer repair to control and reduce infiltration. To date, this work has resulted in limited influent flow reduction.

3.4.2.3 Reduction of Storm water Inflows into Sanitary Sewers

Flows to the WWTP can be reduced by sealing existing manholes to sanitary sewers and by disconnecting domestic sump pumps and roof drains from the sanitary network and diverting these flows to a storm water drainage system. The amount of storm water inflows in the sanitary network is unknown at this time.

Reducing groundwater infiltration and storm water inflows can be onerous and expensive and is a long-term solution. Efforts to date have produced limited reduction of I&I.

The Town should continue the CCTV inspection and sewer repair program. An I&I study is required to identify any surface water connections such as roof drains and building sump pumps.

Elimination of storm water connections on the sanitary sewers must be accompanied by development of a separate storm water management system. Storm water management infrastructure (e.g. ditches, sewers, wet ponds, etc.) would be needed to capture the diverted storm water coming from roofs and sump pumps. I&I reduction (and associated storm water management infrastructure) is a long-term program. Without a detailed I&I study, the amount of flow reduction that can be achieved is unknown.

3.4.3 Option 3: Add an Equalization Tank Upstream of WWTP

The WWTP is inadequate based on current design standards so the preferred solution may be to modify the WWTP to enable reliable and effective treatment of both the average daily flow and the peak daily flow rates.

An equalization tank can be added upstream of the WWTP to buffer the surge of high influent flows that occur during high runoff and infiltration periods (e.g. spring snowmelt and heavy rain event) and reduce the hydraulic stress on the plant. The equalization tank can be located at the WWTP site near the existing wet well (or instead of it). The volume of the equalization tank must be quite large as all influent flow that exceeds 9L/s would have to be diverted to the equalization tank and stored until there is treatment capacity available (when influent flows are less than 9L/s). When the WWTP influent flow is less than 9L/s stored sewage in the equalization tank can be diverted to the plant at a rate that ensures the overall WWTP influent flow does not exceed 9L/s.

Under this option there will be a requirement to store raw sewage for a number of days before the sewage can be conveyed to the plant for treatment. This option must include the facilities to treat any odourous vapours that may be released from the stored sewage. Odour mitigation measures that may be incorporated into the design of the facilities for this option include granular carbon beds or bio-filters.

The MOE Guideline D-2 "*Compatibility between Sewage Treatment and Sensitive Land Use"* states the minimum separation distance from a sewage treatment system noise/odour source to the property line of the sensitive land use shall be 100m. The existing sewage treatment system is approximately 100m from the closest land use which is a private residence. The addition of the equalization tank should be located in the northwest section of the WWTP property to ensure the separation distance from the equalization tank to the closest sensitive land use is greater than100m.

3.4.4 Option 4: Add a Secondary Clarifier

A secondary clarifier can be constructed at the WWTP and designed to treat both average and peak daily flow rates. The depth of the existing clarifier is insufficient and has been identified as the component of the existing WWTP that is inadequate to provide treatment of influent flows that exceed 9L/s. Placing a new secondary clarifier in service will provide additional capacity for removal of solids and other contaminants that are washed out of the existing WWTP under high influent flow conditions.

A new secondary clarifier can be located adjacent to the existing WWTP in the northwest section of the same property. This location will ensure the separation distance from the closest sensitive land use to the new clarifier is greater than 100m. A new secondary clarifier can operate in conjunction with the existing clarifier. The new clarifier would need to be at least 3.5 to 4m deep to meet current MOE design standards (MOE, 2008).

3.4.5 Option 5: Construction of a New Plant (at Present Location)

Expanding the Chalk River WWTP at the present location provides the opportunity to replace the existing WWTP that is nearing its expected full lifecycle and increase the plant capacity to support the predicted increase in serviced users. The WWTP has not reached the end of its useful life but is near the end of its full lifecycle. The execution of effective maintenance in the near term will ensure the WWTP delivers the current level of wastewater treatment service until replacement. The WWTP has been in service for approximately 40 years and replacement of the WWTP within the next 5-10 years should be planned.

The Town currently owns sufficient land at the existing location to house the new facilities. Additional land will not likely be required as the magnitude of the expansion is such that the footprint of a new WWTP is not expected to spill beyond the perimeter fencing of the existing WWTP site.

3.5 OTHER OPTIONS CONSIDERED BUT NOT EVALUATED

There are other options that have been considered but not evaluated because of their higher capital costs and the low tangible benefit. The following is a brief description of other options that were considered but not evaluated:

- A new plant at another location was considered but excluded from further analysis because sufficient land at the current site exists for a new plant.

- Replacing the existing clarifier was considered but removed from further evaluation because it was deemed impractical given the current plant configuration.

3.6 CAPITAL COST COMPARISON OF OPTIONS

The capital cost associated with the “Do Nothing” option (Option 1) is considered negligible as there are no capital works.

The capital cost of reducing flows to the plant (Option 2) and the cost of constructing a new plant at the present location (Option 5), shown below in **Table 3.2,** have been estimated within an “Order of Magnitude” (Class D). This means that the maximum probable cost is 50% higher than the most probable cost and the minimum probable cost is 35% lower than the probable cost.

The cost for flow reduction (Option 2) was estimated within an “Order of Magnitude” because of the unknowns associated with the project scope and schedule and the extent of the study area. The $16M estimate includes costs for sump pump disconnections, new storm sewers and related facilities for the entire community. Capital costs for centralized storm water management facilities will depend on the size and location of the facility. The cost of disconnecting sump pumps was estimated at $4,000,000 based on 400 households and disconnection rates of $10,000 per household. Small wet ponds (less than 30,000 m^3 to be

excavated) can be $1M each. Cost for sewer construction on existing roads is estimated at $1,100/m based on the average cost in Ottawa and Toronto for three pipe diameters: 450mm, 600mm, and 750mm. After accounting for catch basins, manholes, pump stations and storm water ponds, the cost for installing a storm water management system is estimated at $12,000,000 assuming that the required length of storm sewer is the same as the length of sanitary sewer (8km)

The work to implement a storm water management system would need to be done over the long-term (5-10 years) so cost estimates would need to account for inflation. An I&I study and long-term storm water management plan would be required to define the scope of the work and reduce the uncertainty in the cost estimates. Detailed study can identify the requirements for centralized storm water management facilities and storm water pump stations.

The cost of a new plant (Option 5) is based on a design flow of 545m^3/day with no land acquisition allowance. The final design flow will likely be higher, and would be determined later through long-term planning however the selected rate is appropriate because it is the current rated plant capacity. The actual costs will vary depending on the final design rate, the chosen treatment technology, and the prevailing site conditions such as bedrock. The construction cost for a new plant is based on a unit cost of $15,000/$m^3$/day of design flow.

The cost of an equalization tank (Option 3) and a secondary clarifier (Option 4) are provided below in **Table 3.2**. These are preliminary (Class C) cost estimates, meaning that the maximum probable cost is 35% higher than the most probable cost and the minimum probable cost is 20% lower than the most probable cost.

Capital cost estimates include construction and contingency plus engineering, approvals, design, project management, contract administration, and construction services.

Detailed cost information for the equalization tank and the secondary clarifier is in **Appendix K**.

Table 3.2: Opinions of Probable Cost for Evaluated Options

Option	Type of Cost Estimate	Probable Cost	Probable Range
Option 1 - Do Nothing	-	-	-
Option 2 – Reduce Flows into WWTP	Order of Magnitude, Class D (V)	$16M	– 35% to 50%
Option 3 – Add an Equalization Tank	Preliminary, Class C (IV)	$2.9M	-20% to 35%
Option 4 – Add a Secondary Clarifier	Preliminary, Class C (IV)	$0.9M	-20% to 35%
Option 5 - New Plant at Present Location	Order of Magnitude, Class D (V)	$12.9M	– 35% to 50%

4.0 Evaluation Criteria and Results

This section of the report will detail the evaluation criteria and explain the process that was used to review each option in relation to the criteria. Some of the criteria are subjective and, as such, the evaluation process is affected by the opinions of those who participate in the evaluation process. This is generally considered to be a beneficial component of the report since it then compiles many views on the issues presented.

4.1 SCREENING CRITERIA

The criteria for evaluation are the environments that could be affected by the work. These environments have been grouped into three categories: Natural Environment, Social / Economic Environment, and Financial / Technical Environment. The individual criteria for each of these environment categories are as follows (refer to **Section 2.0** for complete description):

Natural Environment

- Air and Birds
- Surface Water and Aquatic Animals
- Groundwater
- Land and Terrestrial Animals

Social / Economic Environment

- Archaeological
- Built Heritage Resources and Cultural Heritage Landscapes
- Aesthetics
- Community Health & Safety / Economic Development

Financial / Technical Environment

- Capital Costs
- Land Ownership / Legal / Approval
- Planning / Zoning Issues
- Physical Site Constraints
- Plant Operations & Maintenance
- Hydraulic Stress at WWTP

Each of the criteria is allocated a relative weight, for assessment purpose. Most of the criteria would receive the minimum relative weight, i.e. 1, while criteria being considered more important and/or critical for the successful completion of this project got a higher relative weight. For example, since all of the options involve works inside the WWTP property boundary, most of the Social/Economic Environment criteria, such as Archeological, Built Heritage Resources and Cultural Heritage Landscapes, and Aesthetics, have a low relative weight of 1. If the proposed work area were to be located within a Historical District then such criteria would have received a much higher relative weight.

Relative weights have been reviewed and endorsed by the Town, as those are a numerical expression of their vision of the project.

4.2 ESTABLISHMENT OF RATING SYSTEM

Each option will be assigned a level of impact, hereafter referred to as its rating, for each of the evaluation criteria listed in **Section 4.1** and described under **Section 2.0**. The rating system used for evaluation establishes seven levels of impact, as follows:

- Major Positive Impact (+3): typically the option having the largest positive impact would get that rating; it may also apply to a multi-factor criteria, each of the factors being moderately positive;
- Moderate Positive Impact (+2)
- Minor Positive Impact (+1)
- Neutral or Inconsequential Impact (0): it may also be the combination of minor negative and minor positive impacts, as a given criteria would typically include many factors that may be rated differently;
- Minor Negative Impact (-1)
- Moderate Negative Impact (-2)
- Major Negative Impact (-3)

4.3 EVALUATION OF OPTIONS

The evaluations of the options are summarized and presented below in **Table 4.1**.

Table 4.1: Level of Impacts

	Relative Weight	Option 1	Option 2	Option 3	Option 4	Option 5
Description		**Do Nothing**	**Reduce Flows into Plant**	**Add an Equalization Tank**	**Add a Secondary Clarifier**	**New Plant at Present Location**
Natural Environment						
Air and Birds	1	0	-1	0	0	0
Surface Water and Aquatic Animals	3	-1	1	2	2	2
Groundwater	2	0	0	0	0	0
Land and Terrestrial Animals	1	-2	1	2	2	2
Social / Economic Environment						
Archaeological	1	0	-1	-1	-1	-1
Built Heritage Resources and Cultural Heritage Landscapes	1	0	-1	0	0	0
Aesthetics	1	0	1	0	0	-1
Community Health and Safety / Economic Development	3	-2	1	2	2	2
Financial / Technical Environment						
Capital Cost	4	0	-3	-2	-1	-3
Land Ownership / Legal / Approval	1	0	-3	-1	-1	-1
Planning and Zoning	1	0	-1	0	0	0
Physical Constraints	1	0	-3	0	0	0
Plant Operations and Maintenance	3	-3	2	-1	0	-1
Hydraulic Stress at WWTP	5	-2	2	2	2	3
Total Score and Overall Ranking						
Total of the ratings, multiplied by relative weights		-30	2	11	18	11
Ranking of Options, from best score to worst score		5	4	2-3	1	2-3

The overall assessment of each option is completed by adding the products of the relative weight of a given criterion multiplied by the assigned rating of such criterion for a given option.

An explanation of the reasoning for the assigned ratings is provided below.

4.3.1 Option 1 – Do Nothing

Natural Environment

Air and Birds – *Neutral or Inconsequential Impact (0)* No impacts are expected for this environment as no work will be undertaken at the WWTP site.

Surface Water and Aquatic Animals – *Minor Negative Impacts (-1)* This option would not reduce WWTP hydraulic stress. As a result during high influent flow events non-compliant effluent could discharge directly into the receiving stream and potentially impair the surface water quality.

Groundwater – *Neutral or Inconsequential Impacts (0)* No impacts are expected for this environment since no work will be undertaken at the WWTP site.

Land and Terrestrial Animals – *Moderate Negative Impacts (-2)* This option will not reduce the WWTP hydraulic stress. As a result during high influent flow events non-compliant effluent could discharge directly into the receiving stream and possibly affect the health of terrestrial animals and pose a potential environmental spill to the land.

Social / Economic Environment

Archaeological – *Neutral or Inconsequential Impact (0)* This option will have no impact on this environment because no work will be undertaken at the WWTP site.

Built Heritage Resources and Cultural Heritage Landscapes – *Neutral or Inconsequential Impact (0)* This option will have no impact on this environment since no work will be undertaken at the WWTP site.

Aesthetics – *Neutral or Inconsequential Impact Impacts (0)* This option would have no aesthetic impact since no work will be undertaken at the WWTP site.

Community Health and Safety/ Economic Development – *Moderate Negative Impact (-2)* This option will limit growth in Chalk River. The impact on this environment would be limited to maintaining the status quo as it relates to the economy. The number of new businesses and homes would be limited, thereby limiting the tax base. Existing sewage contributors would bear all of the economic costs of operating and maintaining the ageing sewage infrastructure. Also, current operating conditions present the risk of releasing non-compliant effluent to the natural environment and sewer surcharge that could result in sewage back-up into connected properties.

Financial / Technical Environment

Capital Costs – *Neutral or Inconsequential Impact (0)* This option will have no new financial investment burden since no work will be undertaken at the WWTP site.

Land Ownership / Legal / Approval – *Neutral or Inconsequential Impact (0)* This option will have no impact in this environment because there are no new capital works.

Planning / Zoning – *Neutral or Inconsequential Impact (0)* This option will have no impact on this environment since no capital work will be undertaken at the WWTP site.

Physical Site Constraints – *Neutral or Inconsequential Impact (0)* This option will have no impact on this environment since no work will be undertaken at the WWTP site.

Plant Operations & Maintenance – *Major Negative Impact (-3)* This option will not increase the plant's ability to handle high influent flows. As a result during high influent flow events the risk of releasing non-compliant effluent to the natural environment increases, the risk of environmental spills increases and the risk of sewage backing up and flooding basements increases. Under this option, the WWTP operations becomes challenging and operator intensive.

Hydraulic Stress at WWTP – *Moderate Negative Impact (-2)* This option will not increase the plant's capacity or ability to handle peak flows. As a result during high influent flow events the plant would be operating beyond its capacity.

4.3.2 Option 2 – Reduction of Flows

Natural Environment

Air and Birds – *Minor Negative Impact (-1)* There is potential for minor short term impacts during the construction phase. Mitigating measures will be implemented during construction to minimize impacts to birds.

Surface Water and Aquatic Animals – *Minor Positive Impacts (+1)* This option will reduce peak flows to the WWTP. As a result non-compliant effluent will be less likely to discharge directly into the receiving stream. Current I&I reduction efforts have resulted in limited improvements. The potential reduction of inflows through an I&I mitigation program is not known therefore this can only be assigned a lower ranking.

Groundwater – *Neutral or Inconsequential Impact (0)* No measurable impacts are expected for this environment.

Land and Terrestrial Animals – *Minor Positive Impacts (+1)* This option will reduce high influent flows to the WWTP. As a result, non-compliant effluent will be less likely to discharge directly into the receiving stream and possibly affect the health of terrestrial animals and pose potential

environmental spills to the land. Full implementation is a long term process short term benefits are inconsequential.

Social / Economic Environment

Archaeological – *Minor Negative Impact (-1)* There is potential for negative impacts due to excavations required for new stormwater management facilities.

Built Heritage Resources and Cultural Heritage Landscapes – *Minor Negative Impact (-1)* There is potential for negative impacts due to excavations required for new stormwater management facilities.

Aesthetics – *Minor Positive Impact (+1)* This option will reduce the potential for the release of non-compliant effluent into the receiving stream.

Community Health and Safety / Economic Development – *Minor Positive Impact (+1)* – Reducing inflows to the WWTP could eventually allow for some growth in Chalk River. This option will reduce the probability of sewer surcharge and basement flooding upstream.

Financial / Technical Environment

Capital Costs – *Major Negative Impact (-3)* This option would require the completion of a detailed infiltration/inflow investigation and development of a community wide stormwater management system. Implementation of a stormwater management system will require a major financial investment.

Land Ownership / Legal / Approval – *Major Negative Impact (-3)* This option would require procurement of land and easements to construct stormwater drainage systems. This option would require approval by MOE (and possibly other agencies).

Planning / Zoning – Minor Negative *Impact (-1)* This option would have implications on the current zoning designations.

Physical Site Constraints – *Major Negative Impact (-3)* This option would be difficult to implement because a new municipal stormwater drainage system would have to be implemented in a developed community.

Plant Operations & Maintenance – *Moderate Positive Impact (+2)* This option would reduce high influent flows and relieve hydraulic stress at the WWTP. The potential reduction in inflows through an I&I mitigation program is not known therefore this can only be assigned a moderate ranking.

Hydraulic Stress at WWTP – *Moderate Positive Impact (+2)* This option would reduce peak influent flows and relieve stress at the WWTP. The potential reduction in inflows through an I&I mitigation program is not known therefore this can only be assigned a moderate ranking.

4.3.3 Option 3 – Add an Equalization Tank Upstream of the WWTP

Natural Environment

Air and Birds – *Neutral or Inconsequential Impact (0)* No impacts are expected for this environment once proper mitigating measures are implemented. Mitigating measures will include taking care not to remove trees used for nesting during the breeding season.

Surface Water and Aquatic Animals – *Moderate Positive Impacts (+2)* This option will improve the plant's ability to handle high flows. As a result during high influent flow events any non-compliant effluent will be less likely to discharge directly into the receiving stream.

Groundwater – *Neutral or Inconsequential Impact (0)* This option will have no impact on this environment since new discharges to surface or subsurface targets are not anticipated.

Land and Terrestrial Animals – *Moderate Positive Impacts (+2)* This option will improve the plant's ability to handle high flows. As a result during high influent events non-compliant effluent will be less likely to discharge directly into the receiving stream and possibly affect the health of terrestrial animals and reduce the potential for environmental spills to the land.

Social / Economic Environment

Archaeological – *Minor Negative Impact (-1)* This option may require excavation therefore there is a potential for minor negative impact on this environment. A Stage 1 Archaeological Assessment will likely be required during the design phase to determine potential impact.

Built Heritage Resources and Cultural Heritage Landscapes – *Neutral or Inconsequential Impact (0)* This option would have no impact on this environment since construction of new works would be confined to the existing WWTP site.

Aesthetics – *Neutral or Inconsequential Impact (0)* This option would have minor positive impacts on this environment due to a reduction in the potential for non-compliant effluent releases. Implementation of this option will not reduce the current separation distance between the WWTP and adjacent sensitive lands. The potential for odour emission during operation of the equalization tank must be addressed during design. Temporary negative impacts will materialize from construction activities.

Community Health and Safety / Economic Development – *Moderate Positive Impact (+2)* This option will increase the plant's ability to handle high influent flows, which could allow for some growth in the Town of Chalk River. This option will reduce the probability of sewer surcharging and resultant basement flooding in the community.

Financial / Technical Environment

Capital Costs – *Moderate Negative Impact (-2)* This option would require the design and construction of a new equalization tank. Costs of a tank are estimated to be more than the "Do Nothing" approach and the secondary clarifier (Option 4) but less costly than plant replacement (Option 5) and I&I reduction (Option 2).

Land Ownership / Legal / Approval – *Minor Negative Impact (-1)* No new land requirements is anticipated. This option would require approval by MOE.

Planning / Zoning – *Neutral or Inconsequential Impact (0)* This option would have no impact on this environment since new development would be confined to the existing WWTP site.

Physical Site Constraints – *Neutral or Inconsequential Impact (0)* Because construction of the tank would be on a vacant portion of the WWTP property, no major physical constraints are anticipated. A geotechnical investigation may identify bedrock.

Plant Operations & Maintenance – *Minor Negative Impact (-1)* This option would require new operations and maintenance requirements for new equipment but eliminates the challenges of operating the WWTP under hydraulic stress. Odour control will create additional operational burden.

Hydraulic Stress at WWTP – *Moderate Positive Impact (+2)* This option would increase the plant's ability to handle high influent flows.

4.3.4 Option 4 – Add a Secondary Clarifier

Natural Environment

Air and Birds – *Neutral or Inconsequential Impact (0)* No impacts are expected for this environment once proper mitigating measures are implemented.

Surface Water and Aquatic Animals – *Moderate Positive Impacts (+2)* This option will increase the plant's ability to handle high influent flows. During high influent flow events non-compliant effluent will be less likely to discharge directly into the receiving stream.

Groundwater – *Neutral or Inconsequential Impacts (0)* This option will have no impact on groundwater.

Land and Terrestrial Animals – *Moderate Positive Impacts (+2)* This option will increase the plant's ability to handle high influent flows. During high influent flow events non-compliant effluent will be less likely to discharge directly into the receiving stream and possibly affect the health of terrestrial animals and reduce the potential for environmental spills to the land.

Social / Economic Environment

Archaeological – *Minor Negative Impact (-1)* This option may require excavation therefore there is potential for a minor negative impact on this environment. A Stage 1 Archaeological Assessment will be required during design and prior to construction.

Built Heritage Resources and Cultural Heritage Landscapes – *Neutral or Inconsequential Impact (0)* This option will have no impact on this environment since all new works will be confined to the existing WWTP site.

Aesthetics – *Neutral or Inconsequential Impact (0)* This option will have minor positive impacts on this environment due to a reduction in the potential for non-compliant effluent releases. Under normal operating conditions the operation of a secondary clarifier will create no noise or odour emissions. Implementation of this option will not reduce the current separation distance between the WWTP and adjacent sensitive lands. Temporary negative minor impacts will materialize during construction.

Community Health and Safety / Economic Development – *Moderate Positive Impact (+2)* This option will increase the plant's ability to handle high influent flows, which could allow for some growth in Chalk River. This option will reduce the probability of sewer surcharging and resultant basement flooding.

Financial / Technical Environment

Capital Costs – *Minor Negative Impact (-1)* This option would require the design and construction of a secondary clarifier. Costs are estimated to be more than the "Do Nothing" option but less than the other options.

Land Ownership / Legal / Approval – *Minor Negative Impact (-1)* No new land requirements are anticipated. This option would require approval by MOE.

Planning / Zoning – *Neutral or Inconsequential Impact (0)* This option will have no impact on this environment since all works will be confined to the existing WWTP site.

Physical Site Constraints – *Neutral or Inconsequential Impact (0)* Since construction of the clarifier will be on a vacant portion of the WWTP property, no major site constraints are expected. A geotechnical investigation may identify bedrock.

Plant Operations & Maintenance – *Neutral or Inconsequential Impact (0)* This option will require new operations and maintenance requirements for new equipment but will eliminate the challenges associated with operating the WWTP when under hydraulic stress. This option will be easier to operate than an equalization tank as it will not likely result in odour generation.

Hydraulic Stress at WWTP – *Moderate Positive Impact (+2)* This option will increase the plant's ability to effectively treat sewage during high influent flow events.

4.3.5 Option 5 – New Wastewater Treatment Plant (at Present Location)

Natural Environment

Air and Birds – *Neutral or Inconsequential Impact (0)* No impacts are expected for this environment once proper mitigating measures are implemented. Mitigating measures will include taking care not to remove trees used.

Surface Water and Aquatic Animals – *Moderate Positive Impact (+2)* This option will increase the plant's ability to treat high flows. As a result, during high influent flow events non-compliant effluent will be less likely to discharge into the receiving stream.

Groundwater – *Neutral or Inconsequential (0)* This option will have no impact on groundwater.

Land and Terrestrial Animals – *Moderate Positive Impact (+2)* This option will increase the plant's ability to treat high influent flows. As a result, during high influent flow events non-compliant effluent will be less likely to discharge into the receiving stream and potentially affect the health of terrestrial animals and reduce the potential for environmental spills on the land.

Social / Economic Environment

Archaeological – *Minor Negative Impact (-1)* This option may require excavation therefore there is a potential for a minor negative impact on this environment. A Stage 1 Archaeological Assessment will be required prior to design and construction.

Built Heritage Resources and Cultural Heritage Landscapes – *Neutral or Inconsequential Impact (0)* Due to the lack of identifiable heritage, cultural or historical features at the site, no impact is expected on this environment since all new works will be construction at the existing WWTP site.

Aesthetics – *Minor Negative Impact (-1)* There should be few impacts to aesthetics. Construction activities will introduce short-term negative impacts locally, but proper implementation of mitigating measures will minimize the impacts.

Community Health and Safety / Economic Development – *Moderate Positive Impact (+2)* This option will increase the plant's ability to treat high flows, which could allow for some growth in the Chalk River. This option will reduce the probability of sewer surcharging and resultant basement flooding.

Financial / Technical Environment

Capital Costs – *Major Negative Impact (-3)* There will be a major negative impact because it is one of the most costly options.

Land Ownership / Legal / Approval – *Minor Negative Impact (-1)* A new WWTP will be on Town owned land. The impact is expected to be minor negative for this environment due to the need to secure various approvals.

Planning / Zoning – *Neutral or Inconsequential Impact (0)* This option will have no impact on this environment since all new works will be located at the existing WWTP site.

Physical Constraints – *Neutral or Inconsequential Impact (0)* Construction of the new plant would be on a vacant portion of the WWTP property so no impacts are expected for this environment.

Plant Operations & Maintenance – *Minor Negative Impact (-1)* This option will require new operations and maintenance requirements for new equipment but would eliminate the challenges associated with operating the WWTP when under hydraulic stress. This option would create a short-term negative impact on O&M due to start-up and commissioning (and decommissioning of the old plant).

Hydraulic Stress at WWTP – *Major Positive Impact (+3)* This option will increase the plant's ability to treat high flows during high influent flow events. It will provide the opportunity to implement new technology at the plant with lower life cycle costs and creates the opportunity for additional plant capacity.

5.0 Conclusions

5.1 IDENTIFICATION OF THE RECOMMENDED OPTION

Table 4.1 presented the level of impacts, the total score and overall ranking of each option. The highest scoring option, Option 4 – Add a Secondary Clarifier, is recommended as the preferred option. The other options had lower scores mainly because of their inability to adequately reduce the high influent flows or to improve plant efficiency at a reasonable cost.

Adding a secondary clarifier is relatively cost efficient and immediately effective in reducing hydraulic stress at the WWTP.

Flow reduction is currently being implemented through planning efforts by reducing process wastewater at the WTP and through the current sewer inspection and repair work. That, in conjunction with a new secondary clarifier will practically eliminate the stress at the WWTP.

5.2 OTHER CONSIDERATIONS FOR FUTURE PLANS

Implementation of the preferred option will address the problem identified in the Problem Definition stage of this EA assignment. It is recommended that the Town also consider the following activities to address other issues related to the current operation of the WWTP:

1) Construct a biosolids storage facility to provide extended storage that will facilitate improved biosolids utilization or disposal strategies.

2) Incorporate in the design of the new secondary clarifier a chlorine contact tank with a dechlorination zone to improve the effluent disinfection performance and dechlorinate the final effluent prior to release to the natural environment.

3) Investigate the benefits of upgrading the Main Street Pumping Station to by incorporating variable speed drives for pump control. The anticipated benefit will be a reduction in short term peak loading events at the wastewater treatment plant. Under the current operation, the Main Street Pumping Station pumps operate in an “on/off” mode, and when “on”, the pumps deliver sewage to the wastewater treatment plant at 100% of the pump capacity.

   Since the wastewater treatment plant does not perform well when influent flow rates exceed 9L/s, the incorporation of variable speed drives at the Main Street Pumping Station will smooth the flow profile and reduce some of the peak inlet flows experienced at the wastewater treatment plant. This will reduce the magnitude of short-term high inlet flow rates to the wastewater treatment plant and aid in the reduction of hydraulic stress

4) Initiate and implement plans for a new WWTP. The current WWTP is a package plant that has been in service for more than 40 years. The WWTP life span is nearing the expected end and replacement in the next 5 to 10 years must be considered. The plan for WWTP replacement should take full advantage of any new works that are constructed as a result of Phase 5 activities related to this EA report.

5) Phase 5 activities related to this EA report should consider future sewage treatment demands in terms of community growth and changes to the number of users connected to the sewer system.

6) Adding a secondary clarifier is relatively cost efficient and immediately effective in reducing hydraulic stress at the WWTP.

During the construction phase of project implementation, the contractor shall take appropriate action to control the environmental impacts that result from construction activities. Some impacts and mitigating measures are listed below.

Construction Phase Potential Impact	**Possible Mitigating Measures**
Increase in Traffic to and from Plant Site	Limit work activities to Monday to Friday (excluding statutory holidays) 7a.m to 5p.m.
Increase in Noise	Limit work activities to Monday to Friday (excluding statutory holidays) 7a.m to 5p.m. Contractor to ensure equipment noise attenuating devices function properly.
Degradation of Landscape Aesthetics	Contractor will be restricted to utilize designated working and laydown areas to perform work, park worker vehicles, stage equipment and store material during the execution of their work.
Erosion	Contractor shall be required to implement a Sediment and Erosion Control Plan
Interruption of Sewage Treatment Services for New Facility Tie-In Work	Planning & coordination effort required to ensure the delivery of sewage treatment services are not interrupted. By pass or recirculation pumping may be required to ensure sewage treatment services remain continuous during activities that require the connection of new facilities to existing facilities.
Disturbance of Archaeological Resources	Perform a Stage 1 Archaeological Assessment during preliminary design to avoid disturbance of resources.
Loss of Bird Habitat	Construction contractor will be restricted from cutting down trees unnecessarily and when necessary shall be prohibited to do so during the breeding season. The contractor shall be required to restore disturbed grasslands to original condition post construction.

5.2.1 Regulatory Upgrades

Environment Canada finalized the *Wastewater Systems Effluent Regulations* and published them in the *Canada Gazette, Part II* on July 18, 2012.

In the event of a significant upgrade at the WWTP the design must consider including plant modifications to comply with the requirement of the new regulations.

A formal consultation with the MOE will be required prior to design and construction of the preferred solution to confirm final effluent requirements.

6.0 Consultation

In October 2012, a Notice of Study Commencement was distributed to review agencies and published in the local newspaper. The Notice of Study Commencement is shown in **Appendix L**. The list of review agencies included in the distribution of materials is given in **Table 6.1**.

Further public consultation may occur as the project progresses. Any additional public notices and written comments will be included in **Appendix L**.

Table 6.1: List of Review Agencies

Ministry of the Environment, Kingston Regional Office, Tech. Support Section, Attn.: Vicki Mitchell, Environmental Assessment Coordinator
Ministry of the Environment, Ottawa District Office, Attn.: Jen Bitten, Environmental Officer
Ministry of Natural Resources, Pembroke, ON
Ministry of Municipal Affairs and Housing, Municipal Services Office, Eastern Municipal Services Office, Kingston ON, Attn.: Vincent Fabiilli, Regional Director
Ministry of Infrastructure, Queen's Park/Minister's Office, Toronto ON
Ministry of Transportation Eastern Region, Kingston ON
Ministry of Economic Development and Innovation, Ottawa Regional Office, Attn.: Chris Puddicombe
Ministry of Agriculture, Food and Rural Affairs, Kemptville ON, Attn.: Gary McTavish, Regional Manager
Ministries of Tourism, Culture and Sport, South East Region, Ottawa ON
Ministry of Community and Social Services Eastern Region, Ottawa ON
Ministry of Health and Long-Term Care, East Region, Ottawa ON
Ministry of Education, Field Services Branch, Ottawa Regional Office, Nepean ON
Renfrew County and District Health Unit, Pembroke ON
County of Renfrew, Public Works & Engineering, Attn: Environmental Studies, Pembroke ON
Ministry of Aboriginal Affairs, Toronto ON, Attn: Kelly Roy
Algonquins of Ontario Consultation Office, Pembroke ON, Attn: Janet Stavinga, Executive Director
Aboriginal Affairs and Northern Development Canada
Renfrew County Catholic District School Board, Pembroke ON
Bell Canada, Pembroke ON
Enbridge Consumer Gas, Attn.: Eastern Ontario Representative, Ottawa ON
Hydro One, Cobden ON
TVCOGECO Pembroke ON

7.0 References

Canadian Heritage Rivers, http://www.chrs.ca/en/main.php

Canadian Historic Places, http://www.historicplaces.ca/en/home-accueil.aspx

City-Data.com, Laurentian Hills, http://www.city-data.com/canada/Laurentian-Hills-Town.html

Design Guidelines for Sewage Works (MOE 2008)

Environment Canada, Canadian Climate Normals Data, 1971 to 2000

Municipal Engineers Association, Municipal Class Environmental Assessment, October 2000 (as amended in 2007 and 2011)

Ontario Ministry of the Environment, 2010. Air Quality in Ontario, Report for 2010, Environmental Monitoring and Reporting Branch, PIBS 8640e, 2012

Ontario Ministry of the Environment, 2008. Design Guidelines for Sewage Works.

Ontario Ministry of Tourism, Culture and Sport, Heritage Conservation Districts http://www.mtc.gov.on.ca/en/heritage/heritage_conserving_list.shtml

Ontario Ministry of Tourism, Culture and Sport, Archaeological Assessments http://www.mtc.gov.on.ca/en/archaeology/archaeology_assessments.shtml#a1

Ontario Ministry of Consumer Services, Cemetery Database, http://www.consumerbeware.mgs.gov.on.ca/esearch/start.do

Ontario Wetland Evaluation System (OWES) http://www.mnr.gov.on.ca/en/Business/Biodiversity/2ColumnSubPage/STDPROD_068974.html

Ottawa Valley Cultural Mapping, http://www.ottawavalleyculture.ca/mapping/

Statistics Canada. 2012. Chalk River, Ontario (Code 350066) and Ontario (Code 35). Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Released October 24, 2012. Accessed December 4, 2012. http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=DPL&Code1=350066&Geo2=PR&Code2=35&Data=Count&SearchText=Chalk%20River&SearchType=Begins&SearchPR=35&B1=All&Custom=&TABID=1

Town of Laurentian Hills, Official Plan of the Town of Laurentian Hills, September 2010

Town of Laurentian Hills, Zoning By-Law, June 20, 2012

APPENDIX A
Chalk River WWTP ECA, July 20, 1989

Ministry of the Environment / Ministère de l'Environnement
Ontario

RECEIVED
JUL 24 1989
VILLAGE OF CHALK RIVER

Certificat d'autorisation (eaux usées)

M.O.E.

Number / *Numéro* 3-0210-87-896

Whereas / *Attendu que*

Her Majesty the Queen, in Right of Ontario as represented by the Minister of the Environment

of / *d*

has applied in accordance with Section 24 of the Ontario Water Resources Act for approval of:
a fait, conformément à l'article 24 de la loi sur les ressources en eau de l'Ontario, une demande d'autorisation:

modifications to the existing Chalk River Water Pollution Control Plant in the Village of Chalk River, in order to treat an average daily sewage flow of 363 m^3/d when operating in an extended aeration mode and an average daily sewage flow of 545 m^3/d when operating in a contact stabilization mode, consisting of the following:

- the installation of seventy-two (72) new coarse bubble air diffusers complete with eighteen (18) header assemblies and new air header piping;
- the installation of two (2) new submersible sewage pumps in main sewage pumping station each rated at 22.7 L/s at a TDH of 12.2 m, including modifications to the pump control system to allow for variable speed pump operation;
- replacement of the existing comminutor with a new unit rated at 53 L/s, complete with an enclosure;
- replacement of the existing scum arm on the final clarifier with a new unit and the replacement and relocation of the scum box;
- the enlargement of all compartmental gates to 300 mm diameter;
- the replacement and extension of the influent trough;
- the relocation of the catwalk;
- the installation of a new submersible sludge pump rated at 5.7 L/s at a TDH of 4.6 m, including installation of a flexible suction hose;

Now therefore this is to certify that after due enquiry the said proposed works have been approved under Section 24 of the Ontario Water Resources Act.
***Le présent document** certifie qu'après vérification en bonne et due forme la construction dudit projet d'ouvrages a été approuvée aux termes de l'article 24 de la loi sur les ressources en eau de l'Ontario.*

DATED AT TORONTO this 20th day of July, 1989
DATÉ À TORONTO ce *jour d*

c.c: Mrs. P. G. Rantz, Clerk, Village of Chalk River ✓
Mr. A. Symmonds, M.O.E. S.E., Acting Reg. Dir.
J. L. Richards & Associates Limited

nk

..... 2

P Antrong
.....

- four (4) variable speed chemical pumps each rated as follows:

  i) alum pump - 45 L/d
  ii) polyelectrolyte pump - 400 L/d
  iii) sodium carbonate pump - 35 L/d
  iv) hypochlorite pump - 140 L/d;

- one (1) FRP 13 m^3 alum storage tank;

- one (1) FRP 350 L alum day tank;

including interconnecting piping, valves, appurtenances, associated equipment and instrumentation, all in accordance with the information outlined in Schedule "A", at a total estimated cost, including engineering and contingencies, of $680,000, subject to the following terms and conditions considered necessary by the undersigned,

SPECIAL TERMS AND CONDITIONS

1.0 DEFINITIONS

For the purpose of this certificate of approval:

(1) "Director" means the Director of the Approvals Branch of the Ministry of the Environment;

(2) "District Officer" means the District Officer of the Ottawa District Office in the Southeast Region of the Ministry of the Environment;

(3) "Ministry" means the Ministry of the Environment for the Province of Ontario;

(4) "Owner" means the Ministry of the Environment for the Province of Ontario;

(5) "Regional Director" means the Regional Director of the Southeast Region of the Ministry of the Environment;

(6) "Spills Action Centre" is the Spills Action Centre for the Ministry of the Environment;

(7) "certificate" means the entire within certificate of approval approval, issued in accordance with Section 24 of the Ontario Water Resources Act;

(8) "work" means the facility approved by the within certificate as described in its preamble, in the owner's application and in supporting information submitted by the Owner and approved by this certificate;

..... 3

(9) "average annual concentration" is the arithmetic mean of all samples taken within a twelve consecutive month period based on a minimum of at least one daily sample per month;

(10) "average annual loading" is the arithmetic mean of the total mass of all daily discharges samples or measured or both during a calendar year and is calculated by multiplying the average annual concentration by the average daily flow;

(11) "average daily flow" means the total flow to the works during the period of operation divided by the number of days in the period;

(12) "average monthly concentration" means the arithmetic mean of the concentration of all daily discharges sampled or measured or both, during a calendar month and is determined based on at least one daily sample per week;

(13) "average monthly loading" means the arithmetic mean of the total mass of all daily discharges sampled or measured or both during a calendar month and is calculated by multiplying the average monthly concentration by the average daily flow;

(14) "biweekly" means once every two weeks;

(15) "BOD_5" means five day biochemical oxygen demand in an unfiltered sample;

(16) "composite sample" means a volume of effluent made up of three or more sub-samples that have been combined automatically or manually or obtained from a slip stream to an on-line analyzer;

(17) "FRP" means fibreglass reinforced plastic;

(18) "grab sample" means an individual sample of at least 100 millilitres collected at a randomly selected time over a period not exceeding 15 minutes;

(19) "kg/d" means kilograms per day;

(20) "L" means litres;

(21) "L/d" means litres per day;

(22) "L/s" means litres per second;

..... 4

(23) "m" means metres;

(24) "mm" means millimetres;

(25) "m^3" means cubic metres;

(26) "m^3/d" means cubic metres per day;

(27) "mg/L" means milligrams per litre;

(28) "TDH" means total dynamic head

2.0 REQUIREMENTS

Requirements specified in this certificate are the requirements under Section 24 of the Ontario Water Resources Act. The issuance of this certificate in no way abrogates the Owner's legal obligations to take all reasonable steps to avoid violating applicable provisions of this legislation and other legislation and regulations.

3.0 SEVERABILITY AND CONFLICTS

1) The requirements of this certificate are severable. If any requirement of this certificate, or the application of any requirement of this certificate to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of the certificate shall not be affected thereby.

2) In the event of a conflict between information submitted in support of the application for this certificate, whether referred to in this certificate or not, and any term or condition of this certificate, the term or condition shall prevail.

4.0 COMPLIANCE

The owner must ensure compliance with all the terms and conditions of this certificate. Any non-compliance constitutes a violation of the Ontario Water Resources Act and is grounds for enforcement.

5.0 INFORMATION

The owner shall furnish to the Regional Director any information which the Regional Director may request concerning compliance with this certificate pursuant to Section 31 of the Ontario Water Resources Act, and copies of any records required to be kept by this certificate.

6.0 ENTRY AND INSPECTION

The Owner shall allow Ministry personnel, or Ministry authorized representatives, upon presentation of credentials, to:

..... 5

(1) carry out any and all inspections authorized by Section 126, 126a or 127 of the Environmental Protection Act, Section 10, 10a, or 10b of the Ontario Water Resources Act or Section 19 or 19a of the Pesticides Act, as amended from time to time, of any place to which this certificate relates; and,

without restricting the generality of the foregoing, to:

(2) (a) enter upon the premises, at reasonable times, where the approved sewage work are located, or the location where the records required by the conditions of this certificate are kept;

(b) have access to and copy, at reasonable times, any records required by the conditions of this certificate;

(c) inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this certificate; and

(d) sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this certificate.

7.0 CONSTRUCTION CHANGES

(1) But for changes in the construction/design, resulting from unforseen construction problems, which may not affect the operation of the works, the characteristics of influents to or effluents from the works or the design hydraulic capacity of the works, the applicant shall ensure that the works are constructed in accordance with this certificate.

(2) Changes in the construction/design of the works, required because of unforseen construction problems, which may affect the operation of the works, the characteristics of influents to or effluents from the works or the design hydraulic capacity of the works, shall be documented by the Owner. No such change shall be made unless and until the Owner receives written approval of the Director.

(3) Within 1 week prior to commencement of operation of the work, the Owner shall notify the District Officer in writing that the work has been constructed in accordance with this certificate.

8.0 NOTIFICATION OF CHANGES IN PROCESS OR MATERIALS

The Owner shall give notice to the Director of:

(1) any plans to change the processes or materials forming a part of the works; and

..... 6

(2) any plans to change the processes or materials used in the works or the Owner's enterprise serviced by the work but not referred to in this certificate or the Owner's application and supporting material, where the change may materially alter the quantity or quality of effluent either entering into or discharging from the works, or both;

and no such change shall be made unless and until the Owner receives the written approval of the Director.

9.0 ADVERSE IMPACT

The Owner shall take all reasonable steps to minimize any adverse impact to surface or ground waters resulting from non-compliance with the effluent requirements specified in this certificate including, but not limited to, such accelerated or additional monitoring as necessary to determine the nature and impact of the discharge which is in non-compliance.

10.0 AS-CONSTRUCTED DRAWINGS

(1) The Owner shall prepare within 6 months of substantial performance of the works a complete set of drawings showing the work as-constructed and shall amend the drawings from time to time to reflect all changes in or additions to the works.

(2) The Owner shall maintain the as-constructed drawings, as amended from time to time, at the work for so long as it is in operation, and shall make them available for inspection by Ministry employees upon request.

11.0 APPROVAL OF DISTRICT OFFICER

In respect of any matter for which this certificate requires the approval of the District Officer, in the event the Owner disputes the District Officer's decision the Owner shall be entitled to refer the disputed matter to the Director, who shall, without further notice to the Owner or the requirement of any hearing, review the disputed matter and render a decision in lieu of the District Officer's decision.

12.0 FREEDOM OF INFORMATION

In accordance with the Freedom of Information and Protection of Individual Privacy Act this certificate and all reports prepared in accordance with the terms of this certificate and in the possession of the Ministry may be available for public inspection at the offices in which they are located.

..... 7

13.0 OPERATIONS AND MAINTENANCE

1) The Owner shall ensure that at all times, the sewage works and related equipment and appurtenances which are installed or used to achieve compliance with this certificate are properly operated and maintained. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training and adequate laboratory process controls, including appropriate quality assurance and quality control procedures.

2) The Owner shall ensure that adequate equipment and materials are available for use in the event of upset conditions and equipment breakdowns in the works and spills of raw or processed materials, and the personnel are trained in its use and the methods and procedures to be employed.

3) The Owner shall prepare an operations and maintenance manual or amend the current manual prior to the commencement of regular operation of the works under this certificate and upon request shall make the manual available for inspection by Ministry personnel and shall upon request furnish an updated copy of the manual to the Ministry.

4) The Owner shall establish complaint procedures for receiving and responding to complaints including a reporting system as to which records, what steps were taken to determine the cause of complaint and corrective measures to alleviate the cause and prevent its reoccurrence.

14.0 EFFLUENT REQUIREMENTS

1) The Owner shall ensure that above approved work are designed, constructed and operated in such a manner and with such facilities as to ensure that the concentration and waste loading of materials as effluent parameters do not exceed the respective indicated values.

Effluent Parameter	Effluent Concentration (mg/l)	Effluent Waste Loading (kg/d)
BOD_5	25	9.1á 13.6*
Suspended Solids	25	9.1á 13.6*
Total Phosphorus	1.0	0.4á 0.5*

where: á for extended aeration operation
* for contact stabilization operation

..... 8

2) Non-compliance with respect to effluent concentration for BOD_5 and Suspended Solids is deemed to have occurred when the average annual concentration for these parameters exceeds their respective indicated value in subsection 1.

3) Non-compliance with respect to effluent concentration for Total Phosphorus is deemed to have occurred when the average monthly concentration for total phosphorus exceeds the respective indicated effluent concentration value in subsection 1.

4) Non-compliance with respect to effluent waste loading for BOD_5, Suspended Solids and Total Phosphorus is deemed to have occurred when the average annual concentration multiplied by the average daily flow, for these effluent parameters, exceeds their respective indicated effluent waste loading value in subsection 1.

15.0 MONITORING

1) The Owner shall collect raw sewage and treated final effluent samples from the works at the frequency indicated and shall have them analyzed for the following parameters:

Parameter	Type of Sample	Frequency
BOD_5	24-hour composite	biweekly
Suspended Solids	24-hour composite	biweekly
Total Phosphorus	24-hour composite	weekly
Total Kjeldahl Nitrogen	24-hour composite	biweekly
Total Ammonium Nitrogen	24-hour composite	biweekly
Nitrate Nitrogen	24-hour composite	biweekly
Nitrite Nitrogen	24-hour composite	biweekly
Total Coliforms	grab	biweekly
Fecal Coliforms	grab	biweekly

2) Analytical and sampling protocols used to undertake the sampling and chemical analyses required in subsection 1 shall be in accordance with Schedule 2 and 3 of O. Reg 695/88 of the MISA program or the latest edition of "Standard Methods for the Examination of Water and Wastewater" as published by the U.S. Public Health Service.

3) The analytical results from the requirements of subsection 1 shall be reported to the District Officer within 90 days of collection of the samples or within such a period as deemed acceptable to the District Officer.

16.0 EFFLUENT DISCHARGE DURING CONSTRUCTION

During the construction of the works approved by this certificate, the owner shall maintain an effluent dilution ratio of at least 50 to 1 for partially treated effluent being discharged from the works.

17.0 ANNUAL PERFORMANCE REPORT

1) The Owner shall prepare a performance report and submit this report to the District Officer on an annual basis with the submission being made no later than 30 working days following the termination of a calendar year. The first such report shall cover the period from the commencement of operation of the facility until the end of the first calendar year of operation. These reports shall contain, but not be limited to, the following:

(1) a comprehensive interpretation of the discharge loadings and concentrations data for the period of reporting and a comparison to any effluent quality criteria required by this certificate;

(2) an outline of any proposed sewage treatment measures to be completed over the next reporting period;

(3) an outline of the proposed sludge handling methods and disposal areas to be used over the next reporting period;

(4) an evaluation of the calibration and maintenance procedures conducted on all monitoring equipment; and

(5) an evaluation of the need for modifications to the sewage treatment facility to improve performance and reliability and to minimize upsets and bypasses.

2) All annual performance reports shall be submitted to the District Officer within the prescribed time periods and shall be accompanied by a signed certification statement from the author attesting to the accuracy of the information contained within.

18.0 REPORTING EMERGENCIES AND ABNORMAL SITUATIONS

1) The Owner shall ensure that, upon the occurrence of any spill, bypass or loss of any product, by product, intermediate product, oils, solvents, waste material or any other polluting substance into the environment, such occurrence be immediately reported to the Spills Action Centre. In addition, within 10 working days of the occurrence, the Owner shall submit a full written report of the occurrence to the District Officer describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

..... 10

Director / Directeur

2) The Owner shall ensure that, within 24 hours of the occurrence of any non-compliance regarding this certificate or operation of the works, report verbally to the District Officer, or his designate, the occurrence of the non-compliance. Also, a written report shall be submitted to the District Officer, within 5 working days of the discovery of the non-compliance, containing the following:

1) a description of the non-compliance and its cause;

2) the period of non-compliance, including exact dates and times;

3) if the non-compliance has not been corrected, the anticipated time period in which it is expected to continue; and

4) the steps to be taken or planned to reduce, eliminate and prevent the re-occurrence of the non-compliance.

THIS IS A TRUE COPY OF THE ORIGINAL CERTIFICATE MAILED
ON JUL 26 1989
MK
(Signed)

SCHEDULE A
CERTIFICATE OF APPROVAL
NO. 3-0210-87-896

1) application dated August 7, 1987 submitted by the Project Engineering Branch of the Ministry of the Environment;

2) design brief dated February 11, 1987 prepared by J.L. Richards and Associates Limited;

3) "Interim Report on the Operation of the Chalk River Water Pollution Control Plant" dated April 1985 prepared by J.L. Richards and Associates Limited;

4) addendum to the design brief dated July 2, 1987 prepared by J.L. Richards and Associates Limited;

5) "Impact of Primary Treatment on Black Duck Creek" dated August 1987 prepared by J.L. Richards and Associates Limited;

6) engineering specifications dated January 1989 prepared by J.L. Richards and Associates;

7) engineering drawings: 86-9650-S-1
-1 to -5
-A1 & A2
-E1 & E2
-M1 & M2

all dated January 1989 and prepared by J.L. Richards and Associates Limited; and

8) letters and attachments dated February 23, 1989 and March 1, 1989 all submitted by J.L. Richards and Associates Limited

Ministry of the Environment / Ministère de l'Environnement
Ontario

Notice Avis

To:
Destinataire:

Her Majesty the Queen, in Right of Ontario
as represented by the Minister of the Environment
Ministry of the Environment
135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5

You are hereby notified that Conditional Certificate of Approval No. 3-0210-87-896 has been issued to you subject to the conditions outlined therein.

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

1) The reason for Condition No. 1 is to define the terms used in this certificate of approval and the attached terms and conditions.

2) The reason for Condition No. 2 is to emphasize that the issuance of the certificate does not diminish any other statutory and regulatory obligations to which the Owner is subject in the construction, maintenance and operation of the works.

3) The reason for Condition No. 3 is to clarify how the certificate is to be judicially interpreted and specifically, to clarify that the requirements are severable and that they prevail over supporting documentation.

4) The reason for Condition No. 4 is to emphasize that the Owner is under a statutory obligation to ensure compliance with the certificate.

5) The reason for Conditions No. 5 and no. 6 are to ensure that Ministry personnel, when acting in the course of their duties, will be given unobstructed access to the facilities, information and records related to the works which are the subject of this certificate, to enable the Ministry to be assured of the Owner's compliance with the terms and conditions of this certificate.

6) The reason for Condition No. 7 is to ensure that the works are constructed in accordance with certificate and that unforseen changes in the construction or design potentially affecting the operation of the works are approved by the Director.

7) The reason for Condition No. 8 is to ensure that the works are operated in accordance with information submitted by the Owner relating to process and materials which formed the basis of the approval, and to ensure that any contemplated changes in them potentially affecting the characteristics of effluent from the works will be properly reviewed and approved.

8) The reason for Condition No. 9 is to emphasize that the Owner has an ongoing duty to mitigate any adverse impacts resulting from non-compliance with the certificate.

9) The reason for Condition No. 10 is to enable the Owner to record and the Ministry to verify that the works are constructed and operated in accordance with the certificate.

10) The reason for Condition No. 11 is to ensure that convenient, effective and timely administration of the certificate by Ministry personnel, by assuring the legality of terms and conditions in the certificate requiring decisions by the District Officer.

11) The reason for Condition No. 12 is to make the Owner aware of the requirements of the Freedom of Information and Protection of Individual Privacy Act.

12) The reason for Condition No. 13 is to ensure that the works are operated and maintained in a satisfactory manner in order to avoid environmental degradation as a result of improper operation or maintenance of the work.

13) The reason for Condition No. 14 is to ensure the protection of the receiving waterbody when the effluent from the sewage works is discharged to the receiving waterbody.

The effluent criteria related to BOD_5 and Suspended Solids concentrations are being imposed to minimize adverse effects of oxygen demanding material on dissolved oxygen concentration in the receiving waterbody.

The effluent criteria related to Total Phosphorus concentrations comply with the policy of the Ministry and the International Joint Commission to reduce nutrient loadings to the Great Lakes and the receiving waterbody, so as to minimize the nuisance growth of aquatic plants and algae.

14) The reason for Condition No. 15 is to ensure that the Owner can demonstrate on a continual basis that the quality and quantity of the effluents from the works are consistent with the effluent limits specified in this certificate and the approved works does not cause any impairment in the receiving watercourse.

15) The reason for Condition No. 16 is to minimize the impact of the discharge of partially treated sewage on the water quality of the receiving watercourse during the construction phase of the project.

16) The reason for Condition No. 17 is to ensure that accurate information is readily available so that a proper and accurate assessment of the operating performance of the works may be conducted and that appropriate measures be taken should the operating performance of the works not be satisfactory.

17) The reason for Condition No. 18 is to ensure that the Ministry is immediately informed of the occurrence of an emergency or otherwise abnormal situation so that appropriate steps are taken to address the immediate concerns regarding the protection of public health and the minimizing of sever environmental damage and to be able to devise an overall abatement strategy to prevent long term degradation and the re-occurrence of the situation

This Notice should be served upon:

The Secretary,
Environmental Appeal Board,
112 St. Clair Ave. West,
5th Floor,
Toronto, Ontario.
M4V 1N3

AND

The Director,
Section 24, O.W.R. Act,
Ministry of the Environment,
250 Davisville Avenue,
Toronto, Ontario.
M4S 1H2

DATED at Toronto this 20 day of July, 1989.

Director,
Section 24, O.W.R. Act,
Ministry of the Environment.

THIS IS A TRUE COPY OF THE ORIGINAL NOTICE MAILED

ON JUL 26 1989

SIGNED

APPENDIX B
WWTP Drawings & Site Photos

Stantec
400–1505 Laperriere Avenue
Ottawa ON Canada
K1Z 7T1
Tel. (613) 722–4420
Fax. (613) 722–2799
www.stantec.com

Legend

Notes

Client/Project

Laurentian Hills

LAURENTIAN HILLS WASTEWATER TREATMENT PLANT DIVERSION & ESR

Laurentian Hills ON, Canada

Title

LOCATION PLAN

Project No. 163401125

Scale 0 10 30 50mm

Figure No.

1

TOWN LINE ROAD

LEGION STREET

JOSEPH ST WEST

JOSEPH ST EAST

PINE ST.

GEORGE ST.

WILSON ST

COOK ST.

STATION STREET

ONTARIO STREET

CHURCH STREET

ALGOMA ST.

RAILWAY STREET

RWY STATION

CANADIAN PACIFIC RAILWAY

PUMPING STATION Nº 1
& GENERATOR BUILDING

6"FORCEMAIN

ELIZABETH STREET

MAIN STREET

ALBERT STREET

PETER STREET

KELLET ST

TO PEMBROKE HIGHWAY NO.17

VILLAGE LIMIT

VILLAGE LIMITS

BLACK DUCK LAKE

BLACK DUCK CR

OTTAWA STREET

SPRUCE STREET

SYDNEY STREET

FINE STREET

HIGHWAY NO. 17

20' EASEMENT FROM OTTAWA ST.

20' EASEMENT FROM MAIN ST.E

site limits

223 224 225 226 227 228

12" 10" 6"

EXIST 6" WM

PLANT ACCESS ROAD

MH 225A

OUTFALL TO BLACK DUCK CREEK

PUMPING STATION Nº 2
SEWAGE TREATMENT PLANT
& CONTROL BUILDING

N

LEGEND

Proposed Sewer & Manhole

Proposed Forcemain

Proposed Pumpstation

NOTE

All sewers are 8" Ø unless otherwise noted

DRAWING INDEX

M.O.E. 1-0149-68 CONTRACT Nº 2

MINISTRY OF THE ENVIRONMENT

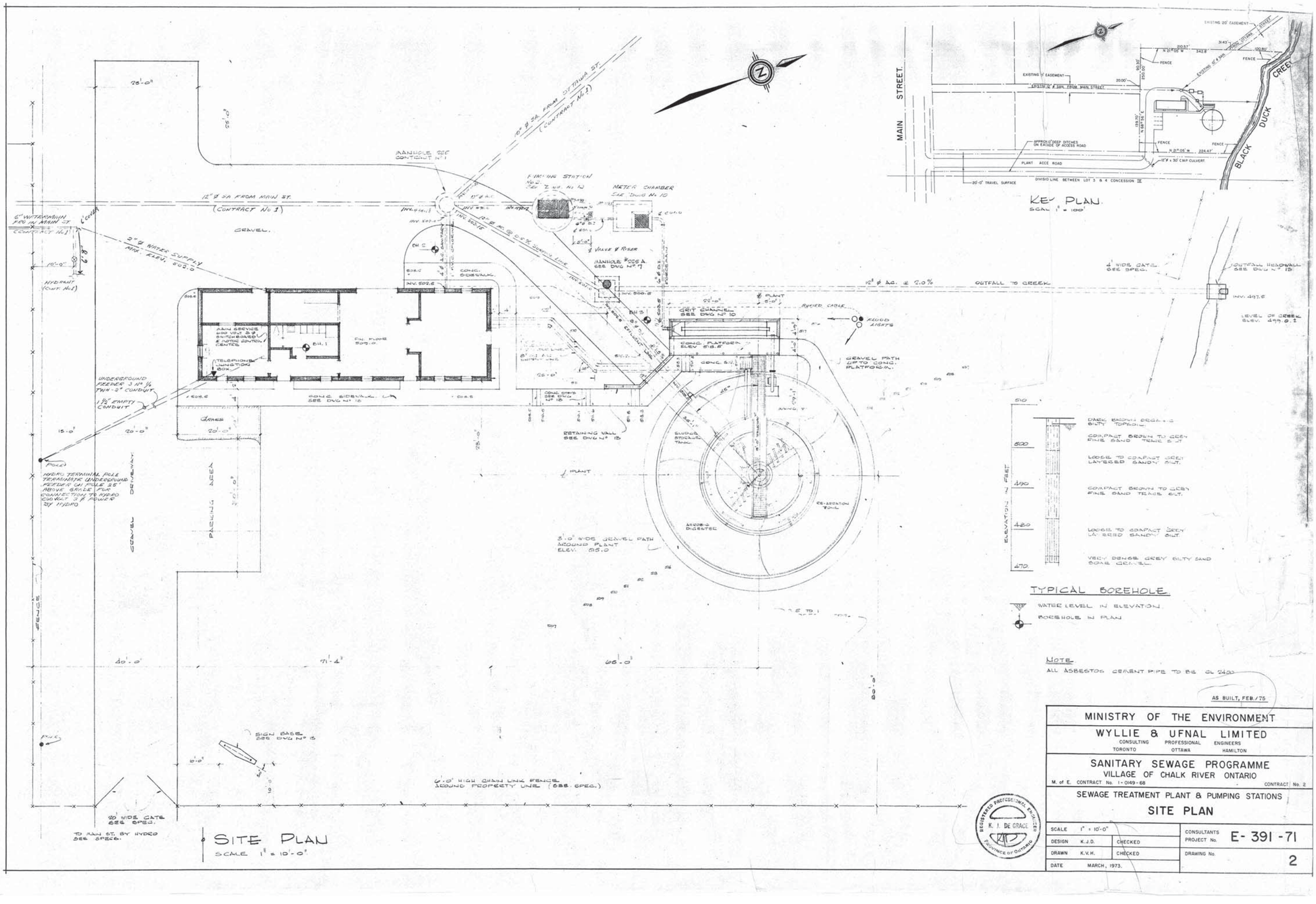
WYLLIE & UFNAL LIMITED
consulting Professional Engineers
TORONTO OTTAWA HAMILTON

SANITARY SEWAGE PROGRAMME
VILLAGE OF CHALK RIVER ONTARIO
M. of E. CONTRACT No 1-0149-68 CONTRACT NO2

SEWAGE TREATMENT PLANT & PUMPING STATIONS

VILLAGE PLAN

SCALE	1" = 200'	CONSULTANTS PROJECT No. E-391-71
DESIGN	E.S.	
DRAWN	J.R.	DRAWING No. 1
DATE	FEB. 71	



NOTE

ALL ASBESTOS CEMENT PIPE TO BE CL 2400

AS BUILT, FEB./75

MINISTRY OF THE ENVIRONMENT

WYLLIE & UFNAL LIMITED
CONSULTING PROFESSIONAL ENGINEERS
TORONTO OTTAWA HAMILTON

SANITARY SEWAGE PROGRAMME
VILLAGE OF CHALK RIVER ONTARIO

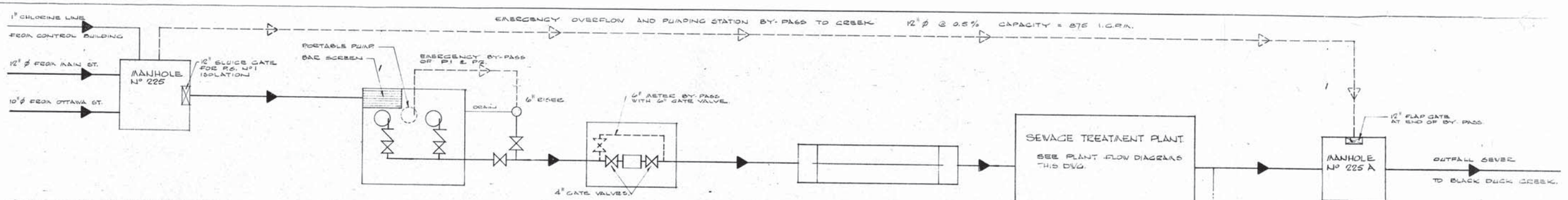
M. of E. CONTRACT No. 1-0149-68 CONTRACT No. 2

SEWAGE TREATMENT PLANT & PUMPING STATIONS

SITE PLAN

SCALE	1" = 10'-0"		CONSULTANTS PROJECT No. E-391-71
DESIGN	K.J.D.	CHECKED	
DRAWN	K.V.H.	CHECKED	DRAWING No. 2
DATE	MARCH, 1973.		

REGISTERED PROFESSIONAL ENGINEER
K. J. DE GRACE
PROVINCE OF ONTARIO



TOTAL FLOW TO MANHOLE 225

DESIGN HOUSES SEVED BY PLANT	= 590
DESIGN POPULATION PER HOUSE	= 3.8
DESIGN POPULATION (20 YEARS)	= 1500
AVERAGE DAILY FLOW PER CAPITA	= 80 I.G.P.D.
AVERAGE DAILY FLOW TO PLANT	= 120,000 I.G.P.D.
PEAK FACTOR FOR MAXIMUM FLOW	= 3.6
MAXIMUM FLOW RATE	= 432,000 I.G.P.D.
	= 300 I.G.P.M.

PUMPING STATION Nº 2

DUPLEX PUMP INSTALLATION (SUBMERSIBLE)
ONE PUMP WILL HANDLE MAX FLOW OF 300 I.G.P.M.
PUMPS WILL NOT OPERATE IN PARALLEL
H.P. REQUIRED FOR EACH PUMP
- DESIGN CAPACITY = 300 I.G.P.M.
- STATIC HEAD = 30' FRICTION HEAD = 10'
- TOTAL DESIGN HEAD = 40'
- EFFICIENCY AT RATED POINT = 64%
- H.P. = $\frac{300 \times 40}{3300 \times .64}$ = 5.7 H.P. USE 6.0 H.P.

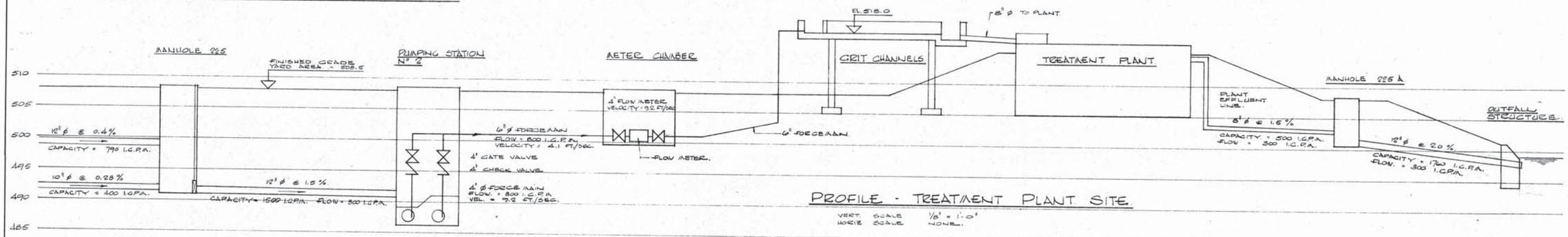
METER CHAMBER

4" MAGNETIC FLOW METER WITH CONVERTER AND TOTALIZER IN CONTROL ROOM.
FLOW THROUGH METER = PUMP DISCHARGE = 300 I.G.P.M.

GRIT CHANNELS

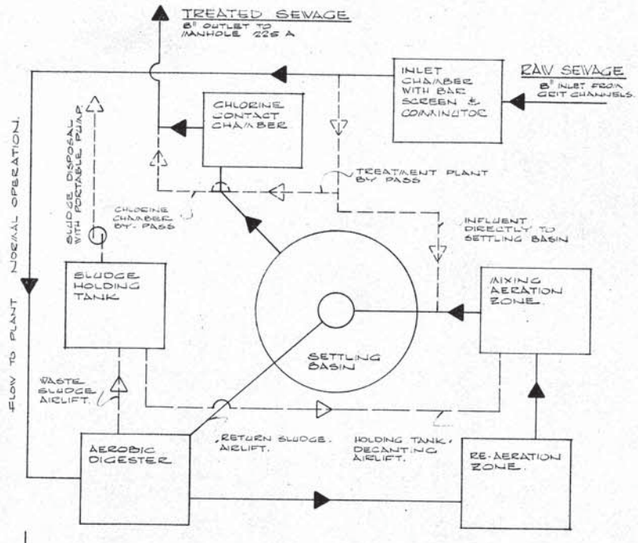
FLOW THROUGH CHANNELS = PUMP DISCHARGE = 300 I.G.P.M.
EACH CHANNEL WILL BE DESIGNED FOR 300 I.G.P.M.
GRIT DATA: 15 MM PARTICLE SIZE; S.G. = 2.65
SETTLING TIME = 3 FT/MIN.
VELOCITY - MAXIMUM = 1.2 FT/SEC.
- MINIMUM = 0.8 FT/SEC.
PROVIDE ADJUSTABLE PROPORTIONAL WEIR TO MAINTAIN VELOCITY
PROVIDE FOR 3" GRIT STORAGE
MINIMUM WIDTH OF EACH CHANNEL = 15"
THEORETICAL LENGTH REQ'D = 15' USE 20' LONG
MAXIMUM FLOW DEPTH = 5"
MINIMUM FLOW DEPTH = 6"

FLOW DIAGRAM TREATMENT PLANT SITE.



PROFILE - TREATMENT PLANT SITE

VERT. SCALE 1/8" = 1'-0"
HORIZ SCALE NONE.



FLOW DIAGRAM - EXTENDED AERATION PROCESS

TREATMENT PLANT DATA

EXTENDED AERATION PROCESS.

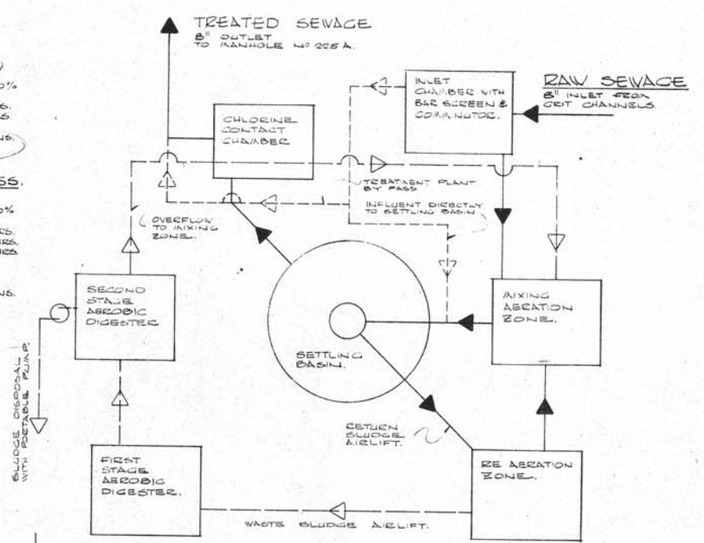
PLANT CAPACITY	80,000 I.G.P.D.	
PLANT EFFICIENCY	B.O.D. 90%; S.S. 90%	
VOLUMES AND RETENTIONS		
AERATION	12925 CU.FT.	24.25 HRS.
FINAL SETTLING	3477 CU.FT.	6.52 HRS
SLUDGE HOLDING	1000 CU.FT.	
CHLORINE TANK	400 CU.FT.	15 MINS.

CONTACT STABILIZATION PROCESS.

PLANT CAPACITY	120,000 I.G.P.D.	
PLANT EFFICIENCY	B.O.D. 90%; S.S. 90%	
VOLUMES AND RETENTIONS.		
MIXING	2640 CU.FT.	1.74 HRS.
REAERATION	6958 CU.FT.	3.92 HRS.
FINAL SETTLING	3477 CU.FT.	4.85 HRS.
AEROBIC DIGESTER		
1ST STAGE	3500 CU.FT.	
2ND STAGE	1000 CU.FT.	
CHLORINE TANK	400 CU.FT.	30 MINS.

FLOW DIAGRAM SYMBOLS

- NORMAL OPERATION CONTINUOUS FLOW.
- NORMAL OPERATION OCCASIONAL FLOW.
- BY PASS POSSIBILITIES.



FLOW DIAGRAM - CONTACT STABILIZATION PROCESS.

PUMPING STATION Nº 1

DESIGN HOUSES SERVED BY P.S. Nº1	= 800
DESIGN POPULATION PER HOUSE.	= 3.8
DESIGN POPULATION (20 YEARS)	= 1150
AVERAGE DAILY FLOW PER CAPITA.	= 80 I.G.P.D. = 92,000 I.G.P.D.
PEAK FACTOR FOR MAXIMUM FLOW.	= 3.75
MAXIMUM FLOW RATE.	= 240 I.G.P.M.

DUPLEX PUMPING INSTALLATION - PUMPS WILL NOT OPERATE IN PARALLEL.

H.P. REQ'D FOR EACH PUMP.
- DESIGN CAPACITY 240 I.G.P.M.
- STATIC HEAD = 16.0
- FRICTION HEAD = 15.0
- DYNAMIC HEAD = 31.0
- EFFICIENCY AT RATED POINT = 63%
- H.P. = $\frac{240 \times 31}{3300 \times .63}$ = 3.6 H.P. USE 6.0 H.P.

AS BUILT, FEB./75

REGISTERED PROFESSIONAL ENGINEER K. J. DE GRACE PROVINCE OF ONTARIO

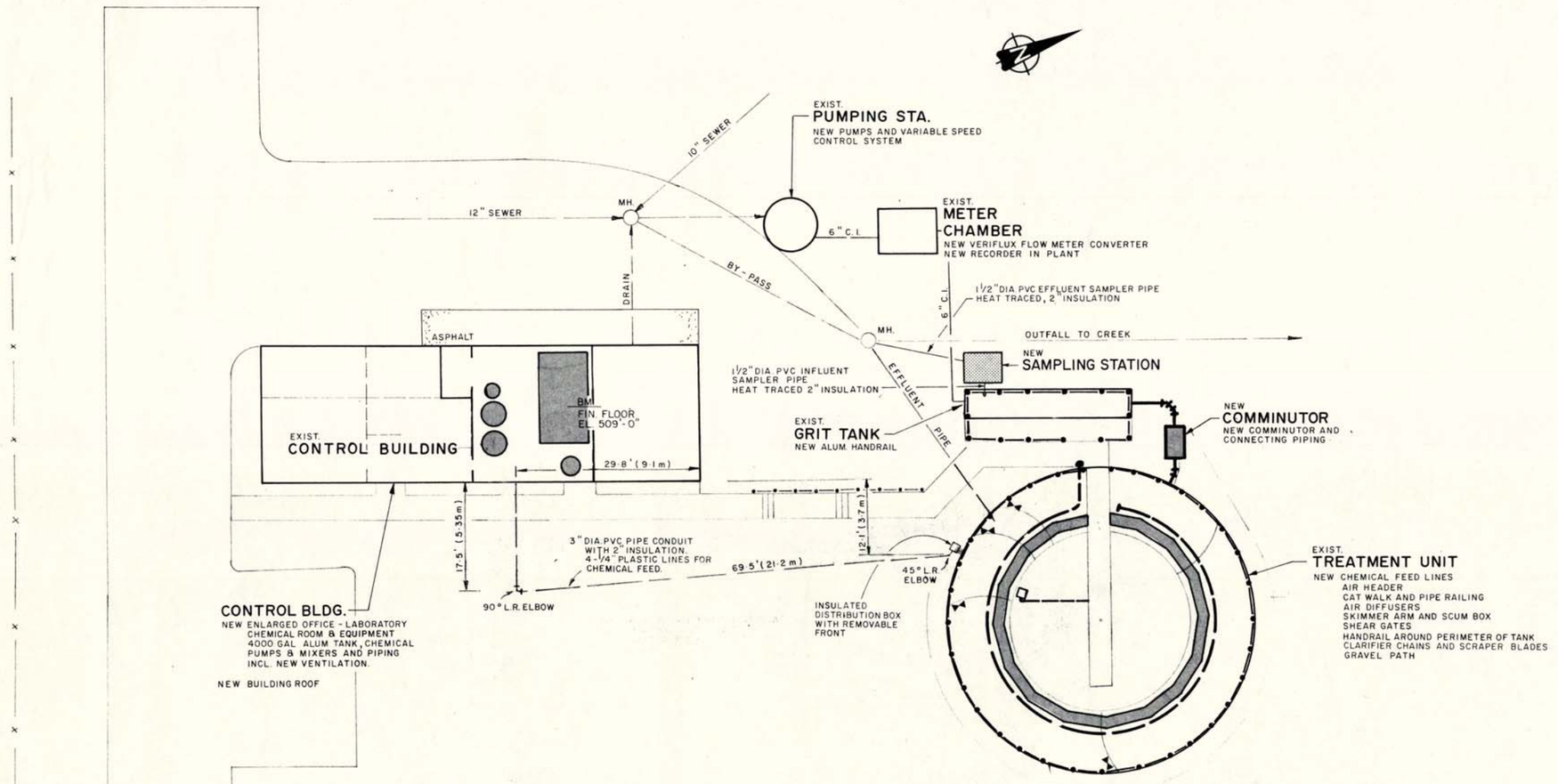
MINISTRY OF THE ENVIRONMENT

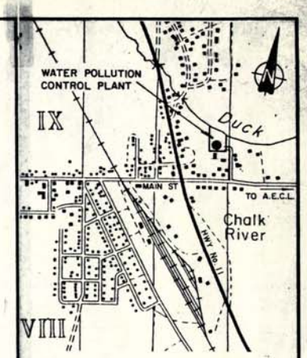
WYLLIE & UFNAL LIMITED
CONSULTING PROFESSIONAL ENGINEERS
TORONTO OTTAWA HAMILTON

SANITARY SEWAGE PROGRAMME
VILLAGE OF CHALK RIVER ONTARIO
M. of E. CONTRACT No. 1-0149-68 CONTRACT No. 2

SEWAGE TREATMENT PLANT & PUMPING STATIONS
FLOW DIAGRAM

SCALE		CONSULTANTS PROJECT No.	E-391-71
DESIGN K.J.D.	CHECKED		
DRAWN K.V.H.	CHECKED	DRAWING No.	14
DATE MARCH, 1973.			





LOCATION PLAN

DRAWING NO.	TITLE
86-9650-SI	SITE PLAN
86-9650-SS-1	SAMPLING STATION
86-9650-1	EXISTING WATER POLLUTION CONTROL PLANT
86-9650-2	PROPOSED TREATMENT PLANT MODIFICATIONS
86-9650-3	MISCELLANEOUS DETAILS NO. 1
86-9650-4	MISCELLANEOUS DETAILS NO. 2
86-9650-5	PROPOSED PUMPING STATION MODIFICATIONS
86-9650-A1	FLOOR PLAN, SECTION AND DETAILS
86-9650-A2	ELEVATION AND DETAILS
86-9650-E1	POWER AND SYSTEMS
86-9650-E2	BUILDING ALTERATIONS
86-9650-M1	HEATING, VENTILATION AND AIR CONDITIONING
86-9650-M2	CHEMICAL ROOM

NOTE

REFER TO SPECIFICATION SECTION 07560 FOR ADDITIONAL WORK ON ROOFING AT MAIN ST. PUMPING STATION, NOT OTHERWISE INDICATED ON THESE DWGS.

RECORD DRAWING
FEB. 1992

NO.	REVISION	DATE
1	GENERAL	JUNE89

NO	ISSUE	DATE

J. N. DICK

MINISTRY of the ENVIRONMENT

VILLAGE of CHALK RIVER

J.L. Richards & Associates Limited
Consulting Engineers & Planners
OTTAWA, KINGSTON, SUDBURY, CANADA.

PROJECT

RENOVATION of WATER POLLUTION CONTROL PLANT
M.O.E. PROJECT No. 1-0149-SA
CONTRACT No. 1

DRAWING

SITE PLAN

DESIGN	J. N. D.	REVISION NO.	
DRAWN	I. T.	DRAWING NO.	S-1
CHECKED			
DATE	JAN. 1989	JOB NO.	86-9650
SCALE	1"=10'		

Photo: Chalk River Wastewater Treatment Plant above grade installation

Photo: WWTP plant process component at Chalk River

Photo: Chalk River WWTP vacant land available for expansion

APPENDIX C
Chalk River WWTP Annual Reports (AWC, MOE)

American Water Canada Corp.
701 Main Street West, Suite 100
Hamilton, ON L8S 1A2
www.amwater.com
P 905.521.1988
F 905.521.9613

March 16, 2009

Town of Laurentian Hills
34465 Highway 17, RR #1
Deep River, Ontario
K0J 1P0

Attn.: Mr. Wayne Kirby, AMCT
CAO-Clerk

Re: Town of Laurentian Hills
Chalk River Wastewater Systems

Please find enclosed the Town of Laurentian Hills, Wastewater Treatment Facility Annual Operations Report 2008. The report is prepared in accordance with the requirements of the Certificate of Approval # 3-0210-87-896 annual report criteria and contains the following:

1. Operating Parameters and Effluent Concentration and Loading;
2. Analytical protocol;
3. Proposed Programs or Remedial Measures;
4. Wastewater Sludge; and,
5. Maintenance and Calibration.

On behalf of the municipality, we have submitted a copy of the wastewater annual report to the MOE, Ottawa District Office, 2430 Don Reid Dr., Ottawa, Ontario K1H 1E1, Attn: Mr. Bryan Dickman.

Yours truly,
American Water Canada Corp.

Jeff Trudeau, P.Eng.
Projects Director

c: D. Ethier, AW Canada
MOE, Ottawa District Office

1. OPERATING PARAMETERS AND EFFLUENT CONCENTRATION AND LOADING;

A summary of the average daily flow, the average daily influent and effluent concentration for the parameters of Biochemical Oxygen Demand, Suspended Solids, Total Phosphorus and E. coli has been summarized in the Annual Status Report for Wastewater Treatment 2008 (attached).

The average influent flow to the plant was 0.472 ML/d for 2008, which approaches the plant design capacity of 0.545 ML/d for the contact stabilization mode of operation. A daily maximum flow of 850m^3 was obtained in June. Figure 1 shows the raw sewage flows to the plant in 2008.

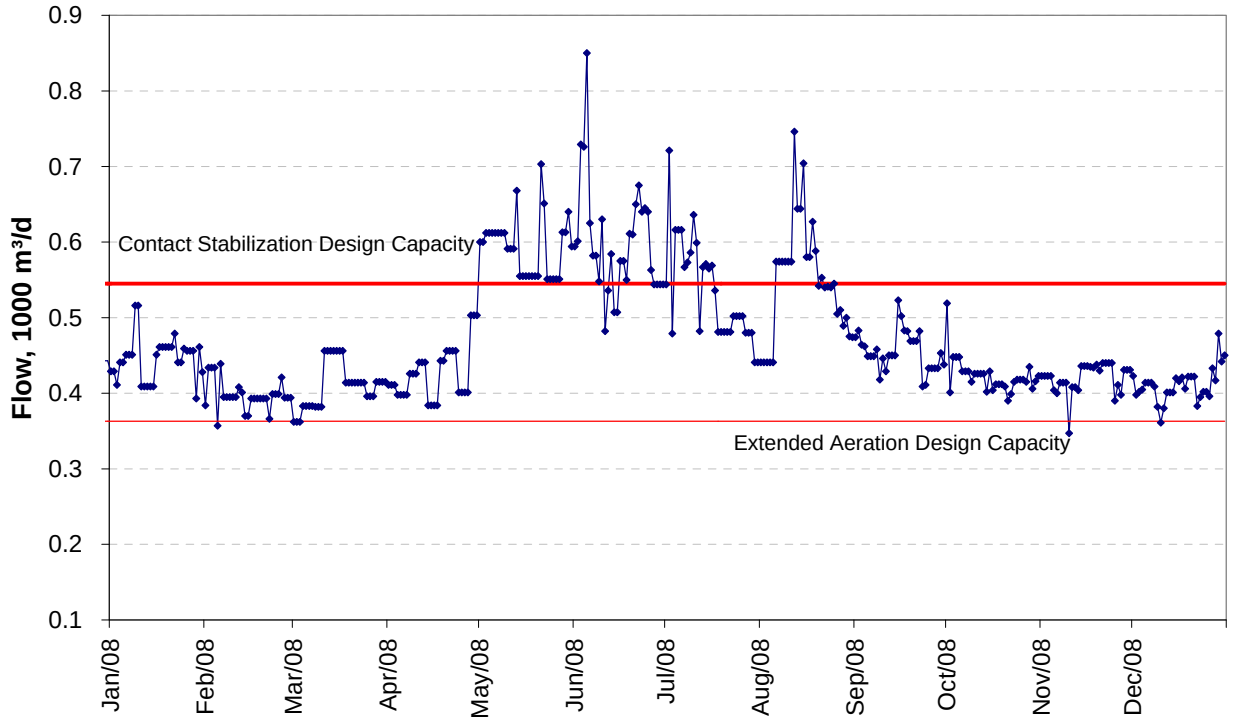


Figure 1: Daily Flows at the Chalk River Sewage Plant

Average flow for 2008 was 0.472 ML/d. In 2007, the average flow was 0.458 ML/d. This represents a 3% increase from 2007. However, throughout much of the summer months, the system was receiving flows higher than the rated contact stabilization design capacity. Some of this was due to a wetter-than-usual summer season.

As has been stated in prior annual reports, the Town of Laurentian Hills should continue with the infiltration study of the collection system and water management activities within the Black Duck Creek watershed. This recommendation was put forth in the 2006 annual report due to a substantial increase in flows from 2005.

The sewage system is operating close to its approved rated capacity.

In the table below, the annual average effluent concentrations for the BOD5, suspended solids and total phosphorus are compared to the criteria in the certificate of approval. All effluent concentration criteria were achieved during the year.

Effluent Parameter	Actual Effluent Concentration (mg/L)		Criteria Effluent Concentration (mg/L)	Attains Criteria in Cert. of Approval
BOD5	6.0		25 (annual)	Yes
Suspended Solids	10.7		25 (annual)	Yes
Total Phosphorus	Jan	0.34	1 (monthly)	Yes
	Feb	0.53		
	Mar	0.59		
	Apr	0.44		
	May	0.30		
	Jun	0.31		
	Jul	0.60		
	Aug	0.23		
	Sep	0.26		
	Oct	0.31		
	Nov	0.59		
	Dec	0.56		
	AVG	**0.42**		

The certificate of approval also requires that the loading from the effluent is monitored and maximum limits have been established.

In the table below, the effluent loading for the BOD5, suspended solids and total phosphorus are compared to the requirements in accordance with the certificate of approval based on the plant operating in the contact stabilization mode. All loading criteria were achieved.

Effluent Parameter	Actual Effluent Loading (Kg/day)	Criteria Effluent Loading (Kg/day)	Attains Criteria in Certificate of Approval
CBOD5	2.8	13.6 (annual)	Yes
Suspended Solids	5.1	13.6 (annual)	Yes
Total Phosphorous	0.20	0.5 (annual)	Yes

As presented above the plant effluent quality achieved the requirements as outlined in Certificate of Approval #3-0210-87-896.

The plant was able to achieve removal efficiencies for BOD5, Suspended Solids and Total Phosphorus of 93.8%, 93.9% and 86.9%, respectively.

2. ANALYTICAL PROTOCOL

The influent and effluent samples are 24-hour composite samples taken at the plant inlet after grit removal and the plant discharge after disinfection.

The operator tests weekly for total phosphorus and pH on the influent and effluent samples, weekly for mixed liquor suspended solids and DO from the aeration tank and daily for chlorine residual.

On a bi-weekly basis, the operator sends the influent and effluent samples to accredited environmental testing laboratories. In 2009, samples were sent to Caduceon Environmental Laboratories Ltd., Ottawa for analysis.

Type of Analysis	Influent	Effluent
BOD5	bi-weekly	bi-weekly
Suspended Solids	bi-weekly	bi-weekly
Total Phosphorus	bi-weekly	bi-weekly
TKN, Ammonia	bi-weekly	bi-weekly
Nitrate and Nitrite	bi-weekly	bi-weekly
Total Coliform	bi-weekly	bi-weekly
Fecal Coliform	bi-weekly	bi-weekly

A summary of the lab results can be found attached as a WaterTrax report.

3. PROPOSED PROGRAMS OR REMEDIAL MEASURES

The plant and pump station experienced no raw sewage bypassing during the year.

For the most part, the plant has been within its hydraulics criteria however, there have been some issues with high flows, and during these periods there have been some hydraulics issues. These incidents have furthered the importance of an infiltration study of the sewage collection system. Despite the high flows, the effluent quality is well within its criteria.
The proposed programs listed below focus on system optimization or capital upgrades.

AW Canada has been using an alternative coagulant, Pre-Hydroxylated Aluminum Sulphate (PHAS), to assist with phosphorus removal and to reduce sludge volumes. Chemical addition rates/usage may need to be changed if the flows are higher than usual.

We recommend that the municipality consider the following capital improvements for the 2009-year:

- Investigate additional sludge management options, such as on-site thickening using Geotubes or installation of an sludge storage tank, to reduce sludge haulage/disposal;
- Conversion of heating systems to natural gas;
- Continue with refurbishment of the submersible pumps at both low lift stations;
- Continue high-pressure flushing of collection system
- Replacement of chemical addition pumps (quote for two pumps forthcoming)
- Continue with infiltration study of the sewage collection system
- Study to investigate removal of backwash water from the water treatment plant
- As part of ongoing system maintenance, it is recommended that the aeration basin/clarifier system be drained, inspected and grit/debris removed and repairs made. This activity will require prior approval from the MOE as is will involve a planned bypass of the treatment system. Operations staff will prepare and send a proposed procedure to the MOE prior to this work taking place.

4. WASTEWATER SLUDGE

During 2008, the sludge was land applied in accordance with certificate # S-4131-31 located at Lots 6 & 7 Con XIII (former Township of Wylie). The sludge hauler has a license # H-8700-17 with the MOE. The sludge was analyzed for heavy metals and the results are on file at the treatment plant.

The volume of sludge haulage for the year 2008 is as follows:

Month	Volume, (m^3)	Disposed To	Month	Volume, (m^3)	Disposed To
Jan	0	N/A	Jul	0	N/A
Feb	0	N/A	Aug	164	Land
Mar	0	N/A	Sep	0	N/A
Apr	224	Pembroke	Oct	0	N/A
May	0	N/A	Nov	180	Land
Jun	0	N/A	Dec	0	N/A

The annual summary of sludge hauled from the Chalk River Wastewater Treatment Plant from 1999 through to 2008 is outlined below:

Year	Sludge Volume, m^3	Year	Sludge Volume, m^3
1999	520	2004	608
2000	500	2005	563
2001	507	2006	539
2002	672	2007	386
2003	632	2008	388

It is estimated that the sludge hauled during 2008 will be around 400m^3.

5. MAINTENANCE AND CALIBRATION

Annual calibrations were performed on the flow meter in May 2008. A certified technician, Ken Harris, conducted the calibration. Copies of both reports are available at the plant.

The 2008 maintenance activities were recorded in the maintenance management log book at the plant. The work orders are completed on site and kept at the plant. The operator maintains a logbook to record the plant operations and maintenance activities for the treatment facility.

The highlights of the maintenance carried out for 2008 year are outlined below:

- All four sewage lift pumps pulled and cleaned and repaired as necessary;
- Lift stations pumped out and cleaned;
- flow meter and alarm system was inspected and calibrated;
- sewer lines flushed

Chalk River
Wastewater Operations

AMERICAN WATER CANADA

Year: 2008

Municipality: ***Laurentian Hills***
Project: ***Chalk River W.P.C.P.***
Design Cap.: ***0.363 ML/d in extended aeration mode***
0.545 ML/d in contact stabilization mode
Description: ***-two pumping stations.***
- extended aeration/contact stablization process

	FLOWS			BIOCHEMICAL 02 DEMAND			SUSPENDED SOLIDS			PHOSPHORUS			E coli
Month	**Total Flow** 1000m3	**Avg. Day Flow** 1000m3	**Max Day Flow** 1000m3	**Avg. Raw BOD** (mg/L)	**Avg. Eff. BOD** (mg/L)	**Avg. Load BOD** (kg/day)	**Avg. Raw SS** (mg/L)	**Avg. Eff. SS** (mg/L)	**Avg. Load SS** (kg/day)	**Avg. Raw Phos.** (mg/L)	**Avg. Eff. Phos.** (mg/L)	**Avg. Load Phos.** (kg/day)	**(geomean)**
January	13.84	0.446	0.516	117.0	3.0	1.3	218.0	10.1	4.5	3.81	0.34	0.15	0
February	11.53	0.398	0.439	129.0	4.5	1.8	197.0	10.2	4.1	3.43	0.53	0.21	108
March	12.70	0.410	0.456	107.0	6.0	2.5	191.0	12.2	5.0	3.76	0.59	0.24	0
April	12.79	0.426	0.503	102.0	11.5	4.9	186.0	11.3	4.8	2.92	0.44	0.19	0
May	18.38	0.593	0.703	94.0	5.5	3.3	245.0	9.3	5.5	3.14	0.30	0.18	0
June	17.99	0.600	0.850	122.0	9.5	5.7	176.0	14.3	8.6	3.44	0.31	0.19	6491
July	16.58	0.535	0.721	94.0	5.5	2.9	183.0	7.4	4.0	2.63	0.60	0.32	4450
August	16.98	0.548	0.746	106.0	5.5	3.0	149.0	12.8	7.0	3.57	0.23	0.13	0
September	13.65	0.455	0.523	63.0	4.5	2.0	155.0	9.1	4.1	2.72	0.24	0.11	318
October	13.10	0.423	0.519	92.0	4.0	1.7	142.0	11.0	4.7	2.91	0.31	0.13	0
November	12.60	0.420	0.440	56.0	6.5	2.7	131.0	10.2	4.3	3.11	0.59	0.25	150
December	12.73	0.411	0.479	90.0	6.5	2.7	148.0	10.8	4.4	3.12	0.56	0.23	98
AVERAGE	**14.41**	**0.472**	**0.575**	**97.7**	**6.0**	**2.9**	**176.8**	**10.7**	**5.1**	**3.2**	**0.42**	**0.19**	**n/a**
MAXIMUM	18.38		0.850	129.0	11.5		245.0	14.3		3.8	0.60		
% Removal					93.8%			93.9%			86.9%		
CRITERIA					**25.00**	**13.6**		**25.00**	**13.6**		**1.00**	**0.5**	
MEETS Concentration Criteria					**YES**	**YES**		**YES**	**YES**		**YES**	**YES**	

Remedial Actions:

Facility: Chalk River WWTP; Chalk River WWTP
Sampling Point: 01 Raw Sewage (1-1-INF, 1236B)

Ammonia (total, as N)		**Criteria**
01/02/2008 08:00	14.9 mg/L	
01/22/2008 08:00	13.8 mg/L	
02/05/2008 08:00	15.4 mg/L	
02/19/2008 07:25	19.0 mg/L	
03/04/2008 08:00	5.28 mg/L	
03/18/2008 08:00	17.6 mg/L	
04/01/2008 08:00	14.1 mg/L	
04/14/2008 08:00	9.42 mg/L	
04/29/2008 08:00	9.06 mg/L	
05/13/2008 08:00	13.7 mg/L	
05/28/2008 06:45	7.61 mg/L	
06/10/2008 08:00	14.8 mg/L	
06/24/2008 07:00	18.0 mg/L	
07/08/2008 07:00	9.27 mg/L	
07/22/2008 00:00	20.2 mg/L	
08/05/2008 08:00	20.5 mg/L	
08/26/2008 07:10	21.2 mg/L	
09/23/2008 06:45	10.1 mg/L	
10/07/2008 06:48	10.7 mg/L	
10/21/2008 06:35	17.5 mg/L	
11/04/2008 08:05	19.2 mg/L	
11/18/2008 06:30	5.11 mg/L	
12/02/2008 07:15	13.1 mg/L	
12/16/2008 06:55	12.9 mg/L	

# **samples:** 24	**min:** 5.11 mg/L
# **detects:** 24	**max:** 21.2 mg/L
# **non-detects:** 0	**avg:** 13.852 mg/L (based on 24 numerical results)
# **exceedances:** 0	

BOD-5		**Criteria**
01/02/2008 08:00	117 mg/L	
02/05/2008 08:00	139 mg/L	
02/19/2008 07:25	119 mg/L	
03/04/2008 08:00	40 mg/L	
03/18/2008 08:00	173 mg/L	
04/01/2008 08:00	109 mg/L	
04/14/2008 08:00	94 mg/L	
05/13/2008 08:00	129 mg/L	
05/28/2008 06:45	59 mg/L	
06/10/2008 08:00	166 mg/L	
06/24/2008 07:00	77 mg/L	
07/08/2008 07:00	50 mg/L	
07/22/2008 00:00	138 mg/L	
08/05/2008 08:00	107 mg/L	
08/26/2008 07:10	105 mg/L	
09/23/2008 06:45	48 mg/L	
10/07/2008 06:48	76 mg/L	
10/21/2008 06:35	107 mg/L	
11/04/2008 08:05	94 mg/L	
12/02/2008 07:15	108 mg/L	
12/16/2008 06:55	72 mg/L	

# **samples:** 21	**min:** 40 mg/L
# **detects:** 21	**max:** 173 mg/L
# **non-detects:** 0	**avg:** 101.286 mg/L (based on 21 numerical results)
# **exceedances:** 0	

Nitrate (as N)		**Criteria**
01/02/2008 08:00	0.4 mg/L	
01/22/2008 08:00	0.8 mg/L	
02/05/2008 08:00	0.6 mg/L	
02/19/2008 07:25	0.3 mg/L	
03/04/2008 08:00	7.3 mg/L	

Nitrate (as N)		Criteria
03/18/2008 08:00	0.7 mg/L	
04/01/2008 08:00	0.3 mg/L	
04/14/2008 08:00	1.4 mg/L	
04/29/2008 08:00	1.2 mg/L	
05/13/2008 08:00	< 0.1 mg/L	
05/28/2008 06:45	0.6 mg/L	
06/10/2008 08:00	1.0 mg/L	
06/24/2008 07:00	1.2 mg/L	
07/08/2008 07:00	0.1 mg/L	
07/22/2008 00:00	< 0.1 mg/L	
08/26/2008 07:10	0.8 mg/L	
09/23/2008 06:45	0.7 mg/L	
10/07/2008 06:48	0.6 mg/L	
10/21/2008 06:35	0.2 mg/L	
11/04/2008 08:05	0.3 mg/L	
11/18/2008 06:30	0.8 mg/L	
12/02/2008 07:15	0.6 mg/L	
12/16/2008 06:55	0.6 mg/L	

# samples: 23	**min:** < 0.1 mg/L
# detects: 21	**max:** 7.3 mg/L
# non-detects: 2	**avg:** 0.900 mg/L (based on 23 numerical results)
# exceedances: 0	

Nitrite (as N)		Criteria
01/02/2008 08:00	0.2 mg/L	
01/22/2008 08:00	0.2 mg/L	
02/05/2008 08:00	0.3 mg/L	
02/19/2008 07:25	0.3 mg/L	
03/04/2008 08:00	0.2 mg/L	
03/18/2008 08:00	0.2 mg/L	
04/01/2008 08:00	0.2 mg/L	
04/14/2008 08:00	0.2 mg/L	

Nitrite (as N)		Criteria
04/29/2008 08:00	0.3 mg/L	
05/13/2008 08:00	< 0.1 mg/L	
05/28/2008 06:45	0.2 mg/L	
06/10/2008 08:00	0.3 mg/L	
06/24/2008 07:00	0.2 mg/L	
07/08/2008 07:00	0.1 mg/L	
07/22/2008 00:00	< 0.1 mg/L	
08/26/2008 07:10	0.2 mg/L	
09/23/2008 06:45	0.2 mg/L	
10/07/2008 06:48	0.1 mg/L	
10/21/2008 06:35	0.3 mg/L	
11/04/2008 08:05	0.2 mg/L	
11/18/2008 06:30	0.1 mg/L	
12/02/2008 07:15	0.2 mg/L	
12/16/2008 06:55	0.2 mg/L	

# **samples:** 23	**min:** < 0.1 mg/L
# **detects:** 21	**max:** 0.3 mg/L
# **non-detects:** 2	**avg:** 0.200 mg/L (based on 23 numerical results)
# **exceedances:** 0	

Phosphorus (total)		Criteria
01/02/2008 08:00	2.59 mg/L	
01/08/2008 08:00	5.94 mg/L	
01/15/2008 08:00	4.53 mg/L	
01/22/2008 08:00	2.36 mg/L	
01/29/2008 06:05	3.64 mg/L	
02/05/2008 08:00	3.24 mg/L	
02/12/2008 08:00	3.00 mg/L	
02/19/2008 07:25	4.05 mg/L	
02/26/2008 08:00	3.44 mg/L	
03/04/2008 08:00	2.78 mg/L	
03/11/2008 08:00	3.74 mg/L	

Phosphorus (total)		Criteria
03/18/2008 08:00	3.87 mg/L	
03/25/2008 08:00	4.65 mg/L	
04/01/2008 08:00	3.44 mg/L	
04/08/2008 00:00	2.78 mg/L	
04/14/2008 08:00	4.82 mg/L	
04/22/2008 08:00	3.45 mg/L	
04/29/2008 08:00	0.12 mg/L	
05/06/2008 08:00	2.34 mg/L	
05/13/2008 08:00	4.56 mg/L	
05/20/2008 08:00	3.99 mg/L	
05/28/2008 06:45	1.66 mg/L	
06/03/2008 06:30	1.99 mg/L	
06/10/2008 08:00	4.80 mg/L	
06/24/2008 07:00	3.54 mg/L	
07/02/2008 07:21	1.08 mg/L	
07/08/2008 07:00	2.65 mg/L	
07/22/2008 00:00	3.96 mg/L	
07/29/2008 07:20	2.83 mg/L	
08/05/2008 08:00	4.67 mg/L	
08/12/2008 06:45	2.70 mg/L	
08/19/2008 07:15	2.74 mg/L	
08/26/2008 07:10	4.18 mg/L	
09/02/2008 00:00	2.64 mg/L	
09/16/2008 06:31	4.88 mg/L	
09/23/2008 06:45	2.08 mg/L	
09/30/2008 09:10	2.43 mg/L	
10/07/2008 06:48	2.72 mg/L	
10/14/2008 06:45	2.78 mg/L	
10/21/2008 06:35	4.23 mg/L	
10/28/2008 06:30	1.89 mg/L	
11/04/2008 08:05	4.22 mg/L	
11/11/2008 07:35	3.54 mg/L	
11/18/2008 06:30	2.16 mg/L	
11/25/2008 07:00	2.53 mg/L	
12/02/2008 07:15	3.13 mg/L	

Phosphorus (total)		**Criteria**
12/09/2008 07:10	2.60 mg/L	
12/16/2008 06:55	3.67 mg/L	
12/22/2008 09:25	3.07 mg/L	

# samples: 49	**min:** 0.12 mg/L
# detects: 49	**max:** 5.94 mg/L
# non-detects: 0	**avg:** 3.239 mg/L (based on 49 numerical results)
# exceedances: 0	

Suspended Solids		**Criteria**
01/02/2008	163 mg/L	
01/02/2008 08:00	628 mg/L	
01/11/2008	178 mg/L	
01/15/2008	178 mg/L	
01/16/2008	183 mg/L	
01/22/2008 08:00	44 mg/L	
01/23/2008	174 mg/L	
01/30/2008	198 mg/L	
02/05/2008 08:00	460 mg/L	
02/06/2008	188 mg/L	
02/13/2008	127 mg/L	
02/19/2008 07:25	148 mg/L	
02/20/2008	142 mg/L	
02/27/2008	116 mg/L	
03/04/2008 08:00	176 mg/L	
03/05/2008	127 mg/L	
03/12/2008	163 mg/L	
03/18/2008 08:00	344 mg/L	
03/19/2008	181 mg/L	
03/26/2008	157 mg/L	
04/01/2008	163 mg/L	
04/01/2008 08:00	372 mg/L	
04/09/2008	184 mg/L	

Suspended Solids		Criteria
04/14/2008 08:00	212 mg/L	
04/16/2008	127 mg/L	
04/23/2008	163 mg/L	
04/29/2008 08:00	94 mg/L	
04/30/2008	171 mg/L	
05/07/2008	163 mg/L	
05/13/2008 08:00	608 mg/L	
05/14/2008	138 mg/L	
05/21/2008	156 mg/L	
05/28/2008	163 mg/L	
05/28/2008 06:45	244 mg/L	
06/04/2008	212 mg/L	
06/10/2008 08:00	260 mg/L	
06/11/2008	186 mg/L	
06/18/2008	146 mg/L	
06/24/2008 07:00	86 mg/L	
06/25/2008	165 mg/L	
07/02/2008	194 mg/L	
07/08/2008 07:00	144 mg/L	
07/09/2008	186 mg/L	
07/16/2008	153 mg/L	
07/22/2008 00:00	312 mg/L	
07/23/2008	138 mg/L	
07/29/2008	154 mg/L	
08/06/2008	162 mg/L	
08/13/2008	182 mg/L	
08/19/2008	107 mg/L	
08/26/2008 07:10	152 mg/L	
08/27/2008	143 mg/L	
09/03/2008	126 mg/L	
09/10/2008	162 mg/L	
09/16/2008	153 mg/L	
09/23/2008 06:45	100 mg/L	
09/24/2008	117 mg/L	
09/30/2008	181 mg/L	

Suspended Solids		Criteria
10/01/2008	136 mg/L	
10/07/2008	152 mg/L	
10/07/2008 06:48	144 mg/L	
10/14/2008	148 mg/L	
10/21/2008	127 mg/L	
10/21/2008 06:35	152 mg/L	
10/29/2008	133 mg/L	
11/04/2008	131 mg/L	
11/04/2008 08:05	164 mg/L	
11/12/2008	147 mg/L	
11/18/2008 06:30	72 mg/L	
11/19/2008	153 mg/L	
11/26/2008	116 mg/L	
12/02/2008 07:15	148 mg/L	
12/03/2008	131 mg/L	
12/04/2008	127 mg/L	
12/10/2008	140 mg/L	
12/11/2008	172 mg/L	
12/16/2008	138 mg/L	
12/16/2008 06:55	264 mg/L	
12/17/2008	134 mg/L	
12/23/2008	116 mg/L	
12/24/2008	143 mg/L	
12/30/2008	122 mg/L	
12/31/2008	139 mg/L	

# samples: 83	**min:** 44 mg/L
# detects: 83	**max:** 628 mg/L
# non-detects: 0	**avg:** 174.735 mg/L (based on 83 numerical results)
# exceedances: 0	

Total Kjeldahl Nitrogen / TKN		Criteria
01/02/2008 08:00	25.0 mg/L	

Total Kjeldahl Nitrogen / TKN		Criteria
01/22/2008 08:00	20.2 mg/L	
02/05/2008 08:00	30.3 mg/L	
02/19/2008 07:25	36.8 mg/L	
03/04/2008 08:00	13.6 mg/L	
03/18/2008 08:00	34.0 mg/L	
04/01/2008 08:00	28.9 mg/L	
04/14/2008 08:00	31.8 mg/L	
04/29/2008 08:00	1.09 mg/L	
05/13/2008 08:00	32.3 mg/L	
05/28/2008 06:45	15.3 mg/L	
06/10/2008 08:00	42.8 mg/L	
06/24/2008 07:00	23.7 mg/L	
07/08/2008 07:00	19.6 mg/L	
07/22/2008 00:00	35.4 mg/L	
08/26/2008 07:10	36.5 mg/L	
09/23/2008 06:45	18.1 mg/L	
10/07/2008 06:48	22.4 mg/L	
10/21/2008 06:35	34.3 mg/L	
11/04/2008 08:05	35.9 mg/L	
11/18/2008 06:30	11.5 mg/L	
12/02/2008 07:15	27.9 mg/L	
12/16/2008 06:55	24.9 mg/L	

# samples: 23	**min:** 1.09 mg/L
# detects: 23	**max:** 42.8 mg/L
# non-detects: 0	**avg:** 26.187 mg/L (based on 23 numerical results)
# exceedances: 0	

Facility:	Chalk River WWTP; Chalk River WWTP
Sampling Point:	07 Final Effluent (1-7-EFF, 12376)

Ammonia (total, as N)		Criteria
01/02/2008 08:00	0.04 mg/L	
01/22/2008 08:00	0.60 mg/L	

Ammonia (total, as N)		**Criteria**
02/05/2008 08:00	0.14 mg/L	
02/19/2008 07:28	0.08 mg/L	
03/04/2008 00:00	0.05 mg/L	
03/18/2008 08:00	0.17 mg/L	
04/01/2008 08:00	0.23 mg/L	
04/14/2008 08:00	0.12 mg/L	
04/29/2008 08:00	0.02 mg/L	
05/13/2008 08:00	0.26 mg/L	
05/28/2008 06:45	1.65 mg/L	
06/10/2008 08:00	2.53 mg/L	
06/24/2008 07:00	0.18 mg/L	
07/08/2008 07:00	0.12 mg/L	
07/22/2008 00:00	7.78 mg/L	
08/05/2008 08:00	2.20 mg/L	
08/26/2008 07:10	1.91 mg/L	
09/23/2008 06:45	0.22 mg/L	
10/07/2008 06:50	0.06 mg/L	
10/21/2008 06:35	0.02 mg/L	
11/04/2008 08:00	0.09 mg/L	
11/18/2008 06:30	1.92 mg/L	
12/02/2008 07:25	1.02 mg/L	
12/16/2008 06:55	< 0.01 mg/L	

# **samples:** 24	**min:** < 0.01 mg/L
# **detects:** 23	**max:** 7.78 mg/L
# **non-detects:** 1	**avg:** 0.893 mg/L (based on 24 numerical results)
# **exceedances:** 0	

BOD-5		**Criteria**
01/02/2008 08:00	3 mg/L	
02/05/2008 08:00	6 mg/L	
02/19/2008 07:28	< 3 mg/L	
03/04/2008 00:00	6 mg/L	

BOD-5		Criteria
03/18/2008 08:00	6 mg/L	
04/01/2008 08:00	15 mg/L	
04/14/2008 08:00	8 mg/L	
05/13/2008 08:00	5 mg/L	
05/28/2008 06:45	6 mg/L	
06/10/2008 08:00	11 mg/L	
06/24/2008 07:00	8 mg/L	
07/08/2008 07:00	3 mg/L	
07/22/2008 00:00	8 mg/L	
08/05/2008 08:00	4 mg/L	
08/26/2008 07:10	7 mg/L	
09/23/2008 06:45	< 3 mg/L	
10/07/2008 06:50	5 mg/L	
10/21/2008 06:35	< 3 mg/L	
11/04/2008 08:00	< 3 mg/L	
12/02/2008 07:25	10 mg/L	
12/16/2008 06:55	< 3 mg/L	

# samples: 21	**min:** < 3 mg/L
# detects: 16	**max:** 15 mg/L
# non-detects: 5	**avg:** 6.000 mg/L (based on 21 numerical results)
# exceedances: 0	

Escherichia coli / E. coli (counts)		Criteria
01/02/2008 08:00	« 10 CFU/100mL	
01/22/2008 08:00	« 2 CFU/100mL	
02/05/2008 08:00	120 CFU/100mL	
02/19/2008 07:28	97 CFU/100mL	
03/04/2008 00:00	« 2 CFU/100mL	
03/18/2008 08:00	< 1 CFU/100mL	
04/01/2008 08:00	« 2 CFU/100mL	
04/14/2008 08:00	« 2 CFU/100mL	
04/29/2008 08:00	« 2 CFU/100mL	

Escherichia coli / E. coli (counts)		Criteria
05/13/2008 08:00	« 2 CFU/100mL	
05/28/2008 06:45	78 CFU/100mL	
06/10/2008 08:00	980 CFU/100mL	
06/24/2008 07:00	43,000 CFU/100mL	
07/08/2008 07:00	3,000 CFU/100mL	
07/22/2008 00:00	6,600 CFU/100mL	
08/05/2008 08:00	« 2 CFU/100mL	
08/26/2008 07:10	6,500 CFU/100mL	
09/23/2008 06:45	252 CFU/100mL	
10/07/2008 06:50	« 2 CFU/100mL	
10/21/2008 06:35	48 CFU/100mL	
11/04/2008 08:00	150 CFU/100mL	
12/02/2008 07:25	> 400 CFU/100mL	
12/16/2008 06:55	24 CFU/100mL	

# samples: 23	**min:** < 1 CFU/100mL
# detects: 22	**max:** 43,000 CFU/100mL
# non-detects: 1	**avg:** 4,680.769 CFU/100mL (based on 13 numerical results)
# exceedances: 0	

Nitrate (as N)		Criteria
01/02/2008 08:00	6.3 mg/L	
01/22/2008 08:00	13.7 mg/L	
02/05/2008 08:00	11.9 mg/L	
02/19/2008 07:28	10.3 mg/L	
03/04/2008 00:00	13.4 mg/L	
03/18/2008 08:00	12.4 mg/L	
04/01/2008 08:00	9.6 mg/L	
04/14/2008 08:00	6.1 mg/L	
04/29/2008 08:00	1.1 mg/L	
05/13/2008 08:00	2.3 mg/L	
05/28/2008 06:45	1.6 mg/L	
06/10/2008 08:00	0.9 mg/L	

Nitrate (as N)		Criteria
06/24/2008 07:00	1.2 mg/L	
07/08/2008 07:00	5.4 mg/L	
07/22/2008 00:00	0.3 mg/L	
08/26/2008 07:10	2.0 mg/L	
09/23/2008 06:45	2.9 mg/L	
10/07/2008 06:50	3.5 mg/L	
10/21/2008 06:35	1.5 mg/L	
11/04/2008 08:00	3.7 mg/L	
11/18/2008 06:30	0.1 mg/L	
12/02/2008 07:25	0.3 mg/L	
12/16/2008 06:55	4.7 mg/L	

# samples: 23	**min:** 0.1 mg/L
# detects: 23	**max:** 13.7 mg/L
# non-detects: 0	**avg:** 5.009 mg/L (based on 23 numerical results)
# exceedances: 0	

Nitrite (as N)		Criteria
01/02/2008 08:00	< 0.1 mg/L	
01/22/2008 08:00	0.3 mg/L	
02/05/2008 08:00	0.2 mg/L	
02/19/2008 07:28	< 0.1 mg/L	
03/04/2008 00:00	< 0.1 mg/L	
03/18/2008 08:00	0.2 mg/L	
04/01/2008 08:00	0.2 mg/L	
04/14/2008 08:00	0.2 mg/L	
04/29/2008 08:00	< 0.1 mg/L	
05/13/2008 08:00	0.5 mg/L	
05/28/2008 06:45	0.8 mg/L	
06/10/2008 08:00	0.4 mg/L	
06/24/2008 07:00	0.5 mg/L	
07/08/2008 07:00	0.6 mg/L	
07/22/2008 00:00	0.4 mg/L	

Nitrite (as N)		**Criteria**
08/26/2008 07:10	1.8 mg/L	
09/23/2008 06:45	0.2 mg/L	
10/07/2008 06:50	< 0.1 mg/L	
10/21/2008 06:35	< 0.1 mg/L	
11/04/2008 08:00	< 0.1 mg/L	
11/18/2008 06:30	< 0.1 mg/L	
12/02/2008 07:25	0.1 mg/L	
12/16/2008 06:55	< 0.1 mg/L	

# **samples:** 23	**min:** < 0.1 mg/L
# **detects:** 14	**max:** 1.8 mg/L
# **non-detects:** 9	**avg:** 0.317 mg/L (based on 23 numerical results)
# **exceedances:** 0	

Phosphorus (total)		**Criteria**
01/02/2008 08:00	0.25 mg/L	
01/08/2008 08:00	0.19 mg/L	
01/15/2008 08:00	0.22 mg/L	
01/22/2008 08:00	0.59 mg/L	
01/29/2008 06:05	0.47 mg/L	
02/05/2008 08:00	0.53 mg/L	
02/12/2008 08:00	0.45 mg/L	
02/19/2008 07:28	0.39 mg/L	
02/26/2008 08:00	0.76 mg/L	
03/04/2008 00:00	0.77 mg/L	
03/11/2008 08:00	0.48 mg/L	
03/18/2008 08:00	0.60 mg/L	
03/25/2008 08:00	0.52 mg/L	
04/01/2008 08:00	0.76 mg/L	
04/08/2008 00:00	0.38 mg/L	
04/14/2008 08:00	0.36 mg/L	
04/22/2008 08:00	0.36 mg/L	
04/29/2008 08:00	0.32 mg/L	

Phosphorus (total)		Criteria
05/06/2008 08:00	0.30 mg/L	
05/13/2008 08:00	0.36 mg/L	
05/20/2008 08:00	0.32 mg/L	
05/28/2008 06:45	0.23 mg/L	
06/03/2008 06:30	0.16 mg/L	
06/10/2008 08:00	0.31 mg/L	
06/24/2008 07:00	0.46 mg/L	
07/02/2008 07:21	0.75 mg/L	
07/08/2008 07:00	0.69 mg/L	
07/22/2008 00:00	0.54 mg/L	
07/29/2008 07:20	0.40 mg/L	
08/05/2008 08:00	0.23 mg/L	
08/12/2008 06:45	0.18 mg/L	
08/19/2008 07:20	0.26 mg/L	
08/26/2008 07:10	0.23 mg/L	
09/02/2008 00:00	0.34 mg/L	
09/16/2008 06:31	0.16 mg/L	
09/23/2008 06:45	0.24 mg/L	
09/30/2008 09:10	0.29 mg/L	
10/07/2008 06:50	0.13 mg/L	
10/14/2008 06:45	0.17 mg/L	
10/21/2008 06:35	0.17 mg/L	
10/28/2008 06:30	0.78 mg/L	
11/04/2008 08:00	0.42 mg/L	
11/11/2008 07:35	0.85 mg/L	
11/18/2008 06:30	0.33 mg/L	
11/25/2008 07:10	0.77 mg/L	
12/02/2008 07:25	0.36 mg/L	
12/09/2008 07:10	0.98 mg/L	
12/16/2008 06:55	0.32 mg/L	
12/22/2008 09:25	0.57 mg/L	

# samples: 49	**min:** 0.13 mg/L
# detects: 49	**max:** 0.98 mg/L

 # non-detects: 0 **avg:** 0.422 mg/L (based on 49 numerical results)
 # exceedances: 0

Suspended Solids			**Criteria**
01/02/2008	14	mg/L	
01/02/2008 08:00	6	mg/L	
01/11/2008	13	mg/L	
01/15/2008	11	mg/L	
01/16/2008	8	mg/L	
01/22/2008 08:00	11	mg/L	
01/23/2008	11	mg/L	
01/25/2008	11	mg/L	
01/28/2008	10	mg/L	
01/30/2008	8	mg/L	
01/31/2008	8	mg/L	
02/01/2008	11.8	mg/L	
02/05/2008 08:00	9	mg/L	
02/06/2008	11.5	mg/L	
02/13/2008	15	mg/L	
02/19/2008 07:28	3	mg/L	
02/20/2008	11	mg/L	
02/27/2008	10	mg/L	
03/04/2008 00:00	8	mg/L	
03/05/2008	16	mg/L	
03/12/2008	12	mg/L	
03/18/2008 08:00	11	mg/L	
03/19/2008	15	mg/L	
03/26/2008	11	mg/L	
04/01/2008	16	mg/L	
04/01/2008 08:00	17	mg/L	
04/09/2008	10	mg/L	
04/14/2008 08:00	13	mg/L	
04/16/2008	8	mg/L	
04/23/2008	12	mg/L	
04/29/2008 08:00	6	mg/L	

Suspended Solids		Criteria
04/30/2008	8 mg/L	
05/07/2008	8 mg/L	
05/13/2008 08:00	8 mg/L	
05/14/2008	11 mg/L	
05/21/2008	13 mg/L	
05/28/2008	8 mg/L	
05/28/2008 06:45	8 mg/L	
06/04/2008	13 mg/L	
06/10/2008 08:00	39 mg/L	
06/11/2008	8 mg/L	
06/18/2008	11 mg/L	
06/24/2008 07:00	3 mg/L	
06/25/2008	12 mg/L	
07/02/2008	11 mg/L	
07/08/2008 07:00	3 mg/L	
07/09/2008	8 mg/L	
07/16/2008	11 mg/L	
07/22/2008 00:00	3 mg/L	
07/23/2008	7 mg/L	
07/29/2008	9 mg/L	
08/06/2008	13 mg/L	
08/13/2008	19 mg/L	
08/19/2008	12 mg/L	
08/26/2008 07:10	7 mg/L	
08/27/2008	13 mg/L	
09/03/2008	11 mg/L	
09/10/2008	8 mg/L	
09/16/2008	9 mg/L	
09/23/2008 06:45	3 mg/L	
09/24/2008	13 mg/L	
09/30/2008	16 mg/L	
10/01/2008	10 mg/L	
10/07/2008	12 mg/L	
10/07/2008 06:50	7 mg/L	
10/14/2008	10 mg/L	

Suspended Solids		Criteria
10/21/2008	13 mg/L	
10/21/2008 06:35	7 mg/L	
10/29/2008	18 mg/L	
11/04/2008	11 mg/L	
11/04/2008 08:00	8 mg/L	
11/12/2008	13 mg/L	
11/18/2008 06:30	5 mg/L	
11/19/2008	15 mg/L	
11/26/2008	9 mg/L	
12/02/2008 07:25	5 mg/L	
12/03/2008	14 mg/L	
12/04/2008	11 mg/L	
12/10/2008	17 mg/L	
12/11/2008	8 mg/L	
12/16/2008	10 mg/L	
12/16/2008 06:55	8 mg/L	
12/17/2008	13 mg/L	
12/23/2008	11 mg/L	
12/24/2008	9 mg/L	
12/30/2008	13 mg/L	
12/31/2008	11 mg/L	

# samples: 87	**min:** 3 mg/L
# detects: 87	**max:** 39 mg/L
# non-detects: 0	**avg:** 10.705 mg/L (based on 87 numerical results)
# exceedances: 0	

Total Kjeldahl Nitrogen / TKN		Criteria
01/02/2008 08:00	1.28 mg/L	
01/22/2008 08:00	2.50 mg/L	
02/05/2008 08:00	1.78 mg/L	
02/19/2008 07:28	1.49 mg/L	
03/04/2008 00:00	1.83 mg/L	

Total Kjeldahl Nitrogen / TKN		Criteria
03/18/2008 08:00	2.31 mg/L	
04/01/2008 08:00	2.71 mg/L	
04/14/2008 08:00	1.33 mg/L	
04/29/2008 08:00	0.95 mg/L	
05/13/2008 08:00	1.34 mg/L	
05/28/2008 06:45	2.29 mg/L	
06/10/2008 08:00	3.30 mg/L	
06/24/2008 07:00	0.81 mg/L	
07/08/2008 07:00	1.11 mg/L	
07/22/2008 00:00	8.77 mg/L	
08/26/2008 07:10	3.24 mg/L	
09/23/2008 06:45	1.32 mg/L	
10/07/2008 06:50	0.80 mg/L	
10/21/2008 06:35	0.48 mg/L	
11/04/2008 08:00	0.72 mg/L	
11/18/2008 06:30	2.55 mg/L	
12/02/2008 07:25	1.63 mg/L	
12/16/2008 06:55	0.93 mg/L	

# samples: 23	**min:** 0.48 mg/L
# detects: 23	**max:** 8.77 mg/L
# non-detects: 0	**avg:** 1.977 mg/L (based on 23 numerical results)
# exceedances: 0	

Result Legend:

P=present, A=absent, PR=presumptive, ND=non-detect, U=non-detect, OR=over-range, OG=overgrown,
TNTC=too numerous to count, NR=no result, NT=not tested, IG=ignore, ER=external report, SC=see comment

< means less than lower detection limit shown
> means greater than upper detection limit shown
« means detected & less than number shown
» means detected & greater than number shown

*** Indicates Criteria is exceeded**

American Water Canada Corp.
701 Main Street West, Suite 100
Hamilton, ON L8S 1A2
www.amwater.com
P 905.521.1988
F 905.521.9613

March 30, 2010

Town of Laurentian Hills
34465 Highway 17, RR #1
Deep River, Ontario
K0J 1P0

Attn.: Mr. Wayne Kirby, AMCT
CAO-Clerk

Re: Town of Laurentian Hills
Chalk River Wastewater Systems

Please find enclosed the Town of Laurentian Hills, Wastewater Treatment Facility Annual Operations Report 2009. The report is prepared in accordance with the requirements of the Certificate of Approval # 3-0210-87-896 annual report criteria and contains the following:

1. Operating Parameters and Effluent Concentration and Loading;
2. Analytical protocol;
3. Proposed Programs or Remedial Measures;
4. Wastewater Sludge; and,
5. Maintenance and Calibration.

On behalf of the municipality, we have submitted a copy of the wastewater annual report to the MOE, Ottawa District Office, 2430 Don Reid Dr., Ottawa, Ontario K1H 1E1, Attn: Mr. Bryan Dickman.

Yours truly,
American Water Canada Corp.

Hugh Skinner
Project Manager

c: D. Ethier, AW Canada
MOE, Ottawa District Office

1. OPERATING PARAMETERS AND EFFLUENT CONCENTRATION AND LOADING;

A summary of the average daily flow, the average daily influent and effluent concentration for the parameters of Biochemical Oxygen Demand, Suspended Solids, Total Phosphorus and E. coli has been summarized in the Annual Status Report for Wastewater Treatment 2009 (attached).

The average influent flow to the plant was 0.493 ML/d for 2009, which approaches the plant design capacity of 0.545 ML/d for the contact stabilization mode of operation. A daily maximum flow of 1251m³ was obtained in April. Figure 1 show the raw sewage flows to the plant in 2009.

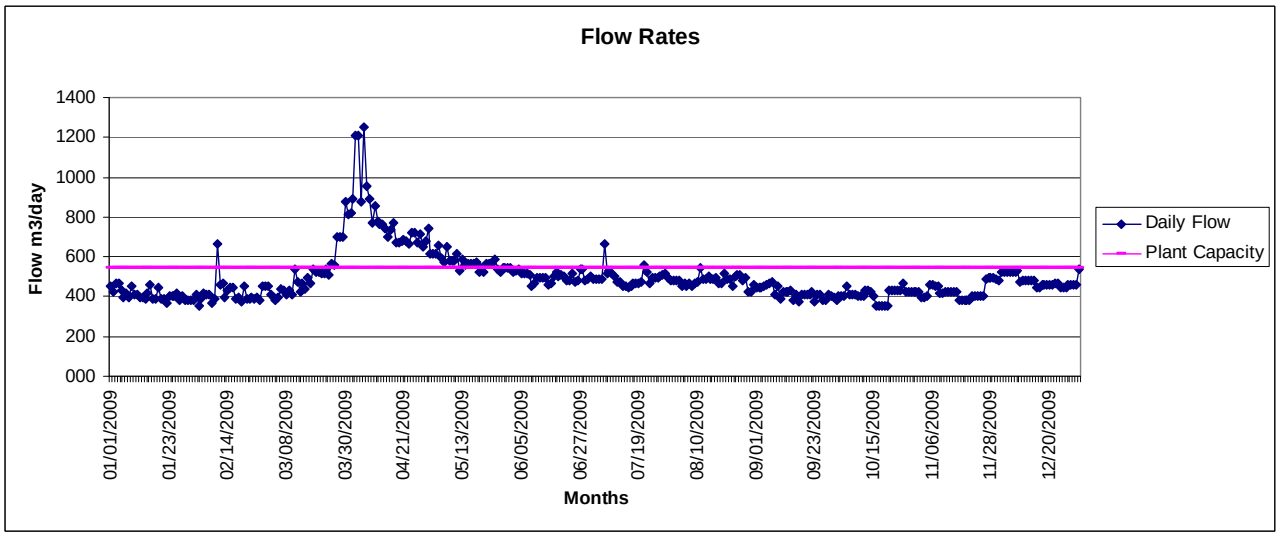


Figure 1 shows the raw sewage flows to the plant in 2009.

Figure 1: Daily Flows at the Chalk River Sewage Plant

Average flow for 2009 was 0.493 ML/d. In 2008, the average flow was 0.472 ML/d. This represents a 4% increase from 2008. However, throughout much of the summer months, the system was receiving flows higher than the rated contact stabilization design capacity. Some of this was due to a wetter-than-usual summer season.

As has been stated in prior annual reports, the Town of Laurentian Hills should continue with the infiltration study of the collection system and water management activities within the Black Duck Creek watershed. This recommendation was put forth in the 2006 annual report due to a substantial increase in flows from 2005.

The sewage system is operating close to its approved rated capacity.

In the table below, the annual average effluent concentrations for the BOD5, suspended solids and total phosphorus are compared to the criteria in the certificate of approval. All effluent concentration criteria were achieved during the year.

Effluent Parameter	Actual Effluent Concentration (mg/L)		Criteria Effluent Concentration (mg/L)	Attains Criteria in Cert. of Approval
BOD5	9.0		25 (annual)	Yes
Suspended Solids	8.8		25 (annual)	Yes
Total Phosphorus	Jan	0.8	1 (monthly)	Yes
	Feb	1.06		
	Mar	0.74		
	Apr	0.40		
	May	0.72		
	Jun	0.32		
	Jul	0.18		
	Aug	0.40		
	Sep	0.47		
	Oct	0.89		
	Nov	0.52		
	Dec	0.64		
	AVG	**0.60**		

The certificate of approval also requires that the loading from the effluent is monitored and maximum limits have been established.

In the table below, the effluent loading for the BOD5, suspended solids and total phosphorus are compared to the requirements in accordance with the certificate of approval based on the plant operating in the contact stabilization mode. All loading criteria were achieved.

Effluent Parameter	Actual Effluent Loading (Kg/day)	Criteria Effluent Loading (Kg/day)	Attains Criteria in Certificate of Approval
CBOD5	4.4	13.6 (annual)	Yes
Suspended Solids	5.2	13.6 (annual)	Yes
Total Phosphorous	0.36	0.5 (annual)	Yes

As presented above the plant effluent quality achieved the requirements as outlined in Certificate of Approval #3-0210-87-896.

2. ANALYTICAL PROTOCOL

The influent and effluent samples are 24-hour composite samples taken at the plant inlet after grit removal and the plant discharge after disinfection.

The operator tests weekly for total phosphorus and pH on the influent and effluent samples, weekly for mixed liquor suspended solids and DO from the aeration tank and daily for chlorine residual.

On a bi-weekly basis, the operator sends the influent and effluent samples to accredited environmental testing laboratories. In 2009, samples were sent to Caduceon Environmental Laboratories Ltd., Ottawa for analysis.

Type of Analysis	Influent	Effluent
BOD5	bi-weekly	bi-weekly
Suspended Solids	bi-weekly	bi-weekly
Total Phosphorus	bi-weekly	bi-weekly
TKN, Ammonia	bi-weekly	bi-weekly
Nitrate and Nitrite	bi-weekly	bi-weekly
Total Coliform	bi-weekly	bi-weekly
Fecal Coliform	bi-weekly	bi-weekly

A summary of the lab results can be found attached as a WaterTrax report.

3. PROPOSED PROGRAMS OR REMEDIAL MEASURES

The plant and pump station experienced no raw sewage bypassing during the year.

For the most part, the plant has been within its hydraulics criteria however, there have been some issues with high flows, and during these periods there have been some hydraulics issues. These incidents have furthered the importance of an infiltration study of the sewage collection system. Despite the high flows, the effluent quality is well within its criteria.
The proposed programs listed below focus on system optimization or capital upgrades.

AW Canada has been using an alternative coagulant, Pre-Hydroxylated Aluminum Sulphate (PHAS), to assist with phosphorus removal and to reduce sludge volumes. Chemical addition rates/usage may need to be changed if the flows are higher than usual.

We recommend that the municipality consider the following capital improvements for the 2009-year:

- Investigate additional sludge management options, such as on-site thickening using Geotubes or installation of an sludge storage tank, to reduce sludge haulage/disposal;
- Conversion of heating systems to natural gas;
- Continue with refurbishment of the submersible pumps at both low lift stations;
- Continue high-pressure flushing of collection system
- Replacement of chemical addition pumps (quote for two pumps forthcoming)
- Continue with infiltration study of the sewage collection system
- Study to investigate removal of backwash water from the water treatment plant
- As part of ongoing system maintenance, it is recommended that the aeration basin/clarifier system be drained, inspected and grit/debris removed and repairs made. This activity will require prior approval from the MOE as is will involve a planned bypass of the treatment system. Operations staff will prepare and send a proposed procedure to the MOE prior to this work taking place.

4. WASTEWATER SLUDGE

During 2009, the sludge was land applied in accordance with certificate # S-4131-31 located at Lots 6 & 7 Con XIII (former Township of Wylie). The sludge hauler has a license # H-8700-17 with

the MOE. The sludge was analyzed for heavy metals and the results are on file at the treatment plant.

The volume of sludge haulage for the year 2008 is as follows:

Month	Volume, (m^3)	Disposed To	Month	Volume, (m^3)	Disposed To
Jan	0	N/A	Jul	0	N/A
Feb	0	N/A	Aug	289	Land
Mar	0	N/A	Sep	0	N/A
Apr	125	N/A	Oct	0	N/A
May	0	N/A	Nov	0	N/A
Jun	0	N/A	Dec	0	N/A

The annual summary of sludge hauled from the Chalk River Wastewater Treatment Plant from 1999 through to 2009 is outlined below:

Year	Sludge Volume, m^3	Year	Sludge Volume, m^3
1999	520	2005	563
2000	500	2006	539
2001	507	2007	386
2002	672	2008	388
2003	632	2009	414
2004	608	2010	TBD

It is estimated that the sludge hauled during 2010 will be around 400m^3.

5. MAINTENANCE AND CALIBRATION

Annual calibrations were performed on the flow meters were completd in 2009. Copies of both reports are available at the plant.

The 2009 maintenance activities were recorded in the maintenance management log book at the plant. The work orders are completed on site and kept at the plant. The operator maintains a logbook to record the plant operations and maintenance activities for the treatment facility.

The highlights of the maintenance carried out for 2009 year are outlined below:

- All four sewage lift pumps pulled and cleaned and repaired as necessary;
- Lift stations pumped out and cleaned;
- flow meter and alarm system was inspected and calibrated;
- sewer lines flushed

American Water Canada Corp.
701 Main Street West, Suite 100
Hamilton, ON L8S 1A2
www.amwater.com
P 905.521.1988
F 905.521.9613

January 27, 2011

Town of Laurentian Hills
34465 Highway 17, RR #1
Deep River, Ontario
K0J 1P0

Attn.: Mr. Wayne Kirby, AMCT
CAO-Clerk

Re: Town of Laurentian Hills
Chalk River Wastewater Systems

Please find enclosed the Town of Laurentian Hills, Wastewater Treatment Facility Annual Operations Report 2010. The report is prepared in accordance with the requirements of the Certificate of Approval # 3-0210-87-896 annual report criteria and contains the following:

1. Operating Parameters and Effluent Concentration and Loading;
2. Analytical protocol;
3. Proposed Programs or Remedial Measures;
4. Wastewater Sludge; and,
5. Maintenance and Calibration.

On behalf of the municipality, we have e-mailed a copy of the wastewater annual report to the MOE, to the attention of Bryan Dickman, Senior Environmental Officer.

Yours truly,
American Water Canada Corp.

Greg Prangley
Project Manager

c: D. Ethier, AW Canada
MOE, Ottawa District Office

1. OPERATING PARAMETERS AND EFFLUENT CONCENTRATION AND LOADING;

A summary of the average daily flow, the average daily influent and effluent concentration for the parameters of Biochemical Oxygen Demand, Suspended Solids, Total Phosphorus and E. coli has been summarized in the Annual Status Report for Wastewater Treatment 2010 (attached).

The average influent flow to the plant was 0.414 ML/d for 2010, which is comfortably within the plant design capacity of 0.545 ML/d for the contact stabilization mode of operation (76% of capacity). A daily maximum flow of 622m³ was obtained in March. Figure 1 show the raw sewage flows to the plant in 2010.

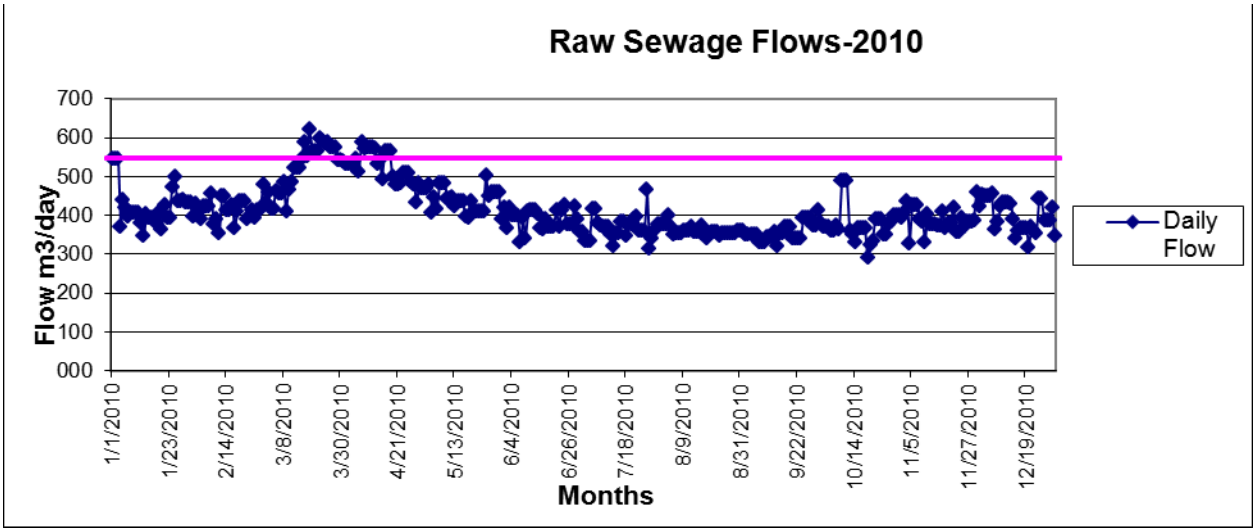


Figure 1 shows the raw sewage flows to the plant in 2010

Figure 1: Daily Flows at the Chalk River Sewage Plant

Average flow for 2010 was 0.414 ML/d. In 2009, the average flow was 0.493 ML/d. This represents a 16% decrease from the previous year. Only during a short period in the early spring was the system receiving higher flows than the rated contact stabilization design capacity.

The Town of Laurentian Hills has conducted two camera surveys of the collection system, the most recent of which took place in the late spring, looking for infiltration. A number of cracks were found and repaired. Also, the Town undertook an aggressive beaver dam removal program in Black Duck Lake which lowered the water table, allowing the sump pumps to be turned off for a large part of the year.

In the table below, the annual average effluent concentrations for the BOD5, suspended solids and total phosphorus are compared to the criteria in the certificate of approval. All effluent concentration criteria were achieved during the year.

Effluent Parameter	Actual Effluent Concentration (mg/L)		Criteria Effluent Concentration (mg/L)	Attains Criteria in Cert. of Approval
BOD5	6.2		25 (annual)	Yes
Suspended Solids	8.8		25 (annual)	Yes
Total Phosphorus	Jan	0.55	1 (monthly)	Yes
	Feb	0.43		
	Mar	0.42		
	Apr	0.23		
	May	0.32		
	Jun	0.25		
	Jul	0.32		
	Aug	0.52		
	Sep	0.39		
	Oct	0.27		
	Nov	0.29		
	Dec	0.30		
	AVG	**0.36**		

The certificate of approval also requires that the loading from the effluent is monitored and maximum limits have been established. A table summarizing the results above is attached at the end of this report.

In the table below, the effluent loading for the BOD5, suspended solids and total phosphorus are compared to the requirements in accordance with the certificate of approval based on the plant operating in the contact stabilization mode. All loading criteria were achieved.

Effluent Parameter	Actual Effluent Loading (Kg/day)	Criteria Effluent Loading (Kg/day)	Attains Criteria in Certificate of Approval
CBOD5	2.6	13.6 (annual)	Yes
Suspended Solids	3.7	13.6 (annual)	Yes
Total Phosphorous	0.15	0.5 (annual)	Yes

As presented above the plant effluent quality achieved the requirements as outlined in Certificate of Approval #3-0210-87-896. All results were significantly lower than in 2009.

2. ANALYTICAL PROTOCOL

The influent and effluent samples are 24-hour composite samples taken at the plant inlet before grit removal and the plant discharge after disinfection.

The operator tests weekly for total phosphorus and pH on the influent and effluent samples, weekly for mixed liquor suspended solids and DO from the aeration tank and routinely for chlorine residual.

On a weekly basis, the operator sends the influent and effluent samples to accredited environmental testing laboratories. In 2010, samples were sent to Caduceon Environmental Laboratories Ltd., Ottawa for analysis.

Type of Analysis	Influent	Effluent
BOD5	bi-weekly	bi-weekly
Suspended Solids	bi-weekly	bi-weekly
Total Phosphorus	weekly	weekly
TKN, Ammonia	bi-weekly	bi-weekly
Nitrate and Nitrite	bi-weekly	bi-weekly
Total Coliforms	bi-weekly	bi-weekly
Fecal Coliforms (E. Coli)	bi-weekly	bi-weekly

3. PROPOSED PROGRAMS OR REMEDIAL MEASURES

The plant and pump station experienced no raw sewage bypassing during the year.

For the most part, the plant has been within its hydraulics criteria however, there have been some issues with high flows, typically in the spring, and during these periods there have been some hydraulics issues. These incidents have furthered the importance of an infiltration study of the sewage collection system.
Despite the periodic high flows, the effluent quality is well within its criteria.
The proposed programs listed below focus on system optimization or capital upgrades.

AW Canada has been using an alternative coagulant, Pre-Hydroxylated Aluminum Sulphate (PHAS), to assist with phosphorus removal and to reduce sludge volumes. Chemical addition rates/usage may need to be changed if the flows are higher than usual.

We recommend that the municipality consider the following capital improvements for 2011. Many of these were identified in previous annual reports:

- Investigate additional sludge management options, such as on-site thickening using Geotubes or installation of an sludge storage tank, to reduce sludge haulage/disposal;
- Conversion of heating systems to natural gas;
- Continue with refurbishment of the submersible pumps at both low lift stations;
- Continue high-pressure flushing of collection system
- Replacement of one chemical addition pump (one replaced in 2010)
- Continue with infiltration study of the sewage collection system
- Study to investigate removal of backwash water from the water treatment plant
- As part of ongoing system maintenance, it is again recommended that the aeration basin/clarifier system be drained, inspected and grit/debris removed and repairs made. This activity will require prior approval from the MOE as is will involve a planned bypass of the treatment system. Operations staff will prepare and send a proposed procedure to the MOE prior to this work taking place.

4. WASTEWATER SLUDGE

During 2010, the sludge was land applied in accordance with certificate # S-4131-31 located at Lots 6 & 7 Con XIII (former Township of Wylie). The sludge hauler has a license # H-8700-17 with the MOE. The sludge was analyzed for heavy metals and the results are on file at the treatment plant.

The volume of sludge haulage for the year 2010 is as follows:

Month	Volume, (m^3)	Disposed/Hauled To	Month	Volume, (m^3)	Disposed To
Jan	0	N/A	Jul	75	land
Feb	0	N/A	Aug	0	N/A
Mar	0	N/A	Sep	0	N/A
Apr	0	N/A	Oct	150	land
May	250	land	Nov	54	land
Jun	250	land	Dec	0	N/A

The annual summary of sludge hauled from the Chalk River Wastewater Treatment Plant from 2000 through to 2010 is outlined below:

Year	Sludge Volume, m^3	Year	Sludge Volume, m^3
2000	500	2006	539
2001	507	2007	386
2002	672	2008	388
2003	632	2009	414
2004	608	2010	779
2005	563	2011	TBD

It is estimated that the sludge hauled during 2010 will be around 500m^3.

5. MAINTENANCE AND CALIBRATION

Annual calibrations were performed on the flow meters were completed in 2010. Copies of the reports are available at the plant.

The 2010 maintenance activities were recorded in the maintenance management log book at the plant. The operator maintains a logbook to record the plant operations and maintenance activities for the treatment facility. A new computerized maintenance management system is being implemented and will be in use early in 2011.

The highlights of the maintenance carried out for 2010 year are outlined below:

- All four sewage lift pumps pulled and cleaned and repaired as necessary;
- Lift stations pumped out and cleaned;
- flow meter and alarm system was inspected and calibrated;
- sewer lines flushed
- some fan motors in heating system replaced
- one new chemical pump purchased
- manholes and collection system inspected

Chalk River
Wastewater Operations

AMERICAN WATER
CANADA

Year: 2010

Municipality: *Laurentian Hills*
Project: *Chalk River W.P.C.P.*
Design Cap.: *0.363 ML/d in extended aeration mode*
0.545 ML/d in contact stabilization mode
Description: *-two pumping stations.*
- extended aeration/contact stablization process

	FLOWS			BIOCHEMICAL 02 DEMAND			SUSPENDED SOLIDS			PHOSPHORUS		
Month	**Total Flow** ML	**Avg. Day Flow** ML	**Max Day Flow** ML	**Avg. Raw BOD** (mg/L)	**Avg. Eff. BOD** (mg/L)	**Avg. Load BOD** (kg/day)	**Avg. Raw SS** (mg/L)	**Avg. Eff. SS** (mg/L)	**Avg. Load SS** (kg/day)	**Avg. Raw Phos.** (mg/L)	**Avg. Eff. Phos.** (mg/L)	**Avg. Load Phos.** (kg/day)
January	13.16	0.424	0.547	144.0	8.0	3.4	246.0	16.5	7.0	4.45	0.55	0.23
February	11.60	0.414	0.479	90.0	4.5	1.9	150.0	10.0	4.1	3.90	0.43	0.18
March	16.23	0.524	0.622	77.0	6.7	3.5	148.8	10.0	5.2	3.81	0.42	0.22
April	15.73	0.524	0.589	90.0	6.0	3.1	132.5	10.3	5.4	2.82	0.23	0.12
May	13.66	0.441	0.504	80.5	4.0	1.8	145.8	6.8	3.0	3.50	0.32	0.14
June	11.68	0.389	0.426	65.0	6.5	2.5	160.0	5.8	2.3	3.30	0.25	0.10
July	11.41	0.368	0.466	41.5	4.0	1.5	123.8	4.8	1.8	2.96	0.32	0.12
August	11.16	0.360	0.401	201.0	8.0	2.9	478.8	11.0	4.0	3.57	0.52	0.19
September	10.73	0.358	0.413	123.0	4.5	1.6	324.5	9.0	3.2	4.34	0.39	0.14
October	11.71	0.377	0.490	109.0	6.0	2.3	259.0	7.8	2.9	5.31	0.27	0.10
November	11.68	0.389	0.459	148.0	7.5	2.9	193.4	5.8	2.3	3.65	0.29	0.11
December	12.34	0.398	0.458	69.5	8.5	3.4	160.0	8.0	3.2	3.46	0.30	0.12
AVERAGE	**12.59**	**0.414**	**0.488**	**103.2**	**6.2**	**2.6**	**210.2**	**8.8**	**3.7**	**3.76**	**0.36**	**0.15**
MAXIMUM	16.23		0.622	201.0	8.5		478.8	16.5		5.3	0.55	
% Removal					94.0%			95.8%			90.5%	
CRITERIA					**25.00**	**13.6**		**25.00**	**13.6**		**1.00**	**0.5**
MEETS Concentration Criteria					**YES**	**YES**		**YES**	**YES**		**YES**	**YES**

Reasons for failure / Other Problems:

Remedial Actions:

American Water Canada Corp.
701 Main Street West, Suite 100
Hamilton, ON L8S 1A2
www.amwater.com
P 905.521.1988
F 905.521.9613

January 23, 2012

Town of Laurentian Hills
34465 Highway 17, RR #1
Deep River, Ontario
K0J 1P0

Attn.: Mr. Wayne Kirby, AMCT
CAO-Clerk

Re: Town of Laurentian Hills
Chalk River Wastewater Systems

Please find enclosed the Town of Laurentian Hills, Wastewater Treatment Facility Annual Operations Report 2011. The report is prepared in accordance with the requirements of the Certificate of Approval # 3-0210-87-896 annual report criteria and contains the following:

1. Operating Parameters and Effluent Concentration and Loading;
2. Analytical protocol;
3. Proposed Programs or Remedial Measures;
4. Wastewater Sludge;
5. Maintenance and Calibration.

On behalf of the municipality, we have e-mailed a copy of the wastewater annual report to the MOE, to the attention of Bryan Dickman, Senior Environmental Officer.

Yours truly,
American Water Canada Corp.

Greg Prangley
Project Manager

c: D. Ethier, AW Canada
MOE, Ottawa District Office

1. OPERATING PARAMETERS AND EFFLUENT CONCENTRATION AND LOADING;

A summary of the average daily flow, the average daily influent and effluent concentration for the parameters of Biochemical Oxygen Demand, Suspended Solids, Total Phosphorus and E. coli has been summarized in the Annual Status Report for Wastewater Treatment 2011 (attached).

The average influent flow to the plant was 0.451 ML/d for 2011, which is within the plant design capacity of 0.545 ML/d for the contact stabilization mode of operation (83% of capacity), though up about 8% from 2010. A daily maximum flow of 885m³ was obtained in June. Figure 1 show the raw sewage flows to the plant in 2011.

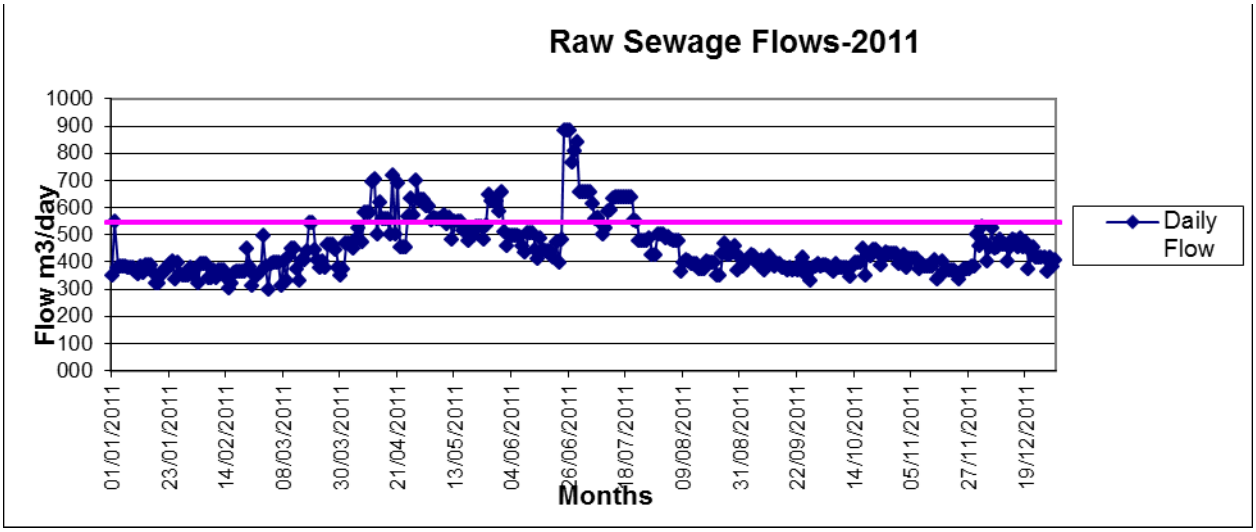


Figure 1: Daily Flows at the Chalk River Sewage Plant-2011

For a short portion in early spring, and also during a wet June, flows were higher than design capacity.

The Town of Laurentian Hills has conducted two camera surveys of the collection system, the most recent of which took place in the late spring 2010, looking for infiltration. A number of cracks were found and repaired. Also, the Town undertook an aggressive beaver dam removal program, also in 2010, in Black Duck Lake which lowered the water table, allowing less frequent use of sump pumps for a large part of the year.

In Table 1 below, the annual average effluent concentrations for the BOD_5, suspended solids (TSS) and total phosphorus are compared to the criteria in the certificate of approval. All effluent concentration criteria were achieved during the year.

Effluent Parameter	Actual Effluent Concentration (mg/L)		Criteria Effluent Concentration (mg/L)	Attains Criteria in Cert. of Approval
BOD_5	7.5		25 (annual)	Yes
Suspended Solids	8.3		25 (annual)	Yes
Total Phosphorus	Jan	0.27	1 (monthly)	Yes
	Feb	0.27		
	Mar	0.45		
	Apr	0.67		
	May	0.44		
	Jun	0.31		
	Jul	0.48		
	Aug	0.47		
	Sep	0.61		
	Oct	0.56		
	Nov	0.34		
	Dec	0.22		
	AVG	**0.42**		

TABLE 1: Concentration Compliance

The certificate of approval also requires that the loading from the effluent is monitored and maximum limits have been established. A table summarizing the results above is attached at the end of this report.

In Table 2 below, the effluent loading for the BOD_5, TSS and total phosphorus are compared to the requirements in accordance with the certificate of approval based on the plant operating in the contact stabilization mode. All loading criteria were achieved.

Effluent Parameter	Actual Effluent Loading (Kg/day)	Criteria Effluent Loading (Kg/day)	Attains Criteria in Certificate of Approval
$CBOD_5$	3.4	13.6 (annual)	Yes
Suspended Solids	3.7	13.6 (annual)	Yes
Total Phosphorous	0.19	0.5 (annual)	Yes

TABLE 2: Loading Compliance

BOD_5 was a bit higher in 2011 than in 2010, TSS remained the same, and total phosphorus was slightly higher. However, as presented above, the plant effluent quality easily achieved the requirements as outlined in Certificate of Approval #3-0210-87-896.

2. ANALYTICAL PROTOCOL

The influent and effluent samples are 24-hour composite samples taken at the plant inlet before grit removal and the plant discharge after disinfection.

The operator tests weekly for total phosphorus and pH on the influent and effluent samples, weekly for mixed liquor suspended solids and DO from the aeration tank and routinely for chlorine residual.

On a weekly basis, the operator sends the influent and effluent samples to accredited environmental testing laboratories. In 2011, samples were sent to Caduceon Environmental Laboratories Ltd., Ottawa for analysis.

Type of Analysis	Influent	Effluent
BOD_5	bi-weekly	bi-weekly
Suspended Solids	bi-weekly	bi-weekly
Total Phosphorus	weekly	weekly
TKN, Ammonia	bi-weekly	bi-weekly
Nitrate and Nitrite	bi-weekly	bi-weekly
Total Coliforms	bi-weekly	bi-weekly
E. Coli	bi-weekly	bi-weekly

3. PROPOSED PROGRAMS OR REMEDIAL MEASURES

The plant and pump station experienced no raw sewage bypassing during the year.

For the most part, the plant has been within its hydraulics criteria however, there have been some issues with high flows, typically in the spring, and during these periods there have been some hydraulics issues. These incidents have furthered the importance of continued monitoring of the sewage collection system.
Despite the periodic high flows, the effluent quality is well within its criteria.
The proposed programs listed below focus on system optimization or capital upgrades.

When required, AW Canada has been using an alternative coagulant, Polyaluminum Sulphate (PAS8), to assist with phosphorus removal and to reduce sludge haulage volumes. Chemical addition rates/usage may need to be changed if the flows are higher than usual.

We recommend that the municipality consider the following capital improvements for 2012. Many of these were identified in previous annual reports:

- Investigate additional sludge management options, such as on-site thickening using Geotubes or installation of an sludge storage tank, to reduce sludge haulage/disposal;
- Upgrading of heating systems to natural gas;
- Continue with refurbishment of the submersible pumps at both low lift stations;
- Continue high-pressure flushing of collection system
- Replacement of one chemical addition pump (one replaced in 2011)
- Continue to monitor infiltration into the sewage collection system
- Study to investigate removal of backwash water from the water treatment plant
- As part of ongoing system maintenance, it is again recommended that the aeration basin/clarifier system be drained, inspected and grit/debris removed and repairs made (**HIGH priority**). This activity will require prior approval from the MOE as is will involve a planned bypass of the treatment system. Discussions will be necessary with the MOE to create a work procedure prior to this event taking place.

4. WASTEWATER SLUDGE

During 2011, the sludge was land applied in accordance with certificate # S-4131-33 located at Lots 6 & 7 Con XIII (former Township of Wylie). The sludge hauler has a license # H-8700-17 with the MOE. The sludge was analyzed for heavy metals and the results are on file at the treatment plant.
Please be advised that the spreading certificate expires Dec. 1, 2014 and the Town will need to investigate the renewal of this certificate.

The volume of sludge haulage for the year 2011 is as follows:

Month	Volume, (m^3)	Disposed/Hauled To	Month	Volume, (m^3)	Disposed To
Jan	0	N/A	Jul	0	N/A
Feb	75	Pembroke WWTP	Aug	0	N/A
Mar	0	N/A	Sep	175	land
Apr	0	N/A	Oct	0	N/A
May	0	N/A	Nov	375	land
Jun	125	land	Dec	0	N/A

The annual summary of sludge hauled from the Chalk River Wastewater Treatment Plant from 2001 through to 2011 is outlined below:

Year	Sludge Volume, m^3	Year	Sludge Volume, m^3
2001	507	2007	386
2002	672	2008	388
2003	632	2009	414
2004	608	2010	779
2005	563	2011	750
2006	539	2012	TBD

It is estimated that the sludge hauled during 2012 will be about 700m^3.

5. MAINTENANCE AND CALIBRATION

Annual calibrations were performed on the flow meters were completed in 2011. Copies of the reports are available at the plant.

The 2011 maintenance activities were recorded in the maintenance management log book at the plant and in the JobCal electronic maintenance management database. The operator maintains a logbook to record the plant operations and maintenance activities for the treatment facility
The highlights of the maintenance carried out for 2011 year are outlined below:

- All four sewage lift pumps pulled and cleaned and repaired as necessary;
- Lift stations pumped out and cleaned;
- flow meter and alarm system was inspected and calibrated;
- sewer lines flushed
- some fan motors in heating system replaced
- one new chemical pump purchased
- manholes and collection system inspected

Chalk River
Wastewater Operations

AMERICAN WATER
CANADA

Year: 2011

Municipality: *Laurentian Hills*
Project: *Chalk River W.P.C.P.*
Design Cap.: *0.363 ML/d in extended aeration mode*
0.545 ML/d in contact stabilization mode
Description: *-two pumping stations.*
- extended aeration/contact stablization process

	FLOWS			BIOCHEMICAL 02 DEMAND			SUSPENDED SOLIDS			PHOSPHORUS		
Month	**Total Flow** ML	**Avg. Day Flow** ML	**Max Day Flow** ML	**Avg. Raw BOD** (mg/L)	**Avg. Eff. BOD** (mg/L)	**Avg. Load BOD** (kg/day)	**Avg. Raw SS** (mg/L)	**Avg. Eff. SS** (mg/L)	**Avg. Load SS** (kg/day)	**Avg. Raw Phos.** (mg/L)	**Avg. Eff. Phos.** (mg/L)	**Avg. Load Phos.** (kg/day)
January	11.60	0.374	0.548	82.0	10.5	2.36	123.8	9.8	3.67	3.24	0.27	0.10
February	10.20	0.364	0.494	176.0	11.0	4.00	228.0	6.5	2.37	3.93	0.27	0.10
March	12.61	0.407	0.544	53.0	4.3	1.75	174.7	7.3	2.97	3.03	0.45	0.18
April	16.77	0.559	0.718	20.5	7.0	3.91	42.0	4.0	2.24	1.77	0.67	0.37
May	17.32	0.559	0.656	55.0	11.5	6.43	96.5	6.0	3.35	2.53	0.44	0.25
June	16.43	0.548	0.885	34.5	11.0	6.03	96.0	4.0	2.19	2.52	0.31	0.17
July	17.55	0.566	0.656	27.0	6.0	3.40	62.0	6.5	3.68	2.38	0.48	0.27
August	13.00	0.419	0.500	60.3	6.3	2.64	186.7	17.0	7.12	2.75	0.47	0.20
September	11.65	0.388	0.427	12.0	5.5	2.13	94.0	8.0	3.10	3.00	0.61	0.24
October	12.41	0.400	0.449	92.0	7.5	3.00	211.0	8.0	3.20	4.95	0.56	0.22
November	11.56	0.385	0.503	90.5	7.5	2.89	134.0	9.5	3.66	3.48	0.34	0.13
December	13.74	0.443	0.531	57.5	3.5	1.55	212.0	7.0	3.10	3.28	0.22	0.10
AVERAGE	**13.74**	**0.451**	**0.576**	**63.4**	**7.6**	**3.3**	**138.4**	**7.8**	**3.4**	**3.07**	**0.42**	**0.19**
MAXIMUM	17.55		0.885	176.0	11.5		228.0	17.0		5.0	0.67	
% Removal					88.0%			94.4%			86.2%	
CRITERIA					**25.00**	**13.6**		**25.00**	**13.6**		**1.00**	**0.5**
MEETS Concentration Criteria					**YES**	**YES**		**YES**	**YES**		**YES**	**YES**

Reasons for failure / Other Problems:

Remedial Actions:

American Water Canada Corp.
701 Main Street West, Suite 100
Hamilton, ON L8S 1A2
www.amwater.com
P 905.521.1988
F 905.521.9613

January 22, 2013

Town of Laurentian Hills
34465 Highway 17, RR #1
Deep River, Ontario
K0J 1P0

Attn.: Mr. Wayne Kirby
CAO-Clerk

Re: Town of Laurentian Hills
Chalk River Wastewater Systems

Please find enclosed the Town of Laurentian Hills, Wastewater Treatment Facility Annual Operations Report 2012. The report is prepared in accordance with the requirements of the Certificate of Approval # 3-0210-87-896 annual report criteria and contains the following:

1. Operating Parameters and Effluent Concentration and Loading;
2. Analytical protocol;
3. Proposed Programs or Remedial Measures;
4. Wastewater Sludge;
5. Maintenance and Calibration.

On behalf of the municipality, we have e-mailed a copy of the wastewater annual report to the MOE, to the attention of Tor Rustad, Senior Environmental Officer.

Yours truly,
American Water Canada Corp.

Greg Prangley
Project Manager

c: D. Ethier, AW Canada
MOE, Ottawa District Office

1. OPERATING PARAMETERS AND EFFLUENT CONCENTRATION AND LOADING;

A summary of the average daily flow, the average daily influent and effluent concentration for the parameters of Biochemical Oxygen Demand, Suspended Solids, Total Phosphorus and E. coli has been summarized in the Annual Status Report for Wastewater Treatment 2012 (attached).

The average influent flow to the plant was 0.396 ML/d for 2012, which is within the plant design capacity of 0.545 ML/d for the contact stabilization mode of operation (73% of capacity) and down from 83% in 2011. A daily maximum flow of 731m³ was obtained in March. Figure 1 show the raw sewage flows to the plant in 2012.

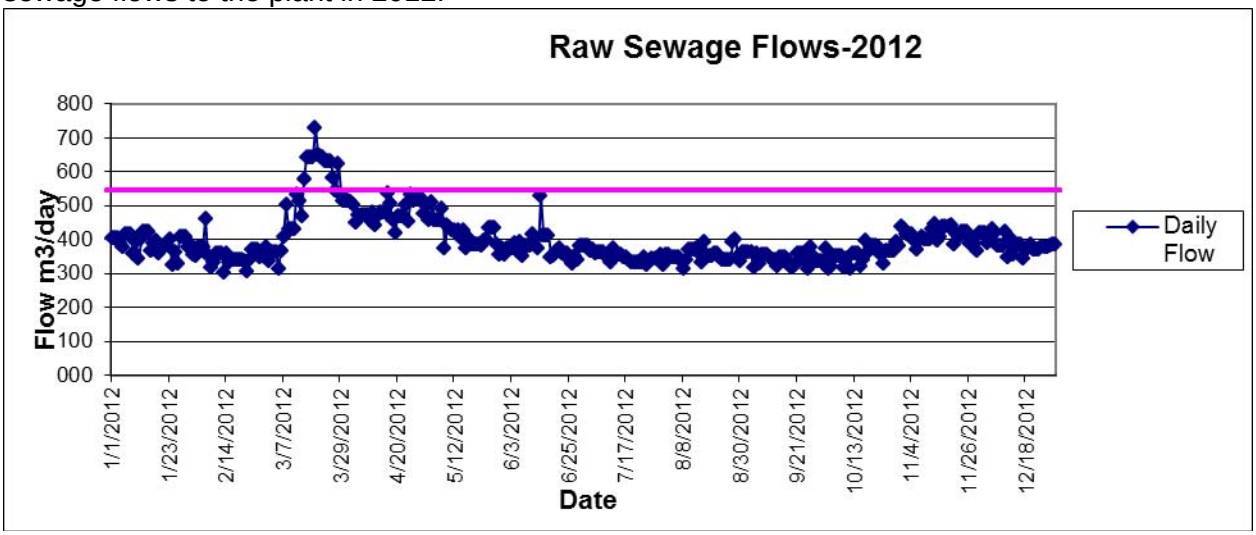


Figure 1: Daily Flows at the Chalk River Sewage Plant-2012

Other than during a two week period in March, flows were within system design capacity for 2012.

The Town of Laurentian Hills has conducted two camera surveys of the collection system, the most recent of which took place in the late spring 2010, looking for infiltration. A number of cracks were found and repaired. However, there is still substantial infiltration from residential sump pumps.

In Table 1 below, the annual average effluent concentrations for the BOD_5, suspended solids (TSS) and total phosphorus are compared to the criteria in the certificate of approval. All effluent concentration criteria were achieved during the year.

Effluent Parameter	Actual Effluent Concentration (mg/L)		Criteria Effluent Concentration (mg/L)	Attains Criteria in Cert. of Approval
BOD_5	4.8		25 (annual)	Yes
Suspended Solids	7.4		25 (annual)	Yes
Total Phosphorus	Jan	0.18	1 (monthly)	Yes
	Feb	0.51		
	Mar	0.20		
	Apr	0.31		
	May	0.34		
	Jun	0.60		
	Jul	0.41		
	Aug	0.46		
	Sep	0.45		
	Oct	0.22		
	Nov	0.28		
	Dec	0.22		
	AVG	**0.35**		

TABLE 1: Concentration Compliance

The certificate of approval also requires that the loading from the effluent is monitored and maximum limits have been established. A table summarizing the results above is attached at the end of this report.

In Table 2 below, the effluent loading for the BOD_5, TSS and total phosphorus are compared to the requirements in accordance with the certificate of approval based on the plant operating in the contact stabilization mode. All loading criteria were achieved.

Effluent Parameter	Actual Effluent Loading (Kg/day)	Criteria Effluent Loading (Kg/day)	Attains Criteria in Certificate of Approval
$CBOD_5$	2.1	13.6 (annual)	Yes
Suspended Solids	2.9	13.6 (annual)	Yes
Total Phosphorous	0.13	0.5 (annual)	Yes

TABLE 2: Loading Compliance

Loading concentrations for all three parameters in the table above were lower in 2012 than in 2011. Therefore, as presented above, the plant effluent quality easily achieved the requirements as outlined in Certificate of Approval #3-0210-87-896.

2. ANALYTICAL PROTOCOL

The influent and effluent samples are 24-hour composite samples taken at the plant inlet before grit removal and the plant discharge after disinfection.

The operator tests weekly for total phosphorus and pH on the influent and effluent samples, weekly for mixed liquor suspended solids and DO from the aeration tank and routinely for chlorine residual.

On a weekly basis, the operator sends the influent and effluent samples to accredited environmental testing laboratories. In 2012, samples were sent to Caduceon Environmental Laboratories Ltd., Ottawa for analysis.

Type of Analysis	Influent	Effluent
BOD_5	bi-weekly	bi-weekly
Suspended Solids	bi-weekly	bi-weekly
Total Phosphorus	weekly	weekly
TKN, Ammonia	bi-weekly	bi-weekly
Nitrate and Nitrite	bi-weekly	bi-weekly
Total Coliforms	bi-weekly	bi-weekly
E. Coli	bi-weekly	bi-weekly

3. PROPOSED PROGRAMS OR REMEDIAL MEASURES

The plant and pump station experienced no raw sewage bypassing during the year.

For the most part, the plant has been within its hydraulics criteria. This is in large part, however, due to operations staff running the lift stations manually. There still have been some issues with high flows, typically in the spring, and during these periods there system hydraulics are negatively affected. These incidents have furthered the importance of continued monitoring of the sewage collection system.
Despite the periodic high flows, the effluent quality is well within its criteria.
The proposed programs listed below focus on system optimization or capital upgrades.

Late in 2012 a study was conducted to investigate the removal of backwash water from the water treatment plant. Follow up work is being prepared by Stantec for 2013.

We recommend that the municipality consider the following repairs/improvements for 2013. Many of these were identified in previous annual reports:

- Investigate additional sludge management options, such as on-site thickening using Geotubes or installation of an sludge storage tank, to reduce sludge haulage/disposal;
- Upgrading of heating systems to natural gas;
- Continue with refurbishment of the submersible pumps at both low lift stations;
- Continue high-pressure flushing of collection system
- Replacement of one chemical addition pump (one replaced in 2011)
- Continue to monitor infiltration into the sewage collection system
- As part of ongoing system maintenance, it is again recommended that the aeration basin/clarifier system be drained, inspected and grit/debris removed and repairs made (**HIGH priority**). This activity will require prior approval from the MOE as is will involve a planned bypass of the treatment system. Discussions will be necessary with the MOE to

create a work procedure prior to this event taking place. At this time, system process valves (already on order) can be installed
- To determine if settled grit/sludge is a greater problem within the system, AW Canada proposes contracting a septic truck to vacuum solids from the aeration basin/clarifier. This can be done fairly easily and without taking the plant out of operation.
- Refrigerator containing auto sampler may need to be replaced due to ineffective cooling
- Diesel genset transfer switch at WWTP needs to be replaced

4. WASTEWATER SLUDGE

During 2012, the sludge was land applied in accordance with certificate # S-4131-33 located at Lots 6 & 7 Con XIII (former Township of Wylie). The sludge hauler has a license # H-8700-17 with the MOE. The sludge was analyzed for heavy metals and the results are on file at the treatment plant.
Please be advised that the spreading certificate expires Dec. 1, 2014 and the Town will need to investigate the renewal of this certificate.

The volume (total 700m^3) of sludge haulage for the year 2012 is as follows:

Month	Volume, (m^3)	Disposed/Hauled To	Month	Volume, (m^3)	Disposed To
Jan	0	N/A	Jul	0	N/A
Feb	0	N/A	Aug	150	Land
Mar	0	N/A	Sep	200	land
Apr	0	N/A	Oct	25	Land
May	125	Land	Nov	200	land
Jun	0	N/A	Dec	0	N/A

The annual summary of sludge hauled from the Chalk River Wastewater Treatment Plant from 2002 through to 2012 is outlined below:

Year	Sludge Volume, m^3	Year	Sludge Volume, m^3
2002	672	2008	388
2003	632	2009	414
2004	608	2010	779
2005	563	2011	750
2006	539	2012	700
2007	386	2013	TBD

It is estimated that the sludge hauled during 2013 will be about 800m^3. This number could be higher if sludge from any of the process tanks are cleaned out, as is recommended for 2013.

5. MAINTENANCE AND CALIBRATION

Annual calibrations were performed on the flow meters were completed in 2012. Copies of the reports are available at the plant.

The 2012 maintenance activities were recorded in the maintenance management log book at the plant and in the JobCal electronic maintenance management database. The operator maintains a logbook to record the plant operations and maintenance activities for the treatment facility
The highlights of the maintenance carried out for 2012 year are outlined below:

- All four sewage lift pumps pulled and cleaned and repaired as necessary;
- Lift stations pumped out and cleaned;
- flow meter and alarm system was inspected and calibrated;
- sewer lines flushed
- one fan motor in heating system replaced
- manholes and collection system inspected twice annually

Chalk River
Wastewater Operations

AMERICAN WATER
CANADA

Year: 2012

Municipality: ***Laurentian Hills***
Project: ***Chalk River W.P.C.P.***
Design Cap.: ***0.363 ML/d in extended aeration mode***
0.545 ML/d in contact stabilization mode
Description: ***-two pumping stations.***
- extended aeration/contact stablization process

	FLOWS			BIOCHEMICAL 02 DEMAND			SUSPENDED SOLIDS			PHOSPHORUS		
Month	**Total Flow** ML	**Avg. Day Flow** ML	**Max Day Flow** ML	**Avg. Raw BOD** (mg/L)	**Avg. Eff. BOD** (mg/L)	**Avg. Load BOD** (kg/day)	**Avg. Raw SS** (mg/L)	**Avg. Eff. SS** (mg/L)	**Avg. Load SS** (kg/day)	**Avg. Raw Phos.** (mg/L)	**Avg. Eff. Phos.** (mg/L)	**Avg. Load Phos.** (kg/day)
January	12.05	0.389	0.422	111.0	3.0	3.50	179.0	4.0	1.55	2.87	0.18	0.07
February	10.26	0.354	0.463	89.5	4.5	1.59	278.0	8.0	2.83	2.84	0.51	0.18
March	16.21	0.523	0.731	36.0	3.0	1.57	40.0	5.0	2.61	2.05	0.20	0.10
April	14.52	0.484	0.535	66.0	4.5	2.18	92.0	13.5	6.53	1.82	0.31	0.15
May	12.99	0.419	0.509	82.5	6.0	2.51	124.0	5.0	2.09	2.36	0.34	0.14
June	11.38	0.379	0.528	124.5	3.5	1.33	136.0	8.0	3.04	3.71	0.60	0.23
July	10.85	0.350	0.383	62.0	7.5	2.63	72.0	13.5	4.73	2.53	0.41	0.14
August	10.99	0.355	0.402	52.0	9.0	3.19	192.0	11.5	4.08	3.30	0.46	0.16
September	10.32	0.344	0.379	62.0	4.0	1.38	86.0	3.5	1.20	2.96	0.45	0.15
October	11.11	0.358	0.439	53.0	5.5	1.97	62.0	7.5	2.69	3.19	0.22	0.08
November	12.34	0.398	0.446	73.5	3.0	1.19	100.0	6.0	2.39	2.57	0.28	0.11
December	11.90	0.397	0.431	58.5	4.0	1.59	58.0	3.0	1.19	3.05	0.22	0.09
AVERAGE	**12.08**	**0.396**	**0.472**	**72.5**	**4.8**	**2.1**	**118.3**	**7.4**	**2.9**	**2.77**	**0.35**	**0.13**
MAXIMUM	16.21		0.731	124.5	9.0		278.0	13.5		3.7	0.60	
% Removal					93.4%			93.8%			87.4%	
CRITERIA		**0.545**			**25.00**	**13.6**		**25.00**	**13.6**		**1.00**	**0.5**
MEETS Concentration Criteria					**YES**	**YES**		**YES**	**YES**		**YES**	**YES**

2009 INSPECTION REPORT

Ministry of the Environment
Eastern Region
Ottawa District Office
2430 Don Reid Drive
Ottawa ON K1H 1E1
Fax: (613)521-5437
Tel: (613) 521-3456 Ext. 231

Ministère de l'Environnement
Direction régionale de l'Est
Bureau du district d'Ottawa
2430 Chemin Don Reid
Ottawa ON K1H 1E1
Télécopieur. (613)521-5437
Tél:(613) 521-3456 Ext. 231

Ontario

April 22, 2009

RECEIVED
APR 24 2009
I 302 09

The Corporation of the Town of Laurentian Hills
34465 Highway 17
Laurentian Hills, Ontario, K0J 1P0
Canada

163401125

Attention: Mr. Wayne Kirby, AMCT, CAO-Clerk

Dear Mr. Kirby;

RE: Chalk River Sewage Treatment Plant, 7 Blimpke St
Laurentian Hills, County of Renfrew

Reference Number 5702-7DKH6R

Please find enclosed a copy of the annual inspection report for the above facility. The plant met all it's approved discharge criteria for 2008. There continues to be a problem with high flows into the plant with design criteria exceedences in May, June and August.

Disinfection was not effective in 2008. While the Certificate of Approval is silent on the subject of disinfection, Ministry policy F-5-1 suggests the minimum treatment requirements for E.coli. are a monthly geometric mean of 200 E.coli per 100 mL. According to Condition 15.0 of the Certificate of Approval, biweekly grab samples must be taken of the raw and treated sewage and analysed for fecal and total coliforms.

Please note the requirements of Section 5.0 of the report. We request the Township submit a report by May 31, 2009 on how the requirements of Section 5.0 will be met. If you have any questions, please do not hesitate to call.
Yours truly,

→ reduce I/I
→ repair & make effective disinfection system

Bryan Dickman
Senior Environmental Officer
Ottawa District Office

Ontario

Ministry of the Environment
Ministère de l'Environnement

Communal Sewage Inspection Report

Client:	The Corporation of the Town of Laurentian Hills Mailing Address: 34465 Highway 17, Rural Route, 1, Laurentian Hills, Ontario, Canada, K0J 1P0 Physical Address: 34465 Highway 17, Deep River, Town, County of Renfrew, Ontario, Canada, K0J 1P0 Telephone: (613)585-3114, FAX: (613)584-3285 Client #: 8438-4M7R7C, Client Type: Municipal Government		
Inspection Site Address:	Chalk River Sewage Treatment Plant Address: 7 Blimpke St, Laurentian Hills, Town, County of Renfrew, K0J 1J0 District Office: Ottawa GeoReference: ,		
Contact Name:	Dave Ethier	**Title:**	Chief Operator
Contact Telephone:	(613)589-2161 **ext**	**Contact Fax:**	(613)589-2158
Last Inspection Date:	2008/02/21		
Inspection Start Date:	2009/02/11	**Inspection Finish Date:**	2009/03/05
Region:	Eastern		

1.0 INTRODUCTION

This inspection was for the purpose of assessing compliance with those aspects of applicable Regulations, policies, standards, Permits, Approvals, and Orders that directly pertain to human health or the environment, as they pertain to effluent quality and sludge disposal. Available data and other information, including certificates of approval for both the works, the sludge hauler and the sludge disposal site, were reviewed for the period of time since the date of the last inspection. The inspection included a field visit to the sewage treatment plant during which the process was viewed to assess odour generation and physical characteristics of the effluent. A sample of the final effluent was obtained for standard analyses but a field measurement for total chlorine residual was not obtained on site. The plant operator was interviewed to determine his overall perception as to how the plant was operating. Notable changes to the physical plant were also noted to later determine whether additional approvals were necessary.

The plant consists of a circular "Ecodyne" package sewage treatment plant. The plant can be operated in two different modes: extended aeration for flows less than 363 m3/day and contact stabilization mode for greater flows up to a capacity of 545 m3/day.

The system has the following components:

Pumping Stations - there are two pumping stations in the system, one off the plant property. Both stations are fitted with variable speed pumps.

Sewage Treatment Plant - the plant consists of a manually cleaned inclined bar screen, twin grit channels, a comminutor and tankage consisting of an aeration/re-aeration tank, aerated digester, sludge holding tank, sludge settling tank and chlorine contact tank.

1.1 AUTHORIZING AND CONTROL DOCUMENT INFORMATION

Authorizing/Control Document	Number	Issue Date	Effluent Limits (yes/no)	Effluent Monitoring Requirements (yes/no)	Effluent Reporting Requirements (yes/no)
Certificate of Approval (Sewage)	52/5/134	1972/07/27	No	No	No
Certificate of Approval	3-0210-87-896	1989/07/21	Yes	Yes	Yes

(Sewage)					
Certificate of Approval (Sewage)	3-0210-87-896	1991/10/17	No	No	No

The plant was first approved in 1972, and modified in 1989. The approval issued in 1989 was for modifications to the existing Chalk River Water Pollution Control Plan in order to treat an average daily
sewage flow of 363 m^3/d when operating in an extended aeration mode and an average daily flow of
545 m^3/d when operating in a contact stabilization mode. The approval allowed the following:

- the installation of seventy-two (72) new coarse bubble air diffusers complete with eighteen (18) header
assemblies and new air header piping;

- the installation of two (2) new submersible sewage pumps in main sewage pumping station each rated
at 22.7 L/s at a TDH of 12.2 m, including modifications to the pump control system to allow for variable
speed pump operation;

- replacement of the existing comminutor with a new unit rated at 53 L/s, complete with an enclosure;

- replacement of the existing scum arm on the final clarifier with a new unit and the replacement and
relocation of the scum box;

- the enlargement of all compartmental gates to 300 mm diameter;

- the replacement and extension of the influent trough;

- the relocation of the catwalk;

- the installation of a new submersible sludge pump rated at 5.7 L/s at a TDH of 4.6 m, including installation of a flexible suction hose;

- four (4) variable speed chemical pumps rated as follows:

i) alum pump - 45 L/d
ii) polyelectrolyte pump - 400 L/d
iii) sodium carbonate pump - 35 L/d
iv) hypochlorite pump - 140 L/d;

- one (1) FRP 10 m^3 alum storage tank

- one(1) FRP 350 L alum day tank;

including interconnecting piping, valves, appurtenances, associated equipment and instrumentation.

The notice issued in 1991 changed the use of the word alum in the original approval to coagulant so
that the plant operator had the flexibility to use coagulants other than alum to achieve acceptable effluent

quality under seasonally changing process conditions.

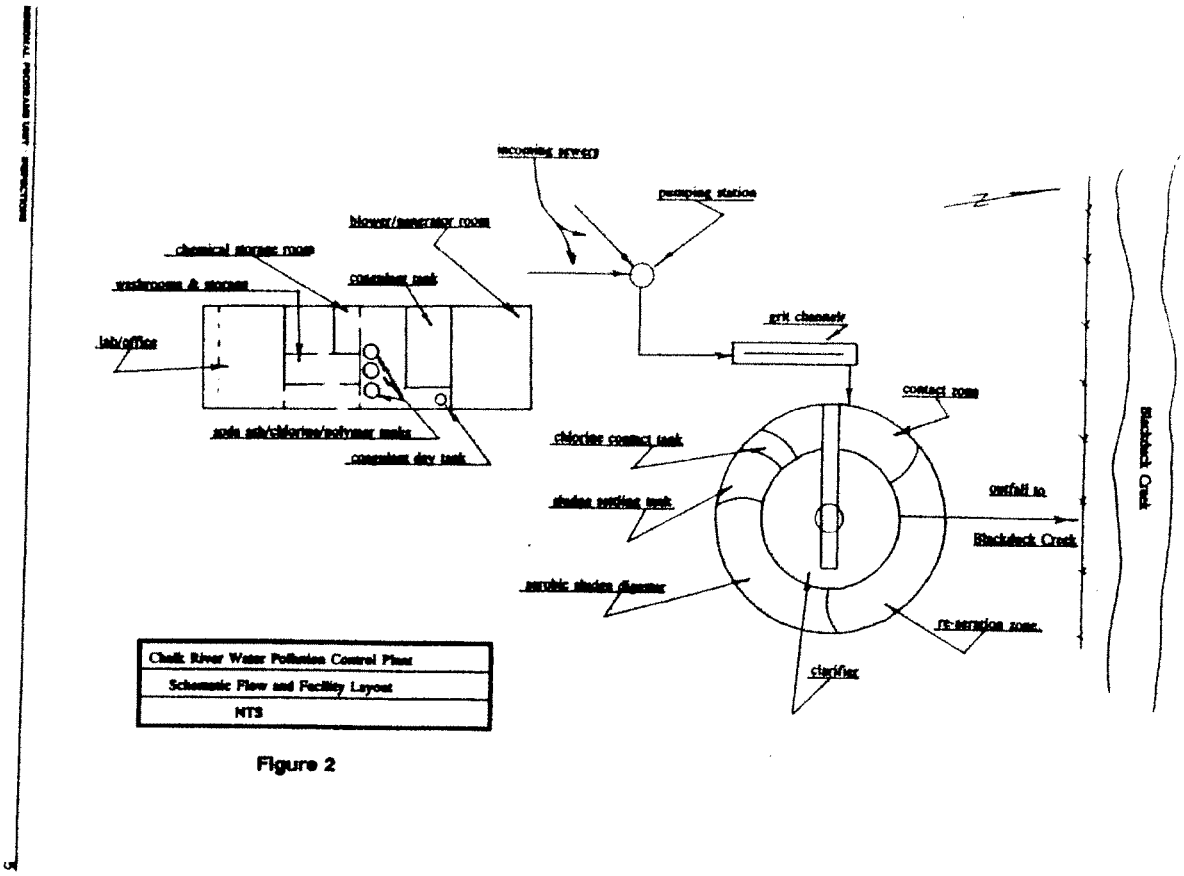


Figure 2

2.0 INSPECTION OBSERVATIONS

Sewage Treatment Plant

Sewage Works Number:	110001589
Certificate of Approval Number(s)	● Yes ○ No
C of A Number(s):	See above
Plant Ownership:	● Munc. ○ OCWA ○ Other
Operating Authority:	○ Munc. ○ OCWA ● Other
	Please specify: American Water Services Canada
Service Population:	930
Wastewater Collection System:	
Certificate of Approval Number(s):	● Yes ○ No
C of A Number(s):	WWC Certification #534, Class 2 December 14, 1987
Collection System Ownership:	● Munc. ○ OCWA ○ Other
Operating Authority:	☒ Munc. ☐ OCWA ☐ Other

2.1 SYSTEM DESCRIPTION

Type Of Plant

Primary:	○ Yes ● No
Secondary:	● Yes ○ No
Advanced:	

	○ Yes ● No
Biological Treatment:	● Yes ○ No
 	○ Conventional AS
	● Contact Stablization
	○ Extended Air Rotating Biological Contactor
Lagoon(s):	○ Yes ● No
Other:	● Yes ○ No
Describe:	Package plant capable of operating in extended aeration or contact stabilization modes.
	○ Communal Septic
	○ Constructed Wetland
	○ Snowfluent
	○ Other
Effluent Discharge Frequency	☐ Seasonal:
	☒ Continuous:
	☐ Annual:
	☐ No Direct Discharge:
Does the Plant Practice Phosphorous Removal?	● Yes ○ No
Effluent Disposal Method	☒ Surface Water
	☐ Surface Land Disposal
	☐ Subsurface

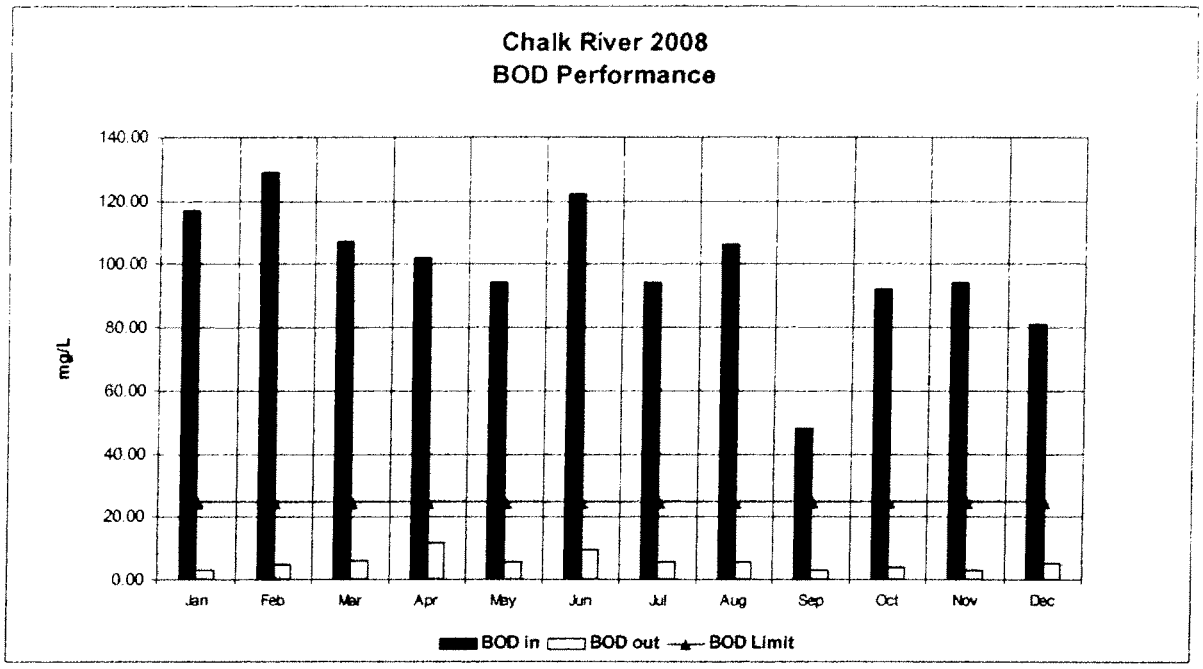
If disposal is to surface water, name of immediate receiving stream: Blackduck Creek

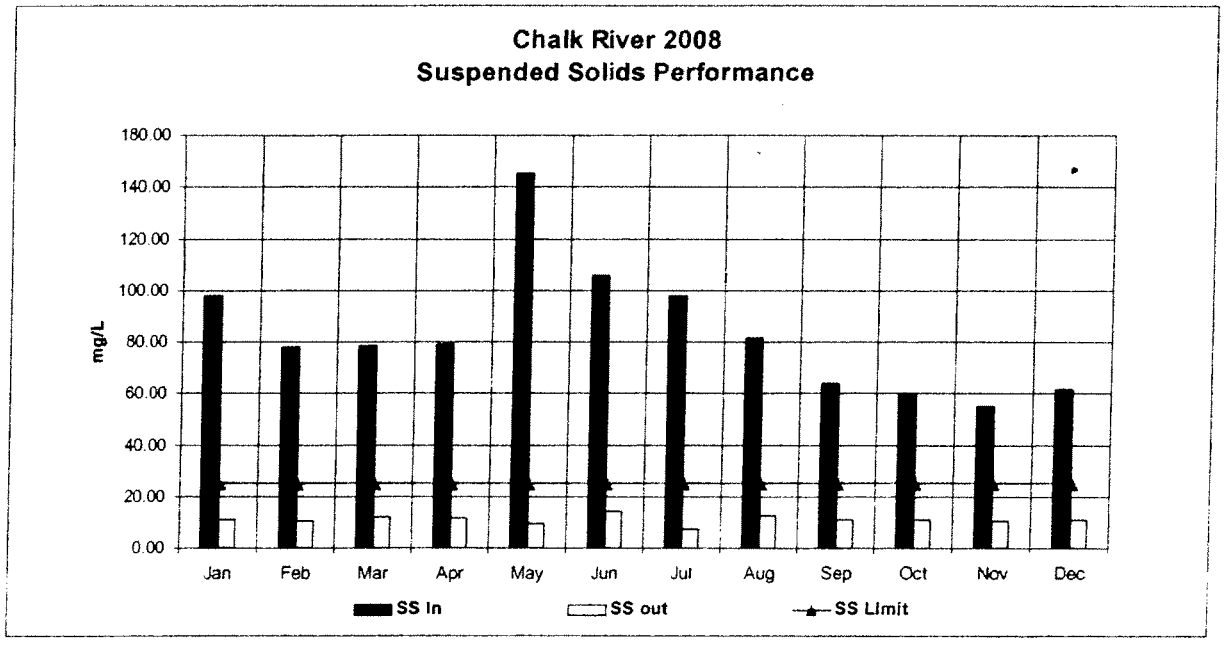
2.2 EFFLUENT QUALITY ASSESSMENT

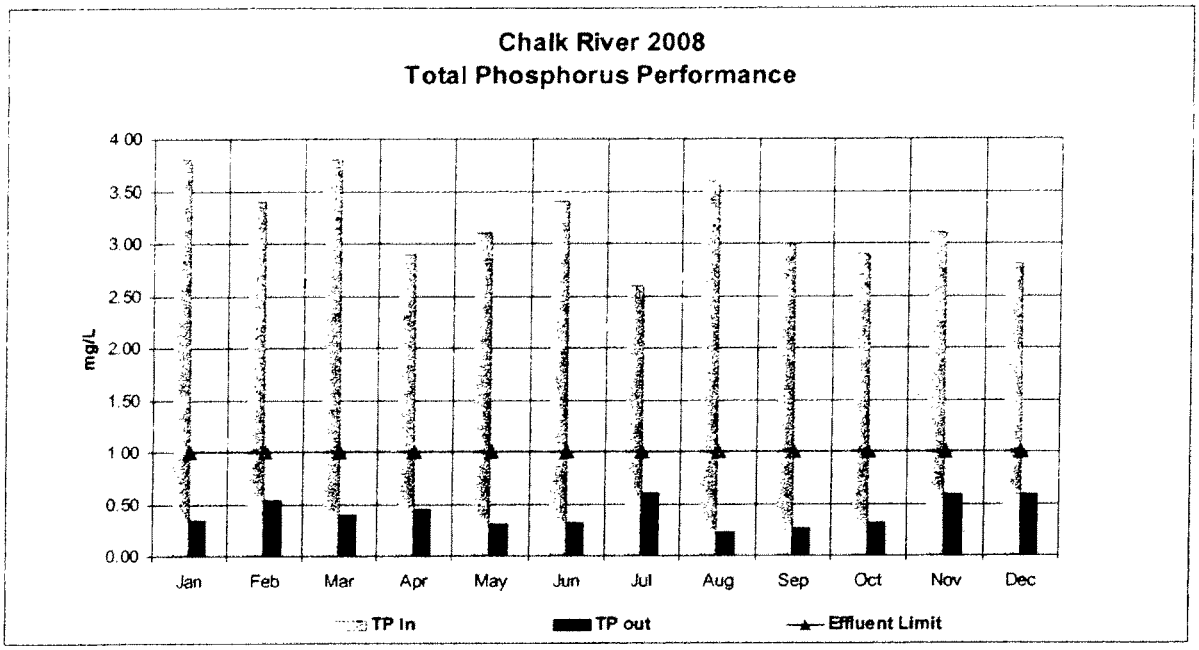
Parameter	Year 1 2006	Year 2 2007	Year 3 2008	Limits
BOD5 (mg/l)	6.9	5.6	5.5	25
Suspended Solids (mg/l)	11.4	10.4	11	25
Total Phosphorus (mg/l)	0.42	0.63	0.60	1.0

Limits are based on:
- ☒ Certificate of Approval
- ☐ PO Order
- ☐ Director's Order
- ☐ Guidelines

Does the facility comply with its limits Yes


Chalk River 2008
BOD Performance
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
mg/L
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
BOD in
BOD out
BOD Limit

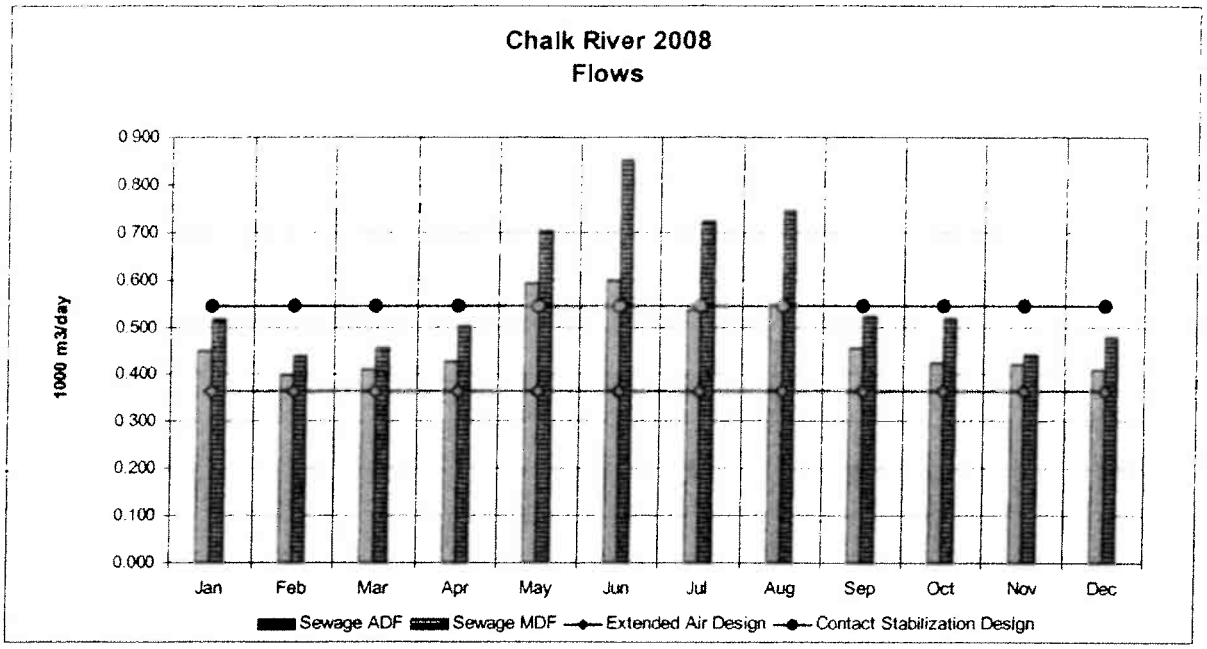

Chalk River 2008
Suspended Solids Performance
180.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
mg/L
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
SS In
SS out
SS Limit



The plant met all discharge criteria in the Certificate of Approval.

2.3 CAPACITY ASSESSMENT

Item	Year 1 2006	Year 2 2007	Year 3 2008
Average daily flow (m^3/day)	510.00	458.00	472.00
Maximum daily flow (m^3/day)	749.00	552.00	850.00
Capacity Design (m^3/day)	545.00	545.00	545.00
% of capacity, based on average daily flow	93.58	84.04	86.61



Flows near plant capacity continues to be an issue with the Chalk River sewage system. The plant ran at 84% capacity through 2007, down from over 93% in 2006 which was an exceptionally wet year.

In 2008, the plant exceeded the contact stabilization design flow in May, June and August.

The municipality must continue to reduce flows into the sewage collection system.

2.4 EFFLUENT SAMPLING REQUIREMENTS

Sampling requirements are based on : Certificate of Approval
Does the plant meet the sampling requirements? Yes

2.5 EFFLUENT REPORTING REQUIREMENTS

Reporting Requirements are based on : Certificate of Approval

Does the plant meet the effluent reporting requirement? Yes

2.6 MINISTRY SAMPLING AT TIME OF INSPECTION

Were Ministry samples collected at the time of inspection Yes

Sample Locations and Analyses: Grab sample- Effluent - Phys/Chem, Grab sample - Effluent - Metals, Grab sample - Effluent - Bacteriological

Parameter Name		Value	Units	Qual
Mercury		0.02	ug/L	<=W
Aluminium	0.955	mg/L		
Barium		0.033	mg/L	
Beryllium		0.001	mg/L	<=W
Cadmium	0.001	mg/L	<=W	
Cobalt		0.001	mg/L	<=W
Chromium	0.020	mg/L		

Copper		0.090	mg/L	
Iron		0.191	mg/L	
Lead		0.005	mg/L	<=W
Magnesium	2.64	mg/L		
Manganese	0.056	mg/L		
Molybdenum		0.005	mg/L	<=W
Nickel		0.014	mg/L	<=T
Silver		0.003	mg/L	<=W
Strontium		0.081	mg/L	
Titanium		0.004	mg/L	<=T
Vanadium	0.001	mg/L	<=W	
Zinc		0.048	mg/L	
Calcium		11.6	mg/L	
Sodium		43.7	mg/L	
Potassium	7.80	mg/L		
Oxygen demand; BOD carbonaceous	1.80	mg/L		
Solids; suspended	6.40	mg/L		
Arsenic		.0005	mg/L	<=W
Selenium		.0005	mg/L	<=W
Nitrogen; nitrite		0.950	mg/L	
Nitrogen; nitrate+nitrite		8.13	mg/L	
Nitrogen; ammonia+ammonium	0.78	mg/L		
Phosphorus; phosphate		0.36	mg/L	
Nitrogen; total Kjeldahl		1.85	mg/L	
Phosphorus; total		0.51	mg/L	
Escherichia coli		-	c/100mL	

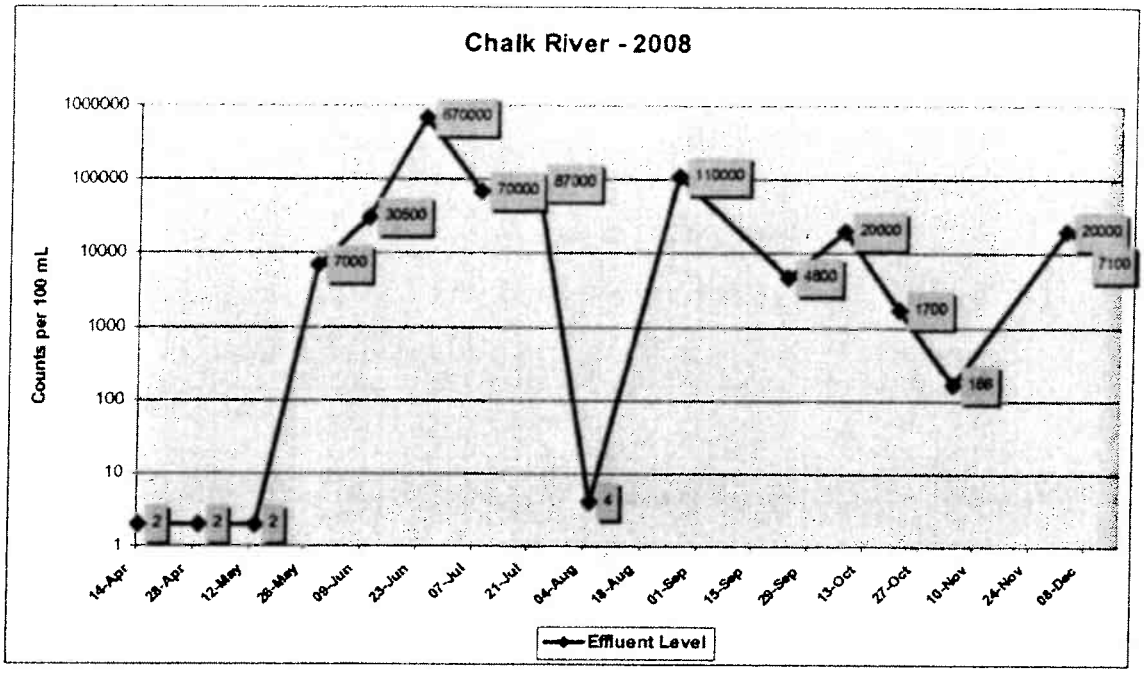
<=T A measurable trace amount: interpret with caution

<=W No measurable response (zero)

2.7 DISINFECTION

a)	**Method of disinfection:**	Chlorination
b)	**Disinfection Period**	Continuous
c)	**Comment on the seasonal disinfection period for each year**	
d)	**Disinfection Required By:**	Not required
e)	**Residual monitoring technique:**	Autoanalyser
f)	**Was there a measurable chlorine residual in the final effluent after contact:**	Not obtained

The certificate of approval is silent on the subject of disinfection. According to Condition 15.0 of the Certificate of Approval, biweekly grab samples must be taken of the raw and treated sewage and analysed for fecal and total coliforms. Ministry policy F-5-1 suggests the minimum treatment requirements for E.coli. are a monthly geometric mean of 200 E.coli per 100 mL.



2.8 PLANT CLASSIFICATION & OPERATOR CERTIFICATION

a) **Plant classification:**
   i) **Facility Level:** Level II
   ii) **Certificate Number:** 533
   iii) **Date of Issue:** 1987/12/14

b) **Plant operators have the appropriate level of certification for this plant** ● Yes ○ No

2.9 FLOW MEASUREMENT

a) **Flows are being metered at:** Final effluent

b) **Date of last calibration of effluent flow meter:**

Date of calibration will be provided in the annual report.

2.10 BYPASSES, AND/OR OVERFLOWS

	Plant	Collection System
Are bypasses and overflows routinely reported?	● Yes ○ No	● Yes ○ No
Are bypasses and overflows routinely monitored?	● Yes ○ No	● Yes ○ No
Are bypasses and overflows routinely sampled?	● Yes ○ No	● Yes ○ No

PLANT INFORMATION:

	Plant Bypass			Plant Overflow		
Item	Year 1 2006	Year 2 2007	Year 3 2008	Year 1 2006	Year 2 2007	Year 3 2008
Total number of events?	NA	NA	NA	NA	NA	NA
Total duration of event(s)? (Hour(s))						
Of the total number of events, how many are dry-weather events?						
Total quantity with no treatment? (1000 m^3)						
Total quantity with only disinfection? (1000 m^3)						
Total quantity with primary treatment? (1000 m^3)						

Total quantity with primary treatment and disinfection? (1000 m^3)						
Total quantity with other treatment? (1000 m^3)						
Total quantity with other treatment and disinfection? (1000 m^3)						
What is the most common reason for event(s)?						
What is the name of the receiving water?						
Name the most important type of sensitive receptor?						
What is the approximate distance to the sensitive receptor? (km)						

COLLECTION SYSTEM INFORMATION: (Satellite(s), Lift Station(s) and Regulator(s))

	Lift Station Overflow			Other Location Overflow		
Item	Year 1 2006	Year 2 2007	Year 3 2008	Year 1 2006	Year 2 2007	Ye 2
Total number of events?	NA	NA	NA	NA	NA	
Total duration of event(s)? (Hour(s))						
Of the total number of events, how many are dry-weather events?						
Total quantity with no treatment? (1000 m^3)						
Total quantity with only disinfection? (1000 m^3)						
Total quantity with other treatment? (1000 m^3)						
Are any overflow(s) at combined sewer locations? (Yes/No)						
What is the most common reason for event(s)?						
What is the name of the receiving water?						
Name the most important type of sensitive receptor?						
What is the approximate distance to the sensitive receptor? (km)						

Comments:
The Town of Chalk River does not have any combined sewers. The sewage treatment plant and the two pumping stations in the Town do not have any means to by-pass.

2.11 SLUDGE (BIOSOLIDS) MANAGEMENT

Sludge Stabilization:	Aerobic
Sludge Storage:	Holding Tank
Total available storage:	
Volume	159 m3
Retention Time	3 months
Certified waste hauler	Yes
Certificate numbers of haulers are:	H870017
Method of Disposal/Utilization:	Agricultural, Off-site Munc. STP
Certified waste disposal facility	Yes
Certificate number(s) of facilities are:	03-0715-94-006

2.12 WASTEWATER COLLECTION SYSTEMS

1. **Does this plant receive sewage from a Combined Sewer Collection System** (sanitary sewage, roof leaders, foundation drains, catch basins and/or storm water conveyed within a single pipe)? ○ Yes ● No

2. **How are bypasses, overflows and/or combined sewers being minimized or eliminated?**

a) Pollution Prevention and Control Plan (As described in Procedure F-5-5)	○ Yes	● No	○ Developing
i. Other Plan	○ Yes	● No	○ Developing
b) Characterization Study?	○ Yes	● No	○ Developing
c) Implementation Plan?	○ Yes	● No	○ Developing

Comments:
The Town of Chalk River does not have any combined sewers. The sewage treatment plant and the two pumping stations in the Town do not have any means to by-pass.

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

No previous non-compliance issues.

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate ?
No
Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?
No

Specifics:

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?
No

Specifics:

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?
No

Specifics:

Was there any indication of non-conformance or minor administrative non-compliance?
Yes
Policy/Guideline(Non-conformance)

Specifics: Policy F-5-1, Minimum Requirements for Sewage Treatment Works Discharging to Surface Waters,

suggests the following minimum treatment level for bacteria:

a monthly geometric mean of 200 *E.coli* per 100 mL.

5.0 ACTION(S) REQUIRED

1. The plant is still experiencing hydraulic stress. Storm events could lead to the plant exceeding the waste loading criteria set out in Condition 14.0 of the Certificate of Approval. The municipality must continue to repair and reduce leaks to manholes and make efforts to prevent infiltration or inflow into the collection system.

2. The disinfection system must be operated to stay within the E.coli. criteria of 200 counts per 100 mL

6.0 OTHER INSPECTION FINDINGS

Coliform test were not performed biweekly in the months of September and November. The sampling must conform to Section 15 of the Certificate of Approval.

7.0 INCIDENT REPORT

Applicable
4601-7PYKZV

8.0 ATTACHMENTS

Required attachments:

PREPARED BY:
Environmental Officer:

Name:	**Bryan Dickman**
District Office:	**Ottawa District Office**
Date:	**2009/03/05**
Signature	

REVIEWED BY:
District Supervisor:

Name:	**Paul Kehoe**
District Office:	**Ottawa District Office**
Date:	**2009/03/09**

Signature:

Paul Kehoe.

File Storage Number: SI RE CH BL 410

Note:
"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"

Ontario

Ministry of the Environment
Ministère de l'Environnement

Communal Sewage Inspection Report

Client:	The Corporation of the Town of Laurentian Hills Mailing Address: 34465 Highway 17, Rural Route, 1, Laurentian Hills, Ontario, Canada, K0J 1P0 Physical Address: 34465 Highway 17, Deep River, Town, County of Renfrew, Ontario, Canada, K0J 1P0 Telephone: (613)585-3114, FAX: (613)584-3285 Client #: 8438-4M7R7C, Client Type: Municipal Government		
Inspection Site Address:	Chalk River Sewage Treatment Plant Address: 7 Blimpke St, Laurentian Hills, Town, County of Renfrew, K0J 1J0 District Office: Ottawa GeoReference: ,		
Contact Name:	Dave Ethier	**Title:**	Chief Operator
Contact Telephone:	(613)589-2161 **ext**	**Contact Fax:**	(613)589-2158
Last Inspection Date:	2010/02/11		
Inspection Start Date:	2011/02/16	**Inspection Finish Date:**	2011/02/16
Region:	Eastern		

1.0 INTRODUCTION

This inspection was for the purpose of assessing compliance with those aspects of applicable Regulations, policies, standards, Permits, Approvals, and Orders that directly pertain to human health or the environment, as they pertain to effluent quality and sludge disposal. Available data and other information, including certificates of approval for both the works, the sludge hauler and the sludge disposal site, were reviewed for the period of time since the date of the last inspection. The inspection included a field visit to the sewage treatment plant during which the process was viewed to assess odour generation and physical characteristics of the effluent. A sample of the final effluent was obtained for standard analyses but a field measurement for total chlorine residual was not obtained on site. The plant operator was interviewed to determine his overall perception as to how the plant was operating. Notable changes to the physical plant were also noted to later determine whether additional approvals were necessary.

The plant consists of a circular "Ecodyne" package sewage treatment plant. The plant can be operated in two different modes: extended aeration for flows less than 363 m3/day and contact stabilization mode for greater flows up to a capacity of 545 m3/day.

The system has the following components:

Pumping Stations - there are two pumping stations in the system, one off the plant property. Both stations are fitted with variable speed pumps.

Sewage Treatment Plant - the plant consists of a manually cleaned inclined bar screen, twin grit channels, a comminutor and tankage consisting of an aeration/re-aeration tank, aerated digester, sludge holding tank, sludge settling tank and chlorine contact tank.

1.1 AUTHORIZING AND CONTROL DOCUMENT INFORMATION

Authorizing/Control Document	Number	Issue Date	Effluent Limits (yes/no)	Effluent Monitoring Requirements (yes/no)	Effluent Reporting Requirements (yes/no)
Certificate of Approval (Sewage)	52/5/134	1972/07/27	No	No	No
Certificate of Approval (Sewage)	3-0210-87-896	1989/07/21	Yes	Yes	Yes

Certificate of Approval (Sewage)	3-0210-87-896	1991/10/17	No	No	No

The plant was first approved in 1972, and modified in 1989. The approval issued in 1989 was for modifications to the existing Chalk River Water Pollution Control Plan in order to treat an average daily sewage flow of 363 m^3/d when operating in an extended aeration mode and an average daily flow of 545 m^3/d when operating in a contact stabilization mode. The approval allowed the following:

- the installation of seventy-two (72) new coarse bubble air diffusers complete with eighteen (18) header assemblies and new air header piping;

- the installation of two (2) new submersible sewage pumps in main sewage pumping station each rated at 22.7 L/s at a TDH of 12.2 m, including modifications to the pump control system to allow for variable speed pump operation;

- replacement of the existing comminutor with a new unit rated at 53 L/s, complete with an enclosure;

- replacement of the existing scum arm on the final clarifier with a new unit and the replacement and relocation of the scum box;

- the enlargement of all compartmental gates to 300 mm diameter;

- the replacement and extension of the influent trough;

- the relocation of the catwalk;

- the installation of a new submersible sludge pump rated at 5.7 L/s at a TDH of 4.6 m, including installation of a flexible suction hose;

- four (4) variable speed chemical pumps rated as follows:

i) alum pump - 45 L/d
ii) polyelectrolyte pump - 400 L/d
iii) sodium carbonate pump - 35 L/d
iv) hypochlorite pump - 140 L/d;

- one (1) FRP 10 m^3 alum storage tank

- one(1) FRP 350 L alum day tank;

including interconnecting piping, valves, appurtenances, associated equipment and instrumentation.

The notice issued in 1991 changed the use of the word alum in the original approval to coagulant so that the plant operator had the flexibility to use coagulants other than alum to achieve acceptable effluent quality under seasonally changing process conditions.

2.0 INSPECTION OBSERVATIONS

Sewage Treatment Plant

Sewage Works Number:	110001589
Certificate of Approval Number(s) C of A Number(s):	● Yes ○ No See above
Plant Ownership:	● Munc. ○ OCWA ○ Other
Operating Authority:	○ Munc. ○ OCWA ● Other **Please specify:** American Water Services Canada
Service Population:	

930

Wastewater Collection System:

Certificate of Approval Number(s): ● Yes ○ No

C of A Number(s): Various

Collection System Ownership: ● Munc. ○ OCWA ○ Other

Operating Authority: ☒ Munc. ☐ OCWA ☐ Other

2.1 SYSTEM DESCRIPTION

Type Of Plant

Primary: ○ Yes ● No

Secondary: ● Yes ○ No

Advanced: ○ Yes ● No

Biological Treatment: ● Yes ○ No

○ Conventional AS
● Contact Stablization
○ Extended Air Rotating Biological Contactor

Lagoon(s): ○ Yes ● No

Other: ● Yes ○ No

Describe: Package plant capable of operating in extended aeration or contact stabilization modes.

○ Communal Septic
○ Constructed Wetland
○ Snowfluent
○ Other

Effluent Discharge Frequency

☐ Seasonal:
☒ Continuous:
☐ Annual:
☐ No Direct Discharge:

Does the Plant Practice Phosphorous Removal? ● Yes ○ No

Effluent Disposal Method

☒ Surface Water
☐ Surface Land Disposal
☐ Subsurface

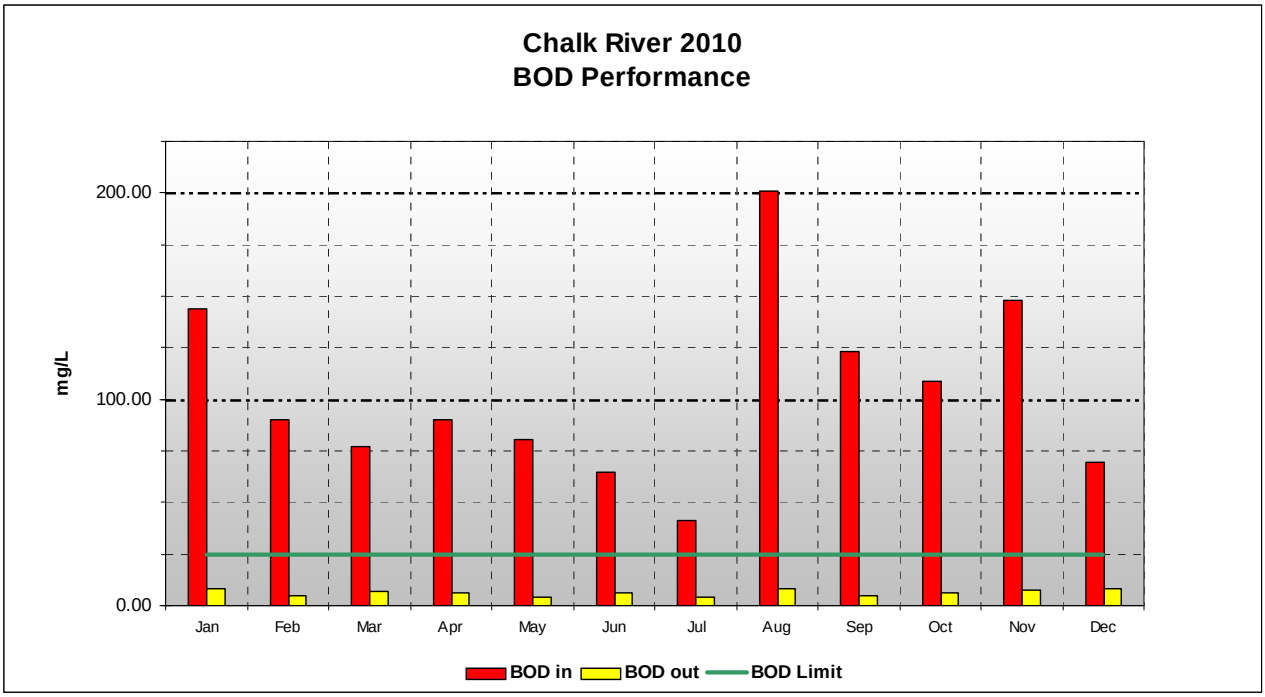
If disposal is to surface water, name of immediate receiving stream: Blackduck Creek

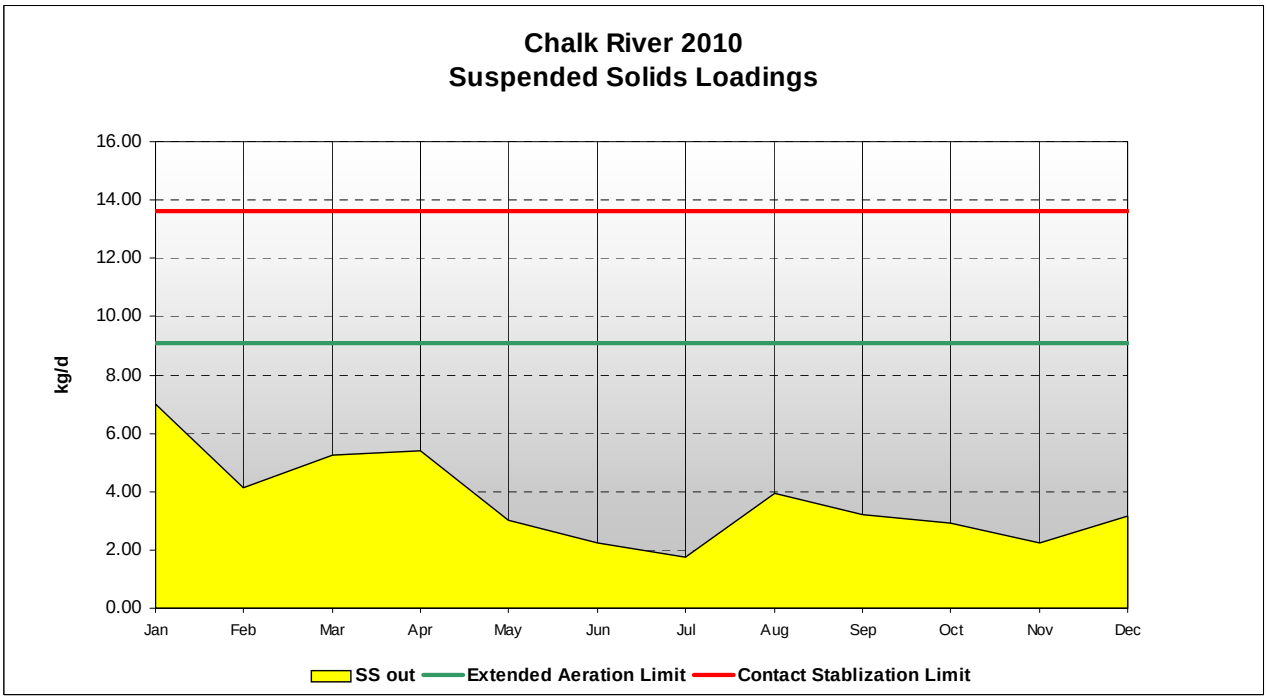
2.2 EFFLUENT QUALITY ASSESSMENT

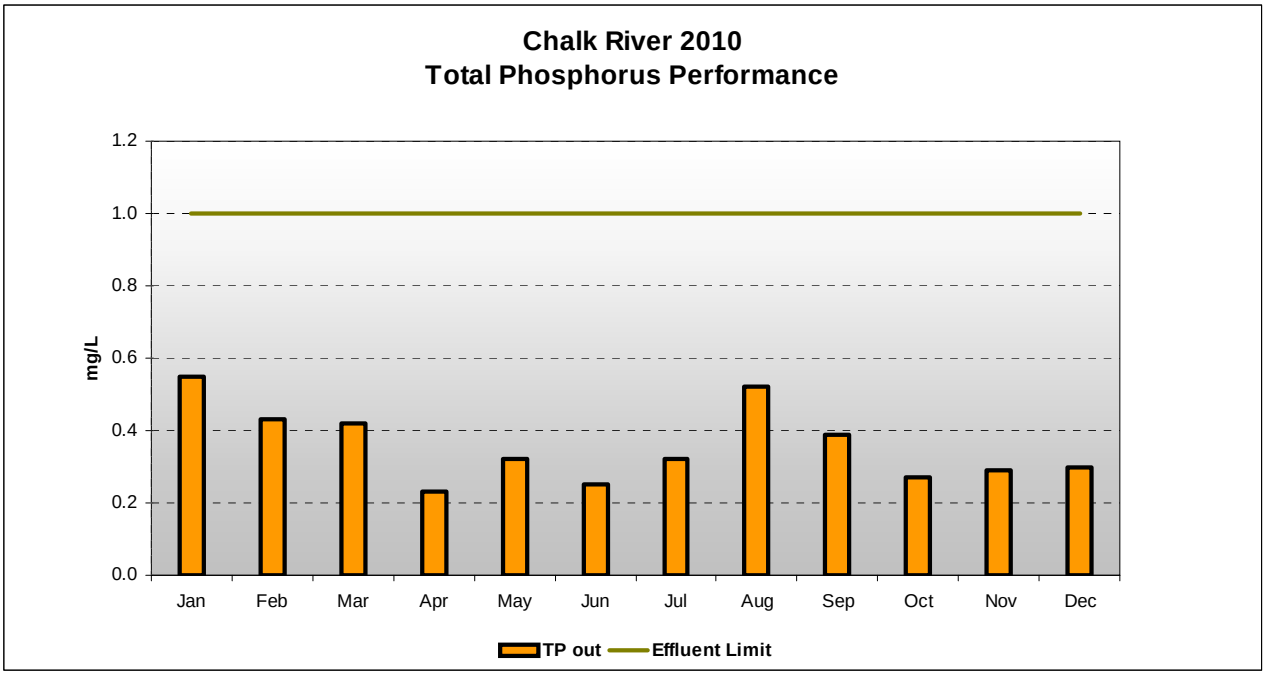
Parameter	Year 1 2008	Year 2 2009	Year 3 2010	Limits
BOD5 (mg/l)	5.5	7.7	6.18	25
Suspended Solids (mg/l)	11	8.5	8.62	25
Total Phosphorus (mg/l)	0.6	1.06	0.55	1.0

Limits are based on:
☒ Certificate of Approval
☐ PO Order
☐ Director's Order
☐ Guidelines

Does the facility comply with its limits Yes


Chalk River 2010
BOD Performance
mg/L
200.00
100.00
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
BOD in
BOD out
BOD Limit

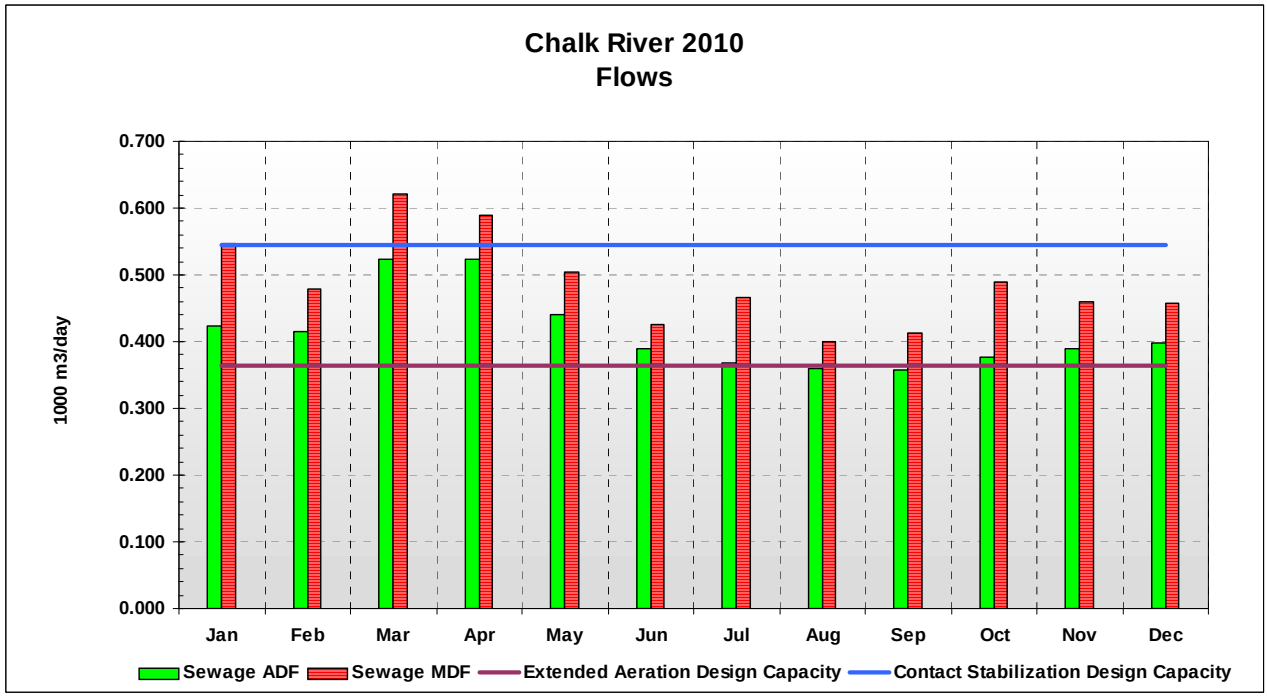

Chalk River 2010
Suspended Solids Loadings
kg/d
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
SS out
Extended Aeration Limit
Contact Stablization Limit

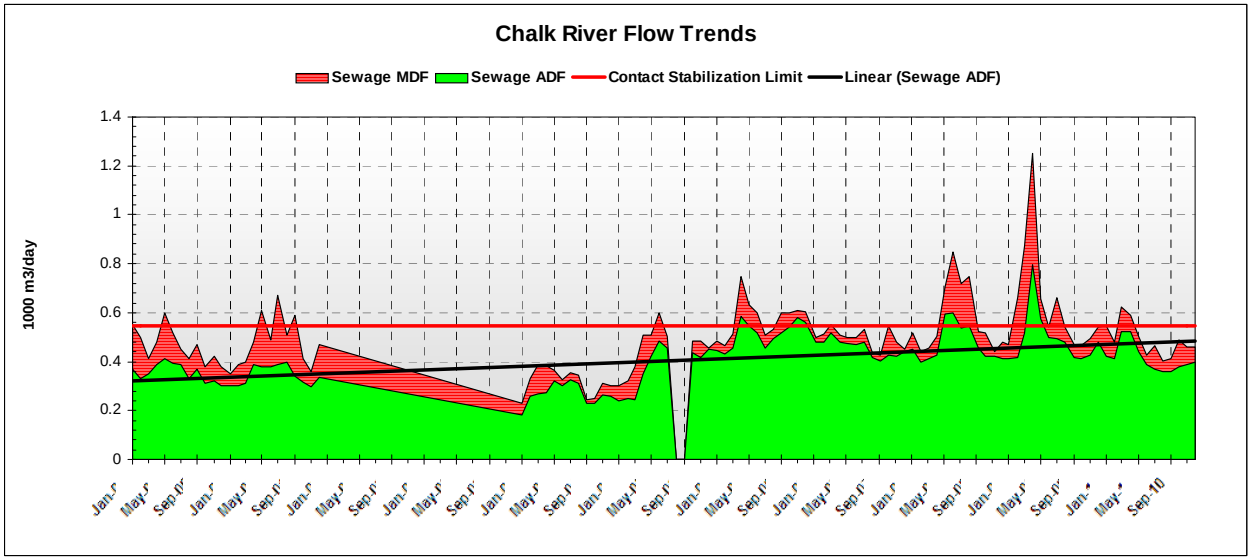


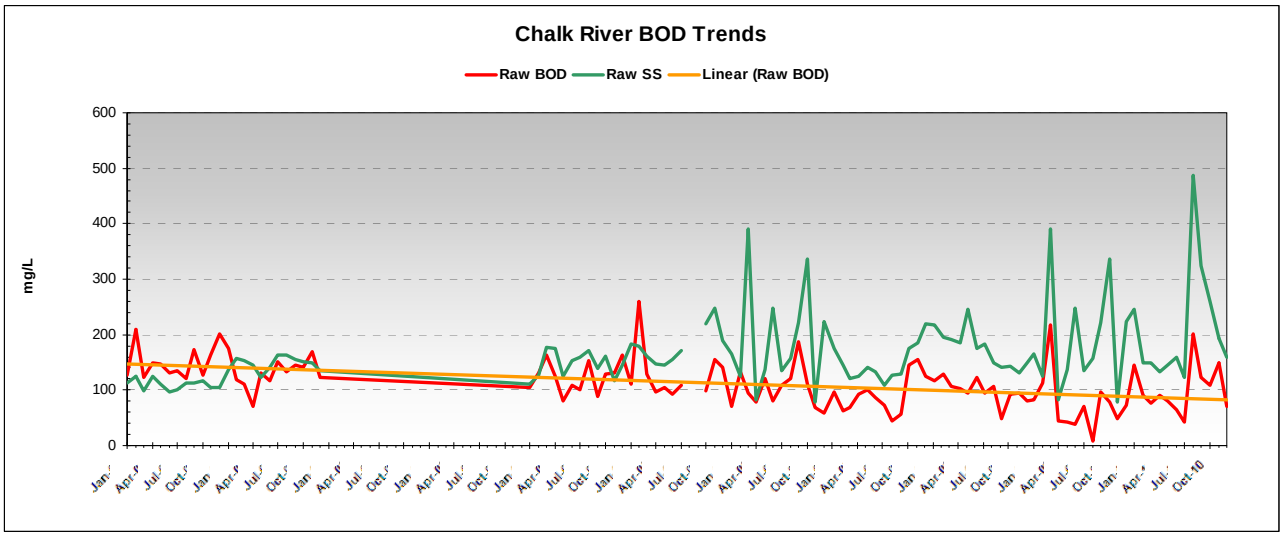
2.3 CAPACITY ASSESSMENT

Flows shown below are for the last three calendar years. Identify the year, eg., 1999

Item	Year 1 2008	Year 2 2009	Year 3 2010
Average daily flow (m^3/day)	472.00	494.00	414.00
Maximum daily flow (m^3/day)	850.00	1251.00	622.00
Capacity Design (m^3/day)	545.00	545.00	545.00
% of capacity, based on average daily flow	86.61	90.64	75.96


Chalk River 2010
Flows
1000 m3/day
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Sewage ADF
Sewage MDF
Extended Aeration Design Capacity
Contact Stabilization Design Capacity


Chalk River Flow Trends
Sewage MDF
Sewage ADF
Contact Stabilization Limit
Linear (Sewage ADF)
1000 m3/day
1.4
1.2
1
0.8
0.6
0.4
0.2
0



2.4 EFFLUENT SAMPLING REQUIREMENTS

Sampling requirements are based on : Certificate of Approval
Does the plant meet the sampling requirements? Yes

2.5 EFFLUENT REPORTING REQUIREMENTS

Reporting Requirements are based on : Certificate of Approval

Does the plant meet the effluent reporting requirement? Yes

2.6 MINISTRY SAMPLING AT TIME OF INSPECTION

Were Ministry samples collected at the time of inspection Yes

Sample Locations and Analyses: Grab sample- Effluent - Phys/Chem, Grab sample - Effluent - Metals, Grab sample - Effluent - Bacteriological

Chalk River Samples August 24, 2010

Parameter Name	Value	Units	Qual
Mercury	0.02	ug/L	<=W
Aluminium	0.780	mg/L	
Barium	0.015	mg/L	
Beryllium	0.001	mg/L	<=W
Cadmium	0.001	mg/L	<=W
Cobalt	0.001	mg/L	<=W
Chromium	0.007	mg/L	<T
Copper	0.053	mg/L	
Iron	0.195	mg/L	
Lead	0.005	mg/L	<=W
Magnesium	2.88	mg/L	
Manganese	0.035	mg/L	
Molybdenum	0.005	mg/L	<=W
Nickel	0.01	mg/L	<=W
Silver	0.005	mg/L	<=W
Strontium	0.051	mg/L	
Titanium	0.001	mg/L	<=W
Vanadium	0.001	mg/L	<=W

Zinc		0.033	mg/L	
Calcium		8.36	mg/L	
Sodium		44.0	mg/L	
Potassium	4.8		mg/L	
Oxygen demand; CBOD		4.0	mg/L	
Solids; suspended	9.0	mg/L		
Arsenic		0.0005	mg/L	<=W
Selenium		0.0005	mg/L	<=W
Nitrogen; nitrite		1.36	mg/L	
Nitrogen; nitrate+nitrite		3.86	mg/L	
Nitrogen; ammonia+ammonium	0.14	mg/L	<T	
Phosphorus; phosphate		0.20	mg/L	
Nitrogen; total Kjeldahl		1.34	mg/L	
Phosphorus; total		0.47	mg/L	
Escherichia coli		380	c/100mL	

<=T A measurable trace amount: interpret with caution

<=W No measurable response (zero)

2.7 DISINFECTION

a)	**Method of disinfection:**	Chlorination
b)	**Disinfection Period**	Continuous
c)	**Comment on the seasonal disinfection period for each year**	
d)	**Disinfection Required By:**	Not required
e)	**Residual monitoring technique:**	DPD Meter
f)	**Was there a measurable chlorine residual In the final effluent after contact:**	Not obtained

The certificate of approval is silent on the subject of disinfection. According to Condition 15.0 of the Certificate of Approval, biweekly grab samples must be taken of the raw and treated sewage and analysed for fecal and total coliforms. Ministry policy F-5-1 suggests the minimum treatment requirements for E.coli. are a monthly geometric mean of 200 E.coli per 100 mL.

2.8 PLANT CLASSIFICATION & OPERATOR CERTIFICATION

a)	**Plant classification:**	
	i) Facility Level:	Level II
	ii) Certificate Number:	533
	iii) Date of Issue:	1987/12/14
b)	**Plant operators have the appropriate level of certification for this plant**	● Yes ○ No

2.9 FLOW MEASUREMENT

a)	**Flows are being metered at:**	Final effluent
b)	**Date of last calibration of effluent flow meter:**	2010/08/05

2.10 BYPASSES, AND/OR OVERFLOWS

	Plant	Collection System
Are bypasses and overflows routinely reported?	● Yes ○ No	● Yes ○ No
Are bypasses and overflows routinely monitored?	● Yes ○ No	● Yes ○ No
Are bypasses and overflows routinely sampled?	● Yes ○ No	● Yes ○ No

PLANT INFORMATION:

	Plant Bypass			Plant Overflow		
Item	**Year 1 2008**	**Year 2 2009**	**Year 3 2010**	**Year 1 2008**	**Year 2 2009**	**Year 3 2010**
Total number of events?	NA	NA	NA	NA	NA	NA
Total duration of event(s)? (Hour(s))						
Of the total number of events, how many are						

dry-weather events?						
Total quantity with no treatment? (1000 m^3)						
Total quantity with only disinfection? (1000 m^3)						
Total quantity with primary treatment? (1000 m^3)						
Total quantity with primary treatment and disinfection? (1000 m^3)						
Total quantity with other treatment? (1000 m^3)						
Total quantity with other treatment and disinfection? (1000 m^3)						
What is the most common reason for event(s)?						
What is the name of the receiving water?						
Name the most important type of sensitive receptor?						
What is the approximate distance to the sensitive receptor? (km)						

COLLECTION SYSTEM INFORMATION: (Satellite(s), Lift Station(s) and Regulator(s))

	Lift Station Overflow			Other Location Overflow		
Item	**Year 1 2008**	**Year 2 2009**	**Year 3 2010**	**Year 1 2008**	**Year 2 2009**	**Year 3 2010**
Total number of events?	NA	NA	NA	NA	NA	NA
Total duration of event(s)? (Hour(s))						
Of the total number of events, how many are dry-weather events?						
Total quantity with no treatment? (1000 m^3)						
Total quantity with only disinfection? (1000 m^3)						
Total quantity with other treatment? (1000 m^3)						
Are any overflow(s) at combined sewer locations? (Yes/No)						
What is the most common reason for event(s)?						
What is the name of the receiving water?						
Name the most important type of sensitive receptor?						
What is the approximate distance to the sensitive receptor? (km)						

Comments:

The Town of Chalk River does not have any combined sewers. The sewage treatment plant and the two pumping stations in the Town do not have any means to by-pass.

2.11 SLUDGE (BIOSOLIDS) MANAGEMENT

Sludge Stabilization:	Aerobic
Sludge Storage:	Holding Tank
Total available storage:	
Volume	159 cubic metres
Retention Time	90 days
Certified waste hauler	Yes

Certificate numbers of haulers are:	H870017
Method of Disposal/Utilization:	Agricultural, Off-site Munc. STP
Certified waste disposal facility	Yes
Certificate number(s) of facilities are:	Pembroke WWTP

2.12 WASTEWATER COLLECTION SYSTEMS

1.	**Does this plant receive sewage from a Combined Sewer Collection System** (sanitary sewage, roof leaders, foundation drains, catch basins and/or storm water conveyed within a single pipe)?	○ Yes	● No	
2.	**How are bypasses, overflows and/or combined sewers being minimized or eliminated?**			
	a) Pollution Prevention and Control Plan (As described in Procedure F-5-5)	○ Yes	● No	○ Developing
	i. Other Plan	○ Yes	● No	○ Developing
	b) Characterization Study?	○ Yes	● No	○ Developing
	c) Implementation Plan?	○ Yes	● No	○ Developing

Comments:

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

No previous non-compliance issues.

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate ?

No

Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?

No

Specifics:

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?

No

Specifics:

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?

No

Specifics:

Was there any indication of non-conformance or minor administrative non-compliance?

No

Specifics:

5.0 ACTION(S) REQUIRED

6.0 OTHER INSPECTION FINDINGS

1. Flows have decreased in 2010. The year had less rainfall than 2009 but some of the flow reduction is probably the Town's efforts in reducing Infiltration and Inflow. Some leaks have been fixed and camera inspections are ongoing. The plant is still operating in the high flow contact stabilization mode. The municipality must continue to repair and reduce leaks to manholes and continue to make efforts to prevent infiltration or inflow into the collection system.

2. The disinfection system should be operated to stay within the E.coli. criteria of 200 counts per 100 mL. Reportedly, a cross connection was discovered in the plant that may have historically affected the effluent E.Coli. results. The operator has recommended that the aeration basin/clarifier system be drained, inspected and grit/debris removed and repairs made. This activity will require prior approval from the MOE under Ontario Regulation 675/98. The Director for this regulation is the Ottawa District Manager.

ONTARIO REGULATION 675/98
CLASSIFICATION AND EXEMPTION OF SPILLS AND REPORTING OF DISCHARGES

Class IV — Planned Spills

4. (1) A Class IV spill is a discharge, consented to by the Director under this section that,
(a) is a direct and unavoidable result of a planned maintenance procedure to a water or waste water system or to pollution abatement equipment; or
(b) is planned for research or training purposes. O. Reg. 675/98, s. 4 (1).
(2) The person having control of the pollutant shall apply in writing for the Director's consent to a Class IV spill not less than 15 days before the spill and the application shall set out the time, place and potential adverse effects of the spill and such additional information as may be required by the Director. O. Reg. 675/98, s. 4 (2).
(3) The Director shall consent in writing to a Class IV spill if he or she is of the opinion that the potential adverse effects of the spill do not present an unreasonable risk to public safety and that any adverse effects of the spill will be minimized, eliminated or ameliorated. O. Reg. 675/98, s. 4 (3).
(4) The Director may attach to the consent conditions respecting the minimization, elimination or amelioration of the adverse effects. O. Reg. 675/98, s. 4 (4).
(5) A Class IV spill is exempt from section 92 of the Act. O. Reg. 675/98, s. 4 (5).
(6) Despite subsection (5), the person having control of the pollutant shall monitor the adverse effects for the Class IV spill and shall report on them in writing to the Director within five days after the spill. O. Reg. 675/98, s. 4 (6).

3. The Town must continue to maintain a minimum flow within Blackduck Lake and Blackduck Creek. The outfall from the plant can become submerged and can limit the discharge volume if beaver dams impede flows in the Blackduck system. The Town must inspect and report on the flow conditions of Blackduck Lake and Blackduck Creek.

4. The Water Treatment Plant can directly affect the sewage treatment process through the discharge of backwash water and sedimentary tank sludge. The sewage treatment plant is currently receiving backwash from one water treatment basin; 2 other basins are off-line and do not provide any flow to the sewage treatment plant. The Town is conducting an Environmental Study Report with respect to the Water Treatment Plant. Due consideration must be made about any options that could affect the sewage treatment process and the operation of the sewage treatment plant.

7.0 INCIDENT REPORT

Not Applicable

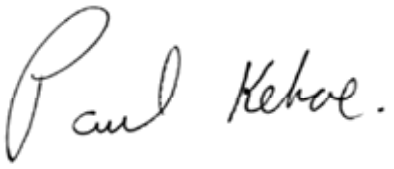
8.0 ATTACHMENTS

PREPARED BY:
Environmental Officer:

Name:	**Bryan Dickman**
District Office:	**Ottawa District Office**
Date:	**2011/03/24**
Signature	

REVIEWED BY:
District Supervisor:

Name:	**Paul Kehoe**
District Office:	**Ottawa District Office**
Date:	**2011/03/24**
Signature:	



File Storage Number: SI RE CH BL 410

Note:
"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"

Ontario

Ministry of the Environment
Ministère de l'Environnement

Communal Sewage Inspection Report

Client:	The Corporation of the Town of Laurentian Hills Mailing Address: 34465 Highway 17, Rural Route, 1, Laurentian Hills, Ontario, Canada, K0J 1P0 Physical Address: 34465 Highway 17 R.R 1, Deep River, Town, County of Renfrew, Ontario, Canada, K0J 1P0 Telephone: (613)584-3114, FAX: (613)584-3285, email: info@town.laurentiallhills.on.ca Client #: 8438-4M7R7C, Client Type: Municipal Government Additional Address Info: R.R 1		
Inspection Site Address:	Chalk River Sewage Treatment Plant Address: 7 Blimpke St, Laurentian Hills, Town, County of Renfrew, K0J 1J0 District Office: Ottawa GeoReference: , LIO GeoReference: Zone: 18, UTM Easting: 310293.84, UTM Northing: 5099048.0, Latitude: 46.018723, Longitude: -77.45081 Sewage Works Number: 110001587		
Contact Name:	Dave Ethier	**Title:**	Chief Operator
Contact Telephone:	(613)589-2161 **ext**	**Contact Fax:**	
Last Inspection Date:	2011/02/16		
Inspection Start Date:	2012/03/14	**Inspection Finish Date:**	2012/03/14
Region:	Eastern		

1.0 INTRODUCTION

For Clarity within this report it should be noted that the Ministry of the Environment has restructured their approvals process. As of October 31st, 2011, all Certificates of Approval will be referred to as Environmental Compliance Approvals (ECA).

An inspection of the Chalk River Sewage Treatment Plant was conducted to assess compliance with applicable Ministry of the Environment legislative requirements, as well as conformance with current Ministry guidelines and policies for operations during 2011. The inspection also assessed the collection of wastewater and conveyance to the sewage treatment plant. The inspection included a review of historical information contained in the Ministry files; a review of available operating data for 2011; a detailed assessment of compliance with the terms and conditions of the ECA and conformance with MOE policies and procedures; a tour of the treatment system; and a review of the audit sample results of the plant's final effluent collected on August 8th, 2011. The inspection focused on the operation and performance of the treatment plant.

The plant consists of a circular "Ecodyne" package sewage treatment plant. The plant can be operated in two different modes: extended aeration for flows less than 363 m3/day and contact stabilization mode for greater flows up to a capacity of 545 m3/day.

The system has the following components:

Pumping Stations - there are two pumping stations in the system, one off the plant property. The pumping station located at the plant is equipped with a variable speed pump, the off-site pumping station, referred to as the Main St pump station has two fixed speed pumps.

Sewage Treatment Plant - the plant consists of a manually cleaned inclined bar screen, twin grit channels, a comminutor and tankage consisting of an aeration/re-aeration tank, aerated digester, sludge holding tank, sludge settling tank and chlorine contact tank.

1.1 AUTHORIZING AND CONTROL DOCUMENT INFORMATION

Authorizing/ Control Document	Number	Issue Date	Effluent Limits (yes/no)	Effluent Monitoring Requirements (yes/no)	Effluent Reporting Requirements (yes/no)
ECA	52/5/134	1972/07/27	No	No	No
ECA	3-0210-87-896	1989/07/21	Yes	Yes	Yes
ECA	3-0210-87-896	1991/10/17	No	No	No

The plant was first approved in 1972, and modified in 1989. The approval issued in 1989 was for modifications to the existing Chalk River Water Pollution Control Plan in order to treat an average daily sewage flow of 363 m^3/d when operating in an extended aeration mode and an average daily flow of 545 m^3/d when operating in a contact stabilization mode. The approval allowed the following:

- the installation of seventy-two (72) new coarse bubble air diffusers complete with eighteen (18) header assemblies and new air header piping;

- the installation of two (2) new submersible sewage pumps in main sewage pumping station each rated at 22.7 L/s at a TDH of 12.2 m, including modifications to the pump control system to allow for variable speed pump operation;

- replacement of the existing comminutor with a new unit rated at 53 L/s, complete with an enclosure;

- replacement of the existing scum arm on the final clarifier with a new unit and the replacement and relocation of the scum box;

- the enlargement of all compartmental gates to 300 mm diameter;

- the replacement and extension of the influent trough;

- the relocation of the catwalk;

- the installation of a new submersible sludge pump rated at 5.7 L/s at a TDH of 4.6 m, including installation of a flexible suction hose;

- four (4) variable speed chemical pumps rated as follows:

i) alum pump - 45 L/d
ii) polyelectrolyte pump - 400 L/d
iii) sodium carbonate pump - 35 L/d
iv) hypochlorite pump - 140 L/d;

- one (1) FRP 10 m^3 alum storage tank

- one(1) FRP 350 L alum day tank;

including interconnecting piping, valves, appurtenances, associated equipment and instrumentation.

The notice issued in 1991 changed the use of the word alum in the original approval to coagulant so that the plant operator had the flexibility to use coagulants other than alum to achieve acceptable effluent quality under seasonally changing process conditions.

The plant is allowed to operate in extended aeration or contact stabilization modes. Due to current flows into the plant the plant runs in contact stabilization mode. If flows were to drop to less then 363 m3/day the plant could switch over to extended aeration however is not expected that flows will decrease to that extent. The average daily flow for 2011 was 451 m3/day.

2.0 INSPECTION OBSERVATIONS

Sewage Treatment Plant

Sewage Works Number: 110001589
Certificate of Approval Number(s) ● Yes ○ No
C of A Number(s): See above
Plant Ownership: ● Munc. ○ OCWA ○ Other
Operating Authority: ○ Munc. ○ OCWA ● Other
Please specify: American Water Services Canada

Service Population: 1000

Wastewater Collection System
Certificate of Approval Number(s): ● Yes ○ No
C of A Number(s): Various
Collection System Ownership: ● Munc. ○ OCWA ○ Other
Operating Authority: ☒ Munc. ☐ OCWA ☐ Other

2.1 SYSTEM DESCRIPTION

Type Of Plant

Primary: ○ Yes ● No
Secondary: ● Yes ○ No
Advanced: ○ Yes ● No
Biological Treatment: ● Yes ○ No
○ Conventional AS
● Contact Stablization
○ Extended Air Rotating Biological Contactor
Lagoon(s): ○ Yes ● No

Other: ● Yes ○ No
Describe: The Plant is capable of operating in both extended aeration or contact stabilization modes

○ Communal Septic ○ Snowfluent
○ Constructed Wetland ○ Other

Effluent Discharge Frequency: ☐ Seasonal: ☐ Annual:
☒ Continuous: ☐ No Direct Discharge:

Does the Plant Practice Phosphorous Removal? ● Yes ○ No
Effluent Disposal Method: ☒ Surface Water ☐ Subsurface
☐ Surface Land Disposal

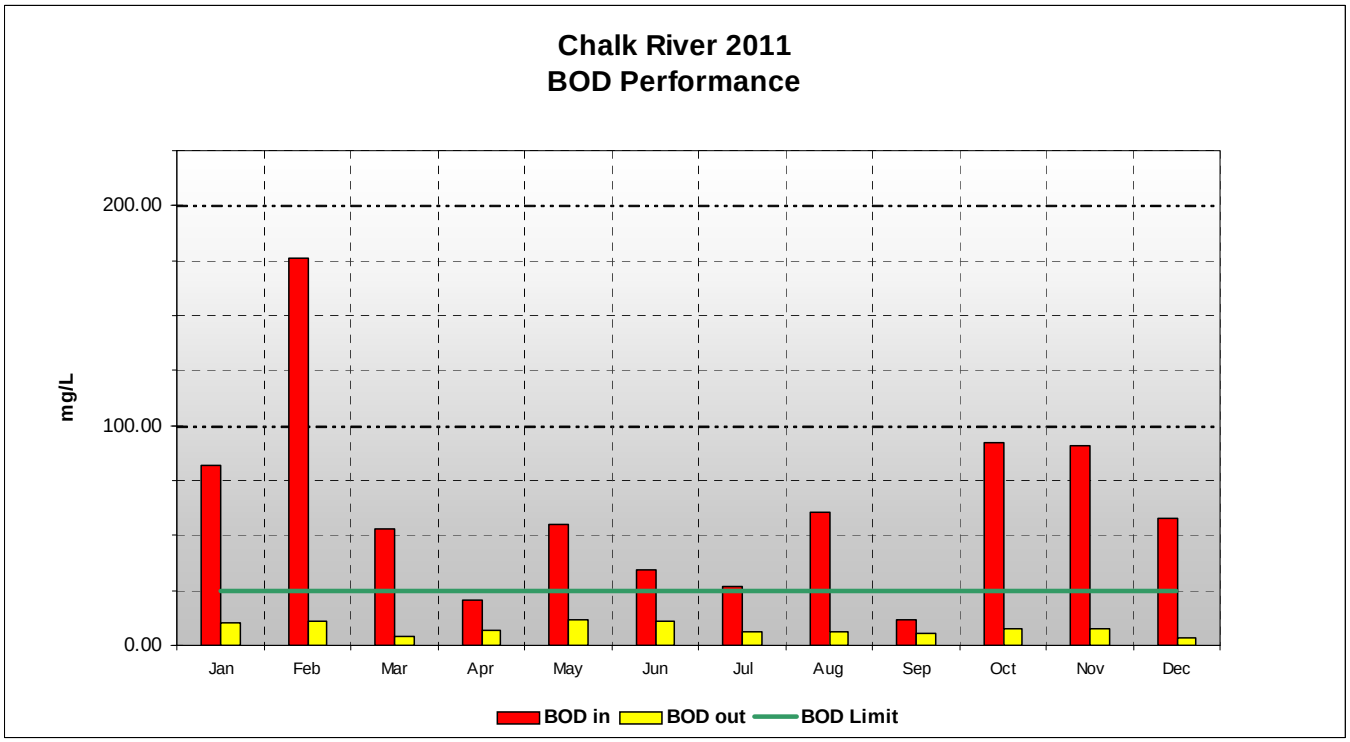
If disposal is to surface water, name of immediate receiving stream: Blackduck Creek

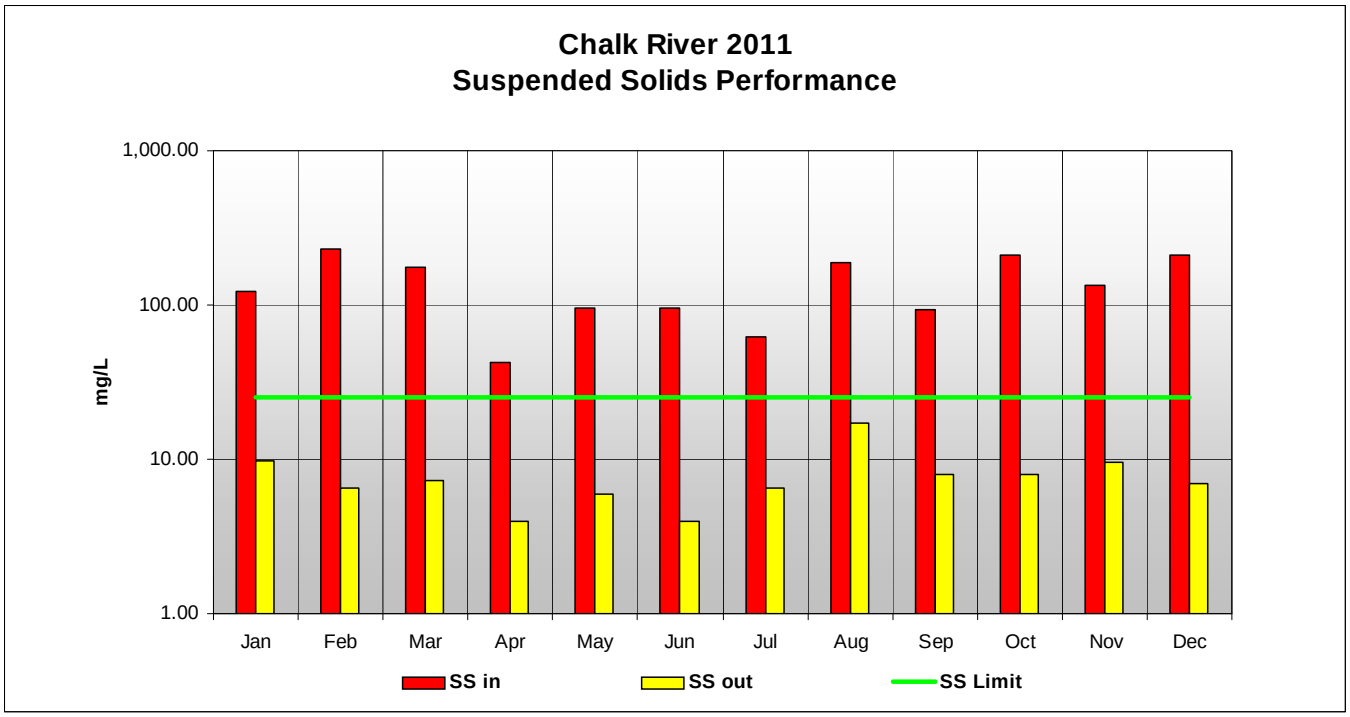
2.2 EFFLUENT QUALITY ASSESSMENT

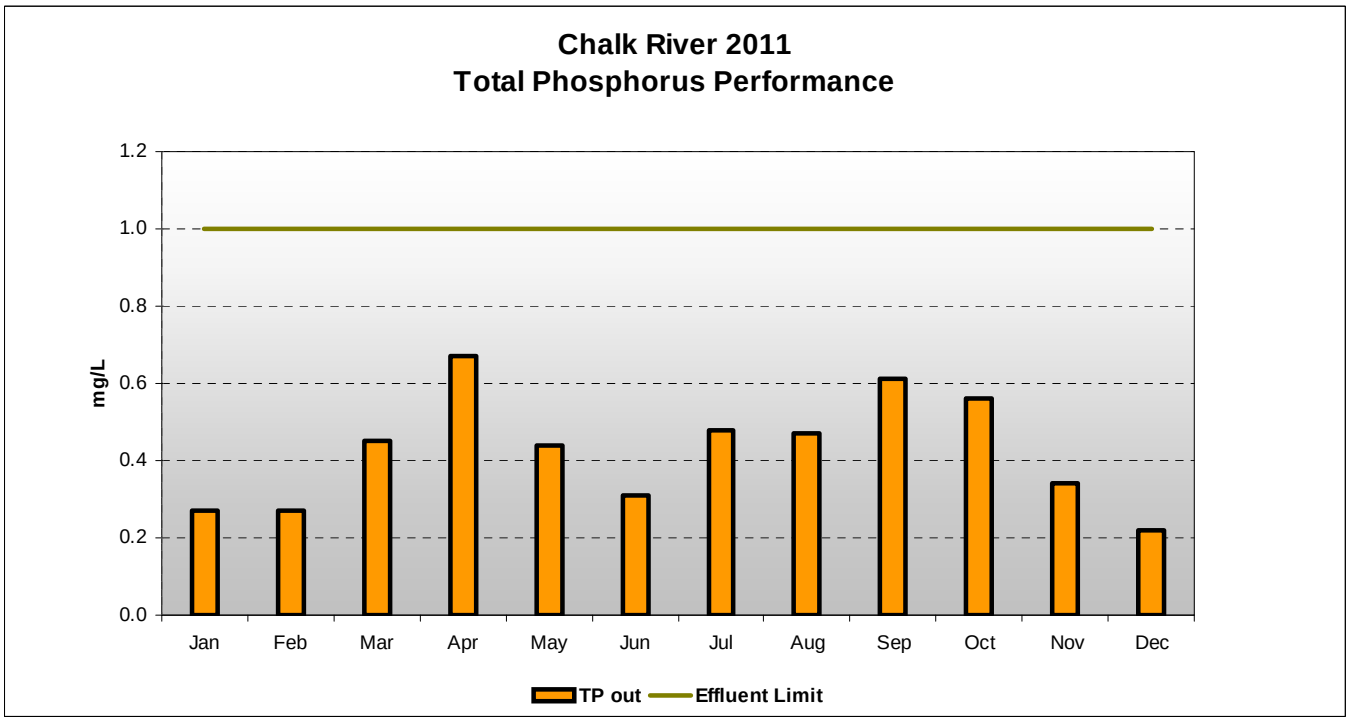
Parameter	Year 1 2009	Year 2 2010	Year 3 2011	Limits
BOD5 (mg/l)	7.7	6.18	7.63	25
Suspended Solids (mg/l)	8.5	8.62	7.8	25
Total Phosphorus (mg/l)	1.06	0.55	0.42	1.0

Limits are based on: ☒ Certificate of Approval ☐ Director's Order ☐ PO Order ☐ Guidelines

Does the facility comply with its limits: Yes





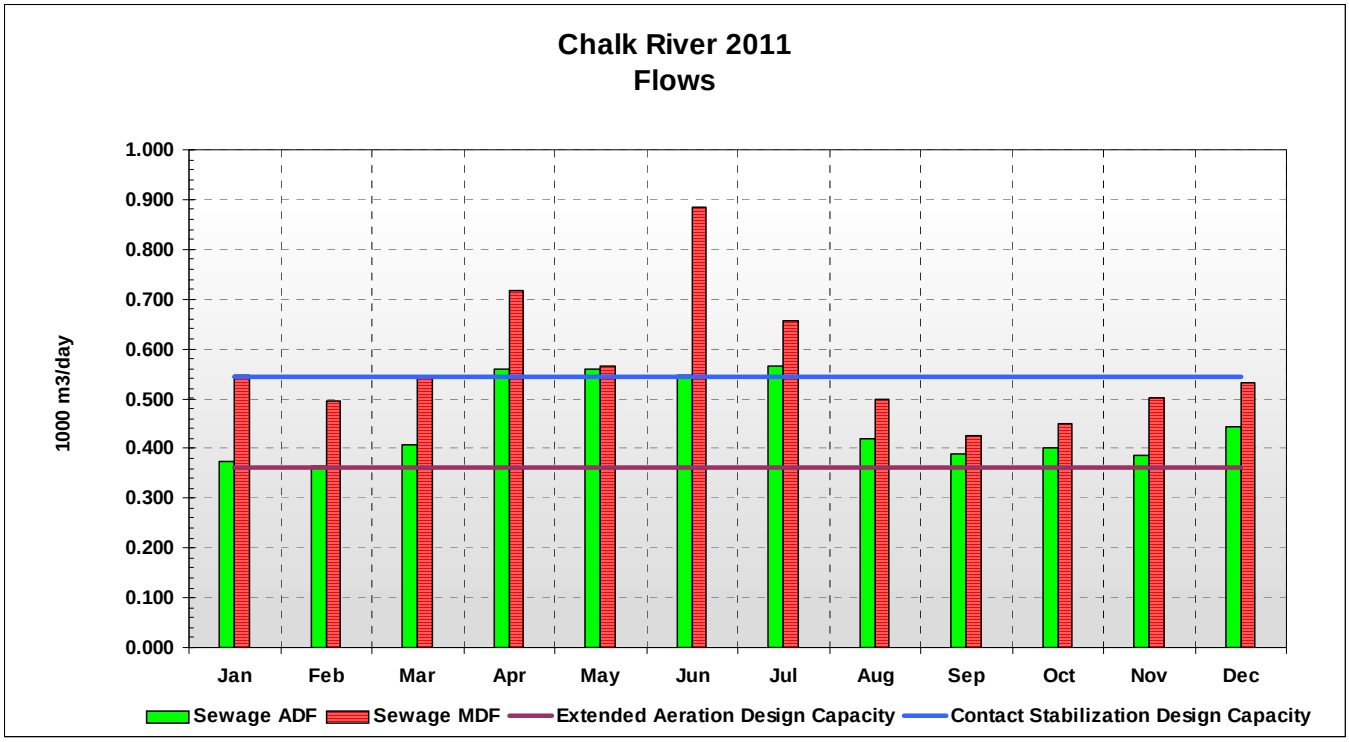


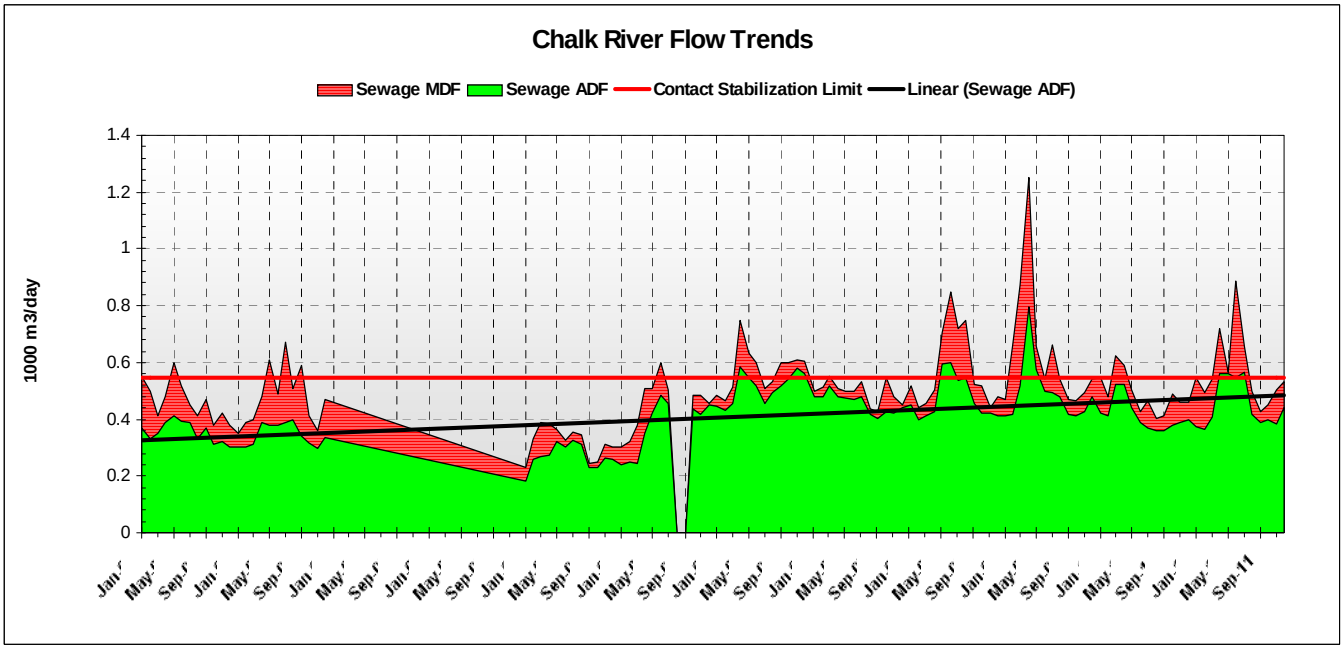
2.3 CAPACITY ASSESSMENT

Flows shown below are for the last three calendar years. Identify the year, eg., 1999

Item	Year 1 2009	Year 2 2010	Year 3 2011
Average daily flow	494.00	414.00	451.00

(m^3/day)			
Maximum daily flow (m^3/day)	1251.00	622.00	885.00
Capacity Design (m^3/day)	545.00	545.00	545.00
% of capacity, based on average daily flow	90.64	75.96	82.75





2.4 EFFLUENT SAMPLING REQUIREMENTS

Sampling requirements are based on : Certificate of Approval
Does the plant meet the sampling requirements? Yes

2.5 EFFLUENT REPORTING REQUIREMENTS

Reporting Requirements are based on : Certificate of Approval
Does the plant meet the effluent reporting requirement? Yes

The 2011 annual report was received on March 14th, 2012.

2.6 MINISTRY SAMPLING AT TIME OF INSPECTION

Were Ministry samples collected at the time of inspection Yes

Sample Locations and Analyses: Grab sample- Effluent - Phys/Chem, Grab sample - Effluent - Metals, Grab sample - Effluent - Bacteriological

Ministry staff collected audit sample of the final effluent on August 8th, 2011 (see results below). Additional Ministry audit samples were not collected at the time of the inspection.

Mercury: 0.03 ug/L <T
Aluminium 2.57 mg/L
Barium 0.021 mg/L
Beryllium 0.001 mg/L <=W
Cadmium 0.001 mg/L <=W
Calcium 8.60 mg/L
Chromium 0.003 mg/L <T
Cobalt 0.001 mg/L <=W
Copper 0.229 mg/L
Iron 0.583 mg/L
Lead 0.005 mg/L <=W
Magnesium 2.24 mg/L
Manganese 0.093 mg/L
Molybdenum 0.005 mg/L <=W
Nickel 0.01 mg/L <=W
Potassium 3.97 mg/L
Silver 0.005 mg/L <=W
Sodium 36.5 mg/L
Strontium 0.051 mg/L
Titanium 0.003 mg/L <T
Vanadium 0.001 mg/L <=W
Zinc 0.021 mg/L
Hardness 30.6 mg/L
CBOD 4.2 mg/L as O2
SS 18.4 mg/L
Arsenic 0.0005 mg/L <=W
Selenium 0.0005 mg/L <=W
Nitrogen; nitrite 1.68 mg/L
Nitrogen; nitrate + nitrite 2.04 mg/L
Nitrogen; ammonia + ammonium 1.44 mg/L
Phosphorus; phosphate 0.23 mg/L
Nitrogen; Total Kjeldahl 2.92 mg/L

Phosphorus; Total 0.38 mg/L
Escherichia coli 4.0 c/100mL

<T a measurable trace amount; interpret with caution
<=W no measurable response (zero); <reported value

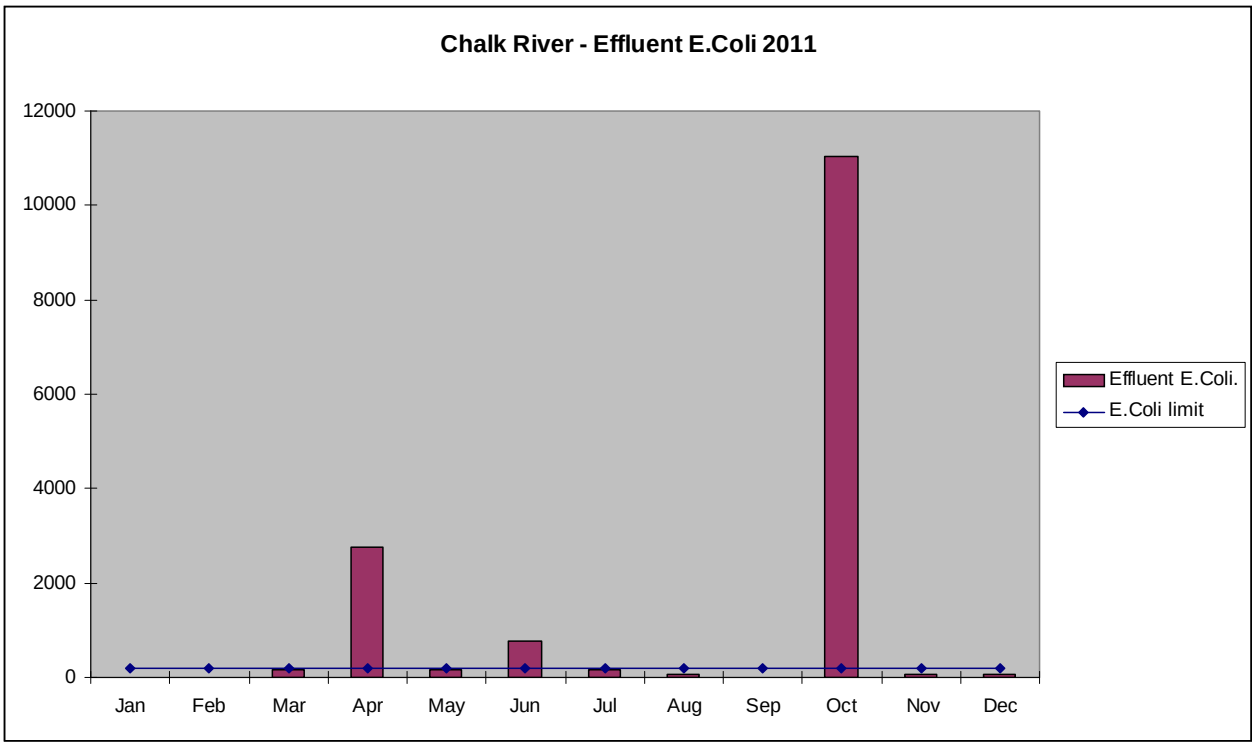
Sample results did not indicate any exceedences with effluent limits in the ECA.

2.7 DISINFECTION

a)	**Method of disinfection:**	Chlorination
b)	**Disinfection Period:**	Continuous
c)	**Comment on the seasonal disinfection period for each year:**	
d)	**Disinfection Required By:**	Not required
e)	**Residual monitoring technique:**	DPD meter
f)	**Was there a measurable chlorine residual in the final effluent after contact:**	Not obtained

The ECA is silent on the subject of disinfection. According to Condition 15.0 of the ECA, biweekly grab samples must be taken of the raw and treated sewage and analysed for fecal and total coliforms. Ministry policy F-5-1 suggests the minimum treatment requirements for E.coli. are a monthly geometric mean of 200 E.coli per 100 mL.

There were 3 months in 2011 where EColi results have exceeded the 200CFU/100mL limit.



2.8 PLANT CLASSIFICATION & OPERATOR CERTIFICATION

a) Plant classification:

i)	**Facility Level:**	Level II
ii)	**Certificate Number:**	533
iii)	**Date of Issue:**	1987/12/14

b) Plant operators have the appropriate level of certification for this plant: ● Yes ○ No

Daniel Danis WWT Class I licence #62300 expires Sept 30, 2012
47.5 hours of training in 2011

David Ethier, WWT Class III licence # 4926 expires August 31, 2012
99 hours of training in 2011

2.9 FLOW MEASUREMENT

a) Flows are being metered at: Raw Sewage

b) Date of last calibration of effluent flow meter: 2011/09/19

The flow meter is located between the pumping station and the plant, it measures flows going into the plant. There is no flow meter at the final effluent. An outside contractor calibrates the flow meter once a year.

2.10 BYPASSES, AND/OR OVERFLOWS

	Plant	Collection System
Are bypasses and overflows routinely reported?	● Yes ○ No	● Yes ○ No
Are bypasses and overflows routinely monitored?	● Yes ○ No	● Yes ○ No
Are bypasses and overflows routinely sampled?	● Yes ○ No	● Yes ○ No

PLANT INFORMATION:

	Plant Bypass			Plant Overflow		
Item	**Year 1 2009**	**Year 2 2010**	**Year 3 2011**	**Year 1 2009**	**Year 2 2010**	**Year 3 2011**
Total number of events?	NA	NA	NA	NA	NA	NA
Total duration of event(s)? (Hour(s))						
Of the total number of events, how many are dry-weather events?						
Total quantity with no treatment? (1000 m^3)						
Total quantity with only disinfection? (1000 m^3)						
Total quantity with primary treatment? (1000 m^3)						
Total quantity with primary treatment and disinfection? (1000 m^3)						
Total quantity with other treatment? (1000 m^3)						
Total quantity with other treatment and disinfection? (1000 m^3)						
What is the most common reason for event(s)?						
What is the name of the receiving water?						
Name the most important type of sensitive receptor?						

What is the approximate distance to the sensitive receptor? (km)				

COLLECTION SYSTEM INFORMATION: (Satellite(s), Lift Station(s) and Regulator(s))

	Lift Station Overflow			Other Location Overflow		
Item	**Year 1 2009**	**Year 2 2010**	**Year 3 2011**	**Year 1 2009**	**Year 2 2010**	**Year 3 2011**
Total number of events?	NA	NA	NA	NA	NA	NA
Total duration of event(s)? (Hour(s))						
Of the total number of events, how many are dry-weather events?						
Total quantity with no treatment? (1000 m^3)						
Total quantity with only disinfection? (1000 m^3)						
Total quantity with other treatment? (1000 m^3)						
Are any overflow(s) at combined sewer locations? (Yes/No)						
What is the most common reason for event(s)?						
What is the name of the receiving water?						
Name the most important type of sensitive receptor?						
What is the approximate distance to the sensitive receptor? (km)						

Comments:

The sewage treatment plant and the two pumping stations in the Town do not have any means to by-pass.

The Town has a portable pump that can be brought to any location in Town to assist in by-passing a blocked sewer or pumping station. Both pumping stations have high level alarms and emergency diesel generators.

There is no SCADA system in place.

2.11 SLUDGE (BIOSOLIDS) MANAGEMENT

Sludge Stabilization:	Aerobic
Sludge Storage:	Holding Tank
Total available storage:	
Volume	159 cubic meters
Retention Time	90 days
Certified waste hauler	Yes
Certificate numbers of haulers are:	H870017
Method of Disposal/Utilization:	Agricultural, Off-site Munc. STP
Certified waste disposal facility	Yes
Certificate number(s) of facilities are:	Pembroke WWTP

In 2011 sludge was sent to the Pembroke WWTP and was land applied at a location certified under ECA #S-4131-33.

The sludge is hauled by P&G pumping under ECA #H870017.

2.12 WASTEWATER COLLECTION SYSTEMS

1.	**Does this plant receive sewage from a Combined Sewer Collection System** (sanitary sewage, roof leaders, foundation drains, catch basins and/or storm water conveyed within a single pipe)?	○ Yes	● No	
2.	**How are bypasses, overflows and/or combined sewers being minimized or eliminated?**			
	a) Pollution Prevention and Control Plan (As described in Procedure F-5-5)	○ Yes	● No	○ Developing
	i. Other Plan	○ Yes	● No	○ Developing
	b) Characterization Study?	○ Yes	● No	○ Developing
	c) Implementation Plan?	○ Yes	● No	○ Developing

Comments:

Staff at the plant are also responsible for managing the collection system and both pumping stations. In 2010 the Town conducted some camera surveys inside part of their collection system to find and repair issues of infiltration and inflow. There was no camera work done in 2011. The entire systems was camera's around 5 years ago, since then the town has been re-doing sections at a time. It is estimated that around 1/3 of the collection system has been had camera surveys done for the second time.

The Town does not have any combined sewers and has by-laws in place restricting sump pump and roof drains from being connected to the sanitary sewers.

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate ?

No

Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?

No

Specifics:

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?

No

Specifics:

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?

No

Specifics:

Was there any indication of non-conformance or minor administrative non-compliance?

No

Specifics:

5.0 ACTION(S) REQUIRED

6.0 OTHER INSPECTION FINDINGS

1. Flows have increased in 2011. The plant is still operating in the high flow contact stabilization mode. The municipality must continue to repair and reduce leaks to manholes and continue to make efforts to prevent infiltration or inflow into the collection system.

2. The disinfection system should be operated to stay within the E.coli. monthly geometric mean limit of 200 CFU/100 mL.

3. The operator has recommended that the aeration basin/clarifier system be drained, inspected and grit/debris removed and repairs made. This activity will require prior approval from the MOE under Ontario Regulation 675/98. The Director for this regulation is the Ottawa District Manager.

ONTARIO REGULATION 675/98
CLASSIFICATION AND EXEMPTION OF SPILLS AND REPORTING OF DISCHARGES

Class IV — Planned Spills
4. (1) A Class IV spill is a discharge, consented to by the Director under this section that,
(a) is a direct and unavoidable result of a planned maintenance procedure to a water or waste water system or to pollution abatement equipment; or
(b) is planned for research or training purposes. O. Reg. 675/98, s. 4 (1).
(2) The person having control of the pollutant shall apply in writing for the Director's consent to a Class IV spill not less than 15 days before the spill and the application shall set out the time, place and potential adverse effects of the spill and such additional information as may be required by the Director. O. Reg. 675/98, s. 4 (2).
(3) The Director shall consent in writing to a Class IV spill if he or she is of the opinion that the potential adverse effects of the spill do not present an unreasonable risk to public safety and that any adverse effects of the spill will be minimized, eliminated or ameliorated. O. Reg. 675/98, s. 4 (3).
(4) The Director may attach to the consent conditions respecting the minimization, elimination or

amelioration of the adverse effects. O. Reg. 675/98, s. 4 (4).
(5) A Class IV spill is exempt from section 92 of the Act. O. Reg. 675/98, s. 4 (5).
(6) Despite subsection (5), the person having control of the pollutant shall monitor the adverse effects for the Class IV spill and shall report on them in writing to the Director within five days after the spill. O. Reg. 675/98, s. 4 (6).

3. The Town must continue to maintain a minimum flow within Blackduck Lake and Blackduck Creek. The outfall from the plant can become submerged and can limit the discharge volume if beaver dams impede flows in the Blackduck system. The Town must inspect and report on the flow conditions of Blackduck Lake and Blackduck Creek.

4. The Water Treatment Plant can directly affect the sewage treatment process through the discharge of backwash water and sedimentary tank sludge. The sewage treatment plant is currently receiving backwash from one water treatment basin. The Town is conducting an Environmental Study Report with respect to the Water Treatment Plant. Due consideration must be made about any options that could affect the sewage treatment process and the operation of the sewage treatment plant.

7.0 INCIDENT REPORT

Not Applicable

8.0 ATTACHMENTS

PREPARED BY:
Environmental Officer:
Name: **Tracy Hart**
District Office: **Ottawa District Office**
Date: **2012/03/26**
Signature

REVIEWED BY:
District Supervisor:
Name: **Tara MacDonald**
District Office: **Ottawa District Office**
Date: **2012/03/27**

Signature:

File Storage Number: SI RE CH BL 410

Note:
"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"

Ontario

Ministry of the Environment
Ministère de l'Environnement

Communal Sewage Inspection Report

Client:	The Corporation of the Town of Laurentian Hills Mailing Address: 34465 Highway 17, Rural Route, 1, Laurentian Hills, Ontario, Canada, K0J 1P0 Physical Address: 34465 Highway 17 R.R 1, Deep River, Town, County of Renfrew, Ontario, Canada, K0J 1P0 Telephone: (613)584-3114, FAX: (613)584-3285, email: info@town.laurentiallhills.on.ca Client #: 8438-4M7R7C, Client Type: Municipal Government Additional Address Info: R.R 1		
Inspection Site Address:	Chalk River Sewage Treatment Plant Address: 7 Blimpke St, Laurentian Hills, Town, County of Renfrew, K0J 1J0 District Office: Ottawa GeoReference: , LIO GeoReference: Zone: 18, UTM Easting: 310293.84, UTM Northing: 5099048.0, Latitude: 46.018723, Longitude: -77.45081 Sewage Works Number: 110001587		
Contact Name:	Dave Ethier	**Title:**	Chief Operator
Contact Telephone:	(613)589-2161 **ext**	**Contact Fax:**	(613)589-2158
Last Inspection Date:	2012/03/14		
Inspection Start Date:	2013/03/12	**Inspection Finish Date:**	2013/03/12
Region:	Eastern		

1.0 INTRODUCTION

On March 12, I, Doug Kehoe, Senior Environmental Officer, with the Ontario Ministry of the Environment's Cornwall Area Office conducted a Communal Sewage Compliance Inspection at the Chalk River Sewage Treatment Plant (STP). The findings and observations of the inspection are detailed in this report.

The purpose of the Ministry's communal sewage compliance inspection program is to confirm that sewage works are in compliance with Ministry legislation and control documents, and are in conformance with Ministry related guidelines and procedures that govern the operation and maintenance of communal sewage facilities.

Specifically this includes compliance/conformance with:

-The Ontario Water Resources Act ("OWRA") and applicable regulations;
-Control documents (including Environmental Compliance Approvals and Orders); and
-Ministry Guidelines and Protocols that address municipal sewage systems.

The Ministry Guidelines considered during sewage inspections include F-5 "Levels of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters"; F-5-5 "Determination of Treatment Requirements for Municipal and Private Combined and Partially Separated Sewer Systems"; and "Design Guidelines for Sewage Works 2008".

The Chalk River Sewage Treatment Plant (STP) is owned by the Corporation of the Town of Laurentian Hills (hereafter referred to in this report as the "Town"). The plant is operated by the American Water Canada (AWC).

The plant consists of a circular "Ecodyne" package sewage treatment plant. The plant can be operated in two different modes: extended aeration for flows less than 363 m3/day and contact stabilization mode for greater flows up to a capacity of 545 m3/day.

The system has the following components:

Pumping Stations - there are two pumping stations in the system, one off the plant property. The pumping station located at the plant is equipped with a variable speed pump, the off-site pumping station, referred to as the Main St pump station has two fixed speed pumps.

Sewage Treatment Plant - the plant consists of a manually cleaned inclined bar screen, twin grit channels, a comminutor and tankage consisting of an aeration/re-aeration tank, aerated digester, sludge holding tank, sludge settling tank and chlorine contact tank.

A file review was conducted as part of the inspection and included a review of annual reports, analytical data and MOE databases and correspondence. In addition to the file review, a site visit and tour of the STP facility was conducted in order to observe the site operations and assess compliance. During the site visit the inspector was accompanied by Dave Ethier, Chief Operator.

Photos taken during the compliance inspection are included in Appendix "A" of this report.
Ministry sampling results from summer of 2012, and some E.coli sampling results are included in Appendix "B" of this report.

1.1 AUTHORIZING AND CONTROL DOCUMENT INFORMATION

Authorizing/ Control Document	Number	Issue Date	Effluent Limits (yes/no)	Effluent Monitoring Requirements (yes/no)	Effluent Reporting Requirements (yes/no)
ECA	52/5/134	1972/07/27	No	No	No
ECA	3-0210-87-896	1989/07/21	Yes	Yes	Yes
Amendment	3-0210-87-896	1991/10/17	No	No	No

The plant was first approved in 1972, and modified in 1989. The approval issued in 1989 was for modifications to the existing Chalk River Water Pollution Control Plant in order to treat an average daily sewage flow of 363 m^3/d when operating in an extended aeration mode and an average daily flow of 545 m^3/d when operating in a contact stabilization mode. The approval included the following:

- The installation of seventy-two (72) new coarse bubble air diffusers complete with eighteen (18) header assemblies and new air header piping;
- The installation of two (2) new submersible sewage pumps in the main sewage pumping station each rated at 22.7 L/s at a TDH of 12.2 m, including modifications to the pump control system to allow for variable speed pump operation;
- Replacement of the existing comminutor with a new unit rated at 53 L/s, complete with an enclosure;
- Replacement of the existing scum arm on the final clarifier with a new unit and the replacement and relocation of the scum box;

- The enlargement of all compartmental gates to 300 mm diameter;
- The replacement and extension of the influent trough;
- The relocation of the catwalk;
- The installation of a new submersible sludge pump rated at 5.7 L/s at a TDH of 4.6 m, including installation of a flexible suction hose;
- Four (4) variable speed chemical pumps rated as follows:
  i) alum pump - 45 L/d
  ii) polyelectrolyte pump - 400 L/d
  iii) sodium carbonate pump - 35 L/d
  iv) hypochlorite pump - 140 L/d;
- One (1) FRP 10 m^3 alum storage tank
- One(1) FRP 350 L alum day tank;
- Including interconnecting piping, valves, appurtenances, associated equipment and instrumentation.

The notice issued in 1991 changed the use of the word alum in the original approval to coagulant so that the plant operator had the flexibility to use coagulants other than alum to achieve acceptable effluent quality under seasonally changing process conditions.

- At the time of inspection only Hypochlorite was being added to the effluent for disinfection purposes; Alum was not being added. Note that the plant is still meeting it's effluent objectives for BOD, SS, and Phosphorous.
- **It was also noted during the inspection that the solids grinder (comminutor) was no longer operational. This was reported to be because the unit appeared to be ineffectual, and was causing maintenance problems by burning out motors.**
- At the time of inspection the scum arm had been disengaged. This was done because during the winter the scum arm, made of aluminium, will become easily bent and broken if ice formation occurs.

2.0 INSPECTION OBSERVATIONS

Sewage Treatment Plant

Sewage Works Number:	110001589
Certificate of Approval Number(s)	● Yes ○ No
C of A Number(s):	3-0210-87-896
Plant Ownership:	● Munc. ○ OCWA ○ Other
Operating Authority:	○ Munc. ○ OCWA ● Other
	Please specify: American Water Services Canada
Service Population:	Approx. 1000

Wastewater Collection System

Certificate of Approval Number(s):	● Yes ○ No
C of A Number(s):	Various
Collection System Ownership:	● Munc. ○ OCWA ○ Other
Operating Authority:	☐ Munc. ☐ OCWA ☒ Other
	Please specify: American Water Services Canada

2.1 SYSTEM DESCRIPTION

Type Of Plant

Primary: ○ Yes ● No
Secondary: ● Yes ○ No
Advanced: ○ Yes ● No
Biological Treatment: ● Yes ○ No
○ Conventional AS
● Contact Stablization
○ Extended Air Rotating Biological Contactor
Lagoon(s): ○ Yes ● No

Other: ● Yes ○ No
Describe: Plant may operate in either extended aeration or contact stabilization modes depending on influent volume.
○ Communal Septic ○ Snowfluent
○ Constructed Wetland ● Other

Effluent Discharge Frequency: ☐ Seasonal: ☐ Annual:
☒ Continuous: ☐ No Direct Discharge:

Does the Plant Practice Phosphorous Removal? ● Yes ○ No
Effluent Disposal Method: ☒ Surface Water ☐ Subsurface
☐ Surface Land Disposal

If disposal is to surface water, name of immediate receiving stream: Blackduck Creek

2.2 EFFLUENT QUALITY ASSESSMENT

Parameter	Year 1 2010	Year 2 2011	Year 3 2012	Limits
BOD5 (mg/l)	6.18	7.63	4.8	25
Suspended Solids (mg/l)	8.62	7.8	7.4	25
Total Phosphorus (mg/l)	0.55	0.42	0.35	1.0

Limits are based on: ☒ Certificate of Approval ☐ Director's Order
☐ PO Order ☐ Guidelines

Does the facility comply with its limits: Yes

In addition to the effluent concentration requirements the Chalk River STP must meet effluent loading limits as follows:

Effluent Parameter	Loading Limit in Contact Mode (kg/ day)	Reported Effluent Loading (kg/d)
CBOD5	13.6	2.1
Suspended Solids	13.6	2.9
Total Phosphorous	0.5	0.13

Compliance is determined for BOD5 and TSS concentrations based on the annual average. Compliance is determined for Total Phosphorous based on the monthly averages. Loadings are determined by the annual average multiplied by the average annual flow.

All effluent limits for both contaminant concentrations and loadings were adhered to for the 2012 operating year, including the monthly phosphorous limits.

2.3 CAPACITY ASSESSMENT

Flows shown below are for the last three calendar years. Identify the year, eg., 1999

Item	Year 1 2010	Year 2 2011	Year 3 2012
Average daily flow (m^3/day)	414.00	451.00	396.00
Maximum daily flow (m^3/day)	622.00	885.00	731.00
Capacity Design (m^3/day)	545.00	545.00	545.00
% of capacity, based on average daily flow	75.96	82.75	72.66

According to the 2012 Annual report for the Chalk River STP, the average daily flows were within the system design capacity except for a two week period in march. The hydraulic influx around the time of the spring freshet highlights the necessity of assessing the collection system for sources of infiltration and storm water connections (such as sump pumps), and removing these sources. Continued effort in this area will ensure that the STP can operate within its designed capacity, with the overall aim of having the plant operate in extended aeration mode.

It was also noted during the inspection that the STP had not been cleaned out in a number of years and sediment build up in the tanks may be reducing overall plant capacity and making it more susceptible to issues with hydraulic loading shocks. As noted in the previous inspection report, this activity will require prior approval from the MOE under Ontario Regulation 675/98.

2.4 EFFLUENT SAMPLING REQUIREMENTS

Sampling requirements are based on : Certificate of Approval
Does the plant meet the sampling requirements? Yes

Under condition 15 of ECA #3-0210-87-896 raw sewage and final effluent monitoring for BOD5 & TSS, TKN, TAN, Nitrate and Nitrite need to be conducted biweekly, using composite samples. For total Phosphorus composite samples are to be taken weekly. Total Coliform and Fecal coliform grab samples are to be taken biweekly.

During the inspection it was reported that sampling was conducted as required by the ECA. It is recommended that a summary of sampling events be included in the annual report (as an appendix) which lists the sampling dates and results to easily demonstrate compliance with the sampling requirements.

2.5 EFFLUENT REPORTING REQUIREMENTS

Reporting Requirements are based on : Certificate of Approval
Does the plant meet the effluent reporting requirement? Yes

No by-passes, parameter exceedances or spills occurred at the Chalk River STP in 2012, thus no events were required to be reported.

The Annual Report was prepared on January 22, 2013 and received prior to inspection of the Facility.

- The Annual report covers all of the requirements stipulated in Section 17.0 of the STP's ECA.

2.6 MINISTRY SAMPLING AT TIME OF INSPECTION

Were Ministry samples collected at the time of inspection Yes

Sample Locations and Analyses: Grab sample- Effluent - Phys/Chem, Grab sample - Effluent - Metals, Grab sample - Effluent - Bacteriological

Ministry staff collected audit sample of the final effluent on June 27th, 2012 (see results below). Additional Ministry audit samples were not collected at the time of the inspection.

Mercury: 0.02 ug/L <=W
Aluminium 0.340 mg/L
Barium 0.014 mg/L
Beryllium 0.001 mg/L <=W
Cadmium 0.001 mg/L <=W
Calcium 9.60 mg/L
Chromium 0.002 mg/L <=W
Cobalt 0.001 mg/L <=W
Copper 0.006 mg/L <T
Iron 0.098 mg/L
Lead 0.005 mg/L <=W
Magnesium 2.02 mg/L
Manganese 0.035 mg/L
Molybdenum 0.005 mg/L <=W
Nickel 0.01 mg/L <=W
Potassium 7.95 mg/L
Silver 0.005 mg/L <=W
Sodium 52.1 mg/L
Strontium 0.052 mg/L
Titanium 0.002 mg/L <T
Vanadium 0.001 mg/L <=W
Zinc 0.029 mg/L
Hardness 32.4 mg/L
*CBOD 1.2 mg/L as O2
*SS 7.0 mg/L
Arsenic 0.0005 mg/L <=W
Selenium 0.0005 mg/L <=W
Nitrogen; nitrite 0.028 mg/L
Nitrogen; nitrate + nitrite 0.09 mg/L <T
Nitrogen; ammonia + ammonium 8.47 mg/L
Phosphorus; phosphate 0.07 mg/L <T
Nitrogen; Total Kjeldahl 10.0 mg/L
*Phosphorus; Total 0.21 mg/L
Escherichia coli 4.0 c/100mL

<T a measurable trace amount; interpret with caution
<=W no measurable response (zero); <reported value
*Parameters with compliance limits in the ECA

2.7 DISINFECTION

a)	**Method of disinfection:**	Chlorination
b)	**Disinfection Period:**	Continuous
c)	**Comment on the seasonal disinfection period for each year:**	
d)	**Disinfection Required By:**	Not required
e)	**Residual monitoring technique:**	DPD meter
f)	**Was there a measurable chlorine residual in the final effluent after contact:**	Not obtained

During the inspection it was stated that hypochlorite is continuously added for disinfection purposes. It was stated that had been a flow paced addition but this was abandoned because at low addition rates the pump was regularly becoming air-locked.

The ECA for the treatment plant does not address disinfection. Condition 15 of the ECA requires biweekly grab samples of the raw and treated sewage and is to be analysed for fecal and total coliforms. Ministry Policy suggests a minimum treatment of E. coli to bring levels to a monthly geometric mean of 200 counts of E.coli per 100ml.

E. coli testing is conducted biweekly as required by the ECA. It is recommended that these results be included in the Annual Report.

In 2012, three exceedances of the 200 counts of E.coli per 100ml were noted. These occurred on Aug 14, Oct 24 and Dec 19. It was suggested during the inspection that these high counts may be in part the result of the hydraulic loading issues at the plant. The hydraulic issues may be compounded by not using flow paced chemical addition. Note that a chlorine residual was still found during all three of the high E. Coli sampling events.

2.8 PLANT CLASSIFICATION & OPERATOR CERTIFICATION

a) Plant classification:

i) Facility Level:	Level II
ii) Certificate Number:	533
iii) Date of Issue:	1987/12/14

b) Plant operators have the appropriate level of certification for this plant: ● Yes ○ No

- David Ethier, WWT Class III - Licence No. 4926 , Expires Aug 31/15 ; 53.5 hours of training in 2012
- Daniel Danis, WWT Class I - Licence No. 62300, Expires Sep 30/15 ; 53.5 hours of training in 2012

2.9 FLOW MEASUREMENT

a) Flows are being metered at: Raw Sewage

b) Date of last calibration of effluent flow meter: 2012/09/06

The flow meter is located between the pumping station and the plant. There is no final effluent flow metering at the facility. The meter is calibrated annually, in 2012 it was calibrated by AAB Instrumentation.

2.10 BYPASSES, AND/OR OVERFLOWS

	Plant	Collection System
Are bypasses and overflows routinely reported?	● Yes ○ No	● Yes ○ No
Are bypasses and overflows routinely monitored?	● Yes ○ No	● Yes ○ No
Are bypasses and overflows routinely sampled?	● Yes ○ No	● Yes ○ No

PLANT INFORMATION:

Item	Plant Bypass			Plant Overflow		
	Year 1 2010	Year 2 2011	Year 3 2012	Year 1 2010	Year 2 2011	Year 3 2012
Total number of events?	NA	NA	NA	NA	NA	NA
Total duration of event(s)? (Hour(s))						
Of the total number of events, how many are						

dry-weather events?						
Total quantity with no treatment? (1000 m^3)						
Total quantity with only disinfection? (1000 m^3)						
Total quantity with primary treatment? (1000 m^3)						
Total quantity with primary treatment and disinfection? (1000 m^3)						
Total quantity with other treatment? (1000 m^3)						
Total quantity with other treatment and disinfection? (1000 m^3)						
What is the most common reason for event(s)?						
What is the name of the receiving water?						
Name the most important type of sensitive receptor?						
What is the approximate distance to the sensitive receptor? (km)						

COLLECTION SYSTEM INFORMATION: (Satellite(s), Lift Station(s) and Regulator(s))

	Lift Station Overflow			Other Location Overflow		
Item	**Year 1 2010**	**Year 2 2011**	**Year 3 2012**	**Year 1 2010**	**Year 2 2011**	**Year 3 2012**
Total number of events?	NA	NA	NA	NA	NA	NA
Total duration of event(s)? (Hour(s))						
Of the total number of events, how many are dry-weather events?						
Total quantity with no treatment? (1000 m^3)						
Total quantity with only disinfection? (1000 m^3)						
Total quantity with other treatment? (1000 m^3)						
Are any overflow(s) at combined sewer locations? (Yes/No)						
What is the most common reason for event(s)?						
What is the name of the receiving water?						
Name the most important type of sensitive receptor?						
What is the approximate distance to the sensitive receptor? (km)						

Comments:

There is no infrastructure in place to allow a by-pass of the plant or pumping station. If a by-pass is necessary to avoid a blocked sewer or pumping station there is a contract in place with P&G Pumping for use of a pump truck that will be deployed to handle the movement of sewage.

Both pumping stations have high level alarms to warn of back-ups, and emergency diesel generators for power outage situations. The alarms trigger at the plant, and is also monitored by a security company which may initiate a call-out

2.11 SLUDGE (BIOSOLIDS) MANAGEMENT

Sludge Stabilization: Aerobic

Sludge Storage:	Holding Tank
Total available storage:	
Volume	159 m3
Retention Time	90-120 days
Certified waste hauler	Yes
Certificate numbers of haulers are:	P&G pumping (ECA# H-8700-17)
Method of Disposal/Utilization:	Agricultural
Certified waste disposal facility	Yes
Certificate number(s) of facilities are:	Lots 6 & 7 Con XIII (Former twp. of Wylie) Certificate# S-4131-33

In 2012, 700 m3 of sludge was land applied at Lots 6 & 7 Con XIII (Former twp. of Wylie) under ECA #S-4131-33. As a back up if sludge cannot be land applied (season, sludge characteristics) it may be taken to either the Pembroke STP or ROPEC in Ottawa for disposal.

It was also explained during the inspection that if the plant were to change configuration back to the low volume, extended aeration mode, consideration may need to be given to sludge storage as the configuration change would reduce the sludge storage capacity of the plant.

2.12 WASTEWATER COLLECTION SYSTEMS

1.	**Does this plant receive sewage from a Combined Sewer Collection System** (sanitary sewage, roof leaders, foundation drains, catch basins and/or storm water conveyed within a single pipe)?	○ Yes	● No	
2.	**How are bypasses, overflows and/or combined sewers being minimized or eliminated?**			
	a) Pollution Prevention and Control Plan (As described in Procedure F-5-5)	○ Yes	● No	○ Developing
	i. Other Plan	○ Yes	● No	○ Developing
	b) Characterization Study?	○ Yes	● No	○ Developing
	c) Implementation Plan?	○ Yes	● No	○ Developing

Comments:

Staff at the plant are also responsible for managing the collection system and both pumping stations.

The entire collection system in chalk river was cameraed around 5-6 years ago, since then, the town has been repairing and/or recameraing select sections at a time, based on identified problem areas and funding. In 2010 the town continued camera surveying part of their collection system to find and repair issues of infiltration and inflow.
This work was continued in 2012, and remains an important ongoing project to deal with the hydraulic loading issues at the STP.

The Town does not have any combined sewers; and has by-laws in place restricting sump pump and roof drains from being connected to the sanitary sewers, though these connections are reported to still be an issue.

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

No non-compliance issues were identified during the previous inspection of the STP. However, several other inspection findings were noted, and are listed below:

1. Flows have increased in 2011. The plant is still operating in the high flow contact stabilization mode. The municipality must continue to repair and reduce leaks to manholes and continue to make efforts to prevent infiltration or inflow into the collection system.

- **The plant is still operating in contact stabilization mode even though 2012 volumes were reduced from the last year. This may be because of the dry season as infiltration and storm water connections have been a noted issue. Collection system cameraing and repair work is and ongoing project. See Section 2.3 and Section 2.12 above for more details.**

2. The disinfection system should be operated to stay within the E.coli. monthly geometric mean limit of 200 CFU/100 mL.

- **In 2012 monthly E.coli levels ranged between less than 4 counts and over 4000 counts. Sample results from the tests that were in excess of the recommended 200 CFU/100ml are included in Appendix 'B' of this report. Note these issues may be linked to the noted hydraulic capacity issues at the facility. See Section 2.7 of this report.**

3. The operator has recommended that the aeration basin/clarifier system be drained, inspected and grit/debris removed and repairs made. This activity will require prior approval from the MOE under Ontario Regulation 675/98. The Director for this regulation is the Ottawa District Manager.

- **This had not been completed in 2012 and is a high priority for the plant operators. This may be linked to the reduced hydraulic capacity at the plant and make it more difficult for the STP to adequately deal with hydraulic shocks.**

3. The Town must continue to maintain a minimum flow within Blackduck Lake and Blackduck Creek. The outfall from the plant can become submerged and can limit the discharge volume if beaver dams impede flows in the Blackduck system. The Town must inspect and report on the flow conditions of Blackduck Lake and Blackduck Creek.

- Action was taken throughout 2012 to ensure that beavers were kept in check and Blackduck Creek did not back up and there were no issues at the STP.

4. The Water Treatment Plant can directly affect the sewage treatment process through the discharge of backwash water and sedimentary tank sludge. The sewage treatment plant is currently receiving backwash from one water treatment basin. The Town is conducting an Environmental Study Report with respect to the Water Treatment Plant. Due consideration must be made about any options that could affect the sewage treatment process and the operation of the sewage treatment plant.

- A study has been conducted to remove the backwash water generation from the water treatment plant, further study is to be done in 2013. **Again, consideration must be made to all aspects of the backwash issue including reducing hydraulic shocks to the STP, and ensuring that if WTP backwash effluent is still generated, that the characteristics of this effluent will not upset STP processes.**

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate ?

No

Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?

No

Specifics:

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?

Yes

☒ yes	Effluent quality did not meet the limits set out in the Certificate of Approval, Director's Order or Provincial Officer's Order
☐ yes	Effluent sampling and monitoring did not meet the requirements set out in a Certificate of Approval, Director's Order or Provincial Officer's Order
☐ yes	Facility operators are not certified in accordance with the *Licensing of Sewage Works Operators* Regulation
☐ yes	Waste carrier (sludge hauler) are not certified
☐ yes	Waste disposal facility (sludge disposal) are not approved

Specifics:

E. Coli levels of greater than 200 CFU / 100 ml was found on three occasions in 2012. This exceeds Ministry guidelines.

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?

No

Specifics:

Was there any indication of non-conformance or minor administrative non-compliance?

Yes
Legal Requirement (Administrative)

Specifics:

- At the time of inspection the STP was not operating as approved in the ECA. See Section 1.1 of this report.

5.0 ACTION(S) REQUIRED

Based on the inspection findings above, The Town of Laurentian Hills must provide **a written workplan** by mail, or electronically, addressing the Action Items listed below. Confirmation must be submitted to the Cornwall Area Office **by no later than May 24, 2013.** In the workplan please detail the actions that are, or will be taken, regarding the following action items:

1. The STP must be operated as approved in its ECA. This may require either replacement broken or offline parts, or amendment to the ECA.

2. Effort must continue to be made to resolve the hydraulic issues at the facility. As noted in Section 3.0 above, several avenues to do this are being pursued including collection system repair, grit removal, and management of the hydraulic load from the STP.

6.0 OTHER INSPECTION FINDINGS

- It is recommended that a summary of sampling events be included in the annual report (as an appendix) to easily demonstrate compliance with the sampling requirements.
- See Section 3.0 above for ongoing issues at the Chalk River STP.

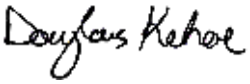
7.0 INCIDENT REPORT

Applicable
6337-95TRSV

8.0 ATTACHMENTS

CR APPEND B.pdf; CR Appendix A FINAL.pdf

PREPARED BY:
Environmental Officer:
Name: **Doug Kehoe**
District Office: **Cornwall Area Office**
Date: **2013/03/15**
Signature



REVIEWED BY:
District Supervisor:
Name: **Tara MacDonald**
District Office: **Ottawa District Office**
Date: **2013/03/30**

Signature:

File Storage Number: SI RE CH BL 410

Note:
"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"

Appendix “A”

Photographs

Photographs were taken by
Doug Kehoe, Environmental Officer,
on March 12, 2013.

1A) Aeration chamber
1B) Clarifier

2A) Part of sludge storage section

3) Chlorine storage vat

Appendix “B”

Sampling Results

Ontario Ministry of Environment
Laboratory Services Branch - 125 Resources Road
Etobicoke, Ontario M9P 3V6
FINAL REPORT(manager)

Login: **C195129**

Print Date: Jul. 29, 2012 10:25 AM By REPORTADMIN

**** REPRINTED ****

Program Code 130152402

Program: MOE OPERATIONS DIVISION
Study: SEWAGE, COMMUNAL (INCLUDES SWIP)
Project: EASTERN REGION - OTTAWA DIST.
Activity: INSPECTION OF MUNIC. STP -SWIP
Organization: District Manager Ottawa

Org. Id: 4614

Mail this copy to :

STRABERGER, KYLE
MOE - OTTAWA DISTRICT OFFICE
2430 DON REID DRIVE
OTTAWA,ONT
K1H 1E1

Final reports to : STRABERGER, KYLE

Approved for release by : DAVE MORSE Manager, Organic Contaminants Section

Approved date : Jul. 27, 2012

Inquiries to : PAUL YANG
Telephone : 416-235-6004
CHUNYAN HAO
Telephone : 416-235-6033

LOGIN DESCRIPTION: SEWAGE TREATMENT PLANTS OTTAWA 613-521-3450

The results relate only to items tested.
To provide customer service feedback on this report and/or other services provided by LaSB, please contact the LaSB HelpDesk at 416-235-6030 or the Customer Service Manager at 416-235-5831

Login: **C195129**

Print Date: Jul. 29, 2012 10:25 AM By REPORTADMIN

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Field Id	Station ID	Sample Location Description	Sampling Date	Time	Zone	Sampler Information
R1		DEEP RIVER SEWAGE TREATMENT PLANT	27 JUN 2012		5	

Sample ID: C195129-0001

Sample Comment Description:

MOE*LIMS Products Requested:

TE	E3060B	HG3060	TE	E3094B	MET3094	TE	E3182A	BODC3182
TE	E3188B	SS3188	TE	E3196A	IBC3196	TE	E3274A	LIC3274
TE	E3302A	ASSE3302	TE	E3366A	DISNUT3366	TE	E3368A	TOTNUT3368
TE	E3371A	EC3371						

Field Id	Station ID	Sample Location Description	Sampling Date	Time	Zone	Sampler Information
R2		PETAWAWA WATER POLUTION CONTROL PLANT	27 JUN 2012		5	

Sample ID: C195129-0002

Sample Comment Description:

MOE*LIMS Products Requested:

TE	E3060B	HG3060	TE	E3094B	MET3094	TE	E3182A	BODC3182
TE	E3188B	SS3188	TE	E3196A	IBC3196	TE	E3274A	LIC3274
TE	E3302A	ASSE3302	TE	E3366A	DISNUT3366	TE	E3368A	TOTNUT3368
TE	E3371A	EC3371						

Field Id	Station ID	Sample Location Description	Sampling Date	Time	Zone	Sampler Information
R3		PEMBROKE POLLUTION CONTROL CENTER	27 JUN 2012		5	

Sample ID: C195129-0003

Sample Comment Description:

MOE*LIMS Products Requested:

TE	E3060B	HG3060	TE	E3094B	MET3094	TE	E3182A	BODC3182
TE	E3188B	SS3188	TE	E3196A	IBC3196	TE	E3274A	LIC3274
TE	E3302A	ASSE3302	TE	E3366A	DISNUT3366	TE	E3368A	TOTNUT3368
TE	E3371A	EC3371						

Field Id	Station ID	Sample Location Description	Sampling Date	Time	Zone	Sampler Information
E3		CHALK RIVER SEWAGE TREATMENT PLANT	27 JUN 2012		5	

Sample ID: C195129-0004

Sample Comment Description:

MOE*LIMS Products Requested:

TE	E3060B	HG3060	TE	E3094B	MET3094	TE	E3182A	BODC3182
TE	E3188B	SS3188	TE	E3196A	IBC3196	TE	E3274A	LIC3274
TE	E3302A	ASSE3302	TE	E3366A	DISNUT3366	TE	E3368A	TOTNUT3368
TE	E3371A	EC3371						

Field ID:	E3
Sample ID:	C195129-0004
MOE*LIMS ID:	2012TE26-00044
Station ID:	
Collect Date:	27 JUN 2012
Sample Location Description:	CHALK RIVER SEWAGE TREATMENT PLANT
Sample Comments Description:	

Listid	Parmname	Value	Units	Qual	Rmk1
3060L1	Mercury	.02	ug/L	<=W	
3094L1	Aluminum	0.340	mg/L		
	Barium	0.014	mg/L		
	Beryllium	.001	mg/L	<=W	
	Cadmium	.001	mg/L	<=W	
	Calcium	9.60	mg/L		
	Chromium	.002	mg/L	<=W	
	Cobalt	.001	mg/L	<=W	
	Copper	0.006	mg/L	<T	
	Iron	0.098	mg/L		
	Lead	.005	mg/L	<=W	
	Magnesium	2.02	mg/L		
	Manganese	0.035	mg/L		
	Molybdenum	.005	mg/L	<=W	
	Nickel	.01	mg/L	<=W	
	Potassium	7.95	mg/L		
	Silver	.005	mg/L	<=W	
	Sodium	52.1	mg/L		
	Strontium	0.052	mg/L		
	Titanium	0.002	mg/L	<T	
	Vanadium	.001	mg/L	<=W	
	Zinc	0.029	mg/L		
	Hardness	32.4	mg/L		
3182L2	Oxygen demand;BOD-carbonaceous	1.2	mg/L		
3188L3	Solids; suspended	7.0	mg/L		
3302L4	Arsenic	.0005	mg/L	<=W	
	Selenium	.0005	mg/L	<=W	
3366L1	Nitrogen; nitrite	0.028	mg/L		
	Nitrogen; nitrate+nitrite	0.09	mg/L	<T	
	Nitrogen; ammonia+ammonium	8.47	mg/L		
	Phosphorus; phosphate	0.07	mg/L	<T	
3368L1	Nitrogen; total Kjeldahl	10.0	mg/L		
	Phosphorus; total	0.21	mg/L		
3371L3	Escherichia coli	4.0	c/100mL	<	

CODE	DESCRIPTION
<T	A MEASURABLE TRACE AMOUNT:INTERPRET WITH CAUTION
NDID	NO DATA: INSUFFICIENT DATA TO PERFORM CALC.
<=W	NO MEASURABLE RESPONSE (ZERO): <REPORTED VALUE
<	ACTUAL RESULT IS LESS THAN THE REPORTED VALUE

TEXT COMMENT

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date
C195129-0001	TE	E3060B	HG3060	6314	06-JUL-12
C195129-0001	TE	E3094B	MET3094	4307	23-JUL-12
C195129-0001	TE	E3182A	BODC3182	5217	16-JUL-12
C195129-0001	TE	E3188B	SS3188	5122	10-JUL-12
C195129-0001	TE	E3302A	ASSE3302	6342	12-JUL-12
C195129-0001	TE	E3366A	DISNUT3366	5319	05-JUL-12
C195129-0001	TE	E3368A	TOTNUT3368	5320	12-JUL-12
C195129-0001	TE	E3371A	EC3371	6515	29-JUN-12
C195129-0002	TE	E3060B	HG3060	6314	06-JUL-12
C195129-0002	TE	E3094B	MET3094	4307	23-JUL-12
C195129-0002	TE	E3182A	BODC3182	5217	16-JUL-12
C195129-0002	TE	E3188B	SS3188	5122	10-JUL-12
C195129-0002	TE	E3302A	ASSE3302	6342	12-JUL-12
C195129-0002	TE	E3366A	DISNUT3366	5319	05-JUL-12
C195129-0002	TE	E3368A	TOTNUT3368	5320	12-JUL-12
C195129-0002	TE	E3371A	EC3371	6515	29-JUN-12
C195129-0003	TE	E3060B	HG3060	6314	06-JUL-12
C195129-0003	TE	E3094B	MET3094	4307	23-JUL-12
C195129-0003	TE	E3182A	BODC3182	5217	16-JUL-12
C195129-0003	TE	E3188B	SS3188	5122	10-JUL-12
C195129-0003	TE	E3302A	ASSE3302	6342	12-JUL-12
C195129-0003	TE	E3366A	DISNUT3366	5319	05-JUL-12
C195129-0003	TE	E3368A	TOTNUT3368	5320	12-JUL-12
C195129-0003	TE	E3371A	EC3371	6515	29-JUN-12
C195129-0004	TE	E3060B	HG3060	6314	06-JUL-12
C195129-0004	TE	E3094B	MET3094	4307	23-JUL-12

C195129-0004	TE	E3182A	BODC3182	5217	16-JUL-12
C195129-0004	TE	E3188B	SS3188	5122	10-JUL-12
C195129-0004	TE	E3302A	ASSE3302	6342	12-JUL-12
C195129-0004	TE	E3366A	DISNUT3366	5319	05-JUL-12
C195129-0004	TE	E3368A	TOTNUT3368	5320	12-JUL-12
C195129-0004	TE	E3371A	EC3371	6515	29-JUN-12

LaSB Method Summary

Method	Method Description	Status	Status Description
E3060B	THE DETERMINATION OF MERCURY IN WATER, LIQUID INDUSTRIAL WASTE AND LANDFILL LEACHATE SAMPLES BY COLD VAPOUR-FLAMELESS ATOMIC ABSORPTION SPECTROPHOTOMETRY (CV-FAAS)	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3094B	THE DETERMINATION OF METALS IN FINAL EFFLUENT, INDUSTRIAL WASTE AND LANDFILL LEACHATES BY INDUCTIVELY COUPLED PLASMA-ATOMIC EMISSION SPECTROSCOPY (ICP-AES)	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3182A	THE DETERMINATION OF BIOCHEMICAL OXYGEN DEMAND IN SURFACE WATER AND SEWAGE EFFLUENTS BY DISSOLVED OXYGEN METER	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3188B	THE DETERMINATION OF SOLIDS IN LIQUID MATRICES BY GRAVIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3196A	LIMS CALCULATIONS-ION BALANCE	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3274A	LIMS CALCULATIONS-LANGELIERS INDEX	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3302A	THE DETERMINATION OF ARSENIC, SELENIUM AND ANTIMONY IN LIQUID INDUSTRIAL WASTE AND LANDFILL LEACHATES BY HYDRIDE - FLAMELESS ATOMIC ABSORPTION SPECTROPHOTOMETRY (HYD-FAAS)	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3366A	THE DETERMINATION OF AMMONIA NITROGEN, NITRITE NITROGEN, NITRITE PLUS NITRATE NITROGEN AND REACTIVE ORTHO-PHOSPHATE IN WATER, SEWAGE, LEACHATE AND INDUSTRIAL EFFLUENTS BY COLOURIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3368A	THE DETERMINATION OF TOTAL KJELDAHL NITROGEN AND TOTAL PHOSPHORUS IN WATER, SEWAGE, LEACHATE AND INDUSTRIAL WASTE BY COLOURIMETRY	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request
E3371A	A MEMBRANE FILTRATION METHOD FOR THE DETECTION AND ENUMERATION OF TOTAL COLIFORM, ESCHERICHIA COLI, PSEUDOMONAS AERUGINOSA AND FECAL STREPTOCOCCI	ROUTINE	Method has been fully validated, is deemed fit for purpose and has the associated Uncertainty information available upon request

*** End of Report ***

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B12-20506

Report To:

American Water Services - Chalk River
P.O Box 430, 15 Main St.
Chalk River Ontario K0J 1J0 Canada
Attention: Dave Ethier

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 14-Aug-12
DATE REPORTED: 29-Aug-12
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.: Chalk River WPCP
P.O. NUMBER: Hach/ Wims 9204
WATERWORKS NO.

			Client I.D.		Raw Sewage	Final Effluent		
			Sample I.D.		B12-20506-1	B12-20506-2		
			Date Collected		14-Aug-12	14-Aug-12		
Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed				
BOD	mg/L	3	SM 5210B	15-Aug-12/O	46	11		
Total Suspended Solids	mg/L	3	SM 2540D	15-Aug-12/O	304	16		
Nitrite (N)	mg/L	0.1	SM4110C	15-Aug-12/O	0.2	< 0.1		
Nitrate (N)	mg/L	0.1	SM4110C	15-Aug-12/O	0.3	0.1		
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	16-Aug-12/O	15.0	11.3		
Total Kjeldahl Nitrogen	mg/L	0.05	MOEE 3367	21-Aug-12/O	18.4	13.2		
Phosphorus-Total	mg/L	0.01	MOEE 3367	21-Aug-12/O	3.49	0.41		
Total Coliform	cfu/100mL	1	MOE E3371	15-Aug-12/O	20000000	20000		
E coli	cfu/100mL	1	MOE E3371	15-Aug-12/O	440000	> 4000		

CL resid = .61

K. Pipin

Krystyna Pipin , M. Sc.
Lab Supervisor

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B12-27259

Report To:

American Water Services - Chalk River
P.O Box 430, 15 Main St.
Chalk River Ontario K0J 1J0 Canada
Attention: Dave Ethier

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 24-Oct-12
DATE REPORTED: 31-Oct-12
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.: Chalk River WPCP
P.O. NUMBER: Hach/ Wims 9204
WATERWORKS NO.

			Client I.D.		Raw Sewage	Final Effluent		
			Sample I.D.		B12-27259-1	B12-27259-2		
			Date Collected		24-Oct-12	24-Oct-12		
Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed				
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	29-Oct-12/O	10.5	5.78		
Total Kjeldahl Nitrogen	mg/L	0.05	MOEE 3367	30-Oct-12/O	18.4	7.47		
Nitrite (N)	mg/L	0.1	SM4110C	25-Oct-12/O	< 0.1	< 0.1		
Nitrate (N)	mg/L	0.1	SM4110C	25-Oct-12/O	0.2	5.1		
Phosphorus-Total	mg/L	0.01	MOEE 3367	30-Oct-12/O	2.71	0.24		
BOD	mg/L	3	SM 5210B	26-Oct-12/O	63	3		
Total Suspended Solids	mg/L	3	SM 2540D	26-Oct-12/O	84	4		
Total Coliform	cfu/100mL	1	MOE E3371	24-Oct-12/O	4200000	> 20000		
E coli	cfu/100mL	1	MOE E3371	24-Oct-12/O	2600000	1080		

CL -96

K. Pipin

Krystyna Pipin , M. Sc.
Lab Supervisor

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B12-32069

Report To:

American Water Services - Chalk River
P.O Box 430, 15 Main St.
Chalk River Ontario K0J 1J0 Canada
Attention: Dave Ethier

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 19-Dec-12
DATE REPORTED: 28-Dec-12
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.: Chalk River WPCP
P.O. NUMBER: Hach/ Wims 9204
WATERWORKS NO.

			Client I.D.		Raw Sewage	Final Effluent		
			Sample I.D.		B12-32069-1	B12-32069-2		
			Date Collected		19-Dec-12	19-Dec-12		
Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed				
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	20-Dec-12/O	19.3	5.66		
Total Kjeldahl Nitrogen	mg/L	0.05	MOEE 3367	27-Dec-12/O	28.2	6.86		
Nitrite (N)	mg/L	0.1	SM4110C	20-Dec-12/O	< 0.1	0.3		
Nitrate (N)	mg/L	0.1	SM4110C	20-Dec-12/O	0.3	5.3		
Phosphorus-Total	mg/L	0.01	MOEE 3367	27-Dec-12/O	2.85	0.14		
BOD	mg/L	3	SM 5210B	21-Dec-12/O	71	< 3		
Total Suspended Solids	mg/L	3	SM 2540D	21-Dec-12/O	76	< 3		
Total Coliform	cfu/100mL	1	MOE E3371	20-Dec-12/O	7300000	8400		
E coli	cfu/100mL	1	MOE E3371	20-Dec-12/O	1200000	1020		

Cl Residual 1.1

K. Pipin

Krystyna Pipin , M. Sc.
Lab Supervisor

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

APPENDIX D
Chalk River WWTP Problem Definition Letter (Phase 1)

Stantec Consulting Ltd.
1505 Laperriere Avenue
Ottawa ON K1Z 7T1
Tel: (613) 722-4420
Fax: (613) 722-2799

November 23, 2012

File: 1634-01125

Town of Laurentian Hills
34465 Highway 17, R.R. #1
Deep River, Ontario, K0J 1P0

Attention: **Wayne Kirby, CAO**

Reference: **Town of Laurentian Hills – Community of Chalk River**
Wastewater Treatment Plant
Environmental Assessment – Phase 1 – Problem Definition

We are pleased to submit this letter-report for the above mentioned project.

Background and Project Understanding

The Chalk River Wastewater Treatment Plant (WWTP), located at 7 Blimkie Street, treats wastewater conveyed by the Chalk River sanitary sewer system using an extended aeration/contact stabilization process and discharges the treated effluent to Black Duck Creek, which drains to the Ottawa River. The secondary treatment process at the WWTP consists of a Circular "Ecodyne" package WWTP that can operate in two different modes, namely, a) extended aeration mode (capable of treating an average daily sewage flow of 363 m^3/d), and b) contact stabilization mode (capable of treating an average daily flow of 545 m^3/d). The WWTP was first approved in 1972 and modified later in 1989. Approximately 930 persons and 400 households in Chalk River are serviced by full municipal water and sanitary sewer services.

Problem Definition

On an annual basis the WWTP operates within its rated capacity however, flows to the WWTP occasionally exceed the rated capacity of the WWTP resulting in reduced treatment capacity and poorer effluent quality. The MOE reported in 2009 that the WWTP is under hydraulic stress, particularly during storm events, which could lead the WWTP to exceed the effluent criteria stipulated in the prevailing Certificate of Approval.

As the community grows the sanitary sewage flows will increase at the WWTP and impact its capacity. The Town has no plan to handle increased flows. The Town is in the process of reducing flows to the WWTP by diverting the backwash process water from the Chalk River Water Treatment Plant away from the sanitary sewers and realizing capacity at the WWTP however the additional capacity may not be sufficient to accommodate future growth and the peak instantaneous flows that occur during wet weather and snow melt.

Project Objective

The project objective is to provide the Town with a plan to reduce the hydraulic stress at the WWTP and increase the WWTP capacity to support future population growth. Achieving this objective will defer growth related wastewater treatment plant expansion requirements and the associated capital and operating costs.

Reference: Town of Laurentian Hills – Community of Chalk River
Wastewater Treatment Plant
Environmental Assessment – Phase 1 – Problem Definition

Achieving this objective requires a review of future growth impacts, sources of hydraulic stress at the WWTP, and confirmation of treatment capacity of the existing WWTP. The plan may recommend solutions such as reduction of wet weather inflows and groundwater infiltration (I/I), modifications to the WWTP within its rated capacity, or upgrades and expansion at the WWTP that will increase its rated capacity.

We trust that the above is satisfactory for your purpose at this time. We are available at your convenience to begin the project and we look forward to the opportunity to work closely with the Town of Laurentian Hills.

Please do not hesitate to contact the undersigned should you have any questions or require any further information.

Yours truly,

STANTEC CONSULTING LTD.

Dave Robertson, C.E.T.
Associate, Water
Tel: (613) 725-5568
Fax: (613) 722-2799
dave.robertson@stantec.com

Karyn Cornfield, M.Sc.Eng, P.Eng.
Project Manager, Water
Tel: (613) 724-4349
Fax: (613) 722-2799
karyn.cornfield@stantec.com

APPENDIX E
Process Capacity Evaluation Memo (February 28, 2013)

Memo

Stantec

To:	Dave Robertson	From:	Hao Tan
	Ottawa (Laperriere Ave) ON		Ottawa (Laperriere Ave) ON
File:	163401125	Date:	February 28, 2013

Reference: Chalk River Wastewater Treatment Plant Process Capacity Evaluation

This technical memorandum was developed to evaluate the treatment capacity of existing process units at Chalk River Wastewater Treatment Plant (WWTP) which was originally designed and constructed in the early1970s to provide secondary wastewater treatment through Contact Stabilization Process.

The purpose of the evaluation is to determine if the existing treatment facilities are still able to satisfy the design criteria stipulated in MOE Design Guidelines for Sewage Works (2008). The results of the evaluation are summarized briefly as follows and detailed calculation spreadsheet is provided in Appendix A for reference.

1. DESIGN BASIS

1.1. Design Plant Flow Rate

Currently the WWTP has a rated capacity of 545m^3/d when it is operated in Contact & Stabilization process mode. Maximum Monthly Flow (MMF) and Peak Daily Flow (PDF) are determined on the basis of the historical flow data collected from 2003 to 2012. The design influent flow rates are shown in Table 1.

Table 1: Design Flows

Flow	Unit	Value	Peak Factor
Average Daily Flow (ADF)	m^3/d	545	
Maximum Monthly Flow (MMF)		800	1.47
Peak Daily Flow (PDF)		1,379	2.53

1.2. Characteristics Of Plant Influent

The historical influent loadings (2010-2012) with respect to BOD_5, TSS, TP and TKN were obtained and reviewed. Table 2 presents the design influent concentrations at Average Daily Flow (ADF) and Maximum Monthly Flow (MMF).

Table 2: Design Influent Concentrations

Parameters	Unit	Average Daily Flow	Maximum Monthly Flow
BOD_5	mg/L	100	100
TSS		160	160
TP		4	4
TKN		25	25

1.3. Design Effluent Concentration

The effluent discharge criteria and design objectives are listed in Table 3.

Table 3: Design Effluent Concentration

Parameters	Unit	MOE Limit	Design Objective
$CBOD_5$	mg/L	25	15
TSS		25	15
TP		1.0	0.8
E.coli		200 / 100 ML	100 / 100 ML

1.4. Unit Process Design/Review Basis

All existing treatment facilities should be hydraulically capable of treating the anticipated peak sewage flow rates without overtopping channels and/or tanks. The evaluation of various process units in Chalk River WWTP is based upon the hydraulic, organic and inorganic loading rates listed in Table 4.

Table 4: Unit Process Design/Review Basis

Process Unit	Design/Review Basis	Unit	Value
Grit Removal Chamber	Design Peak Daily Flow	m^3/d	1,379
Contact & Stabilization Process	Average Daily BOD_5 Loading	$KgBOD_5/d$	55
Secondary Clarifier	Design Peak Daily Flow	m^3/d	1,379
Disinfection	Design Peak Daily Flow	m^3/d	1,379
Activated Sludge Return	100 % of Design Average Daily Flow	m^3/d	545
Aerobic Digester	Maximum Monthly Flow	m^3/d	800

2. PROCESS CAPACITY EVALUATION

2.1. Grit Removal Chamber

The existing grit removal chamber consists of 2 channels with 1 duty 1 standby setup. Each channel is 6m long and 0.38m wide. At the water depth of 0.23m, each grit removal channel can provide 32.6 seconds hydraulic residence time (HRT) at the peak daily flow of 1,379 m^3/d, which exceeds the minimum HRT requirement (30 seconds) in the MOE design guideline.

Table 5 Grit Removal Chamber

Description	Unit	MOE Sewage Design Guidelines	Rated capacity (ADF)	Max. Month Daily Flow (MMF)	Peak Daily Flow (PDF)	Note
Total flow rate	m^3/d		545	800	1,379	
	m^3/s		0.0063	0.0093	0.0160	
Number of grit channel			2	2	2	
Number of chambers in operation			1	1	1	
Capacity per chamber	m^3/s		0.0063	0.0093	0.0160	
Channel width	m	min 0.38	0.38	0.38	0.38	
Total Channel length	m		6	6	6	
Maximum water depth	m				0.228	9" (228 mm) on as-built
Total volume per channel	m^3				0.520	
Retention time	second	>=30@PDF			32.6	
Grit storage depth	m	0.15-0.3	0.075	0.075	0.075	

2.2. Contact & Stabilization Tank

The existing Contact Stabilization tank for BOD removal includes 1 contact zone and 1 stabilization zone. The volume of the contact zone and stabilization zone is 74.8 m^3 and 192.1 m^3 respectively. As shown in the Table 6, at the design average daily flow of 545m^3/d, Solid Residence Time (SRT) of 8 days and MLSS concentration of 2,000 mg/L, the organic loadings to Contact & Stabilization Tank can satisfy the design criteria recommended in MOE design guidelines for Contact & Stabilization Process.

Table 6 Contact & Stabilization Tank

Description	Unit	MOE Sewage Design Guidelines	Rated capacity (ADF)	Max. Month Daily Flow (MMF)	Peak Daily Flow (PDF)	Note
Plant flow rate	m^3/d		545	800	1,379	
BOD_5 Loading	Kg/d		55	80	138	
SRT	d	4-10	8	8	8	Assumed
MLSS in Contact zone	mg/L	1000-3000	2000	2000	2000	Assumed
Volume of Existing Contact Zone	m^3		74.8	74.8	74.8	
Volume of Calculated Contact Zone	m^3		40.1	40.1	40.1	
HRT in Existing contact zone	hour	0.33			0.998	Based on 100% RAS + PDF
Volume of Existing Stabilization Zone	m^3		192.1	192.1	192.1	
Volume of Calculated Stabilization Zone	m^3		75.8	111.1	190.7	
HRT in Existing Stabilization Zone	hour	4	8.4			Based on 100% ADF RAS
Organic loading	Kg/m^3.d	0.31-0.72	0.2	0.3	0.52	Based on existing contact and stabilization tankage
$F/MRatio_v$		0.2-0.5	0.06	0.10	0.16	

2.3. Secondary Clarifier

Currently the WWTP has a circular secondary clarifier with a diameter of 7.06m and a side water depth of 2.51m. Table 7 shows the operating parameters of the existing secondary clarifier at different plant flows.

Table 7 Secondary Clarifier

Description	Unit	MOE Sewage Design Guidelines	Rated capacity (ADF)	Max. Month Daily Flow (MMF)	Peak Daily Flow (PDF)	Note
Plant flow rate	m^3/d		545	800	1,379	
Tank Radius	m		3.53	3.53	3.53	
Side Water depth	m	3.6-4.6	2.51	2.51	2.51	
Tank Volume	m^3		98.46	98.46	98.76	
Weir length	m		33	33	33	Estimated
Surface overflow rate	m/d	<=37 @ PDF	13.9	20.4	35.2	
Sludge Loading	$Kg/m^2.d$	<240	56	69	99	
Weir loading	$m^3/m/d$	<=250@ PDF	16.5	24.2	41.7	

It can be found that at the peak daily flow of 1,379m^3/d, surface overflow rate, sludge loading and weir loading of the existing secondary clarifier can satisfy the design requirements recommended in MOE design guidelines.

However, the existing side water depth is only 2.51m which is much less than the recommended value (3.6-4.6m). As reported by Water Environment Federation (Clarifier Design, WEF Manual of Practice No. FD-8, 2005), the secondary clarifier with shallow side water depth may result in the deteriorated effluent quality and upset from hydraulic peaking.

In accordance with German ATV Design Standard (2000), Stantec calculated the maximum hydraulic capacity of the existing secondary clarifier with 2.51m side water depth and found that the existing tank could treat a peak flow of 700 m^3/d without the risk of sacrificing the effluent quality.

2.4. Chlorine Contact Tank

The volume of the existing chlorine contact tank is only 11.33 m^3 as per the as-built drawing, which can provide hydraulic residence time of 29.9 minutes at plant average daily flow of 545 m^3/d and 11.8 minutes at peak daily flow of 1,379 m^3/d. From Table 8, it can be seen that both HRTs are shorter than the ones recommended in MOE design guide marginally.

Table 8 Chlorine Contact Tank

Description	Unit	MOE Sewage Design Guidelines	Rated capacity (ADF)	Max. Month Daily Flow (MMF)	Peak Daily Flow (PDF)	Note
Plant low rate	m^3/d		545	800	1,379	
Tank Volume	m^3		11.3	11.3	11.3	
HRT	min	>=30@ADF >=15 @ PDF	29.9	20.3	11.8	

2.5. Aerobic digester

The existing aerobic digester has a total volume of 127.4 m^3 and is divided into 2 stages. The volume of stage 1 is 99.1 m^3 while the volume of stage 2 is 28.3 m^3.

In order to achieve 40% VSS destruction in the aerobic digester at design water temperature of 10 degree C, the solid residence time (SRT) in aerobic digester shall be about 60 days, which results in a minimum design volume of 236 m^3 for the aerobic digester. The size of the existing aerobic digester is only 50% as big as the required volume. Refer to attached Appendix A for detailed calculation

3. SUMMARY

From the process calculation attached in Appendix A of this memorandum, it can be concluded that:

- the existing grit removal chamber and contact & stabilization tank are still able to meet the design criteria stipulated in MOE Design Guidelines for Sewage Works (2008) and can handle the design hydraulic and organic loadings to satisfy the discharge limits through contact & stabilization process. Modification to the existing grit channel to increase the volume of the grit storage may be required.

- the side water depth of the existing secondary clarifier (2.51m) is much less than the design parameter (3.6-4.6m) recommended in MOE Design Guidelines for Sewage Works (2008), which may result in deteriorated effluent quality and upset from hydraulic peaking. Modification of the existing secondary clarifier or construction of a new secondary clarifier is suggested.

- the existing chlorine contact tank is short of hydraulic residence time. Tank modification or weir elevation adjustment may be required to provide more chlorine contact time.

- the existing aerobic digester is too small to provide adequate VSS destruction at low water temperature of 10 degree C. Expansion is suggested to increase the size of the existing aerobic digester.

- currently there is no dedicated sludge storage tank. Depending on the approach to dewater and dispose the sludge, min. 240 days storage time is recommended in MOE Design Guidelines for Sewage Works (2008).

STANTEC CONSULTING LTD.

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Attachment: Appendix A: Process Evaluation - Contact & Stabilization Process

Process Evaluation For Chalk River WWTP - Contact & Stabliztion Process

Description		Unit	MOE Sewage Design Guidelines	Rated capacity (ADF)	Max. Month Daily Flow (MMF)	Peak Daily Flow (PDF)	Note
Overall plant capacity		m^3/d		545	800	1,379	
		m^3/s		0.0063	0.0093	0.0160	
		Peaking factor			1.47	2.53	
Effluent Compliance Limits and design objective							
	BOD_5 (annual average)	mg/L		25	25		
	TSS (annual average)	mg SS/L		25	25		
	Total Phosphorus (monthly average)	mg P/L		1.0	1.0		
	E.Coli.,	CFU/100mL					
Raw Sewage Characteristics							
	BOD_5	mg/L		100	100	100	
	TSS	mg/L		160	160	160	
	TP	mg/L		4	4	4	
	TKN	mg/L		25	25	25	
	BOD_5 loading	kg/d		55	80	138	
	TKN loading	kg/d		14	20	34	
	Assume VSS/TSS			80%	80%	80%	
	Assume non-biodegradable VSS/VSS			30%	30%	30%	
Grit Removal Channel							
	Total flow rate	m^3/s		0.0063	0.0093	0.0160	
	Number of chambers			2	2	2	
	Number of chambers in operation			1	1	1	
	Capacity per chamber	m^3/s		0.0063	0.0093	0.0160	
	Channel width	m	min 0.38m	0.38	0.38	0.38	
	Total Channel length	m		6	6	6	
	Effective channel length	m		4	4	4	Assuming 50% inlet & outlet allowance
	Effective channel surface area	sqm		1.52	1.52	1.52	
	Grit settling velocity	m/min	0.75-1.1			0.630	
	Control velocity	m/s	0.3	0.3	0.3	0.3	
	Maximum water depth	m				0.228	9" (228 mm) on as-built
	Total volume per channel	m^3				0.520	
	Retention time	second	>=30@PF			32.6	
	Grit storage depth	m	0.15-0.3	0.075	0.075	0.075	Not enough
Contact & Stabilization Process							
	Total flow rate	m^3/d		545	800	1379	
	Total flow rate	m^3/s		0.0063	0.0093	0.0160	
	Number of tanks			1	1	1	
	Number of tanks in service			1	1	1	
	Flow Rate per tank	m^3/s		0.006	0.009	0.016	
	Actual volume of contact zone	cum		**74.8**	**74.8**	**74.8**	2640 cu ft on as-bult
	Actual HRT in contact zone	hr	0.33			0.933	Based on 100% ADF return + PDF
	Calculated volume of contact zone	cum		**40.1**			Based on 100% ADF return + PDF, 0.5hr HRT, <74.8 cum
	Actual HRT in contact zone	hr	0.5-1.0 (M&E)	3.292	2.243	1.301	Based on wastewater flow
	SRT	d	4-10	8	8	8	Assumed
	MLSS in contact zone (Xc)	mg TSS/L	1000-3000	2000	2000	2000	Assumed
	MLVSS in contact zone (Xcv)	mg VSS/L		1600.0	1600.0	1600.0	
	Sludge production-BOD removal	kg VSS/d		5.1	7.5	12.9	
	Inert TSS to aeration tank	kg TSS/d		17.44	25.60	44.13	
	Non-biodegradable VSS from the influent	kg VSS/d		20.9	30.7	53.0	
	Total VSS production (WAS) (Pv)	kg VSS/d		26.0	38.2	65.8	
	Total TSS production (WAS)	kg TSS/d		44.4	65.1	112.2	
	Total VSS/TSS in WAS			58.7%	58.7%	58.7%	$Xsv = Xrv + \frac{Pv}{RQ}$
	Total MLSS required in contact and stabilization zone	kg TSS		354.8	520.8	897.8	
	MLSS in contact zone	kg TSS		149.5	149.5	149.5	$R = \frac{Xc}{Xs - Xc}$
	Required MLSS in stabilization zone	kg TSS		205.3	371.3	748.3	
	Assumed SVI	MLSS		150.0	150.0	150.0	
	secondary clarifier underflow MLSS (Xr)	mg TSS/L		4666.7	4666.7	4666.7	Xr=0.7x1000000/SVI
	Secondary clarifier underflow MLVSS (Xrv)	mg VSS/L		3733.3	3733.3	3733.3	VSS/TSS=80%
	Assumed RAS ratio	%		74.60%	74.40%	74.00%	based on ADF
	MLVSS in stablization zone (Xsv)	mg VSS/L		3745.8	3751.7	3765.2	
	MLSS in stablization zone (Xs)	mg TSS/L		4682.3	4689.7	4706.6	
	calculated RAS return ratio	%		74.6%	74.4%	73.9%	
	Actual volume of stabilization zone	cum		**192.1**	**192.1**	**192.1**	6783 cu ft on as-built
	Calculated volume of stabilization zone	cum		**75.8**	**111.1**	**190.7**	<192.1 cum (actual volume)
	ACTURAL HRT in stabilization zone	hr	2-4 (M&E)	8.5	5.8	3.3	Based on wastewater flow
	ACTUAL HRT in stabilization zone	hr	4	8.5	8.5	8.5	Based on 100% ADF RAS
	Organic loading	kg BOD/cum.d	0.31-0.72	0.20	0.30	0.52	Base on contact and reaeration tankage
	F/Mv	kg BOD/kg MLVSS.d	0.2-0.5	0.06	0.10	0.16	

Process Evaluation For Chalk River WWTP - Contact & Stabliztion Process

Description		Unit	MOE Sewage Design Guidelines	Rated capacity (ADF)	Max. Month Daily Flow (MMF)	Peak Daily Flow (PDF)	Note
Overall plant capacity		m^3/d		545	800	1,379	
		m^3/s		0.0063	0.0093	0.0160	
		Peaking factor			1.47	2.53	
Secondary clarifiers							
	Total flow rate	m^3/d		545	800	1379	
	Total flow rate	m^3/s		0.0063	0.0093	0.0160	
	Number of Tanks			1	1	1	
	Number of tanks in service			1	1	1	
	Flow Rate per tank	m^3/s		0.006	0.009	0.016	
	Volume	cum		98.458	98.458	98.458	3477 cu ft on as-built
	Tank Radius	m		3.53	3.53	3.53	11'7" shown on as-built
	Surface Area	sqm		39.16	39.16	39.16	
	Water depth	m	3.6-4.6	2.514	2.514	2.514	Not engough
	SOR	$m^3/m^2/d$	37 @ PF	13.9	20.4	35.2	
	HRT	hr		4.34	2.95	1.71	
	Chemical sludge production	kg TSS/d		9.3	13.6	23.5	
	Sludge loading in SC	kg/sqm.d	<240	55.91	69.04	98.86	based on 100% ADF RAS
	Effluent Weir Length	m		33.0	33.0	33.0	Estimated from as-built dwg
	Weir Loading	$m^3/m/d$	<=250@PF	16.5	24.2	41.7	
	WAS Production in aeration tank	kg TSS/d		44.4	65.1	112.2	
	Total sludge to be wasted	kg TSS/d		53.6	78.7	135.7	
	WAS TSS	mg/L		4666.7	4666.7	4666.7	
		%		0.47%	0.47%	0.47%	
	WAS Flow	L/d		11492.23	16869.33	29078.50	
Chlorine Contact Tank							
	Total flow rate	m^3/d		545	800	1379	
	Total flow rate	m^3/s		0.0063	0.0093	0.0160	
	Number of Tanks			1	1	1	
	Flow Rate per tank	m^3/s		0.0063	0.0093	0.0160	
	Tank volume	m^3		11.33	11.30	11.30	400 cu ft shown on as-built
	HRT	min	>30 min @ ADF >15 min @PF	29.9	20.3	11.8	Not enough
Aerobic Digester							
	Total sludge into the digesters	kg TSS/d		53.6	78.7		
	Total VSS	kg VSS/d		26.0	38.2		
	Total VSS to be digested	kg VSS/d		5.1	7.5		
	Fraction of VSS in digester suspended solids (Pv)			48.5%	48.5%		
	WAS TSS	%		0.47%	0.47%		
	Total sludge flow to digester	m^3/d		11.5	16.9		
	Volume of existing digester stage 1	cum		99.1	99.1		3500 cu ft on as-bult
	Sludge loading in stage 1	kg vss/cum.d	<1.6	0.26	0.39		
	Tank depth	m	3.6-4.6	3.0	3.0		
	Minimum design temp.	Degree C	10	10.0	10.0		
	Design solid residence time	d	Min 45	60.0	60.0		
Option 1 Tank volume calculation - Continous operation without decanting in digester	VSS destruction at 10 degree C	%		40.0%	40.0%		
	Mass of volatile solids removed per day	kg VSS/d		2.0	3.0		
	Solid concentration of sludge into the digesters (X_i)	mg/L		4,666.7	4,666.7		$V = \frac{Q(X_i + YS_i)}{X(k_d P_v + 1/\theta)}$
	Digester suspended solid concentration (X)	mg/L		4,489.6	4,489.6		
	Reaction rate k_d in winter (10 degree C)	d-1		0.06	0.06		
	Fraction of VSS in digester suspended solids (Pv)	%		48.5%	48.5%		
	Required digester volume	m^3		**261**	**383**		
	Volume of existing digester stage 1	cum		99.1	99.1		3500 cu ft on as-built
	Volume of existing digester stage 2	cum		28.3	28.3		1000 cu ft on as-built
	Total of existing aerobic digester	cum		127.4	127.4		4500 cu ft, not big enough
Option 2 Tank volume calculation with decanting	Decanted digested sludge concentration	%		2.00%	2.00%		Assumed
	SRT residence time	d		60	60		
	DECANTED SOLIDS VOLUME	cum/d		2.68	3.94		
	Digester tank volume	cum		**160.9**	**236.2**		

APPENDIX F
Climate Data

Climate Data for Chalk River WWTP EA Report

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation and Temperature[1]													
Mean Temperature (°C)	-12.1	-9.8	-3	5.1	12.6	17.5	20	18.7	13.7	7.3	0.3	-7.9	5.2
Rainfall (mm)	14.2	8.7	31.4	51.4	80.2	88.3	86.8	82.1	84.6	76.7	48.4	16.6	669
Snowfall (cm)	43.7	37.7	30.7	9.1	1.4	0	0	0	0	2.7	24.3	45.8	195
Total P (mm)	56.7	45.3	62	60.4	81.6	88.3	86.8	82.1	84.6	79.3	72.3	60.9	860
Wind[2]													
Wind Speed (km/h)	11.2	10.6	11.9	12	10.7	10.2	9.2	8.8	9.9	10.9	11.6	11.2	10.7
Maximum Hourly Speed (km/h)	58	53	**65**	57	48	52	48	52	48	59	56	56	
Maximum Gust Speed (km/h)	80	77	95	107	78	85	111	**113**	98	85	96	85	
Most Frequent Direction	W	W	E	E	E	E	E	E	E	E	SE	W	E
Direction of Maximum Gust	W	W	SW	S	W	NW	SW	W	W	W	SW	SW	W
Extreme Wind Chill	**-51.7**	-46	-38.4	-25.8	-11.6	-4.3	1	-3.4	-7.9	-14.1	-33.3	-45.3	

[1, 2]Environment Canada, Canadian Climate Normals Data, 1971 to 2000

Precipitation and Temperature Data:
Chalk River AECL (Climate ID: 6101335)
Latitude: 46°03' N
Longitude: 77°22' W
Elevation: 121.90 m

Wind Data:
Petawawa A (Climate ID: 6106398)
Latitude: 45° 57' N
Longitude: 77° 19' W
Elevation: 130.1 m

APPENDIX G
Air Quality Report

3.0 Particulate Matter in the Air

Airborne particulate matter is the general term used to describe a mixture of microscopic solid particles and liquid droplets suspended in air. Particulate matter is classified according to its aerodynamic size, mainly due to the different health effects associated with particles of different diameters. Fine particulate matter, also referred to as respirable particles, is denoted as $PM_{2.5}$ and refers to particles that are less than 2.5 microns in diameter. Due to their small size, they can penetrate deep into the respiratory system. To put this in perspective, $PM_{2.5}$ is approximately 30 times smaller than the average diameter of a human hair.

Particles originate from many different industrial and transportation sources, as well as natural sources. They may be emitted directly from a source or formed in the atmosphere by the transformation of gaseous emissions. This chapter discusses the monitoring results from Ontario's ambient $PM_{2.5}$ monitoring network.

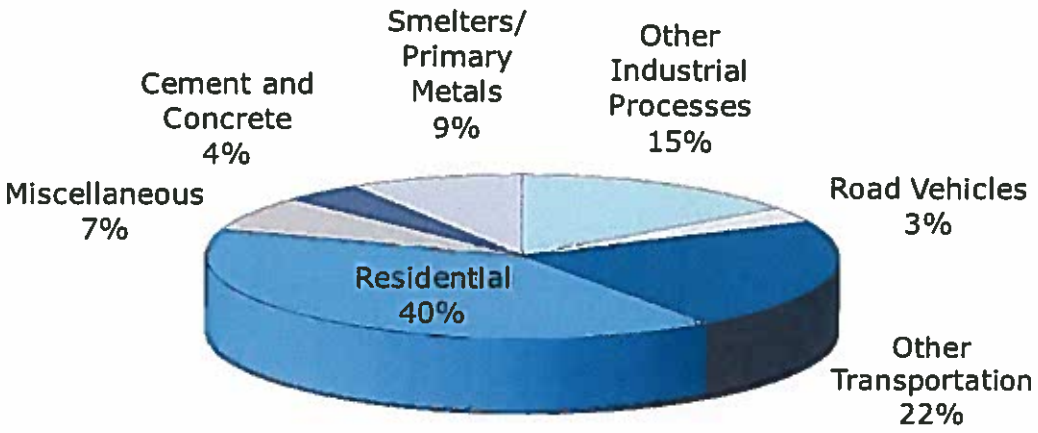
3.1 Characteristics, sources and effects

Particulate matter includes aerosols, smoke, fumes, dust, fly ash and pollen. Its composition varies with origin, residence time in the atmosphere, time of year and environmental conditions. Fine particulate matter may be emitted directly to the atmosphere as a by-product of fuel combustion. Major sources of $PM_{2.5}$ include motor vehicles, smelters, power plants, industrial facilities, residential fireplaces and wood stoves, agricultural burning and forest fires, or may be formed indirectly in the atmosphere through a series of complex chemical reactions.

Figure 3.1 shows the 2009 estimates of Ontario's primary $PM_{2.5}$ emissions from point, area and transportation sources. The residential and transportation sectors accounted for 40 per cent and 25 per cent of $PM_{2.5}$ emissions, respectively, whereas industrial processes accounted for 28 per cent. The major contributor to residential emissions is fuel wood combustion (e.g. fireplaces, wood stoves).

Significant amounts of $PM_{2.5}$ measured in southern Ontario are of secondary formation and of transboundary origin. During periods of elevated concentrations of $PM_{2.5}$ in Ontario, it is estimated that there are significant contributions from the U.S., specifically to border communities such as: Windsor; Port Stanley, located on the northern shore of Lake Erie; Grand Bend and Tiverton, located on the eastern shores of Lake Huron; and Parry Sound, located on the eastern shore of Georgian Bay.

Figure 3.1
Ontario $PM_{2.5}$ Emissions by Sector
(Emissions from Point/Area/Transportation Sources,
2009 Estimates)

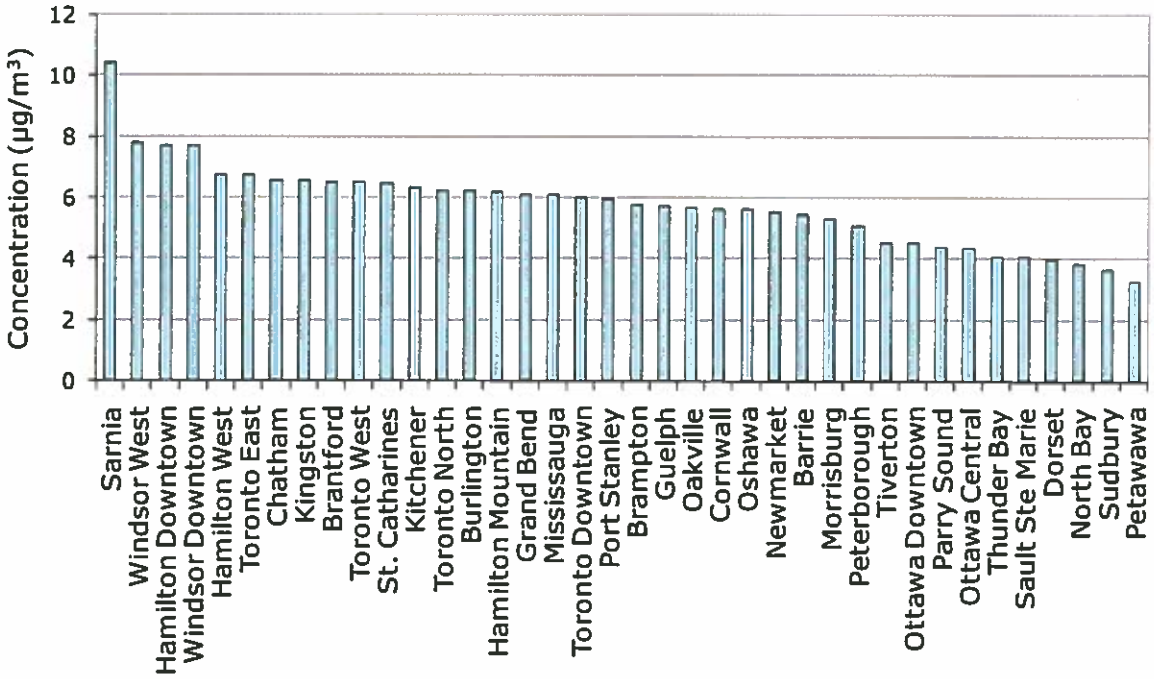


Exposure to $PM_{2.5}$ is associated with several serious health effects, including premature death. People with asthma, cardiovascular or lung disease, as well as children and elderly people, are considered to be the most sensitive to the effects of $PM_{2.5}$. Adverse health effects have been associated with exposure to $PM_{2.5}$ during both short periods such as a single day, and longer periods of a year or more. Fine particulate matter may also be responsible for environmental impacts such as corrosion, soiling, damage to vegetation and reduced visibility.

3.2 Monitoring results in 2010

In 2010, each of Ontario's 40 ambient air monitoring sites operated a Tapered Element Oscillating Microbalance (TEOM) instrument operating at 30°C with a Sample Equilibration System (SES) to measure the $PM_{2.5}$ concentrations on an hourly basis. As shown in Figure 3.2, the 2010 annual mean $PM_{2.5}$ concentrations ranged from 3.2 micrograms per cubic metre ($\mu g/m^3$) in Petawawa to 10.4 $\mu g/m^3$ in Sarnia. The 24-hour maximum $PM_{2.5}$ concentrations measured at urban sites ranged from 15 $\mu g/m^3$ reported in Thunder Bay to 57 $\mu g/m^3$ at Cornwall, and at rural sites ranged from 18 $\mu g/m^3$ in Petawawa to 58 $\mu g/m^3$ in Morrisburg. The 24-hour maximum $PM_{2.5}$ concentrations were recorded on May 31, 2010 at both Cornwall and Morrisburg due to the long-range transport of smoke from forest fires in the province of Quebec at the time. The $PM_{2.5}$ reference level of 30 $\mu g/m^3$ for a 24-hour period was exceeded at 10 of the 40 sites in 2010. Kingston and Sarnia each recorded six days, the highest number of days in Ontario, with 24-hour $PM_{2.5}$ concentrations greater than 30 $\mu g/m^3$.

Figure 3.2
Annual Mean $PM_{2.5}$ Concentrations Across Ontario
(2010)



Note: London and Belleville did not meet the data requirements to report a valid annual mean.

3.3 Trends

The $PM_{2.5}$ annual composite mean during 2010 was 5.9 µg/m³. This is a slight increase of 0.4 µg/m³ when compared to 2009. Since 2003, there has been approximately a 30 per cent decrease in composite annual means, as shown in Figure 3.3. The slight increase in the 2005 annual composite mean is related to the high incidence of smog episodes experienced in the 2005 smog season, which resulted in the issuance of 15 smog advisories covering 53 days.

APPENDIX H
OMNR Pembroke District Species at Risk List and Renfrew County Migrant Species at Risk

OMNR Pembroke District Species at Risk (v. 2012.02.29)

The following list is compiled for information purposes only to assist with local SAR related works. List is arranged by status and taxa
Please refer to official provincial and federal lists available at the following websites:
Ontario(SARO): http:\\www.e-laws.gov.on.ca\html\regs\english\elaws_regs_080230_e.htm
Canada (SARA): www.speciesatrisk.gc.ca
COSEWIC: www.cosewic.gc.ca

Species	Ontario Status (SARO)	National Status (SARA / COSEWIC*)	ESA Habitat (Regulated or General)
American Ginseng (Panax quinqefolium)	END	END	on or before 2013
Butternut (Juglans cinerea)	END	END	on or before 2013
Flooded Jellyskin (Leptogium rivulare)	THR	THR	on or before 2013
Pale-bellied Frost Lichen (Physconia subpallida)	END	END	X
American White Pelican (Pelecanus erythrorhynchos)**	THR	NAR	X
Barn Owl (Tyto alba)	END	END	X
Golden Eagle (Aquila chrysaetos)	END	NAR	X
Kirtland's Warbler (Setophaga kirtlandii)	END	END	X
Loggerhead Shrike (Lanius ludovicianus migrans)	END	END	X
Bobolink (Dolichonyx oryzivorus)	THR	THR	X
Chimney Swift (Chaetura pelagica)	THR	THR	X
Least Bittern (Ixobrychus exilis)	THR	THR	on or before 2013
Peregrine Falcon (Falco peregrinus)	THR	SC	X
Whip-poor-will (Caprimulgus vociferus)	THR	THR	X
Bald Eagle (Haliaeetus leucocephalus alascanus)	SC	NAR	n/a
Black Tern (Chilidonias niger)	SC	NAR	n/a
Canada Warbler (Wilsonia canadensis)	SC	THR	n/a
Cerulean Warbler (Dendroica cerulea)	THR	END	X
Common Nighthawk (Chordeiles minor)	SC	THR	n/a
Golden-winged Warbler (Vermivora chrysoptera)	SC	THR	n/a
Olive-sided Flycatcher (Contopus cooperi)	SC	THR	n/a
Red-headed Woodpecker (Melanerpes erythrocephalus)	SC	THR	n/a
Rusty Blackbird (Euphagus carolinus)	SC	SC	n/a
Short-eared Owl (Asio flammeus)	SC	SC	n/a
Barn Swallow (Hirundo rustica)	THR	THR	X
Eastern Meadowlark (Sturnella magna)	THR	THR	X
Wood Turtle (Glyptemys insculpta)	END	THR	X
Blanding's Turtle (Emydoidea blandingii)	THR	THR	on or before 2013
Eastern Musk Turtle (Sternotherus odoratus)	THR	THR	on or before 2013
Spiny Softshell (Apalone spinifera)	THR	THR	on or before 2013
Northern Map Turtle (Graptemys geographica)	SC	SC	n/a
Snapping Turtle (Chelydra serpentina)	SC	SC	n/a
Western Chorus Frog (Pseudacris tristeriata)		THR	n/a
Eastern Cougar (Felis (Puma) concolor concolor)	END	DD	X
Eastern Wolf (Canis lupus lycaon)	SC	SC	n/a
Little Brown Myotis (Bat) (*Myotis lucifugus*)		END	n/a
Northen Myotis (Northern Long-eared Bat) (*Myotis septentrionalis*)		END	n/a
Tri-colored Bat (Eastern Pipistrelle) (*Perimyotis subflavus*)		END	n/a
American Eel (Anguilla rostrata)	END	SC	on or before 2013
Lake Sturgeon (Acipenser fulvescens)	THR (GL-SL pop.)	THR (GL-SL pop.)	X
River Redhorse (Moxostoma carinatum)	SC	SC	n/a
Hickorynut (Obovaria olivaria)	END	END	X
Eastern Ribbonsnake (Thamnophis sauritius)	SC	SC	n/a
Milksnake (Lampropeltis triangulum)	SC	SC	n/a
Bogbean Buckmoth (Hemileuca spp.)	END	END	X
Monarch Butterfly (Danaus plexippus)	SC	SC	n/a

END – Endangered
THR – Threatened
SC – Special Concern
NAR – Not at risk
DD - Data Deficient

COSEWIC = Committee on Status Endangered Wildlife in Canada
SARA = Species at Risk Act (Federal)
SARO = Species at Risk Ontario List (O.Reg 230)
GL-SL pop.= Great Lakes St. Lawrence Population
ESA = Endangered Species Act 2007

* COSEWIC status based on recommendation, may not yet be SARA regulated

Possible or Migrant SAR for Renfrew County (based upon known provincial distribution and presence of suitable habitat in Renfrew County)

Species	Ontario Status (SARO)	National Status (SARA / COSEWIC)	ESA Habitat (Regulated or General)
Blunt-lobed Woodsia (Woodsia obtusa)	END	THR	on or before 2013
Henslow's Sparrow (Ammodramus henslowii)	END	END	X
Piping Plover (Charadrius melodus circumcinctus)	END	END	on or before 2013
Red Knot (Calidris canutus rufa) **	END	END	on or before 2013
Louisiana Waterthrush (Seiurus motacilla)	SC	SC	n/a
Whooping Crane (Grus americana)**		END	n/a
Yellow Rail (Coturnicops noveboracensis)	SC	SC	n/a
Spotted Turtle (Clemmys guttata)	END	END	on or before 2013
Grey Fox (Urocyon cinereoargenteus)	THR	THR	on or before 2013
Shortjaw Cisco (Coregonus zenithicus)	THR	THR	on or before 2013
Northern Brook Lamprey (Ichthyomyzon fossor)	SC	SC	n/a
Deepwater Sculpin (Myoxocephalus thompsonii)	NAR	SC	n/a
Eastern Hog-nosed Snake (Heterodon platirhinos)	THR	THR	on or before 2013
Gray Eastern Ratsnake (Pantherophis spiloides)	THR	THR (GL-SL pop.)	X
Common Five-lined Skink (Plestiodon fasciatus)	SC (GL-SL pop.)	SC (GL-SL pop.)	n/a
Northern Barrens Tiger Beetle (Cicidela patruela)	END	END	X
Rapids Clubtail (Gomphus quadricolor)	END	END	X
West Virginia White (Pieris virginiensis)	SC		n/a
Rusty-patched Bumble Bee (Bombus affinis)	END	END	X

** = migrant

APPENDIX I
Screening for Archaeological Potential (Working Checklist)

Ministry of Tourism and Culture
Criteria for Determining Archaeological Potential

A Checklist for the Non-Specialist

Feature of Archaeological Potential		Yes	No	Unknown
1.	Known archaeological sites within 300 m of property	❑	✓	❑

Physical Features		Yes	No	Unknown
2.	Water on or near the property If yes, what kind of water?	❑	❑	❑
	a) Primary water source (lake, river, large creek, etc) ▪ within 300 m, OR ▪ 50 m for properties in northern Ontario and Canadian Shield terrain*	✓	❑	❑
	b) Secondary water source (stream, spring, marsh, swamp, etc) ▪ within 300 m, OR ▪ 50 m for properties in northern Ontario and Canadian Shield terrain*	✓	❑	❑
	c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc) ▪ within 300 m, OR ▪ 150 m for properties in northern Ontario and Canadian Shield terrain*	❑	❑	✓
3.	Elevated topography on property (knolls, drumlins, eskers, plateaus, etc)	❑	❑	✓
4.	Pockets of sandy soil in a clay or rocky area on property	✓	❑	❑
5.	Distinctive land formations on property (mounds, caverns, waterfalls, peninsulas, etc)	❑	✓	❑

Cultural Features		Yes	No	Unknown
6.	Known burial site or cemetery on or adjacent to the property (cemetery is registered with the Cemeteries Regulation Unit)	❑	❑	✓
7.	Food or scarce resource harvest areas on property (traditional fishing locations, agricultural/berry extraction areas, etc)	❑	❑	✓
8.	Indications of early Euro-Canadian settlement within 300 m of property (monuments, cemeteries, structures, etc)	❑	❑	✓
9.	Early historic transportation routes within 100 m of property (historic road, trail, portage, rail corridor, etc)	❑	❑	✓

Property-specific Information		Yes	No	Unknown
10.	Property is designated and/or listed under the *Ontario Heritage Act* (municipal register and lands described in Reg. 875 of the *Ontario Heritage Act*)	❑	✓	❑
11.	Local knowledge of archaeological potential of property (from aboriginal communities, heritage organisations, municipal heritage committees, etc)	❑	❑	✓
12.	Recent ground disturbance[†] (post-1960, extensive and deep land alterations)	✓	❑	❑

The entire property should be screened for archaeological potential, not only the footprint where work is proposed.

*Northern Ontario is defined as Manitoulin Island, the Districts of Muskoka, Haliburton and Nipissing, and areas to the north. The Canadian Shield is defined as the area of Ontario underlain by the Precambrian Shield.

[†] Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to extensive and deep land alterations that have severely damaged the integrity of any archaeological resources. This is commonly referred to as 'disturbed' or 'disturbance', and may include: quarrying, major landscaping involving grading below topsoil, building footprints, sewage and infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping do not necessarily affect archaeological potential.

Scoring the results:

If **Yes** to <u>any</u> of **1**, **2a-c, 6** or **11**	→ archaeological potential is **determined –** assessment is required
If **Yes** to <u>two or more</u> of **3 to 5 or 7-10**	→ archaeological potential is **determined –** assessment is required
If **Yes** to **12** <u>or</u> **No** to **1 to 10**	→ **low** archaeological potential is **determined –** assessment may or may not be required (depending on answers from 1-11)
If 3 or more **Unknown**	→ more research is required **(See note below for more information)**

Note: If archaeological potential features are unknown, a professional archaeologist licensed under the *Ontario Heritage Act* should be retained to carry out a minimum Stage 1 archaeological assessment report confirming potential or low potential. All reports are to be in compliance with provincial archaeological assessment standards and guidelines.

APPENDIX J
Screening for Heritage Resources (Working Checklist)

Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

Step 1 – Screening for Recognized Cultural Heritage Value

YES	NO	Unknown	
❑	☑	❑	1. Is the subject property designated or adjacent* to a property designated under the *Ontario Heritage Act*?
❑	☑	❑	2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List)
❑	❑	☑	3. Is the subject property within or adjacent to a Heritage Conservation District?
❑	❑	☑	4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?
❑	☑	❑	5. Is there a provincial or federal plaque on or near the subject property?
❑	☑	❑	6. Is the subject property a National Historic Site?
❑	❑	☑	7. Is the subject property recognized or valued by an Aboriginal community?

Step 2 – Screening Potential Resources

YES	NO	Unknown	
			Built heritage resources
			1. Does the subject property or an adjacent property contain any buildings or structures **over forty years old**† that are:
❑	❑	☑	▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)
❑	❑	☑	▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)
❑	❑	☑	▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)
❑	❑	☑	▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)
❑	☑	❑	▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)
❑	☑	❑	2. Is the subject property or an adjacent property associated with a known architect or builder?
❑	☑	❑	3. Is the subject property or an adjacent property associated with a person or event of historic interest?
❑	❑	☑	4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?
YES	**NO**	**Unknown**	**Cultural heritage landscapes**
			5. Does the subject property contain landscape features such as:
❑	☑	❑	▪ Burial sites and/or cemeteries
❑	☑	❑	▪ Parks or gardens
❑	☑	❑	▪ Quarries, mining, industrial or farming operations
❑	☑	❑	▪ Canals
❑	☑	❑	▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)
❑	☑	❑	▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)
❑	☑	❑	6. Is the subject property within a Canadian Heritage River watershed?
❑	☑	❑	7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?
❑	❑	☑	8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons?

Note:

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

Municipal Clerk or Planning Department – Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

Ontario Heritage Trust – Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: Ontario Heritage Trust

Parks Canada – A list of National Historic Sites can be found on the website: Parks Canada

Ministry of Tourism and Culture – The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. Ontario Heritage Properties Database

Local or Provincial archives

Local heritage organizations*, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.*

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is “unknown”, further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

† The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the *Ontario Heritage Act*.

Step 3 – Screening for Potential Impacts		
YES	**NO**	**Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?**
❑	❑	**Destruction, removal or relocation** of any, or part of any, heritage attribute or feature.
❑	❑	**Alteration** (which means a change in any manner and includes restoration, renovation, repair or disturbance).
❑	❑	**Shadows** created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.
❑	❑	**Isolation** of a heritage attribute from its surrounding environment, context or a significant relationship.
❑	❑	**Direct or indirect obstruction** of significant views or vistas from, within, or to a built or natural heritage feature.
❑	❑	**A change in land use** such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces.
❑	❑	**Soil disturbance** such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.

* For the purposes of evaluating potential impacts of development and site alteration “adjacent” means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.

APPENDIX K
Preliminary Cost Estimates (Class C) for Option 3 and Option 4

	ITEM Description	UNIT	QUANTITY	UNIT PRICE			TOTAL PRICE
				Material	Labor	Combined	
Option 3 EQUALIZATION TANK ($3600\ m^3$)	Excavation	m^3	5159			$ 20	$ 103,180
	Cast-in-place concrete including reinforcing steel	m^3	650			$ 1,200	$ 780,000
	100mm dia. PVC pipe	m	20			$ 450	$ 9,000
	300mm dia. PVC sewer	m	30			$ 500	$ 15,000
	Coarse bubble diffusers For Tank Mixing	ea	250	$ 50	$ 50	$ 100	$ 25,000
	Air Piping	LS	1			$ 50,000	$ 50,000
	Sluice gate (300x300)	ea	5			$ 10,000	$ 50,000
	Air blower (1 duty 1 stanby) Power:50 HP	ea	2	$ 30,000	$ 15,000	$ 45,000	$ 90,000
	Pump (1 duty 1 stanby) Power:4 HP	ea	2	$ 5,000	$ 3,000	$ 8,000	$ 16,000
	Electrical and Instrumentation	ls	1			$106,000	$ 106,000
						Subtotal construction cost	**$ 1,244,180**
						Mob/Demob	$ 62,209
						Insurance, bond & permit	$ 37,325
						Overhead and Profit	$ 186,627
						Total construction cost	**$ 1,530,341**
						Contingency (20%)	$ 306,068
						Total contract cost	**$ 1,836,410**
						Engineering, approvals, design, project management, contract administration & construction review services	**$ 1,046,754**
						Total cost	**$ 2,883,163**

	ITEM Description	UNIT	QUANTITY	UNIT PRICE			TOTAL PRICE
				Material	Labor	Combined	
Option 4 SECONDARY CLARIFIER (3.5WX15.5LX4D, m)	Excavation	m^3	710			$ 20	$ 14,200
	Cast-in-place concrete including reinforcing steel	m^3	120			$ 1,200	$ 144,000
	100mm dia. PVC pipe	m	50			$ 450	$ 22,500
	Sluice gate (300x300)	ea	4			$ 10,000	$ 40,000
	Pump (1 duty 1 stanby) Power:2 HP	ea	2	$ 3,000	$ 3,000	$ 6,000	$ 12,000
	Sludge collector	ea	1			$ 60,000	$ 60,000
	Electrical mechanical and Instrumentation	ls	1			$ 72,000	$ 72,000
						Subtotal construction cost	**$ 364,700**
						Mob/Demob	$ 18,235
						Insurance, bond & permit	$ 10,941
						Overhead and Profit	$ 54,705
						Total construction cost	**$ 448,581**
						Contingency (20%)	$ 89,716
						Total contract cost	**$ 538,297**
						Engineering, approvals, design, project management, contract administration & construction review services	**$ 306,829**
						Total cost	**$ 845,127**

APPENDIX L
Notice of Study Commencement for Option 3 and Option 4

Town of Laurentian Hills
Chalk River Wastewater Treatment Plant
Phase 1 and 2 (Schedule B) Class Environmental Assessment
Notice of Study Commencement

The Town of Laurentian Hills is commencing the environmental assessment planning for the Chalk River Wastewater Treatment Plant (WWTP). The Ontario Ministry of the Environment has reported to the Town that under wet weather flow the WWTP experiences hydraulic stress. The project may be limited to the incorporation of new to mitigate the hydraulic stress and/or replace existing component(s) some of which may have reached its useful life cycle at the facility. The planning process will evaluate alternative options to correct the noted deficiency while taking into consideration the various social and economic environments.

This project is being planned under Schedule 'B' of the Municipal Class Environmental Assessment. An optional Open House, to be advertised separately, may be scheduled during the first quarter of 2013 to provide further information to the public once the alternatives have been evaluated. Public consultation is a key component of the planning process and public comments are invited for use during the planning process.

For further information or to provide input/comments on this project please contact M. Wayne Kirby, Chief Administrative Officer/Clerk, Town of Laurentian Hills at the address noted below. Subject to comments received, the Town of Laurentian Hills intends to proceed with the detailed design, tendering, and construction of the recommended works.

M. Wayne Kirby, chief Administrative Officer
Town of Laurentian Hills
354465 Highway 17
Pointe Alexander, R.R. #1
Deep River, Ontario
K0J 1P0

Tel.: (613) 584-3114
Fax: (613) 584-3285

Email: cao@laurentianhills.ca

APPENDIX M
Meeting Notes

Meeting Notes

Town of Laurentian Hills - Chalk River Water Treatment Plant Operations Review

Project Meeting / FILE 1634-01125

Date/Time:	September 27th, 2012, 9:30 AM	
Place:	Chalk River Water Treatment Plant, 72 Railway Street, Chalk River ON	
Next Meeting:	TBD	
Attendees:	Wayne Kirby (WK) CAO, Town of LH	cao@town.laurentianhills.on.ca
	Anne Giardini (AG) Deputy Mayor	ward2@laurentianhills.ca
	Sherry Batten (SB) Treasurer/Deputy Clerk, Town of LH	treasurer@town.laurentianhills.or
	Bruce Boucher (BB) Councillor, Town of LH	bboucher@town.laurentianhills.ca
	Dave Ethier (DE) Lead Operator, AW Canada	dethier@amwater.com
	Dan Danis (DD) Operator, AW Canada	daniel.danis@amwater.com
	Fern Dicaire (FD) Stantec Consulting Ltd.	Fern.Dicaire@stantec.com
	Dave Robertson (DR) Stantec Consulting Ltd.	Dave.Robertsonn@stantec.com
	Jean Hebert (JH) Stantec Consulting Ltd.	Jean.Hebert@stantec.com
Absentees:	Greg Prangley (GP) Project Manager, AW Canada	gprangley@amwater.com
	Members of Town Council	
Distribution:	All	

Item:	Action:
1. Purpose of Meeting	
This is the project start-up meeting, to review objectives of this project as a group. Secondary objective is data collection at the water treatment plant (WTP) for detailed design purpose, and at waste water treatment plant (WWTP) for general understanding and assessment purpose.	
The meeting allows all major parties to meet and to establish lines of communication. For circulation of minutes of meeting, Stantec would forward electronic copy to Wayne Kirby. Wayne would circulate the minutes members of Council, Town staff, and to Greg Prangley of AWC.	Wayne Kirby, Greg Prangley
2. Project Understanding	
Stantec (FD) summarized the project rationale as follows. Town obtained funding for upgrading municipal infrastructures under the OSWAP Phase Three –Intake One, through the Ontario Ministry of Agriculture Food and Rural Affairs (OMAFRA). The scope of work is limited to:	
- The review and implementation of a method of disposing to the storm system a portion of the backwash water presently being discharged to WWTP. As a result, there would be a net reduction of backwash effluent loading on WWTP. The preparation of a schedule 'B" EA is included in the assignment for the WTP. A notice of project start-up for publication in local newspaper and submission to review agencies was provided to the Town for their action.	
- Preparation of a Schedule 'B' EA to review alternative options to mitigate the WWTP's hydraulic stress as reported by the MOE. Stantec will also include in the report a condition assessment and upgrading of the overall components of the WWTP. It is noted that no design or capital expenditure	

Item: **Action:**

are to be implemented under this WWTP project. A notice of project start-up for publication in local newspaper and submission to review agencies was provided to the Town for their action.

- Both sub-projects are to be completed by November 30th, 2014.

AWC (DE) summarized their understanding of the potential problems as follows.

The 2003 WTP upgrade included implementation of filter-to-waste facilities (mandatory MOE requirement), which generated larger volumes of process backwash water being discharged by WTP into municipal sanitary sewage system. It is also a known fact the sanitary collector sewer is burdened with groundwater infiltration. Thus, under wet weather flow condition, the WWTP is operating near or above its rated 545 m^3/d (average day flow) capacity. The planned capital backwash management modification at WTP would therefore return the hydraulic volumes to pre-2003 flow conditions at the WWTP.

Following the commissioning of SCADA upgrading in 2011, AWC have been able to optimize clarifier operation in order to maximize filter runs (i.e. operating time between two consecutive backwash cycles at a given filter, refer to Appendix I for details).In summary, filters only need to be backwashed at every 60 hours of operation instead of on a daily basis.

The backwash volume reduction is possibly not enough to eliminate the potential hydraulic surge experienced at the WWTP during wet weather conditions. The real bottleneck at the WWTP is an undersized wet well and unstable operating condition of the influent pump operating under variable speed drive motor. This years' dry weather conditions have somewhat resulted in curbing the spiking flow issues. However, as sewer infiltration flow rate would increase under certain weather conditions, the WWTP would again experience unstable operation and hydraulic stress.

AWC (DE) reminded those present that any of the proposed capital modifications at the WTP will likely not change the WTP operating process.

3. Environmental Assessment

Since no land acquisition and no plant rated capacity increase would be included under this funded project, the Environmental Assessment process at WTP and WWTP would both be considered Schedule 'B' activities. There are no mandatory public meeting requirement imposed under a Schedule 'B' EA. It is up to the proponent, Town of Laurentian Hills, to decide if an Open House meeting is to be or not to be held.

Stantec will prepare a list of stakeholders and review agencies that must be notified of project start-up. The Town is responsible for the mail out of the notice of a Schedule B activity at WTP, and at WWTP of project start-up to those stakeholders. Stantec anticipates that the two Schedule 'B' EAs would be completed by the end of December 2012.

4. Agreement

Stantec hand delivered the Town/Consultant agreement.

Item:	Action:
5. WWTP Asset Inventory	
To enable the condition assessment of the WWTP the Town will provide Stantec with a copy of the WWTP asset inventory.	Town
6. WTP Backwash Disposal System	
On a preliminary basis, the backwash water generated by the treatment processes would settle in the existing buffer tank for a few hours. The resultant supernatant consisting of mostly clarified backwash water would then not be required to be disposed of to the municipal sanitary collection system. The WTP EA exercise would therefore review and compare the means of disposing the clarified backwash water For now, the options to be considered are but not limited to:	
- An open ditch, presently located on private property located some 700 meters east of the WTP. Ice build-up at point of discharge is a major concern which will require special consideration. Stantec is not responsible to secure a permanent easement at this outfall ditch. AWC (DE) advised that negotiation with local landowner would be very difficult.	Town
- An on-site absorption field next to the WTP; sufficient surface area is available but ice build-up at point of surface discharge would be of concern.	
7. Geotechnical/Hydrogeological Requirements	
Stantec's engineering proposal excludes the need to conduct percolation field testing to confirm the rate of infiltration of the on-site native soils and to document the high water table elevation below original ground. The Town will retain the services of a local geotechnical firm to conduct the necessary percolation tests. With regards to the high water elevation, the Town will use its own excavation equipment to confirm in the presence of the geotechnical firm the elevation of the high water table.	Town
At about 10:30 am, those attendees from members of Council and Town staff were advised that their presence is not mandatory during the WTP and WWTP visit. Only AWC and Stantec's staff attended the WTP and WWTP visits.	
8. Review of Operational Data for WTP Backwash Water	
After the general meeting, AWC and Jean Hebert met at the WTP to review operation data that would impact the detailed design of the backwash management system. Technical issues are summarized under Appendix I.	
Operator's input regarding detailed design of supernatant pumps is summarized under Appendix II.	
Operator would proceed next week with jar tests on the following process water:	AWC
- Buffer tank mixed water; the presence of concentrated coagulant sludge from both clarifiers may contribute to improve solids settling rate, and may impact positively the quality of supernatant (less suspended solids):	
- Filter backwash water only; Consultant proposed to divert clarifier sludge directly to domestic sewers, in order to reduced drastically the solids loading at buffer tank; however, suspended solids at backwash water may	

Item:	Action:
settle poorly.	
Operator would take a sample of each type of process water (well mixed prior to sampling), and a sample of supernatant at each test vial and forward it to a private lab.	AWC
Consultant would review total suspended solids lab test results, in order to identify the best backwash management strategy.	Stantec
8. Review of WWTP	
AWC and Stantec toured the sewage plant. Stantec picked up as-build drawings, in order to scan and return those by early next week.	Stantec
AWC and Dave Robertson met at the WWTP to review WWTP process and operation data. Technical issues are summarized under Appendix III.	

The meeting adjourned at 1:00 PM.
The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

STANTEC CONSULTING LTD.

Jean Hebert, P. Eng.
Project Manager, Water

APPENDIX I
CHALK RIVER WATER TREATMENT PLANT
BACKWASH MANAGEMENT OPERATIONAL DATA AND SITE CONDITIONS

Plant raw water pumping rate:
- Set to keep plant running hours the same:
- Summer: up to 22 h/d @ 12 L/s;
- Fall: 8-10 h/d @ 12 L/s;
- Winter: 8-10 h/d @ 7 L/s.
- Rated capacity as per CofA: 23 L/s

SC-1 Clarifier de-sludge valve V-18:
- Opening on a raw water volume basis, after 32500 L
- Opening time: 20 sec

SC-2 Clarifier de-sludge valve V-20:
- Opening on a raw water volume basis, after 32500 L
- Opening time: 30 sec

Filter #1 (A&B) time between backwash cycles: 55 h, @ raw water flow = 12 L/s

Filter #2 (C&D) time between backwash cycles: 70 h, @ raw water flow = 12 L/s

Delay set between two backwash cycles (to prevent buffer tank overflow):
240 min

Filter-to-waste Valve Opening Duration (all filters): 300 sec

Compiled by:
Jean Hebert, P. Eng.
Project Manager, Water
Stantec Consulting Ltd

APPENDIX II
CHALK RIVER WATER TREATMENT PLANT
OPERATOR INPUT ABOUT BACKWASH MANAGEMENT STRATEGY

Consultant proposed the following:

- To divert de-sludge valve outlet piping from buffer tank to domestic sewer;
- To add a 1 m^3 capacity buffer tank just outside building, in order to reduce peak flow rate generated during de-sludge valve opening;
- To install two submersible pumps through the existing mixer access hatch; mixer would be eliminated; both pumps would be staggered, as the hatch area is very limited; process piping would be installed beside stairway to exterior door;
- As an alternate solution, install two self-priming pumps on floor, occupying about 1.20 m X 1.50 m foot print, plus room for access and process piping.

Operator Comments are as follows:

Clarifier Sludge: may be kept in the buffer tank, as the coagulant would enhance solids removal, and minimize solids discharge to the environment. There is no need for a 1 m^3 buffer tank, as de-sludge duration (30 sec) would not affect the sewage collection system.

SC-2 Clarifier De-sludge Valve V-20: if such is to be piped outside, re-use the 1980 drain. That has been plugged in 2003.

Existing Mixer: Keep it operational, to improve contact of backwash water with coagulant sludge, for better settling rate (to be confirmed by jar test)

Self-priming Pumps: Those would take too much footprint at main floor level: avoid.

Submersible Pumps: A new opening should be cut at the main floor, large enough to install both pumps from above (not staggered).

Access to Pumps: Contractor should cut a new rectangular opening in main floor slab for direct access to new submersible pumps. Stantec mentioned this opening may conflict with existing power conduits embedded into the slab in 2003, so some cables would be re-routed.

Pump Starter Panels: AWC's preference would be for a duplex pump control panel

Compiled by:
Jean Hebert, P. Eng.
Project Manager, Water
Stantec Consulting Ltd

APPENDIX III
CHALK RIVER WASTEEWATER TREATMENT PLANT
TREATMENT PROCESS, OPERATIONAL DATA AND SITE CONDITIONS

Plant rate capacity: 545 m^3/d at average day

As reported by plant operating staff, process performs well when hydraulic loading is smooth. Process stability is affected by short lived spikes in the hydraulic loading. Spike loading is created by remote pump station on/off operation and control of plant pump station.

Stantec requested historical operating data be provided. Stantec will submit operating data request in writing.

Stantec received from plant operator a copy of plant CofA and as-built drawings. The as-built drawings will be returned to plant operator in early October.

Compiled by:
Dave Robertson, C.E.T.
Associate, Water
Stantec Consulting Ltd

Town of Laurentian Hills-Chalk River
Water & Wastewater Treatment Plant EA

Meeting Notes
Meeting Date: November 29, 2012 @10:30am
Meeting Location: Town Hall-Deep River

Attendees: Wayne Kirby, CAO, Town of Laurentian Hills
Sherry Button, Treasurer, Town of Laurentian Hills
Bruce Boucher, Councilor, Town of Laurentian Hills
Dave Robertson, Stantec
Regrets: Dave Ethier, American Water

The following notes represent the details for the discussion held during the meeting. The meeting objectives were to (a) confirm and finalize the details for the Problem Statement Letters and (b) to provide Town staff with an update on the status of the assignment.

1) **Problem Definition – Water Treatment Plant**

   The draft Problem Definition statement was reviewed. There was no concern raised with respect to the content of the statement letter. Stantec will finalize the letter and distribute it to project stakeholders.

2) **Problem Definition – Wastewater Treatment Plant**

   The draft Problem Definition statement was reviewed. There was no concern raised with respect to the content of the statement letter. Stantec will finalize the letter and distribute it to project stakeholders.

3) **Phase 2 Status – Water Treatment Plant**

   a) 5 different options – confirmed

   Stantec has identified 5 options to consider for the problem solution;
   1) Do nothing. This results in a large volume of process wastewater being discharged to the sanitary sewer and taxing the hydraulic capacity of the sewage treatment plant.
   2) Reduce the flow rate of the process wastewater being discharged to the sewer using a pinched pump discharge valve or replace the pump with a smaller unit. This will buffer the hydraulic loading to the sewage treatment plant.
   3) Collect all process wastewater in the buffer tank, settle the solids, decant the supernatant, dispose of the supernatant to an open ditch that drains to Corry Lake and discharge a reduced volume of buffer tank sludge to the sanitary sewer.

4) Collect all process wastewater in the buffer tank, settle the solids, decant the supernatant, dispose of the supernatant by injection into an on-site disposal well and discharge a reduced volume of buffer tank sludge to the sanitary sewer.
5) Collect all process wastewater in the buffer tank, settle the solids, decant the supernatant, dispose of the supernatant to an on-site infiltration gallery and discharge a reduced volume of buffer tank sludge to the sanitary sewer.

b) technical challenges of each option
Stantec is currently working to assess the advantages and disadvantages of the various options to identify the preferred option.

4) Water Plant Operating Data Request

Stantec has received operating data and other information from American Water (AW) to support the project. Additional information has been requested. Stantec will follow-up with AW to obtain the necessary information.

5) Phase 2 Status - Wastewater Treatment Plant

a) Background documentation in progress;

Stantec is currently working to draft phase 2 of the environmental assessment report.

b) Treatment capacity assessment;

The results from the assessment of the sewage treatment plant design identified short comings when the plant attributes are compared to the MOE *Design Guidelines for Sewage Works 2008*. One shortcoming that is related to the risk of poor plant performance under high hydraulic loadings is the clarifier side wall depth is lower than 2.5m which is lower than defined in the MOE design guidelines. The current design guideline for primary and secondary clarifiers calls for the clarifiers to have a side wall depth of 3.6m to 4.6m. Reports provided by the plant operators indicate that during high flow conditions, the solids from the plant clarifier are washed out with the plant effluent. This creates a risk of the final effluent being non-compliant due to a high total suspended solids concentration. The washed out of solids under high flow conditions and the short clarifier side wall depth are related. Stantec

will investigate this further and address this issue as the preferred solution is developed.

c) Preferred solution will include short term and long term recommendations;

Stantec will develop the EA Phase 2 recommendations to address both long and short term objectives. The recommendations will address plant expansion requirements due to growth, plant upgrades for future regulatory compliance and upgrades necessary to maintain the current level of service and treatment capacity.

6) **Funding Application**
   a) project description
   b) cost breakdown

   The Town provided Stantec with a copy of the funding application.

7) **Stantec Invoices**

   There are no issues to be discussed.

8) **Other Issues**

   No other issues were discussed.

The meeting was adjourned at 11:35am.

Please contact the undersigned if revisions are necessary.

Sincerely,

STANTEC CONSULTING LTD.

Dave Robertson, C.E.T.
Associate, Water
Tel: (613) 725-5568
Fax: (613) 722-2799
Dave.Robertson@stantec.com

Meeting Notes

Environmental Assessment Report Review Meeting

Chalk River Water Treatment Plant (WTP) and the Chalk River Wastewater Treatment Plant Phase 1 & 2 Environmental Assessment / File Number 163401125

Date/Time:	June 26, 2013 / 9:30 AM
Place:	Town of Laurentian Hills Town Office
Next Meeting:	TBD
Attendees:	Laurentian Hills: Wayne Kirby, Sherry Button, Anne Giardini, Bruce Boucher, Scott Loos American Water Canada (AWC): Dave Ethier, Greg Prangley(via telephone call-in) Stantec Jean Hebert, Dave Robertson
Absentees:	n/a
Distribution:	Attendees and Karyn Cornfield

Item:1 **Action:**

Review meeting Outline No action required

DR provided a summary of the following,
1) project objectives,
2) an overall approach to the project, and
3) described the various options to meet the objectives.

Please refer to attached PowerPoint presentation,

Item:2 **Action:**

Confirmation of WTP Evaluation Process No action required

Participants reviewed the evaluation criteria that were applied to the WTP option review and confirmed the relative scores assigned to the options for each evaluation criterion and the relative weighting for each criterion are acceptable.

Item:3 **Action:**

Confirmation of Preferred WTP Option

Participants discussed the results of actions taken by the operators to significantly reduce the volume of the WTP process wastewater and confirmed the next step is to further optimize the WTP wastewater disposal process with the addition of a smaller pump to reduce the impact experienced at the WWTP when the WWTP is operating under high influent flow conditions. AWC (DE) confirmed only one WTP treatment train is operated at a time, so there is practically 27.5 to 35

Stantec will finalize the WTP EA report and confirm the project to be a Schedule A project. Hard copies of the final report will be prepared by Stantec and delivered to the Town for their records.

WK will present the final report to Town Council.

hours of operating time between two backwash cycles. This is more than enough to support backwash wastewater disposal process at reduced flow rate, as recommended in the report.

AWC (DE) mentioned that after the hydraulic loading issue is resolved at the WWTP AWC will be able to operate both treatment trains at the WTP.

It was confirmed that the preferred solution is a Schedule A project and will not require public consultation. The Town can move forward to the implementation phase immediately.

Item:4

WTP Next Steps

Move to implementation of the preferred solution; supply & install a process wastewater disposal pump with a discharge rate of 1L/s.

A second pump for a maintenance spare unit will be supplied loose. For reference; reducing the flow rate of the existing 4 L/s capacity pump by partially closing the pump discharge valve is not a valid long term option as it will lead to premature pump failure.

One larger capacity pump will be operational at all times in order to comply with MOE requirements described in their most recent inspection report (i.e, all plant systems must be able to meet maximum day rated capacity).

Action:

Stantec will prepare technical specifications for the supply & installation of the smaller WTP wastewater disposal pump and submit them to the Town for the Town procurement process.

Item:5

Review of WWTP Options

The participants discussed the various options considered viable to meet the project objectives.

Refer to attached PowerPoint presentation.

Action:

No action required.

Item:6

Confirmation of WWTP Evaluation Process

Participants reviewed the evaluation criteria that were applied to the WWTP option review process and confirmed the relative scores assigned to the options for each evaluation criterion and confirmed the relative weighting for each criterion are acceptable.

Action:

No action required

Item:7

Confirmation of the Preferred WWTP Option

The participants confirmed the preferred option is to upgrade the WWTP to ensure that the process can effectively treat both average day flows and peak day flow. To facilitate this a new second clarifier shall be constructed so that the final effluent of the existing plant can pass through a final clarification process to remove the solids carryover that occurs during high influent flow conditions.

Consideration for additional process upgrades such as disinfected effluent dechlorination and biosolids storage are recommended in the EA report for compliance with new regulations and process reliability.

AWC (DE) stated that, since the proposed second clarifier will capture more solids, the sludge retention capacity at the plant would be reduced accordingly (approximately from 90 to 70 days).

The AWC preference would be to operate both the new and existing clarifiers in parallel instead of in series. Stantec (DR) replied that this is a consideration that should be addressed during the design phase.

These modifications will result in more reliable utilization of the WWTP residual capacity, but will not increase the rated capacity.

Action:

Stantec will finalize the WWTP EA report and deliver the report to the Town for presentation to Town Council.

WK will present the final report to Council.

Item:8

Main Street Pumping Station

DE suggested that modifications to the Main Sreet pump station that include the installation of variable speed pumps will improve the WWTP performance by reducing the peak hydraulic loading to the WWTP pump station caused by the on/off operating mode of the existing Main Street pump station pumps.

Stantec was asked to consider this upgrade under this project.

Action:

Stantec will investigate this opportunity and determine how and if this opportunity can be implemented in conjunction with the WTP upgrade.

Item:9

WWTP Next Steps

Distribute the finalized WWTP EA Phase 1 & 2 Report to the review agencies for a 30-day review period.

Action:

Stantec will prepare multiple copies and mail the copies out to the Review Agency contacts personnel.

Hold a public open house to review the outcome of the EA reports and solicit feedback from the public. The public meeting should be scheduled for a Monday night at the Chalk River library.	WK to confirm the availability and booking of the library for the open house.

The meeting adjourned at 11:45 AM
The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Limited

Dave Robertson, C.E.T.
Senior Associate, Water
Dave.Robertson@stantec .com

Attachment: EA Report Review Meeting PowerPoint Presentation

c. Cc List

APPENDIX N
Agency Review

Simzer, Leah

From: Robertson, Dave
Sent: Friday, August 23, 2013 10:40 AM
To: 'Mike Grace'
Subject: RE: Chalk River Wastewater Treatment Plant

Hi Mike. the following is the report table of contents and the executive summary of the EA report. Let me know if this is adequate or if you wish to review more specific details. I could also post the report in pdf on an ftp site so that you can view it or download it. Please let me know if you need more from Stantec.

Regards.

Dave Robertson, C.E.T.
Senior Associate, Water
Stantec
1331 Clyde Avenue
Ottawa ON K2C 3G4
Ph: (613) 725-5568
Fx: (613) 722-2799
Dave.Robertson@stantec.com
stantec.com

TOWN OF LAURENTIAN HILLS CHALK RIVER WASTEWATER TREATMENT PLANT PHASES 1 & 2 (SCHEDULE B) CLASS ENVIRONMENTAL ASSESSMENT REPORT

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Executive Summary

The Town of Laurentian Hills retained Stantec Consulting Ltd. to review and complete the environmental planning process for implementation of corrective measures to reduce the hydraulic stress at the Chalk River Wastewater Treatment Plant (WWTP). When the WWTP is experiencing hydraulic stress from high influent flows the risk of non-compliant effluent materializes and excessive quantities of solids can be carried out in the final effluent.

The community of Chalk River, in the Town of Laurentian Hills, has been serviced by the communal WWTP since the early 1970's. After a plant upgrade in 1989, the plant can operate in two modes, namely, extended aeration mode with a capacity to treat an average daily flow of 363 m^3, and contact stabilization mode, with a capacity to treat an average daily flow of 545 m^3. Increased process wastewater flows from the Chalk River Water Treatment Plant (WTP), along with groundwater infiltration and stormwater inflows discharging into the sanitary sewers, contribute to hydraulic stress at the WWTP particularly with wet weather and snowmelt. Reducing or controlling high influent flows, or upgrading the WWTP, will reduce the risk of solids carryover at the existing clarifier into the receiving stream (Pumphouse Creek).

Five options to address the aforementioned problem were evaluated. The options included Option 1: Do Nothing, Option 2: Reduce Flows to the WWTP, Option 3: Add an Equalization Tank upstream of the WWTP, Option 4: Add a Secondary Clarifier, Option 5: Expand WWTP at Present Location. The criteria for evaluation address the environments that could be affected by the work. These environments have been grouped into three categories: Natural Environment, Social/Economic Environment, and Financial/Technical Environment.

Option 4: Add a Secondary Clarifier is the preferred option. This option will relieve the hydraulic stress at the WWTP immediately with relatively minimal impact on the natural environment and can be incorporated into future WWTP expansion and lifecycle replacement plans.

This Phase 1 & 2 Class Environmental Assessment (EA) Report is intended to satisfy the legislative requirements of the *Environmental Assessment Act* (EAA) by following the planning process set out in a document published by the Municipal Engineers Association entitled "Municipal Class Environmental Assessment" dated 2011. The WWTP plant upgrades are considered to be "Schedule B" activities according to the categories defined by the Municipal Class EA. Schedule B was selected because the contemplated work will not expand the existing WWTP beyond its rated capacity and will not require land acquisition. This Phases 1 & 2 report represents the initial stages of the Schedule B planning process. Subsequent phases would be documented in additional reports.

A Notice of Study Commencement was distributed to review agencies in October 2012 to notify them of the planning process. Phase 1, Problem Definition, was issued by letter in November 2012. Phase 2 (herein) is expected to be finalized during the second quarter of 2013. Phase 5, Design and Construction, could commence as early as the fall of 2013. Phases 3 and 4 of the planning process are not required for Schedule B activities.

Conclusions

1.1 IDENTIFICATION OF THE RECOMMENDED OPTION

Table 4.1 presented the level of impacts, the total score and overall ranking of each option. The highest scoring option, Option 4 – Add a Secondary Clarifier, is recommended as the preferred option. The other

options had lower scores mainly because of their inability to adequately reduce the high influent flows or to improve plant efficiency at a reasonable cost.

Adding a secondary clarifier is relatively cost efficient and immediately effective in reducing hydraulic stress at the WWTP.

Flow reduction is currently being implemented through planning efforts by reducing process wastewater at the WTP and through the current sewer inspection and repair work. That, in conjunction with a new secondary clarifier will practically eliminate the stress at the WWTP.

1.2 OTHER CONSIDERATIONS FOR FUTURE PLANS

Implementation of the preferred option will address the problem identified in the Problem Definition stage of this EA assignment. It is recommended that the Town also consider the following activities to address other issues related to the current operation of the WWTP:

1) Construct a biosolids storage facility to provide extended storage that will facilitate improved biosolids utilization or disposal strategies.

2) Incorporate in the design of the new secondary clarifier a chlorine contact tank with a dechlorination zone to improve the effluent disinfection performance and dechlorinate the final effluent prior to release to the natural environment.

3) Investigate the benefits of upgrading the Main Street Pumping Station to by incorporating variable speed drives for pump control. The anticipated benefit will be a reduction in short term peak loading events at the wastewater treatment plant. Under the current operation, the Main Street Pumping Station pumps operate in an “on/off” mode, and when “on”, the pumps deliver sewage to the wastewater treatment plant at 100% of the pump capacity.

   Since the wastewater treatment plant does not perform well when influent flow rates exceed 9L/s, the incorporation of variable speed drives at the Main Street Pumping Station will smooth the flow profile and reduce some of the peak inlet flows experienced at the wastewater treatment plant. This will reduce the magnitude of short-term high inlet flow rates to the wastewater treatment plant and aid in the reduction of hydraulic stress

4) Initiate and implement plans for a new WWTP. The current WWTP is a package plant that has been in service for more than 40 years. The WWTP life span is nearing the expected end and replacement in the next 5 to 10 years must be considered. The plan for WWTP replacement should take full advantage of any new works that are constructed as a result of Phase 5 activities related to this EA report.

5) Phase 5 activities related to this EA report should consider future sewage treatment demands in terms of community growth and changes to the number of users connected to the sewer system.

1.2.1 Regulatory Upgrades

Environment Canada finalized the *Wastewater Systems Effluent Regulations* and published them in the *Canada Gazette, Part II* on July 18, 2012.

In the event of a significant upgrade at the WWTP the design must consider including plant modifications to comply with the requirement of the new regulations.

A formal consultation with the MOE will be required prior to design and construction of the preferred solution to confirm final effluent requirements.

From: Mike Grace [mailto:mgrace@rcdhu.com]
Sent: Thursday, August 22, 2013 2:19 PM
To: Robertson, Dave
Subject: Chalk River Wastewater Treatment Plant

Hi Dave,

We received the CD you sent us containing the information regarding the proposed works at the Chalk River Wastewater plant.

I have been advised by our administration dept. that the Health Unit is trying to limit the number of electronic files we receive and inventory. Apparently, there are new public service privacy laws restricting the use of mobile electronic files. There is also a concern about the potential damage that infected files can inflict on a computer network.

I was wondering if you had something for this project that you could send to me by email that I could review and comment on. A brief summary highlighting the proposed improvements to the plant would suffice.

Thanks Dave, sorry for the bother.

Mike

Mike Grace B.A.Sc. CPHI(C)
Acting Manager
Environmental Health
Renfrew County & District Health Unit
613 735-8654 x 535
613 735-3067 fax
mgrace@rcdhu.com

Simzer, Leah

From: Sweezey, Stacy (MTO) <Stacy.Sweezey@ontario.ca>
Sent: Friday, August 23, 2013 10:50 AM
To: Robertson, Dave
Subject: Hwy17 Chalk River WWTP EA
Attachments: Hwy17 Chalk River WWTP EA .pdf

Hi Dave
Please see the attached letter, providing MTO comment pertaining to the Chalk River Wastewater Treatment Plant EA. A hardcopy of the letter is in today's mail.

Thanks

Stacy Sweezey
Corridor Management Planner
Eastern Region, MTO
Phone: (613) 545-4865
Fax: (613) 540-5106

Simzer, Leah

From: Robertson, Dave
Sent: Thursday, August 29, 2013 8:11 AM
To: 'Edwin Makkinga'
Cc: Cornfield, Karyn; Francis, Candace
Subject: RE: Chalk River Waste Water Treatment Plant (WWTP)

Hi Edwin, I will update our stakeholder list to include you and your coordinates.

I do not work with Candace Francis, but I will make contact with her to discuss the gas pipeline project. Without knowing the details of the P/L project I suggest that there will not be any conflicts as the WWTP project activities will be restricted to and will be within the property lines of the WWTP. If the P/L project includes an open road cut across Blimkie Road on the north side of Plant Road east of highway 17, then the P/L project may conflict with access to the WWTP.

Regards.

Dave Robertson, C.E.T.
Senior Associate, Water
Stantec
1331 Clyde Avenue
Ottawa ON K2C 3G4
Ph: (613) 725-5568
Fx: (613) 722-2799
Dave.Robertson@stantec.com
stantec.com

From: Edwin Makkinga [mailto:Edwin.Makkinga@enbridge.com]
Sent: Wednesday, August 28, 2013 7:54 AM
To: Robertson, Dave
Cc: Jim Arnott; Francis, Candace
Subject: Chalk River Waste Water Treatment Plant

Hi Dave,

We received the DRAFT report for the Chalk River Waste Water Treatment Plant. Can you please update your stakeholder list with my information in the signature below.

Do you work with Candace Francis from Stantec? We are currently looking at installing a gas pipeline along Plant Road to the Chalk River AECL plant, not sure if this project has any conflicts with that one? Are you aware of the project or any conflicts?

Thanks,

Edwin Makkinga, B.Sc., EP
Manager, Environment
Enbridge Gas Distribution (Environment, Health and Safety)
3rd Floor, 101 Honda Blvd.
Markham, ON L6C OM6

Phone (905) 927-3178
Fax (905) 927-3293

Simzer, Leah

From: Mitchell, Vicki (ENE) <Vicki.Mitchell@ontario.ca>
Sent: Tuesday, November 26, 2013 3:34 PM
To: cao@laurentianhills.ca
Cc: Bitten, Jen (ENE); Castro, Victor (ENE); karyn.cornfield@stantec.com; Robertson, Dave
Subject: Review Agency Comments_MOE_KINGSTON_Chalk River
Attachments: D2.pdf

Attention: Wayne T. Kirby, CAO

Hi Wayne,

Thanks for providing copies of the draft Phases 1 and 2 Report for the Town of Laurentian Hills Chalk River Wastewater Treatment Plant (WWTP) project, dated August 2013, to the Kingston and Ottawa offices for review.

Staff in the Kingston and Ottawa offices have no concerns with the proposed project. However, please consider the following comments when finalizing the Class Environmental Assessment Report. Also, please send one CD of the final report to Kingston and one to Ottawa, and provide a copy of the Notice of Completion to both offices, when the report and notice are available.

The draft report indicates that the Chalk River WWTP is experiencing hydraulic stress from high influent flows, and that this carries the risk of non-compliant effluent and excessive quantities of solids carried out in the final effluent. The report proposes adding a secondary clarifier to address the identified problem (Option 4). The work will not result in an increase to the rated capacity of the WWTP and will not require land acquisition. The report also identifies other activities to address operational issues, such as constructing a biosolids storage facility, incorporating a chlorine contact tank with a dechlorination zone, investigating upgrading the Main St. Pumping Station with variable speed drives, initiating plans for a new WWTP (to replace existing aging WWTP), and consider future sewage demands/growth.

The Notice of Completion will need to identify which of these listed projects (Option 4 from section 5.1 and "other" activities listed in section 5.2) are considered to have completed the EA process. For example, if the EA work for the secondary clarifier is considered complete, the Notice should identify this project and provide concerned parties with an opportunity to request a Part II Order specifically for the project (i.e. not for the Master Plan itself, which is not subject to Part II Order requests). Then the other future activities would require additional EA work and issuance of Notices of Completion in the future. We recommend that the Master Plan include a table which identifies all of the projects falling out of the Master Plan, which schedule each project falls under, and identifies the projects for which the EA requirements are completed through the Master Plan and the projects for which additional EA work/consultation/notification is needed.

Section 2.3.3 – Planning/Zoning Issues – states that "the separation distance that defines an influence area, as set out by the MOE for Class I and II industrial uses, does not apply for works at the WWTP". The report does not discuss that the separation distance for a WWTP is the subject of a different guideline specific to sewage treatment works. The report should be changed to reference the appropriate guideline, identify the separation distance between odour producing sources and sensitive land uses, refer to the appropriate setback distance from the guideline, and discuss odour mitigation measures. The guideline is "Compatibility Between Sewage Treatment and Sensitive Land Use". I have attached a copy of the guideline for your reference.

Section 4.3.3 – Option 3 Add an Equalization Tank – mentions that odour emissions must be addressed during design (under Social/Economic Environment). However, section 4.3.4 – Option 4 Add a Secondary Clarifier – does not mention the potential for odour or commit to addressing odour issues during the design stage. As discussed above, the report

should identify the current separation distance, whether it meets MOE guidelines, and propose odour mitigation measures for potential odour impacts.

We recommend that the report include a section summarizing the potential impacts during construction, and proposing mitigation measures.

In summary, we have no concerns with the proposed project, but recommend that the above comments be addressed through revisions and additions to the report before it is finalized. We look forward to receiving CD copies of the final report and copies of the Notice of Completion. If you have any questions or concerns about these comments, please contact me by email or phone.

Vicki Mitchell
Regional EA Coordinator
MOE Eastern Region
1259 Gardiners Road, Kingston ON

(613) 540-6852

Simzer, Leah

From: Robertson, Dave
Sent: Friday, December 20, 2013 3:59 PM
To: Robertson, Dave
Subject: FW: Response to Notice of Commencement - Chalk River Wastewater Treatment Plant
Attachments: Archaeological Potential Checklist MTC February 2011.pdf; BuiltHeritage-CHL-Checklist-MTC-Nov2010.pdf

Dave Robertson, C.E.T.
Senior Associate, Water
Stantec
Phone: (613) 725-5568
Fax: (613) 722-2799
Dave.Robertson@stantec.com

Stantec
Design with community in mind
stantec.com

From: Wayne T. Kirby [mailto:cao@laurentianhills.ca]
Sent: Tuesday, February 26, 2013 4:05 PM
To: Robertson, Dave
Subject: Fw: Response to Notice of Commencement - Chalk River Wastewater Treatment Plant

Hi Dave
Sure took them long enough.

Wayne

----- Original Message -----
From: Didrikson, Amy (MTCS)
To: cao@laurentianhills.ca
Sent: Tuesday, February 26, 2013 3:44 PM
Subject: Response to Notice of Commencement - Chalk River Wastewater Treatment Plant

Our File No. : 47EA058
Proponent : Town of Laurentian Hills
Subject : Chalk River Wastewater Treatment Plant – Notice of Study Commencement
Location : Town of Laurentian Hills in the County of Renfrew

Dear Wayne Kirby,

Thank you for circulating the Ministry of Tourism, Culture and Sport ("MTCS") on the notice of study commencement for the above-noted Class Environmental Assessment.

The MTCS has a mandate, under the *Ontario Heritage Act* (*OHA*), to conserve, protect and preserve Ontario's cultural heritage resources, including: archaeological resources, built heritage and cultural heritage landscapes.

Under the EA process, a determination of the undertaking's impact on cultural heritage resources must be carried out, as outlined below. Please advise MTCS whether archaeological and/or heritage impact assessments will be undertaken for your EA project, and forward them to MTCS, prior to issuing a Notice of Completion.

Archaeological Resources
Screening your EA project with the MTCS "*Criteria for Evaluating Archaeological Potential"* will determine whether it may impact archaeological resources: MTCS archaeological sites data are available at *archaeologysites@ontario.ca*. If archaeological potential is identified through a preliminary screening, then an archaeological assessment (AA) by an *OHA* licensed archaeologist is recommended and the AA report must be forwarded to MTCS for review.

Built Heritage and Cultural Heritage Landscapes
The MTCS *"Screening for Impacts to Built Heritage and Cultural Heritage Landscapes"* checklist determines whether your EA project may impact built heritage and cultural heritage landscapes. If your EA project may impact these cultural heritage resources, MTCS recommends that a Heritage Impact Assessment (HIA – see MTCS *Info Sheet #5: Heritage Impact Assessments and Conservation Plans*) be prepared by a qualified consultant. Please send completed HIAs to MTCS and the local municipality for review, and make it available to local heritage organizations with an interest, prior to your EA project approval.

EA Documentation
HIA and AA reports and their recommendations are part of the EA project. Determinations that no heritage resources are impacted and no technical studies are warranted should be documented and summarized as part of the EA process, and incorporated in the final EA report.

Final Remarks
Please continue to circulate MTCS through the review process for this EA project. Thank you for the opportunity to provide comment and please contact me for any questions or clarification.

Regards,

Amy

Amy Didrikson, MCIP, RPP
Heritage Planner
Ministry of Tourism, Culture and Sport
Culture Division| Programs and Services Branch| Culture Services Unit
T. 416.212.7420| Email: amy.didrikson@ontario.ca

Simzer, Leah

From: Robertson, Dave
Sent: Monday, January 13, 2014 3:24 PM
To: 'Frank.Dieterman@infrastructureontario.ca'
Subject: Provincial Heritage Properties-Chalk River
Attachments: Village Plan showing lacation of sewage treatment plant.pdf; App B-1 ChalkRiverWWTP_Aerial Photo.pdf

Hello Mr. Dieterman. Stantec is working to finalize the Municipal Class Environmental Assessment Phase 2 for an upgrade to the existing sewage treatment plant that serves the community of Chalk River. The sewage treatment plant is located on Blimkie Road off of Plant Road. Please refer to the attachments to confirm the location.

Stantec reviewed the Ontario Heritage Properties Database to determine if any heritage properties were found in the study area. Stantec noted that the database had not been updated since 2005. During the agency review step of the draft environmental assessment report preparation, the Ministry of Tourism, Culture and Sport recommended that Stantec make contact with you to obtain any updated information regarding Provincial Heritage Properties that are adjacent to the study area, specifically the existing sewage treatment plant.

Can you please confirm if there are Heritage properties adjacent to the existing sewage treatment plant.

Thanks in advance for your consideration of this request.

Regards.

Dave Robertson, C.E.T.
Senior Associate, Water
Stantec
Phone: (613) 725-5568
Fax: (613) 722-2799
Dave.Robertson@stantec.com

Simzer, Leah

From: Robertson, Dave
Sent: Monday, January 13, 2014 3:41 PM
To: 'Erin.Semande@heritagetrust.on.ca'
Subject: Provincial Heritage Properties-Chalk River
Attachments: Village Plan showing lacation of sewage treatment plant.pdf; App B-1 ChalkRiverWWTP_Aerial Photo.pdf

Hello Erin. Stantec is working to finalize the Municipal Class Environmental Assessment Phase 2 for an upgrade to the existing sewage treatment plant that serves the community of Chalk River. The sewage treatment plant is located on Blimkie Road off of Plant Road. Please refer to the attachments to confirm the location.

During the agency review step of the draft environmental assessment report preparation, the Ministry of Tourism, Culture and Sport recommended that Stantec make contact with you directly to confirm if the Ontario Heritage Trust protects any property within or adjacent to the study area (more specifically the existing sewage treatment plant) as well as information from the Ontario Heritage Register.

Can you please confirm if there are properties adjacent to the existing sewage treatment plant that are protected by the Ontario Heritage Trust.

Thanks in advance for your consideration of this request.

Regards.

Dave Robertson, C.E.T.
Senior Associate, Water
Stantec
Phone: (613) 725-5568
Fax: (613) 722-2799
Dave.Robertson@stantec.com

Simzer, Leah

From: Robertson, Dave
Sent: Monday, January 13, 2014 3:47 PM
To: 'Registrar@mcl.gov.on.ca'
Subject: Provincial Heritage Properties-Chalk River
Attachments: Village Plan showing lacation of sewage treatment plant.pdf; App B-1 ChalkRiverWWTP_Aerial Photo.pdf

To whom it May concern. Stantec is working to finalize the Municipal Class Environmental Assessment Phase 2 for an upgrade to the existing sewage treatment plant that serves the community of Chalk River. The sewage treatment plant is located on Blimkie Road off of Plant Road. Please refer to the attachments to confirm the location.

Stantec reviewed the Ontario Heritage Properties Database to determine if any heritage properties were found in the study area. Stantec noted that the database had not been updated since 2005. During the agency review step of the draft environmental assessment report preparation, the Ministry of Tourism, Culture and Sport recommended that Stantec make contact with you to obtain any updated information regarding Provincial Heritage Properties that are adjacent to the study area; more specifically the existing sewage treatment plant.

Can you please confirm if there are Heritage Properties adjacent to the existing sewage treatment plant.

Thanks in advance for your consideration of this request.

Regards.

Dave Robertson, C.E.T.
Senior Associate, Water
Stantec
Phone: (613) 725-5568
Fax: (613) 722-2799
Dave.Robertson@stantec.com

Simzer, Leah

From: Didrikson, Amy (MTCS) <Amy.Didrikson@ontario.ca>
Sent: Tuesday, August 27, 2013 2:38 PM
To: Robertson, Dave
Cc: Cornfield, Karyn; cao@laurentianhills.ca
Subject: Chalk River Wastewater Treatment Plant - Draft Report for Agency Review
Attachments: MTCS Comments, Aug 27 2013.pdf

Dear Dave Robertson,

Please see the attached comments from MTCS.

Regards,
Amy

Amy Didrikson, MCIP, RPP
Heritage Planner
Ministry of Tourism, Culture and Sport
Culture Division| Programs and Services Branch| Culture Services Unit
T. 416.212.7420| Email: amy.didrikson@ontario.ca

Simzer, Leah

From: Dieterman, Frank (IO) <Frank.Dieterman@infrastructureontario.ca>
Sent: Tuesday, January 14, 2014 11:21 AM
To: Robertson, Dave
Subject: RE: Provincial Heritage Properties-Chalk River

Hi Dave,

There are no heritage properties adjacent to the subject property.
And yes, the Ontario Heritage Properties Database is horribly out of date and not reliable unfortunately.

Frank

Frank Dieterman Ph.D.
Manager, Heritage Projects

Infrastructure Ontario
416-325-3591
frank.dieterman@infrastructureontario.ca

From: Robertson, Dave [mailto:Dave.Robertson@stantec.com]
Sent: Monday, January 13, 2014 3:24 PM
To: Dieterman, Frank (IO)
Subject: Provincial Heritage Properties-Chalk River

Hello Mr. Dieterman. Stantec is working to finalize the Municipal Class Environmental Assessment Phase 2 for an upgrade to the existing sewage treatment plant that serves the community of Chalk River. The sewage treatment plant is located on Blimkie Road off of Plant Road. Please refer to the attachments to confirm the location.

Stantec reviewed the Ontario Heritage Properties Database to determine if any heritage properties were found in the study area. Stantec noted that the database had not been updated since 2005. During the agency review step of the draft environmental assessment report preparation, the Ministry of Tourism, Culture and Sport recommended that Stantec make contact with you to obtain any updated information regarding Provincial Heritage Properties that are adjacent to the study area, specifically the existing sewage treatment plant.

Can you please confirm if there are Heritage properties adjacent to the existing sewage treatment plant.

Thanks in advance for your consideration of this request.

Regards.

Dave Robertson, C.E.T.
Senior Associate, Water
Stantec
Phone: (613) 725-5568
Fax: (613) 722-2799
Dave.Robertson@stantec.com

Design with community in mind
stantec.com

Simzer, Leah

From: Jeremy Collins <Jeremy.Collins@heritagetrust.on.ca>
Sent: Wednesday, January 15, 2014 9:07 AM
To: Robertson, Dave
Cc: Erin Semande
Subject: RE: Provincial Heritage Properties-Chalk River

Hi Dave,

Erin forwarded your email to me as my duties at the Trust include responding to information requests in the context of external Class Environmental Assessment activities.

Thank you for your request. We confirm from a review of our database that the Trust does not protect any properties in Chalk River with a conservation easement. We have also reviewed the OHA Register held by the Trust and are not aware of any properties designated under Part IV or V of the OHA on Blimkie Road in Chalk River.

Notwithstanding the results of our review of the OHA Register, we strongly recommend that you also check with clerk of the municipality of Chalk River for any Part IV or V listings and designations at that municipal address.

Thank you, again, for your inquiry.

Regards,

Jeremy Collins

Jeremy Collins | Acquisitions Coordinator
Ontario Heritage Trust
10 Adelaide Street East, Toronto, Ontario Canada M5C 1J3
Telephone: 416-325-5017 | Fax: 416-314-5979
Email: Jeremy.Collins@heritagetrust.on.ca

Ontario Heritage Trust – bringing our heritage to life, one story at a time.

Discover Ontario's stories at:
www.heritagetrust.on.ca | www.doorsopenontario.on.ca

From: Erin Semande
Sent: Monday, January 13, 2014 3:42 PM
To: Jeremy Collins
Subject: FW: Provincial Heritage Properties-Chalk River

From: Robertson, Dave [mailto:Dave.Robertson@stantec.com]
Sent: Monday, January 13, 2014 3:41 PM
To: Erin Semande
Subject: Provincial Heritage Properties-Chalk River

Hello Erin. Stantec is working to finalize the Municipal Class Environmental Assessment Phase 2 for an upgrade to the existing sewage treatment plant that serves the community of Chalk River. The sewage treatment plant is located on Blimkie Road off of Plant Road. Please refer to the attachments to confirm the location.

During the agency review step of the draft environmental assessment report preparation, the Ministry of Tourism, Culture and Sport recommended that Stantec make contact with you directly to confirm if the Ontario Heritage Trust protects any property within or adjacent to the study area (more specifically the existing sewage treatment plant) as well as information from the Ontario Heritage Register.

Can you please confirm if there are properties adjacent to the existing sewage treatment plant that are protected by the Ontario Heritage Trust.

Thanks in advance for your consideration of this request.

Regards.

Dave Robertson, C.E.T.
Senior Associate, Water
Stantec
Phone: (613) 725-5568
Fax: (613) 722-2799
Dave.Robertson@stantec.com

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stantec.com

Simzer, Leah

From: Didrikson, Amy (MTCS) <Amy.Didrikson@ontario.ca>
Sent: Wednesday, January 15, 2014 10:52 AM
To: Robertson, Dave
Cc: cao@laurentianhills.ca; info@laurentianhills.ca
Subject: RE: Chalk River Wastewater Treatment Plant - Draft Report for Agency Review

Dave,

Thank you for following up on our recommendations. I'll look forward to reviewing the final report.

Best,
Amy

Amy Didrikson, MCIP, RPP
Heritage Planner
Ministry of Tourism, Culture and Sport
Culture Division| Programs and Services Branch| Culture Services Unit
T. 416.212.7420| Email: amy.didrikson@ontario.ca

From: Robertson, Dave [mailto:Dave.Robertson@stantec.com]
Sent: January 13, 2014 4:10 PM
To: Didrikson, Amy (MTCS)
Cc: cao@laurentianhills.ca; info@laurentianhills.ca
Subject: FW: Chalk River Wastewater Treatment Plant - Draft Report for Agency Review

Hi Amy, as you wrote in the comment letter provided to Stantec on August 27, 2013, this message is intended to confirm Stantec has taken action on your recommendations.

Stantec has sent requests to the MTCS registrar and to Frank Dieterman at Infrastructure Ontario for updated information related to Provincial Heritage Properties in the study area. Stantec also sent Erin Semande at Ontario Heritage Trust a request to confirm if lands adjacent to the study area are protected by the OHT.

The final report will note that a Stage 1 Archaeological Assessment will be required during the preliminary design stage of project implementation. Stantec has also revised the EA Phase 2 report to delete the " Heritage / Culture / Historical Significance" terminology and replace it with "Built Heritage Resources and Cultural Heritage Landscapes" throughout the report. The report will also be updated with information provided by OHT, MTCS and Infrastructure Ontario resulting from the Stantec information requests.

If you have any related questions please do not hesitate to contact me.

Regards.

Dave Robertson, C.E.T.
Senior Associate, Water
Stantec
Phone: (613) 725-5568
Fax: (613) 722-2799
Dave.Robertson@stantec.com

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stantec.com

From: Didrikson, Amy (MTCS) [mailto:Amy.Didrikson@ontario.ca]
Sent: Tuesday, August 27, 2013 2:38 PM
To: Robertson, Dave
Cc: Cornfield, Karyn; cao@laurentianhills.ca
Subject: Chalk River Wastewater Treatment Plant - Draft Report for Agency Review

Dear Dave Robertson,

Please see the attached comments from MTCS.

Regards,
Amy

Amy Didrikson, MCIP, RPP
Heritage Planner
Ministry of Tourism, Culture and Sport
Culture Division| Programs and Services Branch| Culture Services Unit
T. 416.212.7420| Email: amy.didrikson@ontario.ca

Simzer, Leah

From: Registrar (MTCS) <Registrar@ontario.ca>
Sent: Friday, January 17, 2014 12:23 PM
To: Robertson, Dave
Cc: Didrikson, Amy (MTCS)
Subject: RE: Provincial Heritage Properties-Chalk River

Dear Mr. Robertson,
At this time there are no provincial heritage properties identified adjacent to the study area. The Ontario Heritage Trust holds the Register of Municipally designated properties.

I have copied my colleague and feel free to contact her for any further advice with regards to this project.
Kind regards,

Deborah Hossack

Registrar, Register Developer, Heritage Advisor
Ministry of Tourism, Culture and Sport
401 Bay Street., Suite 1700
Toronto ON M7A 0A7
ph: 416 314 7204
fx: 416 314 7175

From: Robertson, Dave [mailto:Dave.Robertson@stantec.com]
Sent: January 13, 2014 3:47 PM
To: Registrar (MTCS)
Subject: Provincial Heritage Properties-Chalk River

To whom it May concern. Stantec is working to finalize the Municipal Class Environmental Assessment Phase 2 for an upgrade to the existing sewage treatment plant that serves the community of Chalk River. The sewage treatment plant is located on Blimkie Road off of Plant Road. Please refer to the attachments to confirm the location.

Stantec reviewed the Ontario Heritage Properties Database to determine if any heritage properties were found in the study area. Stantec noted that the database had not been updated since 2005. During the agency review step of the draft environmental assessment report preparation, the Ministry of Tourism, Culture and Sport recommended that Stantec make contact with you to obtain any updated information regarding Provincial Heritage Properties that are adjacent to the study area; more specifically the existing sewage treatment plant.

Can you please confirm if there are Heritage Properties adjacent to the existing sewage treatment plant.

Thanks in advance for your consideration of this request.

Regards.

Dave Robertson, C.E.T.
Senior Associate, Water
Stantec
Phone: (613) 725-5568
Fax: (613) 722-2799
Dave.Robertson@stantec.com

APPENDIX O
Public Open House

Town of Laurentian Hills

Chalk River Wastewater Treatment Plant

Phase 2 Municipal Class Environmental Assessment

Notice of Public Open House

Wednesday, November 13, 2013
4 to 7 pm
Laurentian Hills
Chalk River Fire Hall
31061 Highway 17

The Chalk River Wastewater Treatment Plant experiences hydraulic stress during high influent flow events risking pollution to the natural environment and exceeding approval criteria. The Town of Laurentian Hills has initiated an environmental assessment to review the problem and find a solution. A Notice of Study Commencement on this project was distributed in October 2012 to notify the public of the project. A draft report has been prepared documenting the evaluation of five options to correct the problem have been evaluated. The report provides a description of the problem, alternatives evaluation, potential environmental effects, and mitigation measures. The preferred option is to add an additional clarifier at the Wastewater Treatment Plant. This project is being planned as a Schedule B project in accordance with the Municipal Class Environmental Assessment process (Phase 2), as amended in 2011, which is approved under the Environmental Assessment Act.

The Open House will provide the Public with an opportunity to discuss the project with Town staff. There will be no formal presentation. This is the only public open house scheduled for this project. Following the open house, the draft report will be finalized pending public comment. The Town will accept comments by mail until November 28, 2013. A final report will be made available for a 30-day public review. A Notice of Completion will be published at that time.

For further information or to provide input/comments on this project please contact Sherry Batten, Chief Administrative Officer, Town of Laurentian Hills at the address noted below. Subject to comments received, the Town of Laurentian Hills intends to proceed with the detailed design, tendering, and construction of the recommended works.

The Chalk River WWTP EA report is available on the Town's website at www.laurentianhills.ca

Sherry Batten, Chief Administrative Officer
Town of Laurentian Hills
34465 Highway 17
Point Alexander, R.R. #1
Deep River, Ontario K0J 1P0
Tel.: (613) 584-3114
Fax: (613) 584-3285
Email: cao@laurentianhills.ca

Public Open House

Chalk River Wastewater Treatment Plant - Municipal Class Environmental Assessment
November 13th, 2013 - 4:00 pm to 7:00 pm

Chalk River Fire Hall

ATTENDANCE SHEET

Print Name	Mailing Address	Postal Code	Telephone	E-mail
TAMMY FORBES	30 SELKIRK ST PETAWAWA	K8H 1P2	687-2293	
Richard RABISHAW	P.O. Box 186 Chalk River	K0J 1J0	589-2287	rrabishaw@sympatico.ca
Brenda Blimkie	89 Hunts Rd Chalk River	K0J 1J0	589-9696	
Anne GIARDINI	131 McKee Road, Laurentian Hills	K0J 1P0	584-3981	
Sherry Batten	34465 Highway 17 RR1 Deep River	K0J 1P0	584-3114	
Rick Basso	32045 Hwy 17 Chalk River	K0J 1J0	589-2289	

The above information is collected in accordance with the Municipal *Freedom of Information and Protection of Privacy Act* and the *Environmental Assessment Act*, and will become part of the public record.

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4
Tel: (613) 722-4420
Fax: (613) 722-2799

November 18, 2013
File: 163401125

Attention: Sherry Batten, CAO
Town of Laurentian Hills
34465 Highway 17, R.R. #1
Deep River, Ontario, K0J 1P0

Dear Ms. Batten,

Reference: Chalk River Wastewater Treatment Plant Environmental Assessment Report – Public Open House - Response to Public Feedback

The following information is presented as a response to the question received during the November 13, 2013 Public Open House and is related to the size of the equalization tank described in Option 3. The issue raised at the Public Open House is summarized by stating that the concerned resident thought that Stantec's approach to sizing the tank results in the tank being larger than necessary and therefore the capital cost requirements to implement this Option will make this Option less attractive in the overall evaluation.

Background

The operating basis for Option 3 is to utilize a new equalization (EQ) tank to capture and store wastewater treatment plant (WWTP) influent flows that exceed the maximum reliable treatment capacity of the WWTP. When the influent flows to the WWTP are lower than the maximum reliable treatment capacity, the stored wastewater will be pumped to the WWTP for treatment at a rate that ensures the overall WWTP influent flow does not exceed the maximum reliable treatment capacity of the WWTP.

The historical maximum month flow that occurred in April 2009 was equivalent to 800m^3/d. Although Stantec was advised that the WWTP can effectively treat up to 778m^3/d of raw sewage, the Stantec investigation shows the existing secondary clarifier, with 2.5m side water depth, can treat on a continuous and reliable basis, flows up to 700m^3/d. In Stantec's opinion, 778m^3/d may be considered the instantaneous or short term peak capacity of the WWTP, but effective treatment may not be sustained over an extended period of time during high flow conditions. Therefore Stantec used 700m^3/d as the firm peak treatment capacity of the WWTP for sizing the EQ tank.

For the environmental assessment report Stantec based the EQ tank sizing exercise on a simple calculation to determine the difference between the historical maximum month influent flow, which was 800m^3/day, and the maximum flow the WWTP can treat reliably over a 30day period (700m^3/day). This is represented by the calculation; (800m^3/day-700m^3/day)*30days =3,000 m^3. The EQ tank storage capacity must be at least 3,000m^3.

In accordance with recommendations found in Water Environment Federation MOP 8 (Design of Municipal Wastewater Treatment Plant, Page 11-80, 2010), it is common practice to add a 15 to 20% safety factor to the calculated EQ tank volume.

Considering the potential for an increase in sewer service connections, 20% safety factor was selected and resulted in a proposed EQ tank volume of 3,600 m^3.

Reference: Chalk River Wastewater Treatment Plant Environmental Assessment Report – Public Open House – Response to Public feedback

A Second Look in More Detail

The attached spreadsheet shows the daily inflow and outflow to/from an EQ tank with respect to the WWTP peak treatment capacity (700 and 778m^3/d). Outflow, shown as a negative value on the attached worksheet in the column titled "EQ Tank Inflow/Outflow", indicates that the tank will be releasing flow, whereas inflow (positive values) indicates when net influent flow results in the EQ tank being filled over the course of a day. The cumulative volume of the inflow to the EQ tank is calculated and illustrated on the attached worksheet in the column titled "Cumulative Volume". The volume of the EQ tank is determined by selecting the maximum cumulative volume of the high influent flow period.

Based on this more detailed investigation using historical daily flow data, the EQ tank needs to have a storage capacity of at least 3,380m^3 and by adding a 15% safety factor could be 3,900m^3 in volume.

The required size of the EQ tank, if this Option is implemented, would be confirmed during the detailed design phase of project implementation, but in all cases would have a minimum volume of 3,600m^3.

If and when the sewage collection system is expanded to connect additional users, the maximum month flow rate will increase and this flow rate increase will increase the demand on the EQ tank.

Conclusion

Implementing an EQ tank with a storage volume that is less than 3,600m^3 will result in a risk of WWTP hydraulic stress when the maximum month flow exceeds 700m^3/day.

If you have any questions please do not hesitate to contact the undersigned.

Regards,

STANTEC CONSULTING LTD.

Dave Robertson, C.E.T.
Senior Associate, Water
Phone: 613-725-5568
Fax: 613-722-2799
dave.robertson@stantec.com

Hao Tan, M.Sc., (Eng.)
Project Designer, Water
Phone: 613-724-4085
Fax: 613-722-2799
hao.tan@stantec.com

Attachment: Option 3 Equalization Tank –Tank Sizing Worksheet
Comment Sheet Received at Public Open House

sl w:\active\1634_01125_laurentian hills_wtp diversion and esr\planning\report\wwtp ea\public open house\open house 20131113 event\let_2013_11_18_sb_openhousepublicfeedbackresponse.docx

Date	Daily Plant flow	Plant Peak Capacity	EQ Tank Inflow / Outflow	Cumulative Volume
	m^3/day	m^3/day	m^3/day	m^3
	A	B	A-B	
03/01/2009	449	700	-251	
03/02/2009	412	700	-288	
03/03/2009	393	700	-307	
03/04/2009	383	700	-317	
03/05/2009	393	700	-307	
03/06/2009	440	700	-260	
03/07/2009	428	700	-272	
03/08/2009	412	700	-288	
03/09/2009	432	700	-268	
03/10/2009	407	700	-293	
03/11/2009	540	700	-160	
03/12/2009	474	700	-226	
03/13/2009	426	700	-274	
03/14/2009	464	700	-236	
03/15/2009	437	700	-263	
03/16/2009	493	700	-207	
03/17/2009	469	700	-231	
03/18/2009	535	700	-165	
03/19/2009	526	700	-174	
03/20/2009	525	700	-175	
03/21/2009	517	700	-183	
03/22/2009	517	700	-183	
03/23/2009	536	700	-164	
03/24/2009	510	700	-190	
03/25/2009	563	700	-137	
03/26/2009	560	700	-140	
03/27/2009	702	700	2	2
03/28/2009	702	700	2	4
03/29/2009	702	700	2	6
03/30/2009	874	700	174	180
03/31/2009	816	700	116	296
04/01/2009	823	700	123	419
04/02/2009	889	700	189	608
04/03/2009	1,207	700	507	1115
04/04/2009	1,207	700	507	1622
04/05/2009	874	700	174	1796
04/06/2009	1,251	700	551	2347
04/07/2009	958	700	258	2605
04/08/2009	892	700	192	2797
04/09/2009	770	700	70	2867
04/10/2009	855	700	155	3022
04/11/2009	775	700	75	3097
04/12/2009	765	700	65	3162
04/13/2009	765	700	65	3227
04/14/2009	745	700	45	3272
04/15/2009	703	700	3	3275
04/16/2009	737	700	37	3312
04/17/2009	768	700	68	**3380**
04/18/2009	673	700	-27	3353
04/19/2009	673	700	-27	3326
04/20/2009	682	700	-18	3308
04/21/2009	688	700	-12	3296
04/22/2009	681	700	-19	3277
04/23/2009	665	700	-35	3242
04/24/2009	720	700	20	3262
04/25/2009	720	700	20	3282
04/26/2009	671	700	-29	3253
04/27/2009	715	700	15	3268
04/28/2009	653	700	-47	3221
04/29/2009	682	700	-18	3203
04/30/2009	741	700	41	3244
05/01/2009	615	700	-85	3159
05/02/2009	615	700	-85	3074
05/03/2009	615	700	-85	2989
05/04/2009	656	700	-44	2945
05/05/2009	593	700	-107	2838
05/06/2009	571	700	-129	2709
05/07/2009	654	700	-46	2663
05/08/2009	582	700	-118	2545
05/09/2009	582	700	-118	2427
05/10/2009	582	700	-118	2309
05/11/2009	615	700	-85	2224
05/12/2009	528	700	-172	2052
05/13/2009	588	700	-112	1940
05/14/2009	559	700	-141	1799
05/15/2009	564	700	-136	1663
05/16/2009	564	700	-136	1527
05/17/2009	564	700	-136	1391
05/18/2009	574	700	-126	1265
05/19/2009	523	700	-177	1088
05/20/2009	546	700	-154	934
05/21/2009	526	700	-174	760
05/22/2009	564	700	-136	624
05/23/2009	564	700	-136	488
05/24/2009	564	700	-136	352
05/25/2009	588	700	-112	240
05/26/2009	538	700	-162	78
05/27/2009	526	700	-174	
05/28/2009	545	700	-155	
05/29/2009	542	700	-158	
05/30/2009	542	700	-158	

Date	Daily Plant flow	Plant Peak Capacity	EQ Tank Inflow / Outflow	Cumulative Volume
	m^3/day	m^3/day	m^3/day	m^3
	A	B	A-B	
03/01/2009	449	778	-329	
03/02/2009	412	778	-366	
03/03/2009	393	778	-385	
03/04/2009	383	778	-395	
03/05/2009	393	778	-385	
03/06/2009	440	778	-338	
03/07/2009	428	778	-350	
03/08/2009	412	778	-366	
03/09/2009	432	778	-346	
03/10/2009	407	778	-371	
03/11/2009	540	778	-238	
03/12/2009	474	778	-304	
03/13/2009	426	778	-352	
03/14/2009	464	778	-314	
03/15/2009	437	778	-341	
03/16/2009	493	778	-285	
03/17/2009	469	778	-309	
03/18/2009	535	778	-243	
03/19/2009	526	778	-252	
03/20/2009	525	778	-253	
03/21/2009	517	778	-261	
03/22/2009	517	778	-261	
03/23/2009	536	778	-242	
03/24/2009	510	778	-268	
03/25/2009	563	778	-215	
03/26/2009	560	778	-218	
03/27/2009	702	778	-76	
03/28/2009	702	778	-76	
03/29/2009	702	778	-76	
03/30/2009	874	778	96	96
03/31/2009	816	778	38	134
04/01/2009	823	778	45	179
04/02/2009	889	778	111	290
04/03/2009	1,207	778	429	719
04/04/2009	1,207	778	429	1148
04/05/2009	874	778	96	1244
04/06/2009	1,251	778	473	1717
04/07/2009	958	778	180	1897
04/08/2009	892	778	114	2011
04/09/2009	770	778	-8	2003
04/10/2009	855	778	77	**2080**
04/11/2009	775	778	-3	2077
04/12/2009	765	778	-13	2064
04/13/2009	765	778	-13	2051
04/14/2009	745	778	-33	2018
04/15/2009	703	778	-75	1943
04/16/2009	737	778	-41	1902
04/17/2009	768	778	-10	1892
04/18/2009	673	778	-105	1787
04/19/2009	673	778	-105	1682
04/20/2009	682	778	-96	1586
04/21/2009	688	778	-90	1496
04/22/2009	681	778	-97	1399
04/23/2009	665	778	-113	1286
04/24/2009	720	778	-58	1228
04/25/2009	720	778	-58	1170
04/26/2009	671	778	-107	1063
04/27/2009	715	778	-63	1000
04/28/2009	653	778	-125	875
04/29/2009	682	778	-96	779
04/30/2009	741	778	-37	742
05/01/2009	615	778	-163	579
05/02/2009	615	778	-163	416
05/03/2009	615	778	-163	253
05/04/2009	656	778	-122	131
05/05/2009	593	778	-185	
05/06/2009	571	778	-207	
05/07/2009	654	778	-124	
05/08/2009	582	778	-196	
05/09/2009	582	778	-196	
05/10/2009	582	778	-196	
05/11/2009	615	778	-163	
05/12/2009	528	778	-250	
05/13/2009	588	778	-190	
05/14/2009	559	778	-219	
05/15/2009	564	778	-214	
05/16/2009	564	778	-214	
05/17/2009	564	778	-214	
05/18/2009	574	778	-204	
05/19/2009	523	778	-255	
05/20/2009	546	778	-232	
05/21/2009	526	778	-252	
05/22/2009	564	778	-214	
05/23/2009	564	778	-214	
05/24/2009	564	778	-214	
05/25/2009	588	778	-190	
05/26/2009	538	778	-240	
05/27/2009	526	778	-252	
05/28/2009	545	778	-233	
05/29/2009	542	778	-236	
05/30/2009	542	778	-236	

Comments on Chalk River WWTP Upgrades

received from R Basso Nov 13/13

Excerpts from the Stantec Report (Pages 3.2 to 3.6)

WWTPs are designed to treat peak flow rates that are more than 2 times the annual average daily flow.

The existing WWTP was designed for a specific rated capacity that includes:

- anticipated flows resulting from growth, and
- limited inflows resulting from storm events.

The primary consideration impacting the Chalk River WWTP is its capacity to provide treatment when influent flow rates exceed **778 m^3/day (9 L/s)**, which is ~1.43 times the design annual average daily flow rate.

In 2009, the maximum daily flow at the WWTP was **14.5 L/s (1251 m^3/day)**. This is the worst case event.

Stantec Options

Five WWTP options were proposed. The two most attractive options in terms of cost were:

- Option #3 - the **Equalization Tank ($2.9 million)**, and
- Option #4 - the **Secondary Clarifier ($900,000)**

Of these two options, the Secondary Clarifier should be selected due to its lower cost.

Equalization Tank Comments

As stated in the Stantec Report, the WWTP can handle a maximum flow rate of **778 m^3/day** (*see above*). The equalization tank, proposed by Stantec, is very large (**3600 m^3**). By comparison, our elevated water storage tower has a capacity of **1380 m^3**. The proposed equalization tank capacity is **3** times larger than the 2009 maximum flow of **1251 m^3/day** (*see above*).

The equalization tank must buffer **~500 m^3/day** (1251 - 778). The proposed 3600 m^3 tank could store **~7 days** of maximum flow.

Other Potential Savings

Replace WTP pumps

As stated in the Stantec Report, if new WTP pumps were installed, the peak flow rate from the WTP would be reduced from **3.8 L/s** to **1 L/s** (a savings of **2.8 L/s**). This would reduce the maximum flow from **14.5 L/s** (*see above*) to **11.7 L/s** (*or **1010 m^3/day***).

The equalization tank must buffer **~250 m^3/day** (1010 - 778). The proposed 3600 m^3 tank could store **~14 days** of maximum flow.

Reduce Water Consumption

As pointed out in a previous email to Council, if Chalk River citizens reduced their water consumption to the Ontario average, it would result in a further savings of **1.2 L/s**. Combined with new WTP pumps, this would further reduce the flow from **11.7 L/s** (*or **1010 m3/day***) to **10.5 L/s** (*or **907 m3/day***).

The equalization tank must buffer **~130 m^3/day** (907 - 778). The proposed 3600 m^3 tank could store **~ 28 days** of maximum flow.

Question:

Would the cost of Option #3 be reduced if the WTP pumps were replaced and the equalization tank was right-sized?

APPENDIX P
Notice of Completion

THE CORPORATION OF THE TOWN OF
L A U R E N T I A N H I L L S

34465 HIGWAY NO. 17, POINT ALEXANDER, R.R. # 1, DEEP RIVER, ONTARIO K0J 1P0

NOTICE OF COMPLETION
Municipal Class Environmental Assessment (MCEA)
Chalk River Wastewater Treatment Plant

Background

In September of 2012, the Town of Laurentian Hills initiated the environmental assessment planning project for the Chalk River Wastewater Treatment Plant (WWTP). The Ontario Ministry of the Environment reported to the Town that under wet weather flow, the WWTP experiences hydraulic stress. The project was initiated to mitigate the hydraulic stress and/or replace existing component(s), some of which may have reached their useful service life at the facility. The planning process evaluated alternative options to correct the noted deficiency while taking into consideration the various social and economic environments. This MCEA study was conducted as a Schedule B project in accordance with the requirements of the *Municipal Class Environmental Assessment, as amended 2011*; an approved process under the *Environmental Assessment Act*.

The Process

In November 2012, the first milestone in this project, **Phase 1 – Problem Definition,** was finalized. The problem definition confirmed the project objective is to provide the Town with a plan to reduce the hydraulic stress at the WWTP and increase the WWTP capacity to support future population growth.

Alternative options to relieve the hydraulic stress at the WWTP were assessed. The preferred option adds a second clarifier to clarify the treated effluent prior to being released to the natural environment. A detailed discussion of the problem and assessment of the alternative options to resolve the problem are documented in the ***Town of Laurentian Hills Chalk River Wastewater Treatment Plant Phases 1 and 2 Class Environmental Assessment Report*** (EA report).

In August 2013 the Town circulated a draft copy of the EA report for agency review. In November 2013 a Public Open House was held at the Chalk River Fire Hall located at 31061 Highway 17 in Chalk River. The Open House presented an overview of the problem, the alternative options to resolve the problem, the assessment of the alternative options and the selection of the preferred option.

The new clarifier will be constructed within the property boundaries of the existing WWTP. The new clarifier will be designed and operated to remove settleable contaminants that are carried out of the existing final clarifier during high influent flow events.

Although the recommended option to resolve the WWTP hydraulic stress problem is the design and construction of an additional clarifier, the EA report also identifies other activities that could be considered in the Town's Master Planning program. One of the identified planning activities is to include in the design of the new clarifier, an integral dechlorination zone and associated appurtenances, to enable the dechlorination of the final effluent if the effluent continues to be disinfected with a chlorine based disinfection agent.

Feedback from the Public Open House and agency review has been incorporated into the final version of the EA report. All comments received were collected in accordance with the Freedom of Information and Protection Act and the Environmental Assessment Act, and have become part of the public record.

The final report is available for public viewing at the following locations.

www.laurentianhills.ca

Town of Laurentian Hills Town Office
34465 Highway No. 17,
Point Alexander, R.R. #1, Deep River
Ontario, K0J 1P0

Chalk River Public Library
15 Main Street
Chalk River, Ontario, K0J 1J0
(telephone 613-589-2966 for hours of operation)

This project is being planned in accordance with Schedule B of the Municipal Engineers Association Municipal Class Environmental Assessment (2011). If concerns arise regarding this project, which cannot be resolved in discussion with the Town, a person or party may request the Minister of the Environment make an order for the project to comply with Part II of the Environmental Assessment Act (referred to as a Part II Order), which addresses individual environmental assessments. Requests must be received by the Minister at the address below within 30 calendar days of the first publication of this Notice. A copy of the request must also be sent to the Town contact below. If there is no request received within the designated time on or before March 14, 2014, the Town may proceed to design and construction.

Minister of the Environment
Ministry of the Environment
77 Wellesley Street West
11th Floor, Ferguson Block
Toronto, ON M7A 2T5

Sherry Batten, CAO
Town of Laurentian Hills
34465 Highway No. 17,
Point Alexander, R.R. #1, Deep River
Ontario, K0J 1P0

To provide input into the planning process or for more information please contact the Town of Laurentian Hills, CAO Office.

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