REPORT

Drumbo Wastewater Treatment Plant Expansion Environmental Study Report

Prepared for

Oxford County

May 8, 2018 (revised September 19, 2018 and April 11, 2019)

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Contents

Section Page

Appendixes

Tables

Figures

Acronyms and Abbreviations

alum	aluminum sulphate
BOD_5	5-day biochemical oxygen demand
$cBOD_5$	5-day carbonaceous biochemical oxygen demand
CofA	Certificate of Approval
CH2M	CH2M HILL Canada Limited
County	Oxford County
Drumbo	Village of Drumbo
EA	Environmental Assessment
ECA	Environmental Compliance Approval
ESR	Environmental Study Report
GHG	Greenhouse Gas
HRT	hydraulic retention time
Jacobs	Jacobs Engineering Group Inc.
kg/d	kilogram(s) per day
m^3/d	cubic metre(s) per day
MBR	membrane bioreactor
MEA	Municipal Engineers Association
MECP	Ontario Ministry of the Environment, Conservation and Parks
mg/L	milligram(s) per litre
MLSS	mixed liquor suspended solids
MTCS	Ontario Ministry of Tourism, Culture and Sport
NH_3-N	ammonia-nitrogen
O&M	operations and maintenance
PCC	Public Consultation Centre
PPU	persons per unit
Princeton	Village of Princeton
SBR	sequencing batch reactor
TAN	total ammonia nitrogen
TKN	total Kjeldahl nitrogen
Township	Township of Blandford-Blenheim
TP	total phosphorus
TSS	total suspended solids
UV	ultraviolet
WAS	waste activated sludge
WWTP	wastewater treatment plant

Executive Summary

Introduction

Oxford County (County) has undertaken a Municipal Class Environmental Assessment (EA) study to develop a wastewater treatment strategy for the Village of Drumbo (Drumbo). The study was undertaken to meet future wastewater servicing needs created by population growth in Drumbo, based on a 20-year timeframe. This project was conducted in accordance with the requirements for a Schedule C project as described in the Municipal Engineers Association (MEA)'s Municipal Class EA document (MEA, 2000, as amended in 2007, 2011, and 2015). Phases 1 and 2 were completed in 2016 (XCG Consulting Limited, 2017) and CH2M HILL Canada Ltd (CH2M) was retained to complete Phases 3 and 4.

Background and Objectives

The County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in Drumbo. The Drumbo WWTP, constructed in 1993, is a sequencing batch reactor (SBR) with tertiary filtration and ultraviolet (UV) disinfection with a current rated capacity of 300 cubic metres per day (m^3/d), per the facility's Amended Environmental Compliance Approval (ECA) Number 8752-9Q4H96, issued on February 9, 2015. The Drumbo WWTP treated an average flow of 252 m^3/d in 2016 and treated a long-term average of 260 m^3/d (i.e., 2009 to 2016).

The objectives of the Class Environmental Assessment (EA) Study were to confirm the existing condition of the Drumbo WWTP, to confirm future flows and loads, to develop alternatives to meet the future needs based on utilizing the existing site, to involve the public in the decision-making process, and to identify the preferred alternative. Previous work evaluated five servicing options for the Drumbo WWTP and the recommended alternative was to expand the existing Drumbo WWTP at its current location to meet future needs for Drumbo (XCG Consulting Limited, 2017). This report has re-evaluated the future needs and assessed two upgrade options for the Drumbo WWTP to handle the expected range of flows to meet future needs.

Problem Statement and Environment Assessment Process

Drumbo is designated as a "Serviced Village" in the County Official Plan and, as such, is intended to accommodate growth and development in the Township of Blandford-Blenheim (Township) based on full municipal services. While the existing designated land supply in Drumbo would be more than sufficient to accommodate the Township's forecasted growth, the Drumbo WWTP requires additional capacity to accommodate such growth. For this reason, the County has initiated a Class EA study to develop a preferred wastewater servicing plan for Drumbo to service planned growth in a cost-effective, environmentally sound, and sustainable manner.

This project has followed the Class EA process, including confirmation of needs, evaluation of environmental concerns, alternatives development and evaluation, and public consultation.

Effluent Discharge Needs

The Drumbo WWTP discharges to the Cowan Drain, which flows 3.55 kilometres (km) before discharging into the Nith River. A review of the Cowan Drain and the Nith River near the point of discharge of the Cowan Drain was undertaken based on sampling from the Cowan Drain in 2014; similarly sized streams in the vicinity of the Cowan Drain; and flow and quality monitoring in the Nith River. Although effluent from the Drumbo WWTP is a small component of the flow and loading to the Nith River, it does contain constituent concentrations that are greater than those in the receiver, especially for total phosphorus

(TP) and ammonia-nitrogen (NH_3-N). As such, for continued discharge to the Cowan Drain, and subsequently the Nith River, it is expected that the Ontario Ministry of the Environment, Conservation and Parks (MECP) will maintain the existing effluent loading limits for NH_3-N and TP, per the existing Amended ECA, which translates into lower concentration limits at a higher rated capacity.

Population and Flow Projections

The demand for future development in the Township is based on forecasted growth, and the location of that development is impacted by Official Plan policies and the availability of land and servicing capacity to accommodate such growth (i.e., supply). The designation of Drumbo and Plattsville as “Serviced Villages” in the Official Plan reflects Council’s intent to direct the majority of the Township’s forecasted future growth to lands within those settlements and to confirm that the required infrastructure is available to accommodate such growth.

From this review, CH2M has concluded that Drumbo could accommodate additional development beyond that outlined in the previous work (for further detail, please refer to Section 3). Therefore, Drumbo could service the 86 additional homes identified previously (XCG Consulting Limited, 2017), or with increased servicing capacity could potentially handle the remaining forecasted demand (i.e., 147 additional units) for the Township. This would amount to a total of 233 homes/units (i.e., 86 previously identified plus 147 remaining). For the Drumbo WWTP, this would equate to a target flow of approximately 450 m^3/d, which is an increase from the previous design flow of 322 m^3/d (XCG Consulting Limited, 2017).

Alternative Solutions

The review of alternatives was based on an evaluation of the technical, environmental, social and financial aspects of a long-list of alternatives. As part of the technical criteria the problem statement and policy goals of the County were assessed. The “do-nothing” alternative was evaluated as one of the alternatives in Phases 1 and 2 of the Class EA Study and was subsequently deemed to not be a viable option as it does not satisfy the overall objective for the project nor is it consistent with the County’s policies and strategic plan. Other alternatives reviewed servicing options and expansion at the current site or at a new site. The preferred alternative was to service Drumbo by expanding the Drumbo WWTP within the existing site footprint.

Design Concepts for Preferred Solution

The conclusion from the previous work was that providing wastewater servicing for Drumbo could be met with an expansion of the existing WWTP from 300 m^3/d to 322 m^3/d. This would provide capacity for the existing community and committed or infilling needs. Additional forecasted residential demand for the Township (i.e., 147 additional units) could also be accommodated in Drumbo, since it is a “Serviced Village”, which potentially could increase the capacity requirement to 450 m^3/d. Therefore, the continued review of alternative solutions was based on providing a minimum capacity of 322 m^3/d and a maximum of 450 m^3/d at an expanded WWTP on the existing site.

Two options to accommodate the needs for an upgraded WWTP at the existing Drumbo WWTP were developed and evaluated. These options were: (i) an upgrade of the SBR/Tertiary filter process; and, (ii) the retrofit of the plant to a membrane bioreactor (MBR) process. The needs for both options were developed including new headworks (i.e., screening) and an extension of the outfall for the plant. The MBR retrofit was based on a modular MBR upgrade.

Each concept was evaluated based on the same criteria used to evaluate the long-list of alternatives. Evaluation of the technical, environmental and social aspects of the two options were similar, but the MBR retrofit option was deemed to be better suited to meet effluent limits at the site. Both options need to address issues associated with source water protection, noise and dust during construction and construction staging to ensure continuous performance is maintained. During detailed design consideration will also need to be given to climate change concerns, including reducing emissions during construction and operation of the new facility, and considering and designing for changing climate trends.

CH2M reviewed the previous capital costing for the SBR/Tertiary filter upgrade and updated the cost estimate. The updated cost estimate is within 10 percent of the previous cost and includes full replacement of the tertiary filters and extending the WWTP outfall to Oxford Road 3. The updated capital cost estimate for the MBR upgrade is less than the cost estimated during previous work and is now based on a modular MBR upgrade using existing tankage for process tanks. On average (based on two MBR modular upgrade quotations), the updated capital cost for the MBR option is less than 10 percent higher than the updated cost to upgrade to the SBR/Tertiary filters. Operations and maintenance (O&M) costs are expected to be higher for the MBR process and the overall Life Cycle cost for the MBR option is about 25 percent higher than the SBR/Tertiary filter upgrade.

The MBR upgrade has the advantage of providing a better effluent quality and additional treatment capacity. The MBR upgrade provides the potential for increased capacity using the current process tankage since it operates at a higher mixed liquor suspended solids (MLSS) concentration compared with the SBR process.

Either alternative can meet the previous capacity target of 322 m^3/d, and capital costing for the two main alternatives (i.e., SBR/Tertiary and MBR) are similar. The MBR upgrade has the advantage of providing an enhanced effluent quality and higher treatment capacity with current tankage. Therefore, due to effluent limits and space constraints at the site, the conclusion that an upgraded SBR/Tertiary filter process could meet the lower capacity goal (i.e., 322 m^3/d), but that a process like an MBR would be required for additional capacity, matches a conclusion of the previous work completed (XCG Consulting Limited, 2017).

Public Consultation

The consultation process to-date for this project included notification and communication with the public and government agencies. Public consultation has reached many residents in Drumbo and the neighbouring Village of Princeton (Princeton), through two Public Consultation Centres (PCCs) during Phases 1 and 2 of the Class EA process. Feedback was varied but included comments from Princeton residents that Princeton should have wastewater servicing and municipal wastewater treatment. Drumbo residents' comments varied on whether the Drumbo WWTP should service Drumbo only, or both villages. Government agency notifications were made; feedback was limited to acknowledgement, provide further updates, or no further updates were required.

A final PCC (PCC #3) was held on July 19, 2018: a total of eight persons signed in at the PCC, and no comments were received. Notifications were sent out prior to PCC #3, and no written responses were received. The ESR was posted for the review period, additional follow-up with the MECP and other stakeholders was received and considered.

SECTION 1

Introduction

Oxford County (County) has undertaken a Municipal Class Environmental Assessment (EA) study to develop a wastewater treatment strategy for the Village of Drumbo (Drumbo). The study was undertaken to provide the wastewater servicing necessary to accommodate future population growth in Drumbo. This project was conducted in accordance with the requirements for a Schedule C project as described in the Municipal Engineers Association (MEA)'s Municipal Class EA document (MEA, 2000, as amended in 2007, 2011, and 2015). As a result, the following four phases of the EA process were completed prior to initiation of Phase 5 (i.e., detailed design and construction):

- Phase One: Definition of the Problem
- Phase Two: Identification and Assessment of Alternative Solutions, and Selection of a Preferred Solution
- Phase Three: Identification and Assessment of Alternative Design Concepts, and Selection of a Preferred Design
- Phase Four: Preparation of an Environmental Study Report (ESR)

Consultation with the public and government review agencies was an integral component of the study, and consultation activities were undertaken throughout each phase of the study.

Phases 1 and 2 were completed in 2016 (XCG Consulting Limited, 2017) and CH2M HILL Canada Ltd (CH2M) was retained to complete Phases 3 and 4.

1.1 Background

The County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in Drumbo. The Drumbo WWTP, constructed in 1993, is a sequencing batch reactor (SBR) with tertiary filtration and ultraviolet (UV) disinfection with a current rated capacity of 300 cubic metres per day (m^3/d), per the facility's Amended Environmental Compliance Approval (ECA) Number 8752-9Q4H96, issued on Feburary 9, 2015. A copy of the existing ECA is included in Appendix A.

In June 2013, the County initiated a Municipal Class EA to develop a wastewater servicing plan for Drumbo to service planned growth in the community in a cost-effective, environmentally sound, and sustainable manner. The Drumbo WWTP EA also considered the potential to provide servicing for the Village of Princeton (Princeton) at an expanded or new Drumbo WWTP. Princeton is currently serviced by private sewage systems (i.e., septic tanks).

Public Consultation Centres (PCCs) were held on June 16, 2016, and May 16, 2017, during Phases 1 and 2 to provide information on the study and to receive comments from the public. A third PCC was held on July 19, 2018, to present the preferred alternative to expand capacity at the existing Drumbo WWTP site.

Figure 1-1 shows an aerial of the site showing the WWTP and the water treatment plant (WTP) on the existing site.

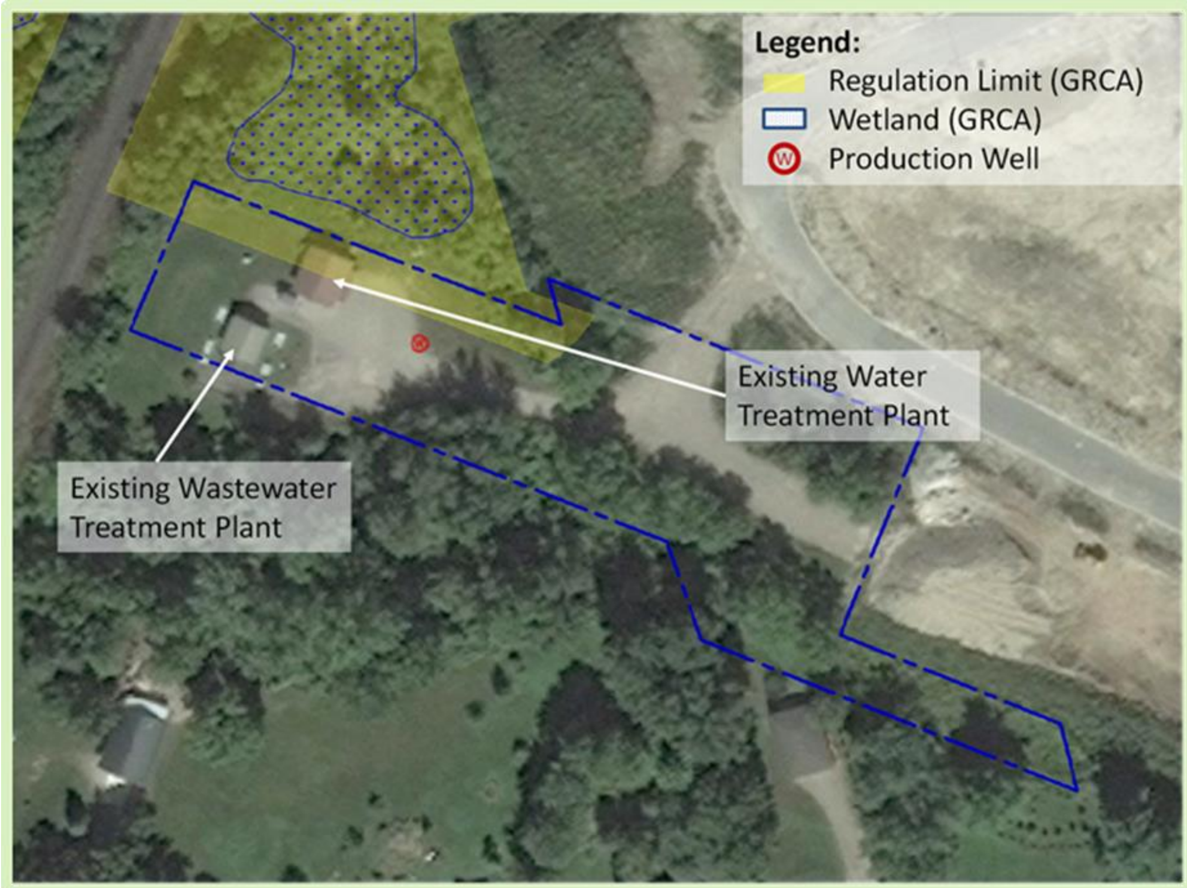

Figure 1-1. Drumbo WWTP Location and Surrounding Areas

1.2 Study Objectives

The objectives of the Class EA Study for the Drumbo WWTP capacity expansion project include the following:

- Confirm existing conditions at the WWTP.
- Forecast future flows and constituent loads based on a 20-year development timeframe.
- Develop and assess feasible servicing alternatives to meet the future demand.
- Involve the public in the decision-making process.
- Identify the preferred alternative for implementation.

Previous work conducted in Phases 1 and 2 of the Class EA Study evaluated five options for the Drumbo WWTP to handle the anticipated growth of the community until 2036 (XCG Consulting Limited, 2017). These five alternatives were brought forward to the public, which considered the growth of Drumbo as well as the potential to provide Princeton with servicing. The five alternatives were evaluated based on technical, environmental, social, and financial feasibility. The evaluation led to the recommendation to expand the existing Drumbo WWTP, on the existing site, to service growth within Drumbo. No treatment of wastewater generated in Princeton would be provided at the Drumbo WWTP.

Further to the Class EA Study work completed previously, an optimization study was conducted on the Drumbo WWTP's tertiary filter operation. The study concluded that the current operation of the tertiary filters does not meet their objectives and that replacement or refurbishment of the filters will be required in the future.

CH2M HILL Canada Limited (CH2M; now Jacobs Engineering Group Inc. [Jacobs]) was retained by the County to conclude the EA process through the completion of Phase Three and Phase Four.

1.3 Problem Statement

Drumbo is designated as a "Serviced Village" in the County Official Plan and, as such, is intended to accommodate growth and development on full municipal services. While the existing designated land supply in Drumbo would be more than sufficient to accommodate the forecasted growth, the Drumbo WWTP requires additional capacity to accommodate such growth. For this reason, the County has initiated a Class EA Study to develop a wastewater servicing plan for Drumbo to service planned growth in a cost-effective, environmentally sound, and sustainable manner.

1.4 Class Environmental Assessment Process

The following regulatory framework has been applied to the study.

Ontario's *Environmental Assessment Act* (EAA) was passed in 1975 and was first applied to municipalities in 1981. The EAA requires the study, documentation, and examination of the environmental effects that could result from projects or activities (Province of Ontario, 2010).

The objective of the EAA is to consider the possible effects of these projects early in the planning process, when concerns may be most easily resolved, and to select a preferred alternative with the fewest identified impacts.

The EAA defines "environment" very broadly:

- *Air, land, or water*
- *Plant and animal life, including humans*
- *Social, economic, and cultural conditions that influence the life of humans or a community*
- *Any building, structure, machine, or other device or thing made by humans*
- *Any solid, liquid, gas, odour, heat, sound, vibration, or radiation resulting directly or indirectly from human activities*
- *Any part or combination of the foregoing, and the interrelationships between any two or more of them, in or of Ontario*

In applying the requirements of the EAA to projects, two types of EA planning and approval processes are identified in the MEA's Municipal Class EA document (MEA, 2000, as amended in 2007, 2011, and 2015):

1. Individual EAs (Part II of the EAA): "*Projects for which Terms of Reference and an individual EA are carried out and submitted to the Minister of the Environment and Climate Change for review and approval"*.
2. Class EAs: "*Projects are approved subject to compliance with an approved Class EA process; provided that the appropriate Class EA approval process is followed, a proponent will comply with the requirements of the EAA"*.

This study followed the MEA's Municipal Class EA document (MEA, 2000, as amended in 2007, 2011, and 2015) to meet, at a minimum, Phase One through Phase Four. The five phases of the Class EA process include the four phases completed under this project, plus Phase Five, which is the implementation of the project (i.e., design and construction). The phases of a Class EA project are summarized as follows:

- *Phase One: Definition of the Problem*
- *Phase Two: Identification and Assessment of Alternative Solutions, and Selection of a Preferred Solution*

- *Phase Three: Identification and Assessment of Alternative Sites/Design Concepts, and Selection of a Preferred Site/Design*
- *Phase Four: Preparation of an ESR*
- *Phase Five: Implementation*

The Class EA document classifies projects undertaken by municipalities into one of four possible schedules depending on the project activities and associated anticipated environmental impact. The four schedules under which a project's EA process is determined are described as follows:

1. Schedule A projects are minor operational and upgrade activities and may go ahead without further assessment once Phase One of the Class EA process is complete (that is, the problem is reviewed, and a solution is confirmed).
2. Schedule "A+" projects are pre-approved but still require public notification prior to implementation of the project. Projects categorized as Schedule A+ include activities such as municipal infrastructure plans previously approved by a council member (Phase 1).
3. Schedule B projects must proceed through the first two phases of the process. Proponents must identify and assess alternative solutions to the problem, inventory impacts, and select a preferred solution. They must also contact relevant agencies and affected members of the public. Provided that no significant impacts are found and no requests are received to elevate the project to Schedule C or undertake the project as an Individual EA (Part II Order), the project may proceed to the next phase.
4. Schedule C projects require more detailed study, public consultation, and documentation, as they may have more significant impacts. Projects categorized as Schedule C must proceed through all five phases of an assessment. An ESR must be completed and be available for a 30-day public review period, prior to proceeding to implementation.

If there are major issues that cannot be resolved upon completion of the final ESR, individuals may request the Ontario Ministry of the Environment, Conservation and Parks (MECP) to require the regions to comply with Part II of the EAA. Upon receiving a Part II Order Request, the MECP reviews the request and study information and makes one of the following decisions: deny the request, refer the matter to mediation, or require completion of an Individual EA. Many factors are considered by the MECP in making decisions, including the adequacy of the planning process, the potential for significant adverse environmental effects after mitigation measures are considered, the participation of the requester in the planning process, and the nature of the request (MEA, 2000, as amended in 2007, 2011, and 2015).

The study is being carried out as a Schedule C project; therefore, all five Phases of the MEA EA process will be followed.

1.5 Report Organization and Format

The Drumbo WWTP ESR presents the Municipal Class EA decision-making process and study recommendations. The ESR is comprised of seven sections, including references and appendices:

- Section 1: Introduction – provides project background information, objectives, and the problem statement, in addition to an overview of the MEA EA process
- Section 2: Existing Conditions – provides a summary of the Drumbo WWTP and its current operation
- Section 3: Population and Flow Projections – summarizes the anticipated future growth and resulting demand for service
- Section 4: Alternative Solutions – presents the identification and description of potential servicing alternatives at the Drumbo WWTP

- Section 5: Alternative Design Concepts for Preferred Solution – describes the evaluation of the potential servicing alternatives, along with the preferred alternative for implementation
- Section 6: Public Consultation – summarizes the public consultation activities undertaken throughout the project
- Section 7: Recommended Servicing Plan – provides a recommended servicing plan for County consideration

1.6 Related Studies

Previous studies undertaken have been used as background information and are referenced throughout this ESR and are generally provided in Appendix B:

- Drumbo WWTP Class EA Study: Summary of Public and Agency Consultation Program – D.C. Damman and Associates, June 1, 2017 (See Appendix G)
- Drumbo WWTP Class EA Study Technical Memorandum (TM) 1: Existing Conditions – XCG Consulting Limited, September 13, 2016
- Drumbo WWTP Class EA Study TM 2: Future Flows and Loads – XCG Consulting Limited, August 26, 2016
- Drumbo WWTP Class EA Study TM 4: Evaluation of Alternative Solutions – XCG Consulting Limited, March 3, 2017
- Drumbo WWTP Class EA Study – Cowan Drain Background Information TM – XCG Consulting Limited, January 14, 2014

SECTION 2

Existing Conditions

2.1 Drumbo WWTP

2.1.1 Facility Overview

Sewage generated in Drumbo is sent to the Drumbo WWTP for treatment before it is discharged to the Cowan Drain and, subsequently, the Nith River. The Drumbo WWTP uses SBR technology to treat raw sewage, followed by multimedia filtration for solids removal and UV disinfection. The following paragraphs provide a more detailed description of how the Drumbo WWTP operates.

Raw sewage is conveyed to the Drumbo WWTP and is measured with a magnetic flow meter. Sewage enters the trash tank, which also serves as a holding tank for waste activated sludge (WAS) from the biological reactors. The trash tank overflows to a transfer tank that feeds the two SBR tanks, which operate in parallel. In the event of high flow periods that exceed the capacity of the transfer tank and SBRs, wastewater can flow by gravity from the transfer tank to the emergency overflow containment basin. Wastewater stored in the emergency overflow containment basin is pumped back to the transfer tank manually, using a submersible pump, when the SBRs have enough capacity to treat the stored wastewater.

Flow from the transfer tank is delivered to the SBRs via submersible pumps. Air supply to the reactors is provided by three Roots-Dresser blowers. Aluminum sulphate (alum) is added for phosphorus removal directly into each of the SBR tanks from the alum storage tanks during the SBR react cycle. At the end of the react cycle, decant water is pumped to two filter equalization tanks and WAS is pumped to the trash tank.

Tertiary filtration is accomplished using three down-flow multimedia pressure filters. Flow to the tertiary filters is controlled by three filter feed pumps. Variable frequency drives are not installed on the filter feed pumps. Manually operated valves installed on the influent and effluent of each filter allow each filter to be taken offline individually; however, three filters are online during typical operation. Filtered effluent is disinfected using UV disinfection and discharged to the Cowan Drain.

A process flow schematic of the treatment train at the Drumbo WWTP is shown on Figure 2-1. Further details on equipment operation and sizing are provided in TM #1 – Drumbo WWTP MCEA Review Summary, dated January 19, 2018, which is provided in Appendix C.

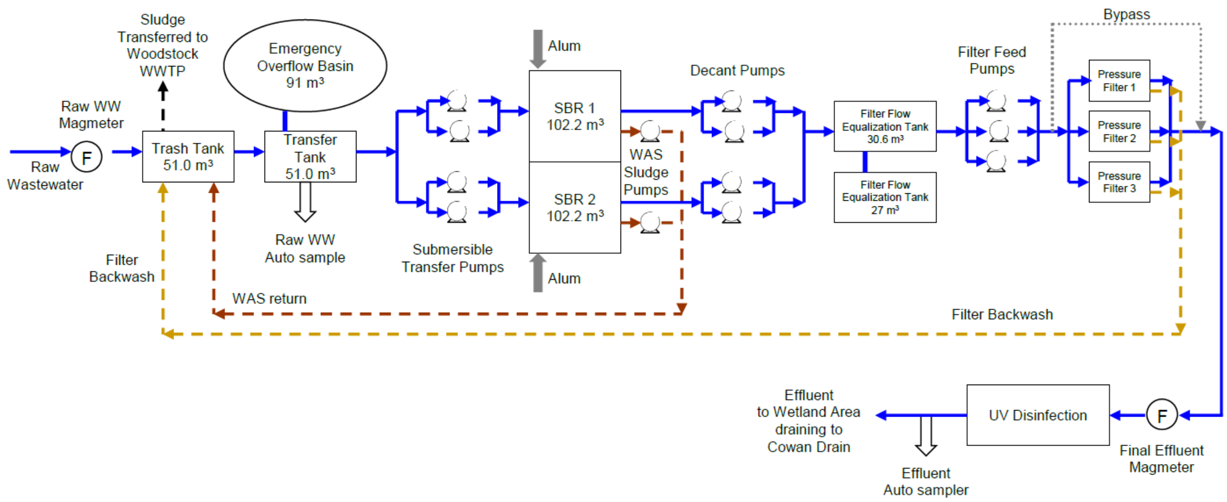

Figure 2-1. Process Flow Diagram for Drumbo WWTP (XCG Consulting Limited, 2017)

2.1.2 Influent Quality

Raw wastewater entering the Drumbo WWTP includes wastewater from domestic and commercial sources in the community. Backwash from the tertiary filters is recycled to the trash tank at the head of the plant upstream of the raw influent sampling point. Raw sewage samples are collected using a 24-hour composite sampler from the SBR transfer tank. Table 2-1 summarizes the raw wastewater concentration of pertinent constituents in milligrams per litre (mg/L).

Table 2-1. Historical Raw Wastewater Characteristics, Drumbo WWTP

Year	Average Concentration (mg/L)			
	BOD_5	**TSS**	**TP**	**TKN**
2009	121	110	4.0	27.2
2010	126	82	3.8	29.8
2011	101	75	3.3	28.7
2012	146	111	4.6	32.9
2013	112	78	3.1	31.8
2014	126	89	4.0	30.0
2015	124	86	4.0	34.0
2016	121	69	3.0	32.0
Average	**122**	**88**	**3.7**	**30.8**
Maximum	**146**	**111**	**4.6**	**34.0**

Notes:
BOD_5 = 5-day biochemical oxygen demand
TKN = total Kjeldahl nitrogen
TP = total phosphorus
TSS = total suspended solids

Results shown in Table 2-1 indicate that BOD_5, TKN, and TP are at levels which are considered medium to low strength for raw wastewater (Metcalf & Eddy, 2003). TSS concentrations are considered below typical concentrations for domestic wastewater (Metcalf & Eddy, 2003).

2.1.3 Drumbo WWTP Performance

2.1.3.1 Effluent Quality

Currently the Drumbo WWTP operates under limits set by its Amended ECA. Note that historical data includes years that operated under a different set of limits stipulated by an earlier certificate of approval (CofA). Table 2-2 summarizes the effluent quality produced by the Drumbo WWTP since 2009.

Table 2-2. Historical Final Effluent Concentrations, Drumbo WWTP

Year	Average Concentration (mg/L)				
	$cBOD_5$	**TSS**	**TAN (May – Oct)**	**TAN (Nov – Apr)**	**TP**
2009[a]	4.9	5.3	0.8	0.8	0.19
2010[a]	4.3	4.3	0.6	0.6	0.17
2011[a]	4.3	4.9	0.7	0.7	0.14
2012	2.3 (3.0)[b]	4.6 (7.0)	1.1 (2.2)	1.2 (2.0)	0.20 (0.36)
2013	2.4 (4.2)	5.6 (7.5)	1.4 (2.2)	2.0 (3.3)	0.17 (0.26)
2014	2.3 (3.0)	5.4 (7.5)	1.2 (1.7)	2.5 (4.3)	0.20 (0.32)
2015	2.7 (3.5)	5.2 (7.2)	1.9 (2.6)	1.6 (2.9)	0.23 (0.32)
2016[c]	2.0 – 6.0	2.2 – 11.9	0.5 – 3.2	0.6 – 4.1	0.1 – 0.3
Average	**3.15 (4.2)**	**5.06 (7.5)**	**1.1 (2.6)**	**1.4 (4.5)**	**0.19 (0.36)**
Effluent Non-Compliance Criteria	**9.3 mg/L**	**9.3 mg/L**	**2.7 mg/L**	**4.5 mg/L**	**0.46 mg/L**

[a] Only average data available

[b] Value in brackets is maximum value

[c] 2016 data presented as minimum and maximum concentrations

Notes:
$cBOD_5$ = 5-day carbonaceous biochemical oxygen demand
TAN = total ammonia nitrogen

Table 2-2 shows that annual effluent and maximum month concentrations of $cBOD_5$ have remained consistently below effluent objectives. Maximum month concentrations of TSS, TAN, and TP have occasionally exceeded effluent objective concentrations, but annual average concentrations remain below effluent limits. In 2016, the effluent TSS and TAN concentrations exceeded the effluent limit during the month of May. The TSS concentration also exceeded the effluent objective during 7 months in 2016, which may be indicative of treatment limitations in the filtration process. Otherwise, effluent quality remains in compliance on average at current flows. Current flows averaged 260 m^3/d (87 percent of current rated capacity) from 2009 to 2016 with a maximum year flow of 290 m^3/d in 2013.

2.1.3.2 Effluent Loading

Table 2-3 summarizes the historical effluent loading in kilograms per day (kg/d) that is discharged to the Cowan Drain and subsequently the Nith River (XCG Consulting Limited, 2017).

Table 2-3. Historical Final Effluent Loading, Drumbo WWTP

Year	Effluent Loading (kg/d)				
	cBOD$_5$	TSS	TAN (May – Oct)	TAN (Nov – Apr)	TP
2009[a]	1.2	1.3	0.2	0.2	0.05
2010[a]	1.1	1.1	0.1	0.1	0.04
2011[a]	1.1	1.2	0.2	0.2	0.03
2012	0.6 (0.8)	1.1 (1.6)	0.2 (0.5)	0.3 (0.6)	0.05 (0.07)
2013	0.6 (1.2)	1.5 (2.0)	0.3 (0.6)	0.6 (0.9)	0.04 (0.07)
2014	0.6 (1.1)	1.4 (1.7)	0.3 (0.5)	0.7 (1.6)	0.05 (0.07)
2015	0.6 (0.9)	1.2 (2.3)	0.4 (0.5)	0.4 (0.6)	0.05 (0.06)
2016[b]	0.5 – 1.5	0.5 – 2.9	0.1 – 0.8	0.1 – 1.0	0.02 – 0.07
Average[c]	**0.8 (1.2)**	**1.3 (2.3)**	**0.3 (0.5)**	**0.5 (1.6)**	**0.05 (0.07)**
Effluent Non-Compliance Criteria	**2.8 kg/d**	**2.8 kg/d**	**0.8 kg/d**	**1.36 kg/d**	**0.14 kg/d**

[a] Only average data available

[b] 2016 data presented as minimum and maximum loadings

[c] Value in brackets is maximum value

Table 2-3 shows that the effluent loading of all parameters has remained below the effluent non-compliance limited established in the Amended ECA.

2.2 Historical Work and Studies

The following are milestone dates associated with the Drumbo WWTP Class EA Study project:

- April 2013: Available Treatment Capacity Review
- June 2013: Municipal Class EA Study Initiated
- June 28, 2013: Notice of Commencement
- January 2014: Cowan Drain Background
- May 2014: Capacity Review
- February 9, 2015: ECA approval for Re-Rating
- October 2015: Drumbo WWTP Alternatives – Design Basis
- June 16, 2016: PCC #1
- June 27, 2016: Steering Committee Meeting #1
- January 26, 2017: Steering Committee Meeting #2
- May 16, 2017: PCC #2
- June 2017: Drumbo WWTP Class EA Study- Summary of Public and Agency Consultation Program
- July 2017: Optimization Progress
- January 2018: Drumbo WWTP MCEA Review Summary
- May 2018: Cowan Drain Assessment
- May 8, 2018: Draft ESR Report
- July 19, 2018: PCC# 3

- Sept 7, 2018: Final ESR Report

2.3 Effluent Discharge Needs

The Drumbo WWTP discharges to the Cowan Drain, which flows 3.55 kilometres (km) before discharging into the Nith River. Figure 2-2 shows the approximate route of the Cowan Drain from the WWTP effluent until its discharge into the Nith River. A review of the Cowan Drain and the Nith River near the discharge point of the Cowan Drain was undertaken based on sampling from the Cowan Drain in 2014, similar size streams in the vicinity of the Cowan Drain, and flow and quality monitoring in the Nith River. The results of the review are provided in TM #2 – Cowan Drain Assessment, dated February 21, 2018, which is provided in Appendix D.

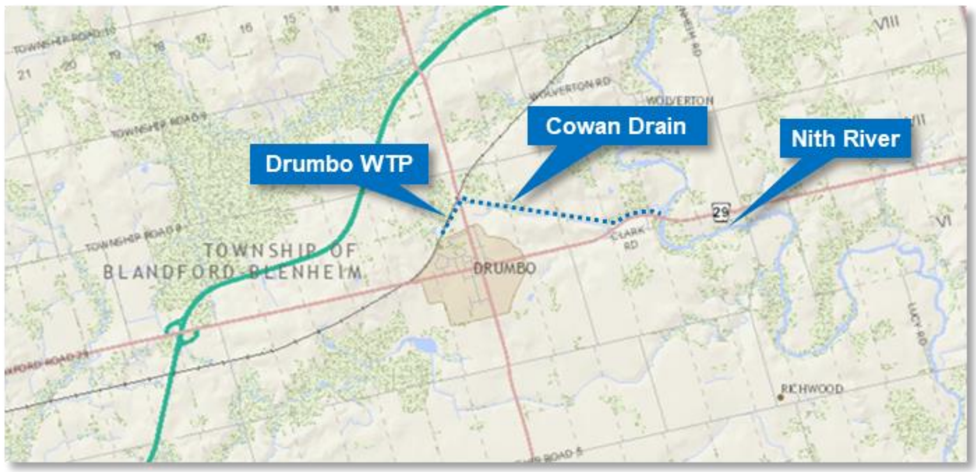

Figure 2-2. Drumbo WWTP and Effluent Receiver

Flow in the Cowan Drain was estimated based on its catchment area and a ratio of flow to catchment area from other, similar size and nearby streams. Table 2-4 summarizes the average, minimum, and seasonal flow estimated for the Cowan Drain and the Nith River (upstream and downstream of the Cowan Drain discharge). Based on this analysis, the Cowan Drain is less than 1 percent of the flow in the Nith River on an average basis, and the Drumbo WWTP is less than 10 percent of the flow in the Cowan Drain on an average basis.

Table 2-4. Summary of Flows in Nith River and Cowan Drain

	Flow in Cubic Metres per Second (m^3/s)			
			95th Quartile	
Stream and Location	**Average**	**Minimum**	**Summer**	**Winter**
Nith River at New Hamburg (Upstream)	6.256	0.202	0.446	1.158
Nith River at Canning (Downstream)	11.646	1.520	2.409	4.106
Cowan Drain	0.039	0.016	0.017	0.020

Sampling was conducted in the Cowan Drain near the WWTP effluent discharge point (Site #1) and near the Cowan Drain's discharge into the Nith River (Site #2) in 2014 (i.e., 12 samples from April to December). Several of the BOD_5 and the ammonia-nitrogen (NH_3-N) results are indicated at less than the stated value; to be conservative, the value indicated has been used in the statistics. The results for similar parameters (no nitrate) are provided in Table 2-5.

Table 2-5. Water Quality for Monitoring Sites in Cowan Drain

Station/Statistic	Parameter Concentration (mg/L) or Other						
	Dissolved Oxygen (DO)	TP	NH_3-N	Un-Ionized NH_3-N in micrograms per litre (µg/L)	Nitrate	pH	Temperature (°C)
Cowan Drain at WWTP (Site #1)							
• Average	3.8	0.132	0.167	2.09	NA	7.7	10.5
• Minimum	0.4	0.035	0.100	0.37	NA	7.5	0.5
• Maximum	7.2	0.338	0.300	6.13	NA	8.0	19.8
• 3rd Quartile	6.3	0.189	0.200	2.98	NA	7.9	17.8
• 1st Quartile	1.1	0.054	0.100	0.57	NA	7.5	4.5
Cowan Drain at Nith River (Site #2)							
• Average	8.5	0.05	0.13	8.81	NA	8.24	10.5
• Minimum	6.45	0.02	0.10	0.04	NA	6.5	1.0
• Maximum	13.2	0.13	0.30	26.4	NA	8.89	17.4
• 3rd Quartile	9.7	0.06	0.125	12.3	NA	8.55	16.0
• 1st Quartile	7.1	0.03	0.10	3.0	NA	8.22	5,1

Note:
NA = not applicable

Effluent NH_3-N and TP concentrations in the Cowan Drain are less than the effluent from the Drumbo WWTP on average. The long-term average concentrations from the Drumbo WWTP were 1.1 mg/L and 0.19 mg/L for NH_3-N and TP, respectively.

Effluent flow from the Drumbo WWTP is about 7.5 percent of the flow in the Cowan Drain on an average basis, and effluent flow is only 0.025 percent of the flow in the Nith River downstream of the Cowan Drain discharge on an average basis. The concentrations of NH_3-N and TP in the WWTP effluent are greater than those found in the Cowan Drain and the Nith River; however, they represent a small loading to the Nith River due to the low flow contribution of the WWTP. For continued discharge to the Cowan Drain, it is expected that the existing effluent loading limits for NH_3-N and TP would be maintained.

Current and potential future effluent limits based on maintaining current ECA loading limits for a potential future flow of 450 m^3/d are shown in Table 2-6.

Table 2-6. Proposed Effluent Limits for the Drumbo WWTP for Increasing Design Flows

Parameter	Loading (kg/d)	Effluent Limit Concentration (mg/L) at Various Design Flows	
		300 m^3/d (current rated)	450 m^3/d
$cBOD_5$	2.8	9.3	6.2
TSS	2.8	9.3	6.2
TP	0.14	0.47	0.3
TAN			
• May-Oct	0.82	2.7	1.8
• Nov-Apr	1.36	4.5	3.0

The results in Table 2-6 show the reduced effluent concentration limits required to maintain the current effluent loading at the current and buildout capacity (i.e., 450 m^3/d). At a rated average day capacity of 450 m^3/d (buildout capacity), the limits would be 6.2, 6.2, 0.3 mg/L for $cBOD_5$, TSS, and TP, respectively, while the seasonal NH_3-N concentration limit would be 1.8 and 3.0 mg/L. These revised limits (i.e., design or objective limits would be lower) would be beyond the treatment ability of the current technology (i.e., SBRs with tertiary filtration), but well within the treatment ability of a membrane bioreactor (MBR) process. These limits are based on maintaining a constant effluent loading at the buildout condition and have been discussed with the MECP as potential future targets.

SECTION 3

Population and Flow Projections

3.1 Planning Considerations

Provincial policy indicates that sufficient land shall be made available to accommodate an appropriate range and mix of land uses to meet projected needs for a time horizon of up to 20 years, with a focus on accommodating growth through intensification and redevelopment as a first priority. The current forecasted residential unit demand (Watson, 2014) for the Township for the current 20-year planning period 2018 through 2038, and the current estimated residential land supply (County Planning, 2018) are summarized in Figure 3-1.

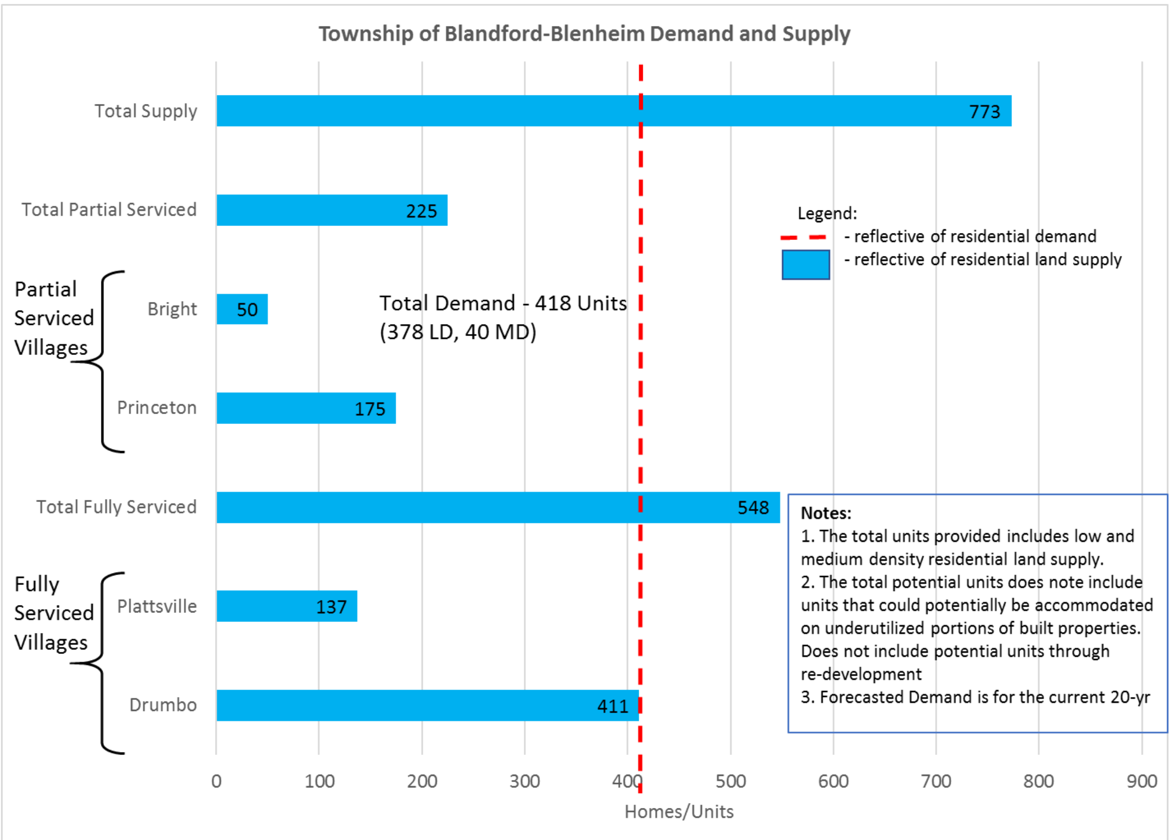

Figure 3-1. Current Demand and Supply for the Township

The forecasted residential demand for the Township for the current planning period (2018-2038) is estimated to be 378 single detached dwellings and semi-detached dwellings (semis) and 40 Townhouse dwellings, which equates to a total of 418 dwelling units.

The Official Plan growth management policies establish the planned role of the various settlements in the Township in accommodating growth and development. The settlements of Drumbo and Plattsville are designated as “Serviced Villages” in the Official Plan, which reflects Council’s intent to direct the majority of the Township’s growth to those settlements and to confirm that sufficient water and wastewater servicing is available to accommodate that growth. It is estimated that the current residential land supply in the Township’s two “Serviced Villages” (Drumbo and Plattsville combined) could potentially accommodate a total of approximately 548 units, not taking into account any existing servicing capacity limitations. The majority of this supply (e.g., 411 units) is located in Drumbo, with the remainder (e.g., 137 units) located in Plattsville.

A limited number of residential units could also potentially be accommodated in the Township's two "Villages" (i.e., Princeton and Bright), which allow for limited growth through minor infilling and minor rounding out of existing development on partial services (e.g., municipal water). Based strictly on land supply and typical lot sizes required to accommodate private septic systems, it is estimated that these partially serviced "Villages" could potentially accommodate as many as 225 dwelling units (total for Princeton and Bright, combined). However, that level of residential development would be beyond what would typically be considered minor infilling and minor rounding out and would leave no opportunity for development of additional non-residential uses, which are also permitted in the "Village" designation. For these and other reasons (such as capacity of existing water supply systems or hydrogeological limitations), the number of units that could realistically be accommodated in those settlements is expected to be considerably less than 225. Current forecasts for the Township indicate that an average of 21 dwelling units per year are expected to be constructed over the next 20 years in the entire Township, dropping from an average of 26 units per year early in the forecast period to 16 units per year toward the end of the forecast period. In comparison, a review of residential building permit volumes over the past five years, indicates that an average of approximately 26 dwelling units per year were constructed in the Township over that period. Of these 26 dwelling units, 23 units per year were located in designated settlement areas, with the remaining 3 units per year located outside of the fully and partially serviced villages.

Therefore, based on recent building permit data and Provincial and local growth management policies, it is expected that the vast majority of the forecasted demand over the planning period will be accommodated within the "Serviced Villages" and, to a limited extent, the "Villages" in the Township.

It would appear that approximately 271 of the forecasted demand of 418 residential dwelling units over the next 20 years (2018 to 2038) can currently be accommodated, as shown on Figure 3-2.

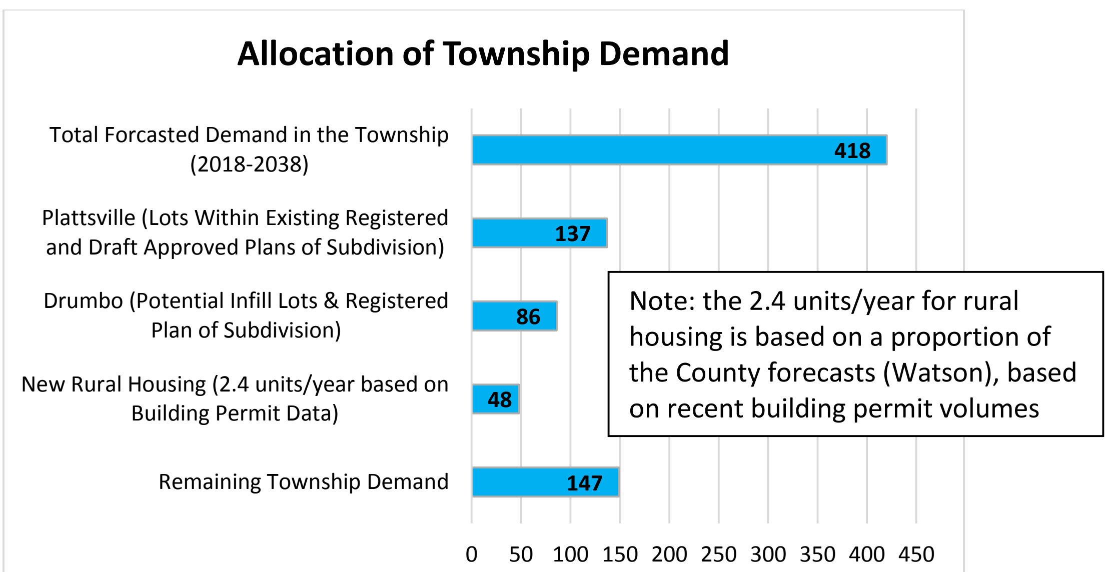

Figure 3-2. Allocation of Township Demand (2018 to 2038)

Footnote: Medium density residential development can only be accommodated in the fully serviced villages.

Based strictly on available residential land supply, the remaining Township forecasted demand of 147 dwelling units for the planning period identified on Figure 3-2 could be accommodated on existing lands within the settlements Drumbo, Princeton, and Bright. In fact, the remaining land supply within the Drumbo settlement boundary could currently accommodate approximately 350 additional residential units (above and beyond approved lots and infilling) which, on its own, would be more than sufficient to accommodate the remaining Township forecasted demand of 147 dwelling units. However, it is noted that, Drumbo currently has insufficient wastewater servicing capacity to accommodate additional growth on these lands. As such, an expansion to the wastewater services for the village of Drumbo would be required to accommodate such growth in full services.

In summary, the expansion of the municipal wastewater services in Drumbo for the purposes of accommodating all, or a substantial portion, of the Township's remaining forecasted growth for the planning period would appear to be supportable from a growth needs perspective and consistent with the strategic principles and growth management policies in the Official Plan.

3.2 Drumbo Servicing Needs

From this review, CH2M has concluded the following: based on its designation as a "Serviced Village" and available supply of designated growth lands, as well as the projected residential growth for the Township over the planning period, Drumbo is expected to accommodate additional development beyond that outlined in the previous work.

Therefore, Drumbo could service the 86 additional homes identified previously (XCG Consulting Limited, 2017), or with increased servicing capacity, could potentially handle the remaining estimated residential demand over the 20-year planning period (i.e., 147 additional units, see Section 3.1). This would amount to a total of 233 homes/units (i.e., 86 previously identified plus 147 remaining). The impact of this range of servicing for Drumbo is summarized in Table 3-1. The result could be a range for Drumbo from the projected population of 1,128 (previous) to an upper value of 1,557 based on a persons per unit (PPU) amount of 2.92. The PPU from the recent 2016 Census was a little lower at 2.7; however, the PPU from previous studies (XCG Consultants Limited, 2017) was used for consistency.

For Drumbo, at an estimated per capacity flow of 293 litres per capita per day, this would equate to a target flow for the WWTP of approximately 450 m^3/d, which is an increase from the previous design flow of 322 m^3/d.

Table 3-1. Projected Servicing Population for Drumbo

Village/Scenario	Existing	Growth[a]	Projected
Drumbo			
• Previous (XCG, 2016)	877	251 (86 units)	1,128
• Upper Range	877	680 (233 units)	1,557

[a] Population estimate based on 2.92 PPU

Alternative Solutions

4.1 Initial Solutions Review

Five servicing alternatives were put forward during Phase 1 of the MCEA. Each of these alternatives were consistent with one of the original demand scenarios previously developed. These alternatives are summarized in Table 4-1. For additional detail, please refer to TM #1 – Drumbo WWTP MCEA Review Summary, dated January 19, 2018, which is provided in Appendix C.

Table 4-1. Summary of Alternative Solutions (XCG Consulting Limited, 2017)

Alternative Number	Description	Demand Scenario
1. Do Nothing	No additional wastewater treatment capacity would be provided for Drumbo and no treatment of Princeton wastewater at the Drumbo WWTP.	1
2. Service Drumbo at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service the planned growth in Drumbo. No treatment of Princeton wastewater would be provided at the Drumbo WWTP.	2
3. Service Drumbo at a new Drumbo WWTP at a new site[a]	A new Drumbo WWTP would be constructed at a new site to service Drumbo. The existing Drumbo WWTP would be decommissioned. No treatment of Princeton wastewater would be provided at the new Drumbo WWTP.	2
4A/4B. Service Drumbo and Princeton at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service the planned growth in Drumbo and the community of Princeton, excluding (4A) or including (4B) the proposed 324-unit development in Princeton.	A – 3 B – 4
5A/5B. Service Drumbo and Princeton at a new Drumbo WWTP at a new site[a]	A new Drumbo WWTP would be constructed at a new site to service Drumbo and the community of Princeton, excluding (5A) or including (5B) the proposed 324-unit development in Princeton. The existing Drumbo WWTP would be decommissioned.	A – 3 B – 4

[a] Alternatives that consider the construction of a new WWTP at a new site may require upgrades to the existing Drumbo WWTP in the interim to maintain plant operation and effluent quality.

4.2 Inventory of Natural, Social, and Economic Environment

The alternatives presented in Table 4-1 inherently have potential impacts on the natural, social and economic environment. These impacts were assessed with the evaluation criteria outlined in Technical Memo #3 – Evaluation Process (XCG Consulting Limited, 2017). A summary of the evaluation criteria is listed below (Table 4-2), the full evaluation (i.e. technical memorandum) can be seen in Appendix B.

Table 4-2. Evaluation Criteria (XCG Consulting Limited, 2017)

EA Categories	Criteria	Description
Technical	Satisfaction of Objectives	• Meets the Problem/Opportunity Statement established for the Drumbo WWTP Class EA
	Consistent with County's policies, guidelines,	• Addresses compliance with the County's Strategic Plan, planning policies, guidelines and standards

Table 4-2. Evaluation Criteria (XCG Consulting Limited, 2017)

EA Categories	Criteria	Description
	standards, and Strategic Plan	
	Technical Feasibility	• Ease of implementation • Constructability • Operational capability • Potential for phased construction
	System Complexity	• Operational requirements for existing, new, and retrofitted infrastructure (plant and collection system) • Operator familiarity with collection system/plant treatment technology
	Sustainability	• Energy usage • Impact on investments in infrastructure already made
Environmental	Surface Water Impacts	• Potential impacts on surface water resources • Assimilative capacity of receiver
	Groundwater Impacts	• Potential (positive or negative) impacts on groundwater quality and quantity • Compliant with Grand River Source Water Protection Plan
	Impacts on the natural environment	• Greater potential for impacts on the natural environment if additional lands required for facility construction
Social	Community Impacts	• Potential noise, dust, odour, traffic, etc. impacts on adjacent land owners and users during construction • Potential noise, dust, odour, traffic, etx. Impacts on adjacent land owners and users during operations • Time required for construction
	Archaeological and Heritage Resource Impacts	• Greater potential for impacts on archaeological and heritage resources if additional lands required for facility construction
Financial	Capital Cost	• Total capital cost of alternative • Capital cost per existing lot • Impact on Development Charges • Impact on County Servicing Assistance Program (CSAP) • Land acquisition costs
	Operating and Maintenance (O&M) Costs	• Total annual O&M cost • O&M costs per lot
	Life Cycle Cost	• Net present value life cycle cost of alternative
	Financial Risk	• Risk to the County to incur debt if new units are not developed and Development Charges are not collected • Risk of increase in user fees if new units are not developed.

Each of the alternative solutions were evaluated against each criterion using the general methodology:

1. Alternatives were evaluated on a range from No Impact/Lowest Cost to Major Impact/Highest Cost
2. All EA categories had equal weight
3. Based on results, options were ranked from most preferred to least preferred

4.3 Impact of Alternative Solutions and Mitigating Measures

The available alternatives inherently will have an impact on the surrounding area. One major impact of the alternatives will be the periphery effects of construction. Primarily this will be the nuisance of dust and noise. Whether the construction is simply the expansion of the existing WWTP, or constructing brand new infrastructure, best construction practices will need to be implemented to mitigate the negative social effects of the project.

The second major impact would consider the ability of the existing Drumbo WWTP to maintain capacity while undergoing plant expansion. Mitigating the potential of process upsets will require consideration of construction sequencing prior to starting the project. Any required downtimes would need to be identified early and minimized wherever possible.

Another impact involves potential disturbance of heritage or archaeological resources. Again, this is particularly of concern for alternatives which include modifications to the natural environment. These alternatives would require careful archaeological investigation prior to making any changes to the environment. Prior to any changes occurring in the environment archaeological considerations need to be confirmed with the Ontario Ministry of Tourism, Culture and Sport (MTCS) to determine if further archaeological assessment is needed.

Finally, source water protection must be considered. As a result of the proximity of the WWTP to Production Well 3, the County has noted that any expansion to the Drumbo WWTP would be subject to policies within the approved Grand River Source Protection Plan ("the Plan"), which came into effect on July 1, 2016. Briefly, the Plan directs the MECP to review and, where necessary, amend the ECA to incorporate terms and conditions to ensure any expansion of the WWTP would not result in a significant drinking water threat. Conditions imposed by the MECP may include, but are not limited to:

- More frequent cleaning/inspection;
- More stringent specifications on construction materials;
- More robust spill response plans and procedures; and,
- Additional reporting requirements for spills.

In addition, it is possible to extend the outfall to Oxford Road No. 3, which should further protect the source water at the site.

4.4 Evaluation of Alternatives

The alternative solutions were evaluated based on their impacts in the four categories: Technical, Environmental, Social and Financial. The evaluation of the alternatives is summarized here, and the full evaluation can be found in Appendix B, TM #4 – Evaluation of Alternative Solutions (XCG Consulting Limited, 2017). Alternative #1 was eliminated before evaluation as “do nothing” is not a viable option for the planned growth of the County. The “do-nothing” alternative is not a viable option as it does not satisfy the overall objective for the project nor is it consistent with the County’s policies and strategic plan. The Problem/Opportunity statement for the Drumbo WWTP Upgrade states that the servicing plan for the Drumbo WWTP will accommodate existing and future development in the Community. Hence, the primary objective is to provide wastewater servicing for future planned growth in the

Community of Drumbo. Also, Drumbo is designated as a “Serviced Village” in the Official Plan and servicing development in the Village is consistent with the goal that the majority of growth will be directed to settlements with centralized wastewater facilities or serviced communities.

Technical criteria were used to evaluate the alternatives based on their feasibility to work within the existing framework of the County’s strategic plans, objectives and existing infrastructure. Therefore, this area favours the alternatives that account for the growth of Drumbo without any additional development or Princeton servicing, maintaining system simplicity. This area also favours sustainable options that keep the energy consumption of the facility relatively low. Again, this skews towards supporting the alternatives that maintain existing infrastructure at the existing location as best as possible. From a technical feasibility, upgrades to the existing plant will require additional source water protection for the existing onsite well and consideration to residential buffers. Also upgrades at the existing site will require careful planning to ensure treatment capacity is maintained during construction. Construction of a new facility at a new location has less technical feasibility issues. System complexity was similar for all alternatives, but alternatives requiring a new site and/or servicing Princeton have added needs for the collection system and forcemain(s). For the sustainability criteria, use of the existing plant allows for reuse of plant infrastructure, whereas a new facility does not.

Alternatives were assessed based on the environmental impact of surface water, groundwater and natural environment. The primary surface water consideration is the discharge location, being the Cowan Drain for the existing plant, and the Nith River for the new site. The Cowan Drain is assumed to have a relatively low assimilative capacity, while the Nith River’s is relatively high.

Generally, groundwater impacts are not expected for any alternative. The expanded Drumbo WWTP would encroach on a wellhead protection area of a production well, which services Drumbo and Princeton, this is the only groundwater concern. As a result of the proximity of the WWTP to Production Well 3, the County has noted that any expansion to the Drumbo WWTP would be subject to policies within the approved Grand River Source Protection Plan ("the Plan"), which came into effect on July 1, 2016. Briefly, the Plan directs the MECP to review and, where necessary, amend the ECA to incorporate terms and conditions to ensure any expansion of the WWTP would not result in a significant drinking water threat.

Impact on the natural environment is primarily an issue with alternatives that require more construction, particularly options which include a new WWTP and installing a collection system and/or forcemains.

Each of the alternatives were evaluated on their expected social impact. Specifically, the social impact encompasses community impacts and the impact on archaeological and heritage resources. The main community impact is expected to be the noise and dust associated with the construction project, which applies to all alternatives identified. Archaeological and heritage impacts are only expected to be a potential issue for alternatives which include constructing a new WWTP. The existing site is already disturbed; however, this will not be the case for a new site. The MTCS has been consulted to confirm the environmental archaeological considerations for the site and if further assessment is needed. As indicated above since the existing footprint for the WWTP is not changing, the impact to archaeological resources is expected to be minimal.

Each of the alternatives were evaluated on the basis of financial feasibility and risk. They were considered across four major metrics: Capital Cost, Yearly O&M Cost, O&M Cost per Lot, and Lifecycle Cost. Alternatives 2 and 3 posed relatively low financial risk as these options directly address approved development plans in Drumbo. Alternatives 4A and 5A posed a moderate financial risk as there is uncertainty surrounding the new demand from infilling. Alternatives 4B and 5B posed a significant financial risk as the additional development will far exceed the currently estimated wastewater flows.

4.5 Preferred Alternative Solution

Results from the evaluation matrix were quantified by assigning a numerical value to the assessment. No Impact/ Low Cost was assigned a “1” while Major Impact/ Highest Cost was assigned a “5”. Therefore, the lowest total score represents the preferred alternative. Details of the evaluation process used are provided in Appendix B (TM #3 – Evaluation Process September 16, 2016)

During Phase 2 of the MCEA, the alternatives were evaluated against the four main criteria: technical, environmental, social, and financial. A score was given to each alternative using this basis, the results are reproduced in Table 4-3.

Alternative 2 was preferred for the following reasons (XCG Consulting Limited, 2017):

- Alternative 2 is the most consistent with existing County policies and plans for future growth.
- Alternative 2 is the most comparable in size and operational complexity to the existing WWTP.
- Alternative 2 represents the best use of existing infrastructure and the lowest relative energy usage for wastewater treatment.
- Expansion required for Alternative 2 is proposed to occur within the existing site boundary, thereby reducing risks for impacts on the natural environment or archaeological and heritage resources.
- Relative to the other alternative solutions, Alternative 2 has the lowest estimated capital and operational costs, and the lowest financial risk for the County and local residents (i.e., system users).

Table 4-3. Summary of Alternative Evaluation Scores (XCG Consulting Limited, 2017)

Treatment Alternatives	Total Score	Ranking
1. Do Nothing	- [1]	- [1]
2. Service Drumbo at an expanded Drumbo WWTP	22	1
3. Service Drumbo at a new Drumbo WWTP at a new site[a]	28	2
4A. Service Drumbo and Princeton at an expanded Drumbo WWTP **excluding** proposed 324-unit development in Princeton	40	3
4B. Service Drumbo and Princeton at an expanded Drumbo WWTP **including** proposed 324-unit development in Princeton	46	5
5A. Service Drumbo and Princeton at a new Drumbo WWTP at a new site **excluding** proposed 324-unit development in Princeton	41	4
5B. Service Drumbo and Princeton at a new Drumbo WWTP at a new site **including** proposed 324-unit development in Princeton	46	5

[1] Alternative 1 does not meet the objectives of the Problem/Opportunity Statement and will not accommodate planned community growth. Therefore, it does not meet the needs of the County was no considered further.

Therefore, based on the evaluation of alternative solutions, the preliminary preferred solution is Alternative 2. This solution provides the lowest risk with respect to the natural environment, archaeological and heritage resources, while having the lowest relative capital and operational costs. This alternative is also most consistent with County policies.

Alternative Design Concepts for Preferred Solution

5.1 Alternative Design Concept Identification

A feasibility study was conducted to evaluate alternative approaches for expanding the Drumbo WWTP (i.e., implementing Alternative 2). The options that were evaluated included the following: increasing the capacity of the existing SBR treatment process; and converting to a new MBR treatment process.

The following conclusions were made regarding the expansion of the Drumbo WWTP (Appendix B - XCG Consulting Limited, 2017 – Feasibility Study April 18, 2016):

- Relative to MBRs, SBRs represent a less complex and less expensive treatment technology. County operating staff are experienced working with the current SBR treatment process.
- Relative to MBRs, SBR treatment technology occupies a larger footprint, cannot produce an effluent quality meeting all the proposed effluent limits, and cannot be easily expanded.
- Installation of preliminary treatment, which would be required for an MBR system, creates the potential for additional odours and increased truck traffic.
- Sludge production will increase with increasing flows. Relative to the current operation, future sludge production (per treated m^3) is expected to be comparable between MBR and SBR technologies.
- Due to receiver constraints, plant expansion beyond an average day flow of about 950 m^3/d is limited, due to effluent TAN and TP quality that would be required at higher flows.

Further evaluation of the alternative solutions (i.e., expansion of SBR or upgrade to MBR) is provided in the following subsections.

The conclusion from the previous work was that implementing Alternative 2 could be met with an expansion of the existing WWTP from 300 to 322 m^3/d (XCG Consulting Limited, 2017). This would provide capacity for the existing community and committed or infilling needs. Through subsequent review by CH2M, it was determined that the remaining residential demand for the Township identified in Section 3.1 could also be accommodated in Drumbo, as it is a fully serviced community, and this potentially could increase the capacity requirement of the WWTP to 450 m^3/d, based on current planning demand requirements. The continued review of alternative solutions is based on providing a minimum capacity of 322 m^3/d and a maximum of 450 m^3/d at an expanded WWTP on the existing site.

5.2 Inventory of Natural, Social, and Economic Environments

The inventory of natural, social, and economic environments is similar to that developed for the alternative solutions. Please refer to Section 4.2.

5.3 Impact of Alternative Design Concepts on the Environment and Mitigating Measures

The impact of the evaluation criteria on the design concepts for the preferred solution are outlined below in terms of the technical, environmental, social and financial criteria, and any mitigating measures recommended. The two design concepts being:

- Expand the existing SBR process with tertiary filters
- Convert the existing SBR process to an MBR

5.3.1 Technical

Technically both design concepts would meet the County's objective and policy goal to provide servicing for growth in Drumbo. Both design concepts are technically feasible, some of the necessary upgrades would be similar for both design concepts, and some are unique. Upgrading the existing SBR process would involve upgrades to the headworks, an additional SBR reactor, new tertiary filters and new UV disinfection. Upgrading to an MBR process would involve upgrades to the headworks, provision of membranes and new UV disinfection. Both design concepts would require upgrades to the aeration system. The two design concepts have similar complexity with the need to clean the filters and the membranes. Both design concepts make good use of the existing infrastructure.

5.3.2 Environmental

Both design concepts will provide an enhanced effluent which would be discharged to the current receiver. The MBR upgrade would provide a better effluent quality, which is potentially required for the buildout capacity of 450 m^3/d. Neither design concept would have a different impact on groundwater or the natural environment. Any upgrade at the site would be a continued potential risk to a drinking water production well, which is located on the site. Mitigating measures would be recommended and are expected to be included in any new ECA for the expanded WWTP.

5.3.3 Social

Upgrades are required at the existing site for both design concepts which will have impacts during construction, although the construction schedule should be similar for both. Minor noise and dust impact on adjacent residences are an issue for both design concepts and should be mitigated during construction. Both design concepts would be maintained on the existing site which is already disturbed and no new impacts on archaeological and heritage resources is anticipated.

5.3.4 Financial

A financial review was undertaken during the Feasibility Study (see Appendix B), which indicated a higher cost for the MBR upgrade compared to the upgrade of the existing SBR process for a minor upgrade at the site. Larger upgrades would be expected to require conversion to an MBR process. The impact of the financial cost for an expansion to the buildout capacity of 450 m^3/d is detailed below, and although higher for an MBR upgrade, the difference is not as large based on using modular MBR technology as the basis. An MBR upgrade is anticipated to be required to meet the expected future effluent limits.

5.3.5 Climate Change

In addition to measures to mitigate the impact of technical, environmental and social aspects of the design concepts, climate change needs to be considered. Consideration for climate change includes greenhouse gas (GHG) emissions during construction and operation of the retrofitted facility. Vehicle and equipment used during construction will contribute to GHG emissions and mitigation measures to reduce the amount of GHG emissions should be considered, such as multi-passenger vehicles for crew transport to and from the site, maintaining equipment, reducing idling and confining construction activities to the existing site. WWTPs emit GHG and other emissions during operation. Opportunities to reduce a WWTP's contribution to GHG emissions can be considered during detailed design. Energy efficient considerations such as variable frequency drives, efficient lighting, efficient motors etc, should be addressed during detailed design.

Climate change is acknowledged as the variability of local climate that is identified and/or documented over an extended period of time. Therefore, the effects of changing climate trends (e.g., severe weather, changes in precipitation levels and/or temperature) should be considered through the operational phase of a project.

Mitigation measures that are anticipated to reduce the potential effects of changing climate trends and severe weather events include: all new infrastructure will be designed to withstand extreme weather events (e.g., flooding, high winds and precipitation, extreme heat or cold). materials used will be relevant to the environmental setting of the Project (e.g., resilient to extreme weather events such as the freeze-thaw effect and salting).

5.3.6 Mitigating Measures

Mitigating measures. and an overview of those measures. are expected for the following:

- **Construction Phasing** – Upgrading an existing WWTP requires careful planning to ensure treatment performance is maintained during construction. Construction phasing will need to be further considered during detailed design but would include retrofitting part of the plant and commissioning prior to retrofitting the rest, providing temporary onsite treatment, hauling some wastewater to another facility or a combination of measures.
- **Source Water Protection** - As a result of the proximity of the WWTP to Production Well 3, the County has noted that any expansion to the Drumbo WWTP would be subject to policies within the approved Grand River Source Protection Plan ("the Plan"), which came into effect on July 1, 2016. Briefly, the Plan directs the MECP to review and, where necessary, amend the ECA to incorporate terms and conditions to ensure any expansion of the WWTP would not result in a significant drinking water threat. Conditions imposed by the MECP may include, but are not limited to:
    - More frequent cleaning/inspection;
    - More stringent specifications on construction materials;
    - More robust spill response plans and procedures; and,
    - Additional reporting requirements for spills.

  In addition, it is proposed to extend the outfall to Oxford Road No. 3, which should further protect the source water at the site.
- **Construction Impacts** – Upgrades at the current site can cause noise and dust issues in the vicinity of the site. During detailed design this needs to be considered and measures included in the contract terms to mitigate and minimize the impacts, including hours of construction, access routes, dust mitigating measures and noise limits. Communication with the residents is also recommended.
- **Climate Change Impacts** – During the detailed design consideration should be given to climate change and GHG emissions, to minimize GHG emissions during construction and operation of the upgraded facility. Also, consideration to climate change and issues such as severe weather,

changes in precipitation and/or temperature should be considered in the design of the upgraded facility.

- **Capital Cost** – Needs to address issues with the existing SBR process with tertiary filters, including complete replacement of the tertiary filters and potential for a modular MBR upgrade, results in both solutions having a similar capital cost. Also, to service the required development, it potentially appears that an MBR is the preferred solution.

5.4 Evaluation of Alternative Design Concepts and Recommended Design

5.4.1 Technical Needs

The needs for each of the two technology alternatives (i.e., SBR with tertiary filtration vs. MBR) are discussed in this section. For either technology upgrades are required to the Drumbo WWTP site to provide the following:

- New Headworks – the existing grit removal system is inadequate, and a new headworks area is needed to pretreat the influent with fine screens
- The Outfall should be extended to Oxford Road 3 a distance of approximately 840 metres (m)

5.4.1.1 SBR and Tertiary Filter Upgrade

The SBR process will require upgrades to improve the performance of the process for current and future design flows. Generally, the aeration system and diffusers should be upgraded at this time. The existing SBR decanting system should be improved, but this will be difficult for the existing system, since the tanks are underground. Any expansion of the site should investigate improvements for the new SBRs in terms of the decant system. The tertiary filters are currently pressure filters, that have been shown to not improve effluent quality as currently operated and cannot provide the capacity needed if filled with the design amount of media. Hence, instead of upgrading and adding to the current pressure filter system, it is recommended that the filters be replaced. It is recommended that the filters be replaced with a small footprint system that can be located in the main building. Cloth media filters or drum filters provide a high-quality effluent, with a small footprint and low hydraulic profile. Main suppliers of cloth media or drum filters include Aqua-Aerobic, Fluidyne and WesTech. For this evaluation, it has been assumed that the filters are replaced with modular cloth media filters.

5.4.1.2 Membrane Bioreactor

An MBR, which is widely used in municipal wastewater treatment and reuse applications, is also an option to upgrade the Drumbo WWTP. MBRs are operated at a higher biomass concentration and produce a higher quality effluent compared to conventional activated sludge processes (Bodik, Blst'akova, Danvoca, & Sedlacek, 2008).

MBRs typically exist as one of two configurations: internal/submerged and external/sidestream. The internal/submerged configuration includes the membrane modules within the bioreactor, whereas the external/sidestream configuration utilizes membrane modules that exist as a separate process.

The main drawback of the MBR process is membrane fouling. Membrane fouling limits the performance of the process and reduces the lifespan of the unit. Membrane fouling occurs gradually over the lifespan of the MBR. Fouling occurs when suspended or dissolved solids build up on the surfaces of the membranes and clog the pores, which make it difficult for the process to meet design flows. Methods are implemented to control membrane fouling, such as air scouring, agitation, or backflushing.

Chemicals can also be used for cleaning if other methods will not suffice (Bodik, Blst'akova, Danvoca, & Sedlacek, 2008).

Given the existing facilities at the Drumbo WWTP, upgrading to an MBR process using a modular approach can be accomplished by using the existing tankage and adding influent screening, UV disinfection, and the membranes at the existing site.

Smaller wastewater systems are often constructed onsite, and major equipment is installed into concrete structures and buildings. A modular or packaged wastewater treatment plant is a sewage treatment module or series of linked modules that are constructed in a factory and subsequently transported to site for connection and installation. Some of the main advantages of a package or modular wastewater plant are the potential to construct the system in a controlled environment and potential capital cost reductions. Modular systems can also be assembled onsite quickly, making weather constraints during construction less of an issue. Disadvantages can include equipment access issues, operator access issues, and higher operating and maintenance (O&M) costs. Higher O&M costs can result from the use of less robust materials (such as plastic pipe or valves) for a modular system design. The County visited a new modular MBR facility in Talbotville on February 21, 2018.

Three vendors were approached to provide a modular MBR retrofit for the Drumbo WWTP. The modular design is expected to be the most innovative and capital cost-effective option for upgrading a small facility. The three firms contacted were Newterra, Clearford Koester (Clearford) and BluMetric. Although all three could be considered as suppliers with the experience and capability to provide a complete modular MBR facility, only Newterra and Clearford provided conceptual designs for the Drumbo WWTP upgrade. Capital and operating cost estimates are presented in Section 5.2.

Both retrofits assumed that the existing tankage are in good condition and can be modified without any concrete repairs.

(a) Vendor Option #1

The first vendor option (Option #1) proposes a retrofit that includes using the existing transfer tank and SBR #1 as equalization tanks. SBR #2 would be retrofitted and upgraded as the main bioreactor. Option #1 proposes a submerged flat sheet membrane system, with the following major new components:

- Fine screens
- New aeration blowers
- Membrane feed pumps
- New waste activated sludge pump
- Membrane tank and membranes
- Permeate extraction pumps
- Air scouring blowers
- Chemical dosing pumps
- UV disinfection
- Odour control

The system was designed based on the current characteristics of the Drumbo WWTP influent and an average design flow of 322 m^3/d. Discussions with the vendor indicate that the capacity of the retrofitted MBR process would potentially be as high as 580 m^3/d, although the aeration hydraulic retention time (HRT) may be limited at this flow, and upgrades to proposed equipment would need to be considered. With one SBR tank retrofitted to an aeration tank, the HRT would be 7.6 hours at 322 m^3/d, and 4.2 hours at 580 m^3/d. To maintain a minimum HRT of 6 hours, the retrofitted plant capacity would be 415 m^3/d.

(b) Vendor Option #2

The second vendor option (Option #2) proposes a retrofit of the existing SBR tanks into bioreactor tanks or aeration tanks and using the existing trash tanks and transfer tank as equalization. Therefore, Option #2 would have two bioreactors, similar in size to the current SBRs, which would provide a similar aeration volume to the existing system. As a result, the new capacity is larger, since the process will operate at a significantly higher mixed liquor suspended solids (MLSS) concentration (i.e., potentially 8,000 mg/L) relative to the existing system. The capacity of the retrofitted facility is estimated between 600 and 700 m^3/d and would include maintaining an HRT greater than 6 hours. The average HRT would be 8.2 hours and 7.0 hours for the 600 m^3/d and 700 m^3/d ratings, respectively.

The modified treatment process includes the following major components:

- Influent strainer, instead of fine screens; automatic system, but may want to modify
- Existing treatment plant modifications to facilitate equalization and process tankage
- New aeration blowers
- Membrane feed pumps
- New sludge transfer pumps
- Membrane tank and membranes
- Permeate extraction pumps
- Chemical dosing pumps
- UV disinfection

The system was designed based on the current characteristics of the Drumbo WWTP influent and an average design flow of 322 m^3/d, although (as indicated) the vendor believes the capacity of the entire facility will be between 600 and 700 m^3/d.

5.4.2 Life Cycle Cost Comparison

Capital cost estimates for upgrading the existing SBR/Tertiary filter process and to modify the existing plant to an MBR process were undertaken. The upgrade to the existing SBR/Tertiary filter is to provide the previous rated capacity of 322 m^3/d. Generally, the MBR retrofits were also requested for this capacity, but there is the potential for additional capacity, especially for Option #2, which would retrofit both SBRs into aeration tanks. Table 5-1 summarizes the capital cost estimate for the three alternatives (i.e., SBR and 2 MBR retrofits), including equipment, installation, contingency (20 percent) and engineering/construction support (15 percent). The capital cost estimate for the SBR/Tertiary filter retrofit includes a complete replacement of the existing filter process and is slightly less than the previous cost estimate (XCG Consulting Limited, 2017). The previous cost estimate for the SBR/Tertiary filter upgrade was $3.13 million, which is about 8 percent higher than the current estimate summarized in Table 5-1. The previous estimate carries a higher “general requirements” cost and a contingency of 50 percent.

The previous MBR retrofit capacity cost estimate was $6.01 million (XCG Consulting Limited, 2017), which is significantly higher than the current estimate summarized in Table 5-1 (i.e., 60 percent). It is expected that the previous cost estimate was higher due to the higher “general requirements” cost carried and contingency values. Also, the current retrofit is based on a modular MBR system, which will use existing infrastructure and pre-fabricated units, and is expected to be less costly than constructing these processes onsite. These comparisons are based on the Option #2 cost estimate. The Option #1 estimate was lower than Option #2 and similar to the SBR/Tertiary filter retrofit estimate, but did not include installation (i.e., installation was estimated based on percentage of equipment cost) and does not provide as great a bioreactor volume as the Option #2 retrofit estimate. The current MBR retrofit cost is estimated at between 90 and 130 percent of the SBR/Tertiary filter upgrade or an average of 110 percent. Details of the capital cost estimates is provided in Appendix E.

Table 5-1. Current Capital Cost Estimates to Upgrade the Drumbo WWTP

Capital/Option	SBR/Tertiary Filter Upgrade	MBR Upgrade (Option #2)	MBR Upgrade (Option #1)
Upgrade to firm 322 m^3/d capacity (min)[a]	$2,893,000	$3,689,000	$2,572,000

[a] Capacity for MBR retrofit will be higher than 322 m^3/d using existing tankage

O&M costs were estimated for operating a retrofitted SBR/Tertiary filter plant or a modular MBR plant at the site. O&M costs considered operating, energy, chemicals, equipment maintenance, equipment replacement costs, and sludge haulage. Similar O&M costs are expected for labour, chemicals, and sludge haulage. Energy, equipment maintenance, and equipment replacement O&M costs are expected to be different and potentially higher for the MBR process. Table 5-2 summarizes the estimated O&M costs for each process.

Table 5-2. Operations and Maintenance Cost Summary for Each Process

	Estimated O&M Cost	
Item	SBR/Tertiary Filter	MBR
Operator Labour	$23,750	$23,750
Utilities (Energy)	$63,072	$102,492
Chemicals	$43,800	$44,800
Equipment Maintenance	$27,953	$40,101
Equipment Replacement	$26,636	$69,601
Sludge Haulage	$46,800	$46,800
Total Annual O&M Cost	***$232,011***	***$327,544***

O&M costs were estimated as follows:

- Operator Labour: estimated the operator labour cost based on staffing for 25 percent of an operator and 5 percent of a supervisor. assumed an annual full-time operator salary of $75,000 and an annual full-time supervisor salary of $100,000.
- Utilities: estimated utilities cost based on a preliminary assessment of motor sizes and run times, and an average electricity cost of $0.15 per kilowatt-hour.
- Chemicals: estimated the chemical usage cost based on input from the MBR vendors and typical alum dosage for TP removal.
- Equipment Maintenance: An annual maintenance factor of 3 percent of the estimated equipment cost was used.
- Equipment Replacement: estimated the annual cost for equipment replacement based on input from the MBR vendors for membrane replacement, typical UV bulb replacement frequency and cost, and an allowance for miscellaneous equipment replacement.
- Sludge Haulage: estimated sludge disposal costs based on hauling sludge using a vacuum truck with a total haul time of three hours per week, per input from the County.

Previous estimates were $99,000 and $152,000 for SBR/Tertiary filter and MBR processes, respectively (XCG Consulting Limited, 2017). However, previous estimates did not appear to include equipment maintenance and had a significantly lower sludge haulage cost. The current estimate indicates a higher O&M cost for the MBR process due to increased utilities (i.e., additional pumps, especially permeate pumps), equipment replacement (i.e., membrane replacement) and equipment maintenance (i.e., more equipment to maintain).

Life cycle costs for the three alternatives (i.e., SBR/Tertiary filter upgrade and the two MBR upgrade options) are summarized in Table 5-3 and are based on a 5 percent interest rate and 2 percent inflation rate. The O&M cost for the two MBR options are assumed to be the same. Overall, the life cycle cost difference is closer than the previous estimates (XCG Consulting Limited, 2017), in part due to the modular nature of the proposed MBR upgrade. Previously the SBR/Tertiary filter upgrade was significantly less than the MBR option (i.e., MBR option 80 percent higher). Current estimates have the MBR upgrade (based on a modular MBR) at between 36 and 20 percent higher than the SBR/Tertiary filter upgrade and the proposed MBR upgrade will provide additional capacity beyond the previous 322 m^3/d and should be able to handle the upper range 450 m^3/d capacity.

Table 5-3. Current Life Cycle Cost Estimates to Upgrade the Drumbo WWTP

Costs/Option	SBR/Tertiary Filter Upgrade	MBR Upgrade (Option #2)	MBR Upgrade (Option #1)
Upgrade to firm 322 m^3/d capacity (minimum)[a]	$2,893,000	$3,689,000	$2,572,000
O&M Costs			
• Annual[a]	$232,000	$328,000	$328,000
• PV (25-year)	$4,067,000	$5,750,000	$5,750,000
Life Cycle Cost (20-year)	$6,960,000	$9,439,000	$8,322.000

[a] O&M cost rounded to nearest $1,000

5.4.3 Results of Alternatives Evaluation

The Drumbo WWTP needs to be upgraded to meet either the previous effluent design flow target of 322 m^3/d, or the potential future design target of 450 m^3/d (i.e., to service the remaining forecasted demand for the Township over the 20-year planning period).

A review of the previous capital costing for the SBR/Tertiary filter upgrade resulted in an updated cost that is within 10 percent of the previous cost and includes full replacement of the tertiary filters and extending the outfall to Oxford Road 3. The capital cost estimate for the MBR upgrade is less than the previously estimated cost and is based on a modular MBR upgrade using the existing tankage for process tanks. On average (based on two MBR modular upgrades), the capital cost for the MBR option is less than 10 percent higher than the upgrade to the SBR/Tertiary filters. O&M costs are expected to be higher for the MBR process, and the overall the Life Cycle cost for the MBR option is about 25 percent higher than the SBR/Tertiary filter upgrade. The MBR upgrade also has the advantage of providing a better effluent quality and additional capacity beyond 322 m^3/d. An MBR process will consistently provide a lower effluent TSS concentration and, therefore, will be able to verify lower TP and NH_3-N concentrations (i.e., based on ability to operate at a higher sludge age). The MBR upgrades also provide the potential for increased capacity using the current process tankage, since it operates at a higher MLSS concentration compared with the SBR process. The Option #1 MBR conversion would likely provide a capacity of 415 m^3/d (although it might need some additional screening, aeration, or UV capacity), whereas the Option #2 MBR upgrade would be capable of 600 m^3/d.

Figure 5-1 summarizes the ability of the two options to meet the needs for Drumbo, based on modest growth (i.e., approved and infilling) and enhanced growth (i.e., including modest growth plus the remaining Township demand for the 20-year planning period). The figure shows that, if modest growth is expected, the SBR/Tertiary filter option is more cost effective; however, if accommodating additional growth is required, it is expected that the MBR retrofit will become more cost effective and will be able to meet future effluent limits. The effluent limit is represented by TP concentration, which is expected to become more stringent as capacity increases, based on maintaining the existing TP effluent loading limit. Therefore, due to effluent limits and space constraints at the site, the conclusion that an upgraded SBR/Tertiary filter process could meet the lower capacity goal (i.e., 322 m^3/d), but that a process like an MBR would be required for additional capacity, matches a conclusion of the previous work completed (XCG Consulting Limited, 2017).

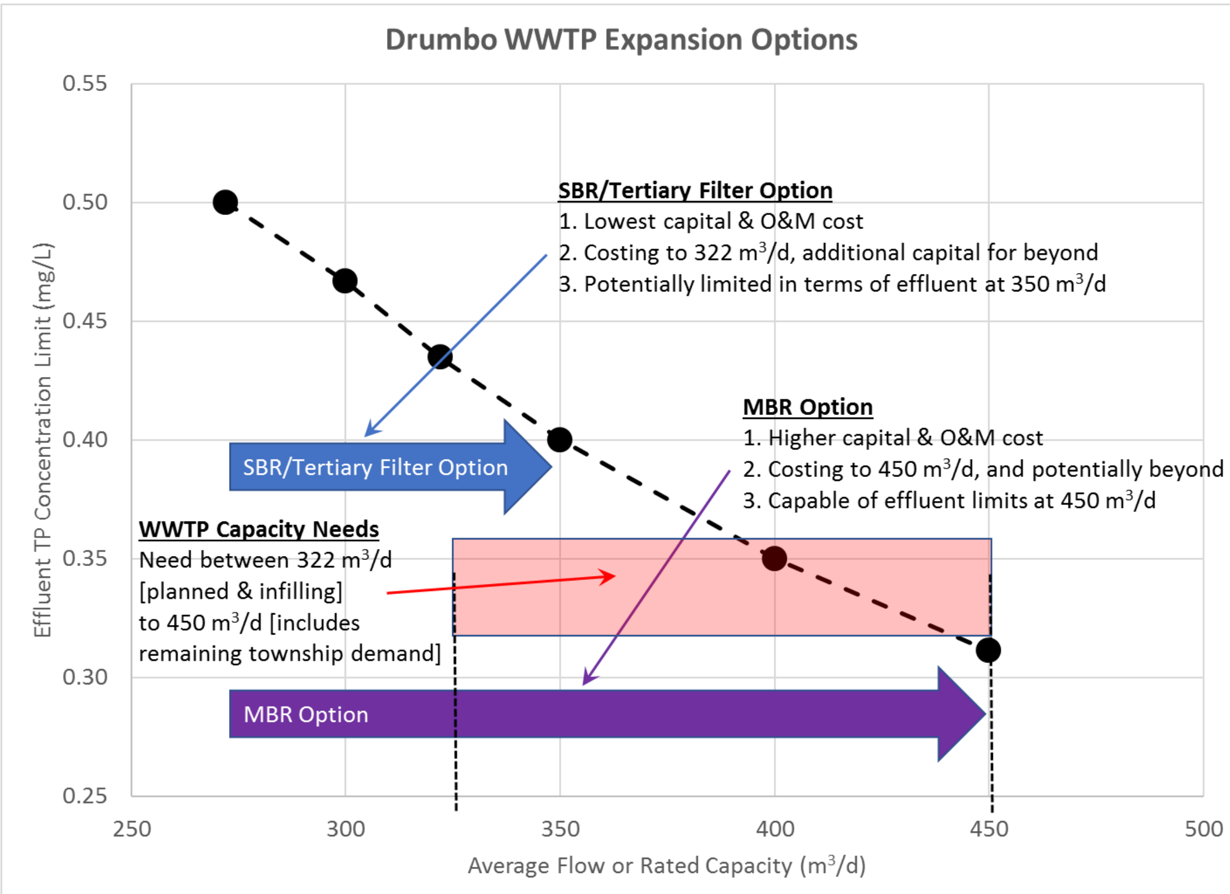

Figure 5-1. Summary of Drumbo WWTP Expansion Options

The council report summarizing the preferred alternative and submitted to the County can be found in Appendix F.

Public Consultation

The EA process, particularly the development of alternative solutions, requires transparent stakeholder consultation to incorporate input from interested or impacted groups. This EA included an appropriate amount of consultation effort that consisted of three PCCs in addition to project meetings with regulatory agencies. This section summarizes the stakeholder consultation activities that took place throughout the Class EA Study. Detailed documentation of the consultation process, including mailing lists, PCC documentation, correspondence, and meeting summaries, is included in the D.C. Damman and Associates report, Summary of Public and Agency Consultation Program, dated June 1, 2017 (Appendix G).

6.1 Notifications

Public consultation notifications were provided to members of the public, and those on the project mailing list, via direct mailouts at key points during Phase 1 and Phase 2. Notices were also provided in local newspapers, and via Canada Post mailbox delivery to residents of Drumbo and Princeton. These notifications included the following:

- Notice of Commencement
- Notice of PCCs

For further detail, please refer to the D.C. Damman and Associates report, Summary of Public and Agency Consultation Program, dated June 1, 2017. Notifications (both agency and public) were also undertaken for PCC#3 held in July 2018, details are provided in section 6.2.3.

6.2 Public Consultation Centres

Two PCCs were held over the course of Phase 1 and 2 of the EA. The PCCs were held in Drumbo to discuss future plans for the Drumbo WWTP. Residents of Princeton made up the majority of the attendance to voice their concerns about the prospect of connecting Princeton to Drumbo for servicing. The finding of the PCCs are summarized in the following subsections. For further detail, please refer to the D.C. Damman and Associates report, Summary of Public and Agency Consultation Program, dated June 1, 2017. PCC #3 was held in July 2018; details are provided subsequently, and background is provided in Appendix G.

6.2.1 PCC #1 Comments

PCC #1 was held on June 16, 2016, during Phase 1 with the purpose of providing the public with background information about the study, present the problem statement, and outline the alternatives that would be evaluated in Phase 2. In total, 54 people signed the attendance register for PCC #1. Of these, 15 completed comment sheets, and 2 submitted emails to the County. A summary of the major points is as follows:

- Certain Princeton residents want to be included in the future wastewater plan.
- Certain Princeton residents feel left out of growth plans for the County.
- Concern that many of the septic systems (i.e., in Princeton) have reached their expiry dates and are in favour of a new solution.
- Other Princeton residents do not want to see any change to Princeton and are not in favour of the sewer.

- Princeton residents do not want to pay for the sewer, and they believe landowners should pay themselves.

6.2.2 PCC #2 Comments

PCC #2 was held on May 16, 2017, during Phase 2 of the MCEA. This consultation presented the alternatives that were evaluated in Phase 2 and delineated the methodology by which the recommended alternative was selected. The recommended alternative (Alternative 2) was presented and the next steps of the MCEA process were outlined. In total, 38 people signed the attendance register for PCC #2. Of these, 8 completed comment sheets, and 2 submitted emails to the County. A summary of the major points is as follows:

- Many are in favour of Alternative 2.
- There are concerns that no sewer system will stunt future growth in Princeton.

6.2.3 PCC #3 Comments

PCC #3 was held on July 19, 2018, during Phase 4 of the MCEA. A notification was sent out and placed in the Oxford Review and on the County's website prior to the PCC. A notification letter was sent to agencies outlined in Section 6.3. This consultation presented the identified preferred alternative, presented the recommended conceptual design for implementing the preferred alternative, and outlined the next steps. In total, eight people signed the attendance register for PCC #3. There were no completed comment sheets submitted as a result of this consultation effort. A notification list and sample letter, notification notice, presentation slides, comment sheet and sign-in sheet are provided in Appendix G.

6.3 Agency Consultation

Federal, provincial, and municipal agencies, as well as utilities and special interest groups, were consulted during Phase 1 and Phase 2 of the EA process. The following list of agencies were included on the project mailing list:

- Federal:
  - Aboriginal Affairs and Northern Development Canada (now Indigenous and Northern Affairs Canada)
- Provincial:
  - Ministry of Aboriginal Affairs (now Ministry of Indigenous Relations and Reconciliation)
  - Ministry of the Environment and Climate Change (now Ministry of the Environment, Conservation and Parks), Southwestern Region
  - Ministry of Agriculture, Food and Rural Affairs
  - Ministry of Tourism, Culture and Sport
  - Ministry of Municipal Affairs and Housing
  - Ministry of Natural Resources and Forestry
  - Ministry of Transportation
  - Infrastructure Ontario
  - Grand River Conservation Authority
  - Upper Thames Conservation Authority
- County and Municipal:
  - Oxford County Public Health and Emergency Services
  - Oxford County Medical Officer of Health

  - Oxford County Risk Management Official
  - Township of Blandford-Blenheim, Mayor
  - Township of Blandford-Blenheim, CAO/Clerk
  - Township of Blandford-Blenheim, Director of Public Works
  - Township of Blandford-Blenheim, Manager of Building Services/Chief Building Official

- Utilities:
  - Hydro One Networks, Inc.
  - Union Gas Limited
  - Canadian National Railway Company
  - Enbridge Gas Distribution, Inc.
  - Rogers Cable
  - Bell Canada

- Special Interest Groups and Stakeholders:
  - Frank Cowan Company
  - Princeton Centennial Hall

Additions were made to the project contact list upon request. For further detail, please refer to the D.C. Damman and Associates report, Summary of Public and Agency Consultation Program, dated June 1, 2017.

6.4 First Nations Consultation

Notices for the PCCs were sent to the following Aboriginal contacts:

- Six Nations of the Grand River
- Six Nations Haudenosaunee Confederacy Council
- Mississaugas of the New Credit
- Munsee-Delaware Nation
- Chippewas of the Thames River First Nation
- Delaware Nation
- Oneida Nation of the Thames
- Walpole Island First Nation
- Métis Nation of Ontario

Only one response was received, coming from the Chippewas of the Thames First Nation, stating that they no longer feel they require regular project updates or notices. For further detail, please refer to the D.C. Damman and Associates report, Summary of Public and Agency Consultation Program, dated June 1, 2017.

6.5 Post Phase 1 and 2 PCC Consultation

At the time of the PCC for Drumbo (PCC#2 – May 16, 2017), Princeton residents met (meeting held May 11, 2017) to discuss development options for Princeton. Oxford County staff were not present at this meeting, and it was not part of the Class EA process. The meeting was initiated by a private landowner who provided a presentation to attendees. At that time, attendees we asked to provide their opinion on servicing Princeton with sanitary sewers. This would only impact Drumbo and the capacity needs for the Dumbo WWTP, if the servicing of Princeton involved pumping the sewage to Drumbo for treatment. At that time the opinion in Princeton was split as to whether the Village should be serviced or not, and generally servicing was based on a stand-alone WWTP located in Princeton and discharging to the Nith River.

Also, there have been further inquiries to the County from interested parties since the last PCC, although some are specifically for Princeton, some are for overall servicing needs in the area (i.e., both Drumbo and Princeton). One interested resident of Drumbo communicated that development is impacted in the area, since the County has not provided wastewater services and, therefore, is providing the wrong message to developers.

During the ESR posting period, additional correspondence from the Mississaugas of the New Credit First Nation was received (December 18, 2018) and additional communication with them and Haudenosauee Confederacy Chiefs Council was undertaken via telephone and email. No further concerns or comments were received. Feedback was also received from the MECP concerning the content of the ESR, these correspondence and the County's responses are provided in Appendix G. Lastly, follow-up with the MTCS was undertaken to address the request that environmental archaeological considerations for the site be considered and if further assessment is needed. As indicated above since the existing footprint for the WWTP is not changing, the impact to archaeological resources is expected to be minimal.

6.6 Summary of Consultation Process

The consultation process for this project included notification and communication with the Public and Government Agencies. Public consultation has reached many residents in Drumbo and the neighbouring Village of Princeton, through three PCCs. Feedback was varied but included comments from Princeton residents that the Village should have municipal wastewater services. Drumbo residents' comments varied on whether the Drumbo WWTP should service Drumbo only, or both Villages. Government agency notifications were made, feedback was limited to acknowledgement, provide further updates or no further updates were required.

Recommended Servicing Plan

7.1 Servicing Plan

The recommended servicing plan for Drumbo is to upgrade the existing WWTP based on one of the following scenarios:

Scenario 1: will accommodate the existing approved development, as well as infilling within the existing built area of the Village (i.e., 86 lots), and will require a WWTP capacity of 322 m^3/d.

Scenario 2: will accommodate both the existing approved development, as well as infilling within the existing built area of the Village (i.e., 86 lots), and the remainder of the forecasted residential growth for the Township over the 20-year planning period (i.e., 147 lots). This option requires a WWTP capacity of 450 m^3/d.

While Scenario 1 would only require an upgrade to the existing SBR/Tertiary filter, which is the most cost-effective approach, this retrofit cannot accommodate the upper capacity need identified in Scenario 2 due to the expected effluent limits and site constraints. As such, to accommodate for Scenario 2 on the same site as the existing WWTP, the facility will need to be retrofitted to a modular MBR process. While the MBR process has a higher lifecycle cost, approximately 25% higher than the SBR/Tertiary filter upgrade option, the MBR process has the following advantages:

- Providing capacity up to 450 m^3/d and potentially beyond to accommodate the remainder of the forecasted residential growth for the Township over the 20-year planning period (i.e., 147 lots) in addition to the existing and approved development and infilling within the existing built up area of the Village (i.e., 86 lots)
- Producing a higher quality effluent meeting future effluent quality needs
- Being a compact process that can be accommodated in the existing site
- Addressing operational issues with the current SBR process, particularity its decanting process

Given that accommodating all, or a substantial portion, of the Township's remaining forecasted growth for the planning period in Drumbo appears to be supportable from a growth needs perspective and consistent with the strategic principles and growth management policies in the Official Plan it is recommended that the existing WWTP be retrofitted and upgraded to an MBR facility.

7.2 Study Monitoring and Commitments

As Oxford County continues to the detailed design and construction phases of this project, there are a number of commitments and monitoring activities that will need to be fulfilled. These commitments and monitoring undertakings will be completed to ensure that the potential issues and their mitigating measures identified earlier in the report are recognized and resolved early during design and construction phases.

Commitments during the design phase of the project include:

- Complete geotechnical studies as needed
- Complete archaeological studies, if required by the MTCS
- Design of an extended plant outfall to further promote source water protection

- Identification of testing, monitoring, construction, and operating practices to be utilized to comply with the Grand River Source Protection Plan
- Identify efficiencies that can be undertaken to minimize GHG emissions such as using more energy efficient equipment and specifying the use of local supplies and contractors where appropriate
- Work with MECP to establish Environmental Compliance Approval requirements for the proposed WWTP capacity expansion project designed around effluent parameters identified in this ESR

Commitments during the construction phase of the project include:

- Review and mitigation of potential construction impacts to residents which include odour management, dust mitigation, construction traffic and excessive noise
- Maintaining WWTP operations and effluent limits throughout the construction
- Pre-construction meeting with the public
- Adhere to the source water protection measures identified in the amended ECA for the WWTP and recommended by the design consultant to comply with the Grand River Source Protection Plan

Appendix A
Drumbo WWTP ECA

Content Copy Of Original

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 8752-9Q4H96
Issue Date: February 9, 2015

County of Oxford
21 Reeve St
Post Office Box, No. 1614
Woodstock, Ontario
N4S 7Y3

Site Location: Drumbo Wastewater Treatment Plant
93 Peterson St, Drumbo
Blandford-Blenheim Township, County of Oxford
N0J 1G0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

Re-rating of the existing municipal sewage treatment works for the collection, transmission, treatment and disposal of domestic sewage, to a new Rated Capacity of 300 m 3 /d, consisting of the following:

Sanitary Sewers

- sanitary sewers on Wilmot Street N, Wilmot Street S, Oxford Street, Maitland Street, Centre Street, Pinkham Street, Mechanic Street, Railway Street, Jarvis Street, Mill Street, Matheson Street, Muma Street, Hazel Street, Station Street, Powell Street, Prospect Street and Easements;

Sewage Pumping Stations

Main Sewage Pumping Station

- a raw sewage pumping station located on Oxford Street approximately 450 m west of Wilmot Street, with a 2.4 m dia wetwell and equipped with three (3) self-priming centrifugal pumps (one standby), each rated at 11.7 L/s;
- a 150 mm forcemain, approximately 755 m in length along Oxford Street, Morrow Street and an easement, discharging to the primary settling/waste activated sludge holding tank at Drumbo Wastewater Treatment Plant;

East Sewage Pumping Station

- a raw sewage pumping station located on Oxford Street approximately 550 m east of Wilmot Street, with a 1.8 m dia wetwell and equipped with two (2) submersible pumps (one standby), each rated at 5.4 L/s;
- a 100 mm forcemain, approximately 510 m in length along Oxford Street from the pumping station to the manhole located immediately east of the intersection of Oxford Street and Wilmot Street;

North Sewage Pumping Station

- a raw sewage pumping station located on Wilmot Street North approximately 550 m north of Oxford Street, with a 1.8 m dia wetwell and equipped with two (2) submersible pumps (one standby), each rated at 7.5 L/s;
- a 100 mm forcemain, approximately 535 m in length along Wilmot Street North and Peterson Street, discharging to the primary settling/waste activated sludge holding tank at Drumbo Wastewater Treatment Plant;
- a 100 mm backup forcemain, approximately 400 m in length along Wilmot Street North from the pumping station to the manhole located immediately north of the intersection of Wilmot Street and Station Street (normally offline);

Drumbo Wastewater Treatment Plant

- one (1) influent flowmeter;
- one (1) 12.2 m x 1.5 m x 2.4 m SWD 51 m^3 primary settling/waste activated sludge holding tank, equipped with sludge removal system;
- one (1) 51 m^3 flow equalization tank, equipped with four (4) transfer pumps (two standby), each rated at 12.6 L/s, with overflow to the emergency overflow basin;
- one (1) 91 m^3 emergency overflow basin, with gravity flow back to the flow equalization tank;
- two (2) 102.2 m^3 Sequencing Batch Reactor (SBR) tanks, each reactor tank equipped with two (2) 12.6 L/s supernatant decant pumps, one (1) 12.2 L/s waste sludge pump and coarse bubble diffused aeration system;
- three (3) air blowers (one standby) for the SBR tanks, each rated at 68 L/s;
- one (1) 30 m^3 and one (1) 27.6 m^3 filter feed equalization tanks, equipped with three (3) 4.7 L/s filter feed pumps (one standby) and coarse bubble diffused aeration system supplied by one (1) 94 L/s air blower;
- three (3) mixed media pressure filters, each with a bed area of approximately 0.5 m^2;
- one (1) ultra-violet disinfection system;
- one (1) effluent outfall pipe to a wetland area draining to Cowan Drain;
- one (1) phosphorus removal chemical storage tanks with metering pumps;
- sludge to be hauled offsite to Woodstock Wastewater Treatment Plant or other approved sewage treatment facilities for treatment and disposal;

- all other controls, electrical equipment, instrumentation, piping, pumps, valves and appurtenances essential for the proper operation of the aforementioned sewage works;

all in accordance with the submitted supporting documents listed in Schedule A.

For the purpose of this environmental compliance approval, the following definitions apply:

"Approval" means this entire document and any schedules attached to it, and the application;

"Average Daily Flow" means the cumulative total sewage flow to the sewage works during a calendar year divided by the number of days during which sewage was flowing to the sewage works that year;

"BOD5" (also known as $TBOD_5$) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demand;

"By-pass" means diversion of sewage around one or more unit processes within the Sewage Treatment Plant with the diverted sewage flows being returned to the Sewage Treatment Plant treatment train upstream of the Final Effluent sampling location, and discharging to the environment through the Sewage Treatment Plant outfall;

"CBOD5" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

"Daily Concentration" means the concentration of a contaminant in the effluent discharged over any single day, as measured by a composite or grab sample, whichever is required;

"Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

" *E. Coli* " refers to the thermally tolerant forms of Escherichia that can survive at 44.5 degrees Celsius;

"Emergency Situation" means a structural, mechanical or electrical failure that causes a temporary reduction in the capacity of the Sewage Treatment Plant or an unforeseen flow condition that may result in:

a) danger to the health or safety of any person; or,
b) injury or damage to any property, or serious risk of injury or damage to any property; or
c) treatment process biomass washout.

"Equivalent Equipment" means a substituted equipment or like-for-like equipment that meets the required quality and performance standards of a named equipment;

"Event" means an action or occurrence, at a given location within the Sewage Treatment Plant that causes a Plant Bypass or Plant Overflow. An Event ends when there is no recurrence of a Bypass or Overflow in the 12-hour period following the last Bypass or Overflow. Two Events are separated by at least 12 hours during which there has been no recurrence of a Bypass or Overflow;

"Final Effluent" means sewage discharge via the Sewage Treatment Plant outfall after undergoing the full train of unit processes as listed in the Approval;

"Geometric Mean Density" is the nth root of the product of multiplication of the results of n number of samples over the period specified;

"Limited Operational Flexibility” (LOF) means any modifications that the Owner is permitted to make to the Works under this Approval;

"Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

"Monthly Average Concentration" means the arithmetic mean of all Daily Concentrations of a contaminant in the effluent sampled or measured, or both, during a calendar month;

"Monthly Average Daily Flow" means the cumulative total sewage flow to the sewage works during a calendar month divided by the number of days during which sewage was flowing to the sewage works that month;

"Monthly Average Loading" means the value obtained by multiplying the Monthly Average Concentration of a contaminant by the Monthly Average Daily Flow over the same calendar month:

"Notice of Modifications" means the form entitled "Notice of Modifications to Sewage Works";

"Owner" means County of Oxford and its successors and assignees;

"OWRA" means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;

"Peak Flow Rate" means the maximum rate of sewage flow for which the plant or process unit was designed;

"Plant Overflow" means a discharge to the environment from the Sewage Treatment Plant at a location other than the plant outfall or into the plant outfall downstream of the Final Effluent sampling location;

"Previous Works" means those portions of the sewage works previously constructed and approved under an Approval;

"Proposed Works" means the sewage works described in the Owner’s application, this Approval, to the extent approved by this Approval;

"Rated Capacity" means the Average Daily Flow for which the Works are approved to handle;

"Regional Water Compliance Manager" means the Regional Water Compliance Manager of the Southwestern Region of the Ministry;

"Sewage Treatment Plant" means the entire sewage treatment and effluent discharge facility;

"Substantial Completion" has the same meaning as "substantial performance" in the *Construction Lien Act* ;

"Water Supervisor" means the Water Supervisor for the London office of the Ministry; and

"Works" means the sewage works described in the Owner's application, and this Approval, and includes Proposed Works, Previous Works, and modifications made under Limited Operational Flexibility.

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

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

(1) The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Except as otherwise provided by these conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, and the application for approval of the Works.

(3) Where there is a conflict between a provision of any document in the schedule referred to in this Approval and the conditions of this Approval, the Conditions in this Approval shall take precedence, and where there is a conflict between the documents in the schedule, the document bearing the most recent date shall prevail.

(4) Where there is a conflict between the documents listed in the Schedule A, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

(5) The Conditions of this Approval are severable. If any Condition of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this Approval shall not be affected thereby.

2. CHANGE OF OWNER

(1) The Owner shall notify the Water Supervisor and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

(a) change of Owner;

(b) change of address of the Owner;

(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act* , R.S.O. 1990, c.B17 shall be included in the notification to the Water Supervisor;

(d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the *Corporations Information Act* , R.S.O. 1990, c. C39 shall be included in the notification to the Water Supervisor;

(2) In the event of any change in ownership of the Works, other than a change to a successor municipality, the Owner shall notify in writing the succeeding owner of the existence of this Approval, and a copy of such notice shall be forwarded to the Water Supervisor and the Director.

3. BY-PASSES

(1) Any By-pass or Plant Overflow is prohibited, except:

(a) in an Emergency Situation;

(b) where the By-pass / Plant Overflow is a direct and unavoidable result of a planned maintenance procedure, the Owner notified the Water Supervisor 15 days prior to the By-pass and the Water Supervisor has given written consent of the By-pass; and

(c) where the By-pass / Plant Overflow is planned for research or training purposes, the discharger notified the Water Supervisor 15 days prior to the By-pass / Plant Overflow and the Water Supervisor has given written consent of the By-pass / Plant Overflow.

(2) The Owner shall forthwith notify the Spills Action Centre (SAC) and the Medical Officer of Health of all By-pass and Plant Overflow Events. This notice shall include, at a minimum, the following information:

(a) the date, time, and duration of the Event;

(b) the location of the Event;

(c) the measured or estimated volume of the Event (unless the Event is ongoing);

(d) the reason for the Event; and

(e) the level of treatment the By-pass(es) and/or Plant Overflow(s) received and disinfection status of same.

(3) The Owner shall submit By-pass and Plant Overflow Event Reports to the Ministry's local office on a quarterly basis, no later than each of the following dates for each calendar year: February 14, May 15, August 14, and November 15. Event Reports shall be in an electronic format specified by the Ministry. In each Event Report the Owner shall include, at a minimum, the following information on any Events that occurred during the preceding quarter:

(a) the date of the Event(s);

(b) the measured or estimated volume of the Event(s);

(c) the duration of the Event(s);

(d) the location of the Event(s);

(e) the reason for the Event(s); and

(f) the level of treatment the By-pass(es) and/or Plant Overflow(s) received and disinfection status of same .

(4) The Owner shall use best efforts to collect a representative sample consisting of a minimum of two (2) grab samples of the By-pass / Plant Overflow and have it analyzed for parameters outlined in Condition 5, one at the beginning of the Event and the second approximately near the end of the Event, to best reflect the effluent quality of such By-pass or Plant Overflow.

(5) The Owner shall maintain a logbook of all Plant By-passes and Plant Overflows, which shall contain, at a minimum, the types of information set out in subsection 2 (a) to 2(e) in respect of each By-pass and Plant Overflow.

4. EFFLUENT OBJECTIVES

(1) The Owner shall use best efforts to design, construct and operate the Works with the objective that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from the Works.

Table 1 - Effluent Objectives

Effluent Parameter	**Concentration Objective** (milligrams per litre unless otherwise indicated)
CBOD5	4.7
Total Suspended Solids	4.7
Total Phosphorus	0.27
Total Ammonia Nitrogen	1.8 (May 1 to Oct 31)

	3.6 (Nov 1 to Apr 30)
E. Coli	150 organisms/100 mL (Monthly Geometric Mean Density)
Dissolved Oxygen	6.0

(2) The Owner shall use best efforts to:

(a) maintain the pH of the effluent from the Works within the range of 6.5 - 8.5, inclusive, at all times;

(b) operate the works within the Rated Capacity of the Works;

(c) ensure that the effluent from the Works is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam or discolouration on the receiving waters.

(3) The Owner shall include in all reports submitted in accordance with Condition 8 a summary of the efforts made and results achieved under this Condition.

5. EFFLUENT LIMITS

(1) The Owner shall operate and maintain the Works such that the concentrations and waste loadings of the materials named below as effluent parameters are not exceeded in the effluent from the Works.

Table 2 - Effluent Limits		
Effluent Parameter	**Average Concentration** (milligrams per litre unless otherwise indicated)	**Average Waste Loading** (kilograms per day unless otherwise indicated)
Column 1	Column 2	Column 3
CBOD5	9.3	2.8
Total Suspended Solids	9.3	2.8
Total Phosphorus	0.46	0.14
Total Ammonia Nitrogen	2.7 (May 1 to Oct 31) 4.5 (Nov 1 to Apr 30)	0.8 1.36
Dissolved Oxygen	5.0	-
pH of the effluent to be maintained between 6.0 to 9.5, inclusive.		

(2) For the purposes of determining compliance with and enforcing subsection (1):

(a) The Monthly Average Concentration of a parameter named in Column 1 of subsection (1) shall not exceed the corresponding maximum concentration set out in Column 2 of subsection (1).

(b) The Monthly Average Loading of a parameter named in Column 1 of subsection (1) shall not exceed the corresponding maximum waste loading set out in Column 3 of subsection (1).

(c) The pH of the effluent shall be maintained within the limits outlined in subsection (1), at all times.

(3) Notwithstanding subsection (1), the Owner shall operate and maintain the Works such that the effluent is continuously disinfected so that the monthly Geometric Mean Density of *E. Coli* does not exceed 200 organisms per 100 millilitres of effluent discharged from the Works.

(4) The Monthly Average Concentration of Dissolved Oxygen in the effluent shall not be less than the corresponding minimum concentration set out in Column 2 of subsection (1).

(5) Paragraph (a), (b) and (c) of subsection (2) shall apply upon the issuance of this Approval.

(6) The effluent limit set out in subsection (3) and (4) shall apply upon the issuance of this Approval.

6. OPERATION AND MAINTENANCE

(1) The Owner shall exercise due diligence in ensuring that, at all times, the Works and the related equipment and appurtenances used to achieve compliance with this Approval are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate operator staffing and training, including training in all procedures and other requirements of this Approval and the OWRA and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances used in the Works.

(2) The Owner shall prepare an operations manual within six (6) months of Substantial Completion of the Works, that includes, but not necessarily limited to, the following information:

(a) operating procedures for routine operation of the Works;

(b) inspection programs, including frequency of inspection, for the Works and the methods or tests employed to detect when maintenance is necessary;

(c) repair and maintenance programs, including the frequency of repair and maintenance for the Works;

(d) procedures for the inspection and calibration of monitoring equipment;

(e) a spill prevention control and countermeasures plan, consisting of contingency plans and procedures for dealing with equipment breakdowns, potential spills and any other abnormal situations, including notification of the Water Supervisor; and

(f) procedures for receiving, responding and recording public complaints, including recording any followup actions taken.

(3) The Owner shall maintain the operations manual current and retain a copy at the location of the Works for the operational life of the Works.Upon request, the Owner shall make the manual available to Ministry staff.

(4) The Owner shall provide for the overall operation of the Works with an operator who holds a licence that is applicable to that type of facility and that is of the same class as or higher than the class of the facility in accordance with Ontario Regulation 129/04.

7. MONITORING AND RECORDING

The Owner shall, upon commencement of operation of the Works, carry out the following monitoring program:

(1) All samples and measurements taken for the purposes of this Approval are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) For the purposes of this condition, the following definitions apply:

(a) Weekly means once each week;
(b) Monthly means once every month;

(3) Samples shall be collected at the following sampling points, at the frequency specified, by means of the specified sample type and analyzed for each parameter listed and all results recorded:

Table 3 - Influent Monitoring - Influent Forcemain		
Parameters	**Sample Type**	**Frequency**
BOD5	Composite	Monthly
Total Suspended Solids	Composite	Monthly
Total Phosphorus	Composite	Monthly
Total Kjeldahl Nitrogen	Composite	Monthly

Table 4 - Effluent Monitoring - Outfall Sewer		
Parameters	**Sample Type**	**Frequency**
CBOD5	Composite	Weekly
Total Suspended Solids	Composite	Weekly
Total Phosphorus	Composite	Weekly
Total Ammonia Nitrogen	Composite	Weekly
E. Coli	Grab	Weekly
Dissolved Oxygen	Grab	Weekly
pH	Grab	Weekly
Temperature	Grab	Weekly

(4) The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's Procedure F-10-1, “Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended from time to time by more recently published editions;

(b) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;

(c) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition), as amended from time to time by more recently published editions.

(5) The temperature and pH of the effluent from the Works shall be determined in the field at the time of sampling for Total Ammonia Nitrogen. The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives" dated July 1994, as amended, for ammonia (un-ionized).

(6) The Owner shall install and maintain (a) continuous flow measuring device(s), to measure the flowrate of the influent to or effluent from the Works with an accuracy to within plus or minus 15 per cent (+/- 15%) of the actual flowrate for the entire design range of the flow measuring device, and record the flowrate at a daily frequency.

8. REPORTING

(1) Ten (10) days prior to the date of a planned By-pass being conducted pursuant to Condition 3 and as soon as possible for an unplanned By-pass,the Owner shall notify the Water Supervisor (in writing) of the pending start date, in addition to an assessment of the potential adverse effects on the environment and the duration of the By-pass.

(2) The Owner shall report to the Water Supervisor or designate, any exceedence of any parameter specified in Condition 5 orally, as soon as reasonably possible, and in writing within seven (7) days of the exceedence.

(3) In addition to the obligations under Part X of the *Environmental Protection Act* , the Owner shall, within ten (10) working days of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the Water Supervisor 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.

(4) The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

(5) The Owner shall prepare and submit a performance report to the Water Supervisor on an annual basis, within ninety (90) days following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the Works and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

(a) a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 5, including an overview of the success and adequacy of the Works;

(b) a description of any operating problems encountered and corrective actions taken;

(c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works;

(d) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

(e) a summary of the calibration and maintenance carried out on all effluent monitoring equipment; and

(f) a description of efforts made and results achieved in meeting the Effluent Objectives of Condition 4.

(g) a tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;

(h) a summary of any complaints received during the reporting period and any steps taken to address the complaints;

(i) a summary of all By-pass, spill or abnormal discharge events;

(j) a copy of all Notice of Modifications submitted to the Water Supervisor as a result of Schedule B, Section 1, with a status report on the implementation of each modification;

(k) a report summarizing all modifications completed as a result of Schedule B, Section 3; and

(l) any other information the Water Supervisor requires from time to time.

(7) The Owner shall, within thirty (30) calendar days of issuance of this Approval, submit a Municipal Wastewater System Profile Information Form, and shall resubmit the updated document every time a notification is provided to the Water Supervisor in compliance with requirements of change of ownership under this Approval.

9. LIMITED OPERATIONAL FLEXIBILITY

(1) The Owner may make modifications to the Works in accordance with the Terms and Conditions of this Approval and subject to the Ministry's "Limited Operational Flexibility Criteria for Modifications to Sewage Works ", included under Schedule B of this Approval, as amended.

(2) Sewage works proposed under Limited Operational Flexibility shall adhere to the design guidelines contained within the Ministry's publication "Design Guidelines for Sewage Works 2008", as amended.

(3) The Owner shall ensure at all times, that the Works, related equipment and appurtenances which are installed or used to achieve compliance are operated in accordance with all Terms and Conditions of this Approval.

(4) For greater certainty, the following are not permitted as part of Limited Operational Flexibility:

(a) Modifications to the Works that result in an increase of the Rated Capacity of the Works;

(b) Modifications to the Works that may adversely affect the approved effluent quality criteria or the location of the discharge/outfall;

(c) Modifications to the treatment process technology of the Works, or modifications that involve construction of new reactors (tanks) or alter the treatment train process design;

(d) Modifications to the Works approved under s.9 of the EPA, and

(e) Modifications to the Works pursuant to an order issued by the Ministry.

(5) Implementation of Limited Operational Flexibility is not intended to be used for piecemeal measures that result in major alterations or expansions.

(6) If the implementation of Limited Operational Flexibility requires changes to be made to the Emergency Response, Spill Reporting and Contingency Plan, the Owner shall, as deemed necessary in consultation with the Water Supervisor, provide a revised copy of this plan for approval to the local fire services authority prior to implementing Limited Operational Flexibility.

(7) For greater certainty, any modification made under the Limited Operational Flexibility may only be carried out after other legal obligations have been complied with, including those arising from the *Environmental Protection Act, Niagara Escarpment Planning and Development Act, Oak Ridges Moraine Conservation Act, Lake Simcoe Protection Act* and *Greenbelt Act.*

(8) Prior to implementing Limited Operational Flexibility, the Owner shall complete a Notice of Modifications describing any proposed modifications to the Works and submit it to the Water Supervisor.

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

1. Condition 1 is imposed to ensure that the Works are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this Approval the existence of this Approval.

2. Condition 2 is included to ensure that the Ministry records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

3. Condition 3 is included to indicate that By-pass / Plant Overflows of untreated or partially treated sewage to the receiving watercourse is prohibited, save in certain limited circumstances where the failure to By-pass / Plant Overflow could result in greater injury to the public interest than the Bypass itself where a By-pass / Plant Overflow will not violate the approved effluent requirements, or where the By-pass / Plant Overflow can be limited or otherwise mitigated by handling it in accordance with an approved contingency plan. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of By-pass / Plant Overflow events.

4. Condition 4 is imposed to establish non-enforceable effluent quality objectives which the Owner is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits of Condition 7 are exceeded.

5. Condition 5 is imposed to ensure that the effluent discharged from the Works to the wetland and ultimately to Cowan Drain meets the Ministry's effluent quality requirements thus minimizing environmental impact on the receiver and to protect water quality, fish and other aquatic life in the receiving water body.

6. Condition 6 is included to require that the Works be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the Owner and made available to the Ministry. Such a manual is an integral part of the operation of the Works. Its compilation and use should assist the Owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the Owner's operation of the Works.

7. Condition 7 is included to enable the Owner to evaluate and demonstrate the performance of the Works, on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives and effluent limits specified in the Approval and that the Works does not cause any impairment to the receiving watercourse.

8. Condition 8 is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this Approval, so that the Ministry can work with the Owner in resolving any problems in a timely manner.

9. Condition 9 is included to ensure that the Works are operated in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider. These Conditions are also included to ensure that a Professional Engineer has reviewed the proposed modifications and attests that the modifications are in line with that of Limited Operational Flexibility, and provide assurance that the proposed modifications comply with the Ministry's requirements stipulated in the Terms and Conditions of this Approval, Ministry of the Environment and Climate Change (MOECC) policies, guidelines, and industry engineering standards and best management practices.

Schedule A

1. Application for Approval of Municipal and Private Sewage Works submitted by K. Smart Associates Limited including final engineering plans and specifications and subsequently revised on September 10, 1992;
2. Environmental Compliance Approval Application submitted by Shahab Shafai of the County of Oxford received on May 30, 2014 for proposed re-rating, including Drumbo WWTP Capacity Review prepared by XCG Consultants Ltd.

Schedule B
Limited Operational Flexibility Criteria for Modifications to Municipal Sewage Works

1. The modifications to sewage works approved under an Environmental Compliance Approval (Approval) that are permitted under the Limited Operational Flexibility (LOF), are outlined below and

are subject to the LOF conditions in the Approval, and require the submission of the Notice of Modifications. If there is a conflict between the sewage works listed below and the Terms and Conditions in the Approval, the Terms and Conditions in the Approval shall take precedence.

1.1 Sewage Pumping Stations

a. Alter pumping capacity by adding or replacing equipment where new equipment is located within an existing sewage treatment plant site or an existing sewage pumping station site, provided that the modifications do not result in an increase of the sewage treatment plant Rated Capacity and the existing flow process and/or treatment train are maintained, as applicable.

b. Forcemain relining and replacement with similar pipe size where the nominal diameter is not greater than 1,200mm

1.2 Sewage Treatment Process

a. Installing additional chemical dosage equipment including replacing with alternative chemicals for pH adjustment or coagulants (non-toxic polymers) provided that there are no modifications of treatment processes or other modifications that may alter the intent of operations and may have negative impacts on the effluent quantity and quality.

b. Expanding the buffer zone between a sanitary sewage lagoon facility or land treatment area and adjacent uses provided that the buffer zone is entirely on the proponent’s land.

c. Optimizing existing sanitary sewage lagoons with the purpose to increase efficiency of treatment operations provided that existing sewage treatment plant rated capacity is not exceeded and where no land acquisition is required.

d. Optimizing existing sewage treatment plant equipment with the purpose to increase the efficiency of the existing treatment operations, provided that there are no modifications to the works that result in an increase of the approved Rated Capacity, and may have adverse effects to the effluent quality or location of the discharge.

e. Replacement, refurbishment of previously approved equipment in whole or in part with Equivalent Equipment, like-for-like of different make and model, provided that the firm capacity, reliability, performance standard, level of quality and redundancy of the group of equipment is kept the same or exceeded. For clarity purposes, the following equipment can be considered under this provision: pumps, screens, grit separators, blowers, aeration equipment, sludge thickeners, dewatering equipment, UV systems, chlorine contact equipment, bio-disks, and sludge digester systems.

1.3 Sewage Treatment Plant Outfall

a. Replacement of discharge pipe with similar pipe size or diffusers provided that the outfall location is not changed.

1.4 Sanitary Sewers

a. Pipe relining and replacement with similar pipe size within the Sewage Treatment Plant site, where the nominal diameter is not greater than 1,200mm.

1.5 Pilot Systems

a. Installation of pilot systems for new or existing technologies provided that:

i. any effluent from the pilot system is discharged to the inlet of the sewage treatment plant or hauled off-site for proper disposal,
ii. any effluent from the pilot system discharged to the inlet of the sewage treatment plant or sewage conveyance system does not significantly alter the composition/concentration of the influent sewage to be treated in the downstream process; and that it does not add any inhibiting substances to the downstream process, and
iii. the pilot system's duration does not exceed a maximum of two years; and a report with results is submitted to the Director and Water Supervisor three months after completion of the pilot project.

2. Sewage works that are exempt from section 53 of the OWRA by O. Reg. 525/98 continue to be exempt and are not required to follow the notification process under this Limited Operational Flexibility.

3. Normal or emergency operational modifications, such as repairs, reconstructions, or other improvements that are part of maintenance activities, including cleaning, renovations to existing approved sewage works equipment, provided that the modification is made with Equivalent Equipment, are considered pre-approved.

4. The modifications noted in section (3) above are not required to follow the notification protocols under Limited Operational Flexibility, provided that the number of pieces and description of the equipment as described in the Approval does not change.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 3-2191-90-916 issued on November 22, 1991.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

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

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

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

This Notice must be served upon:

The Secretary***** Environmental Review Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5	AND	The Director appointed for the purposes of Part II.1 of the Environmental Protection Act Ministry of the Environment 2 St. Clair Avenue West, Floor 12A Toronto, Ontario M4V 1L5

*** Further information on the Environmental Review Tribunal 's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 9th day of February, 2015

Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

FL/
c: DWMD Supervisor, MOECC London - District
Water Standards Section, MOE Standards Development Branch
Registration and Compliance Section, MOE Drinking Water Programs Branch – IMBS
Stephen G. Nutt, XCG Consultants Ltd.

Appendix B
Previous Reports/Studies for Drumbo WWTP Upgrade Project

XCG Environmental Engineers & Scientists
XCG CONSULTANTS LTD.
T 613 542 5888 F 613 542 0844 | kingston@xcg.com
6 Cataraqui Street, Woolen Mill, West Wing, Suite 105, Kingston, Ontario, Canada K7K 1Z7

Date:	December 3, 2013	**XCG File No.:3-277-47-02**
To:	Mark Maxwell and Shahab Shafai (Oxford County)	
cc:	Stephen Nutt (XCG Consultants Ltd.)	
From:	Colin Clarke (XCG Consultants Ltd.)	
Re:	Summary of Water Quality/Quantity Data Sources near the Drumbo WWTP	

1. INTRODUCTION

As a component of the Drumbo Wastewater Treatment Plant (WWTP) Class Environmental Assessment (EA), it will be necessary to establish effluent limits for an expanded plant. The intent of this memo is to identify the existing data sources that could be used as inputs to an assimilative capacity study.

2. THE RECEIVER

The Drumbo WWTP discharges into the Cowen Drain which conveys effluent flows to the Nith River (see Figure 1). Review of the topography suggests that the drainage area of the Cowen Drain to the Nith River is about 4 to 4.5 km^2. Given the small drainage area, it is highly likely that the Cowen Drain is dry for most of the year. Because the Cowen Drain is expected to be dry most of the year, the Drumbo WWTP can be classified as a dry ditch discharge with the ultimate receiver being the Nith River.

3. WATER QUALITY DATA ON THE NITH RIVER

A review of the Provincial Water Quality Monitoring Network (PWQMN) identified an upstream and downstream water quality station on the Nith River. Both stations are approximately 10 km from where the Cowen Drain discharges to the Nith River.

The Regional Municipality of Waterloo (RMOW) maintains several water quality monitoring stations on the Nith River. The closest upstream station is located about 4.5 km upstream from where the Cowen Drain discharges to the Nith River (see Figure 1). This monitoring location will likely provide the best available data.

4. STREAM FLOW

There are two stream flow gauges on the Nith River that could be used to estimate low flows with reasonable accuracy at the outlet of the Cowen Drain to the Nith River (see Figure 1). The upstream gauge is located in New Hamburg (Water Survey of Canada gauge 02GA018; drainage area 544 km^2); the downstream gauge is located near Canning (Water Survey of Canada gauge 02GA010; drainage area 1034 km^2).

5. SUMMARY

- Based on the small drainage area of the Cowen Drain, the Drumbo WWTP can be classified as a dry ditch discharge with the ultimate receiver being the Nith River.
- The best available water quality data is likely the RMOW located approximately 4.5 km upstream from where the Cowen Drain discharges to the Nith River.
- There is an upstream and downstream stream flow gauge on the Nith River. Either of these could be used to generate reasonable low flow estimates from where the Cowen Drain discharges to the Nith River

Figure 1 Points of Interest

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Date:	January 14, 2014	**XCG File No.: 3-277-47-02**
To:	Bob Aggerholm, Tom Clubb and Scott Abernethy (Ministry of the Environment)	
cc:	Shahab Shafai and Mark Maxwell (Oxford County) Stephen Nutt (XCG Consultants Limited)	
From:	Colin Clarke (XCG Consultants Limited)	
Re:	Drumbo WWTP Class EA - Cowan Drain Background Information	

1. INTRODUCTION

On December 4, 2013, a pre-consultation meeting was held with the Ministry of the Environment (MOE) regarding the Drumbo Wastewater Treatment Plant (WWTP) Class Environmental Assessment (EA). The meeting discussed current flows to the WWTP, future flows, and available water quality data for the Cowan Drain, the receiver of the effluent from the Drumbo WWTP.

Very little data appear to be available on the Cowan Drain and MOE requested that additional parties be contacted to identify if any other data were available. As an action item from the meeting, Oxford County and XCG Consultants Ltd. (XCG) were to contact the Grand River Conservation Authority (GRCA), Ministry of Natural Resources (MNR), Oxford County Public Works staff and the Township of Blandford-Blenheim Drainage Superintendent to obtain any additional information that might be available with respect to the Cowan Drain. Further, XCG was to prepare a memo detailing what was found from the aforementioned data sources for circulation to the MOE. The MOE would use the memo to assist in identifying the need for a monitoring program to allow development of treatment requirements and effluent limits for a Drumbo WWTP expansion.

This memo summarizes the additional data that was found as a result of the aforementioned contacts.

2. GRCA

GRCA was contacted and it was identified that there were no flow or water quality data available for the Cowan Drain. XCG was advised that a fish study had been completed on the Cowan Drain and that the MNR would be the best contact to obtain the information.

GRCA also indicated that their mapping showed that there may be a Species at Risk located in the lower portion of the Cowan Drain. GRCA advised contact with MNR and the Department of Fisheries and Oceans (DFO).

3. MNR

The Cowan Drain transects two MNR jurisdictions. Parts of the drain within Oxford County are dealt with from the MNR Aylmer Office; the remaining parts are dealt with from the MNR Guelph Office.

MNR (Aylmer Office) could not provide an immediate response with respect to Species at Risk and indicated that a review could take up to eight weeks. The project team is compiling the required information for submission to the Aylmer Office to allow a review to be completed.

MNR (Guelph Office) was contacted regarding the fish study (Nith-1-68) referenced by the GRCA. During a phone conversation, the contact at MNR summarized the highlights of the report as follows.

- Electro-fishing on the Cowan Drain was completed on August 7, 1997. The air temperature was 26^{o}C and the water temperature was 15^{o}C.
- MNR provided the latitude and longitude and it was found that the location of the electro-fishing was approximately 400 m upstream of the confluence with the Nith River.
- One "fairly" rare species (not protected), blacknose shiner was identified. Further, a dead steelhead was found. MNR noted that rainbow trout have had resurgence in the Grand River watershed and that they had recently been observed in tributaries of the Nith River in Brant County.
- The Cowan Drain in this area contains pools, riffles and runs. It meanders and has large undercut banks.

4. TOWNSHIP DRAINAGE SUPERINTENDENT

The Township of Blandford-Blenheim Drainage Superintendent was contacted but provided no information. The County has been offered the opportunity to review drainage reports available from the Township.

5. OXFORD COUNTY PUBLIC WORKS

Oxford County Public Works staff noted that some flow has always been observed in the drain, even during summer months.

6. OXFORD COUNTY COWAN DRAIN TEMPERATURE DATA

Historically, Oxford County had assumed that receiver temperatures were below 5^{o}C from December to April and above 5^{o}C for the remaining months. This temperature transition was used to determine whether Period A or Period B limits contained in the Drumbo WWTP Certificate of Approval apply. Recently, temperature readings of the Cowan Drain have been taken at the Oxford Road 3 crossing. As a result, there is some record of temperatures in the drain downstream of the Drumbo WWTP discharge. The monthly 75th percentile temperatures for January to December range from 0 to 29°C. Oxford County will also be collecting pH readings at this location when the Cowan Drain is not ice covered.

7. COLLECTION OF PHOTOS

Oxford County was able to assemble a series of photos (provided below) at different locations on the Cowan Drain. Photos 1 and 2 were taken on September 25, 2013. Based on Photo 1, the WWTP was not discharging due the cycling of the SBRs; however, flow was observed in the Cowan Drain approximately 600 m downstream at Oxford Road 3 on the same day. On September 20 to 21, there was 60 to 80 mm of precipitation recorded at the nearby Woodstock and Roseville climate stations. The flow in the Cowan Drain was likely higher than normal on September 25th due to the preceding rainfall.

Photo 3 was taken at the Oxford 3 road crossing on December 6, 2013 and the Cowan Drain was flowing. A dead fish was noted at this location, although the species was unknown. Photo 4 was taken on December 5, 2013 at the confluence with the Nith River and flow was observed at that point.

Photo 1 Photo of Outfall Pipe taken on September 25, 2013

Photo 2 ***Cowan Drain West of Oxford Road 3 taken on September 25, 2013***

Photo 3 ***Cowan Drain at Oxford Road 3 Crossing taken on December 6, 2013***

Photo 4 ***Cowan Drain Directly Upstream of Nith River Confluence taken on December 5, 2013***

8. DFO

DFO was contacted regarding Species at Risk; a response is still outstanding.

9. ADDITIONAL MAPPING

The Conservation Ontario website provides Species at Risk mapping information for download. The mapping was prepared by DFO in May 2013 and is valid until May 2014 (see attachment). The lower two thirds of the Cowan Drain are under consideration for listing. Potential species that may exist include American Eel, Redside Dace, Silver Shiner, Silver Lamprey, Grass Pickerel and River Redhorse.

10. ESTIMATING STREAMFLOW IN THE COWAN DRAIN

No streamflow measurements exist on the Cowan Drain. It may still be possible to estimate low flows by evaluating flows at nearby streamflow gauges. Table 1 lists gauges that could be used potentially to estimate flows in the Cowan Drain.

Table 1 Nearby Streamflow Gauges

Streamflow Gauge Name	Drainage Area (km^2)	Distance to Drumbo (km)
East Canagagigue Creek near Floradale	27.7	46
Canagagigue Creek near Floradale	17.9	48
Hunsburger Creek near Wilmot Centre	14.9	15
Hunsburger Creek near Haysville	7.34	15
Hunsburger Creek near Schindelsteddle	3.46	17
O.A.C. Farm Gauge No. 5 at Guelph	2.51	38
Silver Spring Creek near Wilmot Centre	2.19	17

11. ASSUMPTIONS ABOUT WATER QUALITY

Given the geographical location of the Cowan Drain, it is reasonable to assume that the Cowan Drain is Policy 2 with respect to TP. Under Policy 2, TP loads should be maintained or reduced if possible for an expanded WWTP.

The current CofA for the Drumbo WWTP has BOD_5 and TSS compliance limits ranging from 10 to 15 mg/L depending on the discharge period and the design objective ranges from 5 to 10 mg/L. For an expanded WWTP, it would be reasonable to adjust the design objective and compliance limit to 5 mg/L and 10 mg/L respectively for both $cBOD_5$ and TSS.

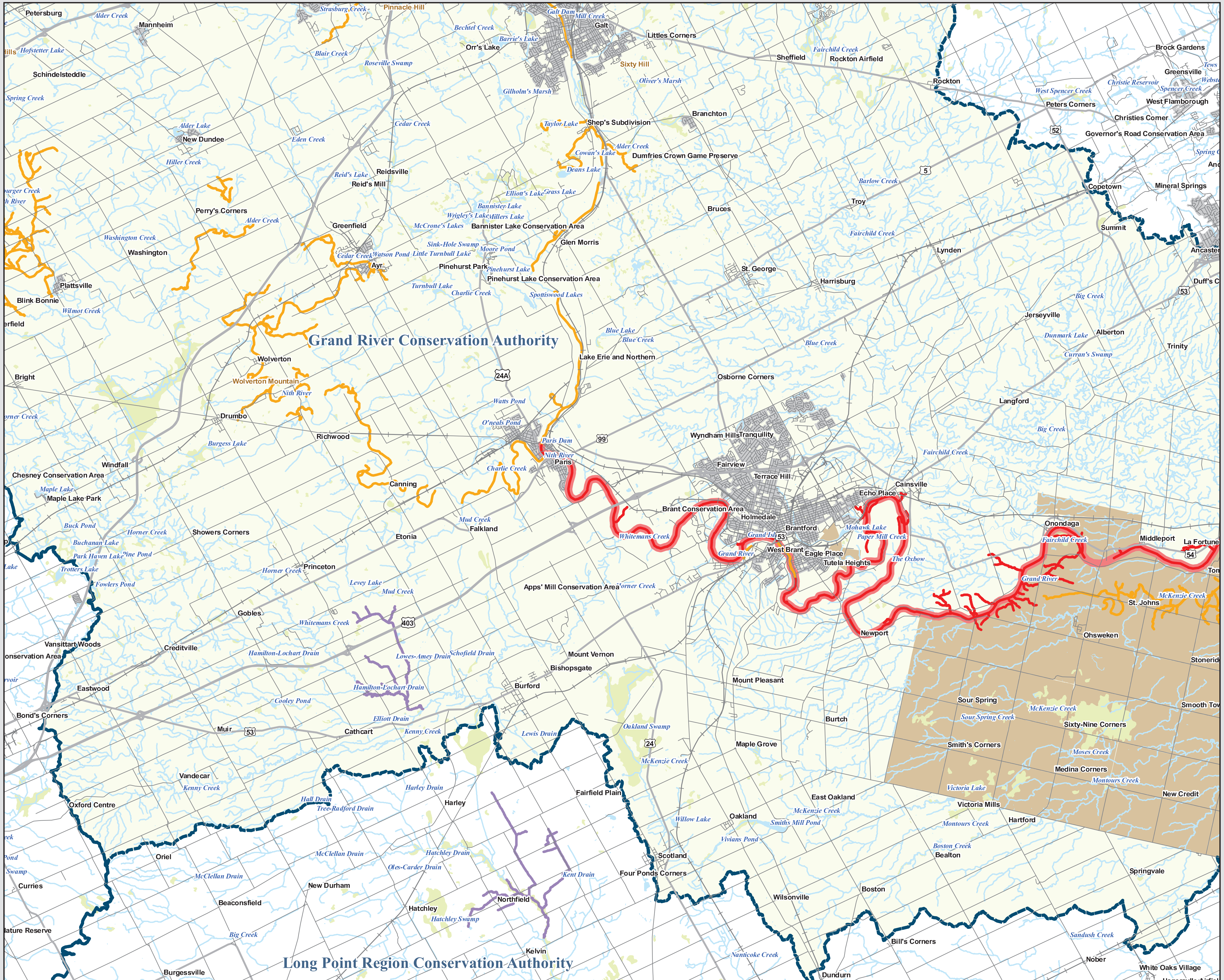
The receiver may be a coldwater fishery in the lower portion of the Cowan Drain. The current CofA includes a dissolved oxygen compliance limit of 5 mg/L. The plant has met this limit consistently over the years. This compliance limit should be maintained for an expanded WWTP.

A compliance limit of 200 cfu/100mL and design objective of 100 cfu/100mL would be recommended for *E. coli*.

Effluent ammonia concentrations (TAN) will depend on stream temperatures and pH to ensure that PWQO for un-ionized ammonia is met. The County's monitoring of pH and temperature data will be available for analysis.

12. CONCLUSIONS

- Based on anecdotal information, there appears to be flow in the Cowan Drain throughout the year. Estimates of the low flow (7Q20) are not available. It may be possible to generate low flow estimates using data from nearby streamflow gauges.
- There may be species at risk located in the drain; however, this will require confirmation by MNR and/or DFO.
- Reasonable assumptions can be made for several water quality parameters of interest.
- County monitoring of pH and temperature in the Cowan Drain will provide additional guidance on the required effluent TAN concentrations to ensure that un-ionized ammonia concentrations do not exceed PWQO.



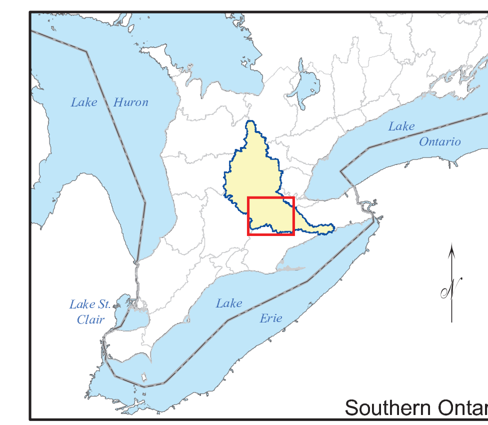
Distribution of Fish Species at Risk

Grand River Conservation Authority (Map 6 of 7)

- Protected under SARA (Extirpated, Endangered, Threatened)
- Under consideration for listing (Endangered, Threatened)
- All Special Concern Species (Sch. 1,3 and newly listed)
- Area within which Critical Habitat is found or proposed*

*Note: Within the delineated areas, only those areas that meet the functional habitat requirements of one or more life stages of the species are considered Critical Habitat. For more information on Critical Habitat please refer to the Reference Guide and the species-specific Recovery Strategies.
Species are listed with * in table below.

- Railway
- River/Stream
- Road
- Conservation Authority Boundary
- Wetland
- First Nations Land Claim
- Urban Area



Conservation Authority Fish SAR Listing

Common Name	Colour
* Eastern Sand Darter	Red
American Eel	Orange
Redside Dace	Orange
Silver Shiner	Orange
Silver Lamprey	Orange
Grass Pickerel	Purple
River Redhorse	Purple

0 1 2 4 km

Base Map Sources: Ontario Ministry of Natural Resources, Natural Resources Canada, Conservation Ontario
Aussi disponible en français.

Map produced May 2013.
Valid until May 2014.

Fisheries and Oceans Canada Pêches et Océans Canada

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XCG File No.: 3-277-47-02
May 14, 2014

DRUMBO WWTP CAPACITY REVIEW

Prepared for:

OXFORD COUNTY
P.O. Box 1614, 21 Reeve Street
Woodstock, ON
N4S 7Y3

Attention: Mark Maxwell, P. Eng.

Prepared by:

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TABLE OF CONTENTS

TABLE

FIGURE

ATTACHMENTS

1. INTRODUCTION

The Drumbo Wastewater Treatment Plant (WWTP) is a package sequencing batch reactor (SBR) facility with tertiary filtration and UV disinfection with an approved average day flow (ADF) capacity of 272 m^3/d and a peak flow capacity of 774 m^3/d. The Drumbo WWTP is owned and operated by Oxford County ("the County"). Raw sewage flows to the Drumbo WWTP are at or near the approved capacity and further development is planned for the service area. This technical memorandum presents a summary of the historical wastewater flows and quality to the Drumbo WWTP, as well as a review of the existing capacity of each unit treatment process and the potential to increase the rated capacity of the Drumbo WWTP.

Re-rating of the Drumbo WWTP to a proposed average day flow (ADF) of 300 m^3/d represents the first stage of a two stage expansion of the facility. This first stage would require no construction and would be a Schedule A undertaking under the Municipal Class Environmental Assessment (MCEA) process. The second stage would increase the capacity of the plant to 350 m^3/d to provide servicing for future growth in the community. Stage 2 is a Schedule C undertaking under MCEA process. The Schedule C Class EA for the plant expansion has been initiated by the County.

1.1 Background and Objectives

The Drumbo WWTP was constructed in 1993 as part of the implementation of a communal water and wastewater system to serve the community of Drumbo. Since commissioning, a number of changes have been made to the WWTP to improve operation. In July 1999, XCG conducted a review of the available treatment capacity at the Drumbo WWTP. That review identified that the effluent filters and the SBR process, as operated at that time, limited the overall treatment capacity. Recommendations were made to address the capacity limitations identified, and these recommendations have been implemented by the County.

The primary objective of this review is to determine if additional capacity exists within the existing treatment process, beyond the current Certificate of Approval (C of A) rated ADF capacity of 272 m^3/d.

2. DESCRIPTION OF THE EXISTING DRUMBO WWTP

Raw sewage is delivered to the Drumbo WWTP via a sewage forcemain and flow entering the Drumbo WWTP is measured with a raw sewage magnetic flow meter. Sewage flows enter a 51.0 m^3 trash tank, which also serves as a holding tank for waste activated sludge (WAS) from the biological reactors. The trash tank overflows to a 51.0 m^3 transfer tank that feeds the two parallel SBRs. In the event of high flow events that exceed the capacity of the transfer tank and SBRs, wastewater flows by gravity from the transfer tank to a 91 m^3 emergency overflow basin. Wastewater stored in the emergency overflow containment basin flows by gravity back to the transfer tank and to the SBRs when the SBRs have enough capacity to treat the stored wastewater.

Flow from the transfer tank is delivered to the SBRs by four submersible 0.76 m^3/min transfer pumps. Two pumps are dedicated to each reactor; one active and one standby. Each SBR reactor has a volume of 102.2 m^3. Air supply to the reactors is provided by three Roots-Dresser blowers. Aluminum sulphate (alum) is added for phosphorus removal directly into each of the SBR tanks from the alum storage tanks during the SBR react cycle. Each reactor goes through a sequence of filling, reacting, settling, decanting and sludge wasting that is controlled by a programmable logic controller (PLC). Filling is initiated by liquid level in the transfer tank and continues until the reactor is full. The react cycle is currently set for 30 minutes after the fill cycle has been completed. 60 minutes of quiescent (unaerated) settling is provided, after which the clear, treated supernatant in the reactor is decanted by one of two 0.76 m^3/min decant pumps dedicated to each reactor (four decant pumps total, two for each reactor) into aerated flow equalization tanks with a total volume of 57.6 m^3. A volume of 47.4 m^3 is decanted from each reactor during each cycle. Following the decant stage, sludge is wasted from the reactor to the trash tank for approximately 1.0 minute. At the completion of the waste stage, the reactor is ready to receive feed again from the transfer tank, initiating another treatment cycle. A reactor can only receive feed from the transfer tank when it is in the fill portion of the cycle.

The decanted effluent from the equalization tank is filtered and disinfected prior to discharge. Three filter feed pumps (one active, two standby) pump the equalization tank contents to the pressure filters at a rate of 0.28 m^3/min per feed pump. The filter feed pumps are activated by liquid level in the equalization tank. Three pressure filters are provided. These filters were originally designed as multi-media filters, but currently are single media (sand) filters. During any backwash occurrence, only one of the three filters is undergoing the backwash cycle while the other two filters are in service. Backwash flow is recycled to the trash tank at the head of the plant. Filter effluent is disinfected by an ultraviolet (UV) disinfection system.

A process flow schematic of the treatment train at the Drumbo WWTP is shown in Figure 2.1.

2.1 Treatment Objectives and Compliance Requirements

Effluent objectives and non-compliance criteria for the Drumbo WWTP are found in the Amended Certificate of Approval (C of A) Number 3-2191-90-916, issued on October 4, 2000. The C of A specifies monthly concentration objectives and limits for biochemical oxygen demand (BOD_5), suspended solids (SS), total phosphorus (TP), total ammonia as nitrogen (TAN), and *E. coli*. The C of A also specifies non-compliance limits for dissolved oxygen (DO), and total chlorine residual (TRC). The effluent objective and non-compliance limit for *E. coli* is 200 organisms/100 mL (monthly geometric mean density) for any calendar month. The C of A effluent requirements for the Drumbo WWTP are summarized in Table 2.1.

Table 2.1 Existing C of A Objectives and Non-compliance Limits

Parameter (1)	Effluent Objectives		Non-Compliance Limits	
	Concentration(2)	Average Loading(3)	Concentration(2)	Average Loading(3)
BOD_5 Period A Period B	 5 mg/L 10 mg/L	 1.4 kg/d 2.8 kg/d	 10 mg/L 15 mg/L	 2.8 kg/d 4.0 kg/d
Suspended Solids (SS) Period A Period B	 5 mg/L 10 mg/L	 1.4 kg/d 2.8 kg/d	 10 mg/L 15 mg/L	 2.8 kg/d 4.0 kg/d
Total Phosphorus (TP) Period A Period B	 0.3 mg/L 0.8 mg/L	 0.08 kg/d 0.21 kg/d	 0.5 mg/L 1.0 mg/L	 0.14 kg/d 0.27 kg/d
Total Ammonia as N (TAN) Period A Period B	 2 mg/L 4 mg/L	 0.54 kg/d 1.08 kg/d	 3 mg/L 5 mg/L	 0.8 kg/d 1.36 kg/d
E. coli (4)	200 counts/100mL	-	200 counts/100mL	-
Total Chlorine Residual (TRC)	-	-	0.01 mg/L	-
Dissolved Oxygen (DO)	-	-	> 5.0 mg/L	-

Notes:
1. Period A refers to the time that the receiving stream temperature exceeds 5°C. Period B refers to the time that the receiving stream temperature is less than or equal to 5°C.
2. Based on monthly average values.
3. Based on an average day flow of 272 m^3/d.
4. Based on monthly geometric mean density during any calendar month.

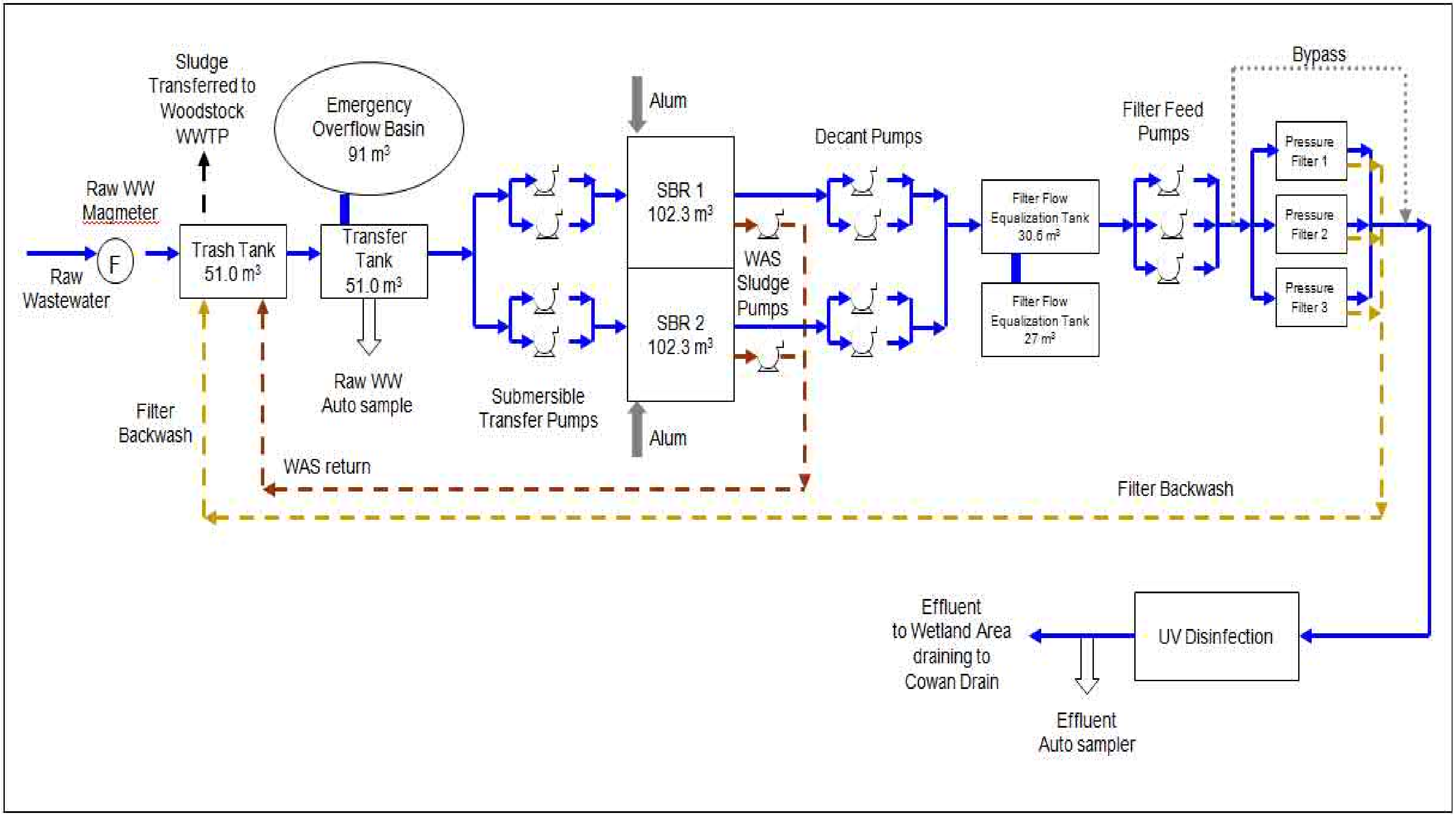

Figure 2.1 Process Flow Diagram for Drumbo WWTP

3. FLOW ANALYSIS

3.1 Historical Flows

Sewage flows are conveyed to the treatment plant by a forcemain from a duplex sewage pumping station (SPS), the Main SPS, located at Oxford Street West. The East Local SPS pumps to the Main SPS before being re-pumped to the Drumbo WWTP. Since February 2012, sewage flows have been pumped directly from the North local SPS to the Drumbo WWTP. Raw sewage flow is measured by a raw sewage magmeter as it enters the Drumbo WWTP.

Influent flow records for the Drumbo WWTP were provided by plant operating staff for the period from January 2009 to December 2013. Flow records are based on the influent flow meter totalizer, which is read and recorded manually. The flow meter totalizer is usually read every three or four days. As a result, daily flows represent the average of several days of flows because the meter is not read on a daily basis.

There have not been any bypass events at the Drumbo WWTP recorded over the review period.

A summary of the annual influent wastewater flows for January 2009 to December 2013 is presented in Table 3.1.

Table 3.1 Summary of Historical Plant Wastewater Flow (2009 - 2013)

Year	Average Day Flow (1) (m^3/d)	Maximum Day Flow (1)	
		(m^3/d)	Factor
2009	245	612	2.5
2010	244	386	1.6
2011	282	656	2.3
2012	250	379	1.5
2013	291	710	2.4
Average	**262**	**-**	**-**
Maximum	**-**	**710**	**2.5**
C of A Rated Capacity	**272**	**774** (2)	**-**

Notes:

1. Historical flows are based on flows read from the flow meter totalizer and averaged over several days, as the flow meter is not read on a daily basis.
2. The C of A identifies a peak flow capacity but does not specify whether this capacity is associated with a peak maximum flow, peak hourly flow, or peak instantaneous flow.

As the flow meter is not read on a daily basis, peak hourly flows are not recorded at the plant. Peak flows into the plant are controlled by the combined pumping capacity of the North and Main SPSs. Based on pumping tests completed by the County in 2012, the combined flow rate of the North and Main SPS's duty pumps is 1,400 m^3/d. The combined flow rate of all pumps at the North and Main SPSs is 1,645 m^3/d. These flow rates are approximately double the Drumbo WWTP peak flow rated capacity of 774 m^3/d.

Figure 3.1 shows the ADF and maximum day flow (MDF) to the Drumbo WWTP for the period of 2009 to 2013.

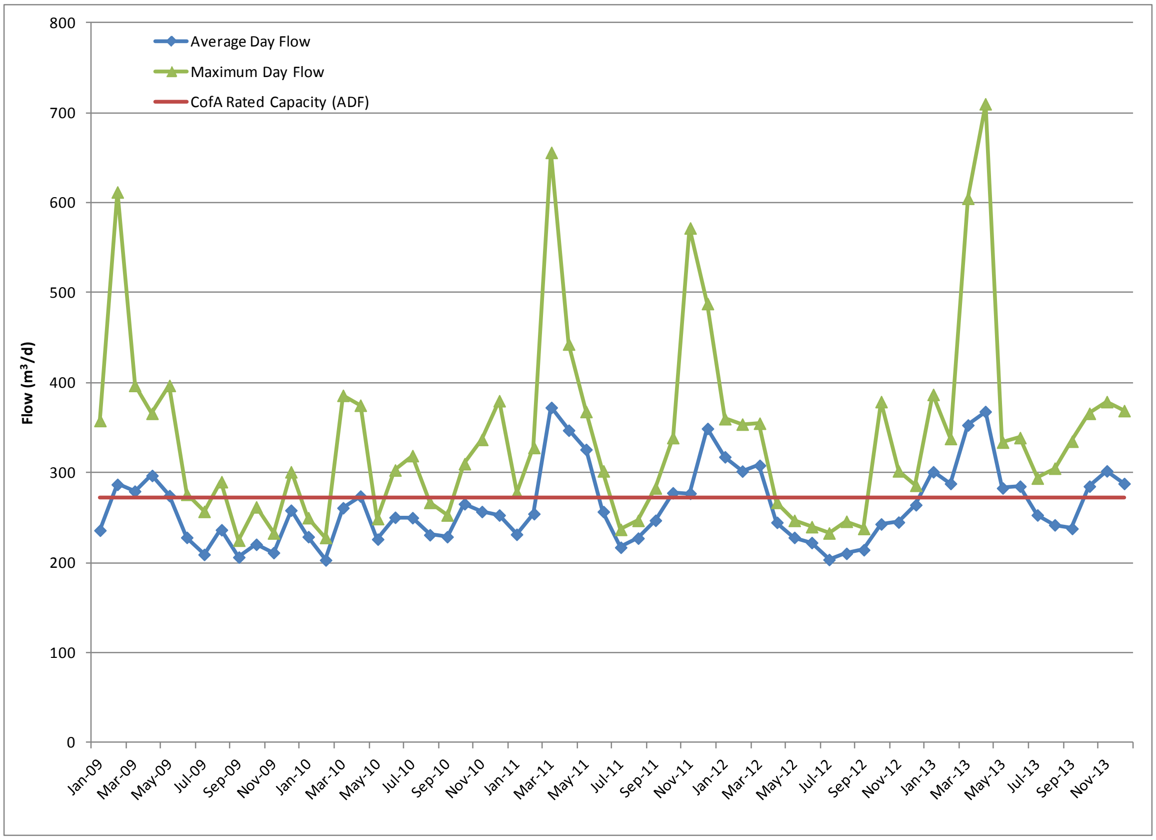

Figure 3.1 Drumbo WWTP Average and Maximum Day Flows (2009 - 2013)

On a yearly basis, the annual average flow marginally exceeded the C of A rated capacity of the plant (272 m^3/d) in 2011 and 2013, as shown in Table 3.1; however, effluent quality remained compliant.

3.2 Historical Serviced Population and Per Capita Flows

Per capita flow values were calculated based on annual average wastewater flows (summarized in Table 3.1) and serviced population estimates provided by the County from 2009 to 2012. The estimated serviced populations presented in Table 3.2 are based on a combination of billing data, reserve capacity calculations, and total system connections.

Table 3.2 Estimated Serviced Population and Per Capita Flow

Year	Estimated Serviced Population [1]	Flows Per Capita (L/cap·d) [2]
2009	778	315
2010	803	304
2011	829	340
2012	888	282
Average	-	**310**

Notes:

1. Estimated historical serviced populations from Oxford County based on a combination of billing data, reserve capacities, and total connections.
2. Based on historical average day flows (see Table 3.1) and estimated serviced populations.

The typical range of per capita flows is 225 to 450 L/cap·d, exclusive of extraneous flows (MOE, 2008), and the typical average per capita inflow/infiltration (I/I) flow is 90 L/cap·d (MOE, 1985). This provides a typical range of per capita flows of 315 to 540 L/cap·d, inclusive of extraneous flows. Based on Table 3.2, the historical average per capita flow to the Drumbo WWTP is 310 L/cap·d, inclusive of I/I. This is slightly lower than the MOE Design Guideline range, suggesting that on average, over the course of a year, I/I contributions are within an expected and acceptable range.

4. HISTORICAL RAW WASTEWATER AND EFFLUENT QUALITY

4.1 Historical Raw Wastewater Characteristics and Loadings

The raw wastewater entering the Drumbo WWTP includes wastewater from domestic and commercial sources in the community. Backwash from the filters is recycled to the transfer tank at the plant and contributes to the measured solids, organic, and nutrient loadings; however, the backwash flow is not included in influent flow recordings. WAS is pumped to the trash tank prior to the transfer tank which can affect the influent raw sewage quality data.

Raw sewage samples are collected using a 24 hour composite sampler on a bi-weekly basis from the transfer tank of the Drumbo WWTP. Historical raw wastewater characteristics are shown in Table 4.1. According to the typical literature values, the raw wastewater flowing to the Drumbo WWTP would be characterized as low to medium strength. The raw wastewater concentrations are representative of a low strength wastewater with respect to BOD_5, TSS, and TP, and low-medium strength with respect to TKN (Metcalf & Eddy, 2014).

Although the raw sewage sample is a composite sample, the transfer tank is not mixed. This may allow the suspended solids in the raw wastewater to settle, affecting the reported wastewater strength. Occasionally, operators find that a composite sample is uncharacteristically high in TSS concentration due to a build-up of sludge in the unmixed transfer tank. When this occurs, the operator's hose out the transfer tank and the raw sewage values return to normal concentrations. Due to the bi-weekly sampling data, these extremely high concentration values affect the monthly average. For this reason, data for May 2009, June 2009, and December 2011 were removed from the 2009 and 2011 annual averages, respectively.

Table 4.1 Raw Wastewater Characteristics (2009 - 2013)

Year	Average Concentration, mg/L			
	BOD_5	TSS	TP	TKN
2009 (1)	121	110	4.0	27.2
2010	126	82	3.8	29.8
2011 (1)	101	75	3.3	28.7
2012	146	111	4.6	32.9
2013	112	78	3.1	31.8
Average	**121**	**91**	**3.7**	**30.2**
Typical Raw Sewage Concentrations (2)	*133 mg/L (low)* *200 mg/L (med)* *400 mg/L (high)*	*130 mg/L (low)* *195 mg/L (med)* *389 mg/L (high)*	*3.7 mg/L (low)* *5.6 mg/L (med)* *11.0 mg/L (high)*	*23 mg/L (low)* *35 mg/L (med)* *69 mg/L (high)*

Notes:

1. May 2009, June 2009, and December 2011 monthly averages were removed for the annual average calculation due to extremely high concentrations. It was assumed that these sample results were due to a build-up of sludge in the transfer tank, resulting in an extremely high concentration.
2. Metcalf & Eddy (2014) for untreated domestic wastewater.

Table 4.2 summarizes the average and maximum month loadings experienced historically at the Drumbo WWTP. Included in the table are per capita loadings based on the average of the estimated annual per capita loadings from 2009 to 2012 and typical per capita loading values for comparison.

Table 4.2 Historical Influent Raw Wastewater Loadings (2009 - 2013)

Year	Average Loading, kg/d			
	BOD_5	TSS	TP	TKN
2009 (1)	29.6 (38.2)	27.0 (59.5)	1.0 (1.4)	6.5 (7.9)
2010	30.5 (42.2)	19.9 (29.7)	0.9 (1.1)	7.2 (8.3)
2011 (1)	27.1 (32.2)	20.5 (34.4)	0.9 (1.1)	7.8 (9.0)
2012	36.2 (47.2)	27.9 (63.5)	1.1 (2.5)	8.1 (13.4)
2013	32.0 (43.0)	22.0 (32.2)	0.9 (1.2)	9.1 (11.1)
AVERAGE	**31.2 (47.2)**	**23.4 (63.5)**	**1.0 (2.5)**	**7.8 (13.4)**
Per Capita Loading (g/cap·d) (2)	37	29	1.2	9.0
Typical Per Capita Loading Values (g/cap·d)	75 (3)	90 (3)	2.1 (4)	13.2 (4)

Notes:

Values in parentheses represent maximum monthly average load values.

1. May 2009, June 2009, and December 2011 monthly averages were removed for the annual average calculation due to extremely high concentrations. It was assumed that these sample results were due to a build-up of sludge in the transfer tank, resulting in an extremely high concentration.
2. Based on average of per capita loadings for each of 2009 - 2012.
3. MOE Design Guidelines, 2008.
4. Metcalf and Eddy, 2014.

Based on the estimated historical serviced population from 2009 to 2012, the average per capita loadings were 37 g BOD_5/cap·d, 29 g TSS/cap·d, 1.2 g TP/cap·d, and 9.0 g TKN/cap·d. All historical per capita loading values are significantly below the typical per capita loadings.

4.2 *Effluent Wastewater Quality*

The C of A effluent objectives and non-compliance limits for the Drumbo WWTP are found in the Amended C of A Number 3-2191-90-916, issued October 4, 2000 and were presented in Table 2.1. Effluent samples are taken bi-weekly using a 24-hour composite sampler installed so as to sample during periods of effluent flow. Samples are analyzed on-site for pH, chlorine residual, dissolved oxygen, and temperature.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all parameters that are reported for compliance except for pH, DO, chlorine residual, and temperature.

The historical effluent quality with respect to the key concentration parameters, including BOD_5, TSS, TP, and TAN is summarized in Table 4.3. Historical effluent loadings for BOD_5, TSS, TP, and TAN parameters are summarized in Table 4.4.

Table 4.3 Historical Effluent Quality (2009 - 2013)

Year	Average Concentration, mg/L			
	BOD_5	TSS	TP	TAN
2009				
Period A	3.6 (4.0)	5.9 (9.7)	0.2 (0.4)	0.2 (0.8)
Period B	6.6 (12.5)	4.3 (6.0)	0.1 (0.2)	1.7 (3.2)
2010				
Period A	3.8 (5.5)	4.1 (5.5)	0.2 (0.3)	0.4 (0.9)
Period B	4.9 (10.5)	4.6 (8.0)	0.1 (0.2)	1.0 (1.7)
2011				
Period A	2.9 (4.3)	5.1 (8.0)	0.2 (0.2)	0.3 (0.6)
Period B	6.4 (9.3)	4.6 (8.0)	0.1 (0.1)	1.2 (2.8)
2012				
Period A	4.1 (8.3)	4.7 (7.0)	0.2 (0.4)	1.0 (2.2)
Period B	4.6 (8.5)	4.3 (6.5)	0.1 (0.3)	1.4 (2.0)
2013				
Period A	5.4 (7.3)	5.5 (7.5)	0.2 (0.3)	1.2 (2.2)
Period B	4.3 (6.5)	6.4 (8.8)	0.2 (0.2)	2.3 (3.3)
AVERAGE				
Period A	**4.0 (8.3)**	**5.1 (9.7)**	**0.2 (0.4)**	**0.6 (2.2)**
Period B	**5.4 (12.5)**	**4.8 (8.8)**	**0.1 (0.3)**	**1.5 (3.3)**
C of A Non-Compliance Limits				
Period A	**10 mg/L**	**10 mg/L**	**0.5 mg/L**	**3 mg/L**
Period B	**15 mg/L**	**15 mg/L**	**1.0 mg/L**	**5 mg/L**

Notes:

1. Values in parenthesis represent maximum month concentration.
2. Based on monthly average concentrations.

Table 4.4 Historical Effluent Loadings (2009 - 2013)

Year	Average Loading, kg/d			
	BOD_5	TSS	TP	TAN
2009 Period A Period B	 0.8 (1.1) 1.7 (3.0)	 1.4 (2.0) 1.1 (1.5)	 0.05 (0.07) 0.04 (0.05)	 0.05 (0.17) 0.45 (0.88)
2010 Period A Period B	 0.9 (1.3) 1.2 (2.7)	 1.0 (1.3) 1.1 (2.0)	 0.04 (0.06) 0.04 (0.04)	 0.09 (0.19) 0.22 (0.38)
2011 Period A Period B	 0.8 (1.1) 2.0 (3.5)	 1.3 (1.8) 1.4 (1.9)	 0.04 (0.05) 0.03 (0.05)	 0.08 (0.14) 0.40 (1.03)
2012 Period A Period B	 0.9 (1.7) 1.3 (2.1)	 1.1 (1.7) 1.2 (1.6)	 0.05 (0.07) 0.04 (0.07)	 0.23 (0.49) 0.38 (0.60)
2013 Period A Period B	 1.4 (2.1) 1.4 (2.4)	 1.5 (2.1) 2.0 (2.6)	 0.05 (0.07) 0.05 (0.07)	 0.34 (0.63) 0.71 (0.94)
AVERAGE **Period A** **Period B**	 **1.0 (2.1)** **1.5 (3.5)**	 **1.2 (2.1)** **1.4 (2.6)**	 **0.05 (0.07)** **0.04 (0.07)**	 **0.16 (0.63)** **0.43 (1.03)**
C of A Non-Compliance Limits **Period A** **Period B**	 **2.8 kg/d** **4.0 kg/d**	 **2.8 kg/d** **4.0 kg/d**	 **0.14 kg/d** **0.27 kg/d**	 **0.8 kg/d** **1.36 kg/d**

Notes:
1. Values in parenthesis represent maximum month concentration.
2. Based on monthly average concentrations.

Based on the historical plant effluent data, the Drumbo WWTP has consistently been able to achieve its effluent concentration and loading objectives throughout the historical review period. Based on the C of A, the average monthly concentration of DO in the effluent should not be less than 5.0 mg/L. During the review period (2009 - 2013), effluent DO levels have always exceeded the minimum required concentration of 5 mg/L, and *E. coli* monthly geometric mean density has not exceeded the effluent objective and non-compliance limit of 200 organisms/100 mL in any calendar month.

5. DESIGN BASIS

5.1 Re-rated Flows to the Drumbo WWTP

5.1.1 Population Estimations and Average Day Flow

Proposed flows for the re-rated Drumbo WWTP were developed based on the historical (2009 to 2012) per capita flow of 310 L/cap/d for near-term growth. The estimated existing and re-rated future service population and projected residential flows for the Drumbo WWTP are presented in Table 5.1.

Table 5.1 Proposed Re-Rated Average Day Flow to the Drumbo WWTP

Parameter	Current	Proposed
Service Population	888	968
ADF (m^3/d)	275 [(1)]	300
Proposed Re-rated ADF (m^3/d)	-	300

Notes:
1. Calculated based on the 2012 service population of 888 and historical per capita flow of 310 m^3/d.

Based on Table 5.1 population projections and historical per capita flows, the proposed re-rated ADF for the Drumbo WWTP is 300 m^3/d.

5.1.2 Maximum Day Flow

The proposed re-rated MDF was based on the historical MDF factor observed for the existing service area of 2.5. A comparison of ADF, MDF, and calculated MDF factors observed historically for raw wastewater flows conveyed to the WWTP from 2009 to 2012 was presented in Table 3.1. It was assumed that a similar MDF factor would continue to occur from the service area in the near-term, therefore based on the overall MDF observed over the historical review period of 2.5 and the proposed re-rated ADF of 300 m^3/d, the proposed re-rated MDF is 750 m^3/d.

5.1.3 Peak Instantaneous Flow

Historical PIF data were not available for the Drumbo WWTP; therefore, a PIF factor from the current WWTP service area was estimated based on the Harmon Formula. The Harmon Formula predicts the PIF factor, exclusive of extraneous flows, experienced by a sewage system based on the size of the service population. The estimated peak dry weather flow (DWF) from the existing service area is 1,046 m^3/d. The I/I from existing servicing was estimated based on the Harmon Formula for DWF and a peak extraneous flow allowance of 227 L/cap/d (MOE, 1985). Based on these assumptions, the estimated existing PIF and PIF factor are 1,248 m^3/d and 4.5, respectively.

To determine the PIF factor associated with near-term connections to the sewage collection system, the Harmon Formula was used for DWF, and a peak extraneous flow allowance of 227 L/cap/d (MOE, 1985). Based on these assumptions, the projected PIF and estimated PIF factor for near-term development are 112 m^3/d and 4.5, respectively.

Table 5.2 provides the estimated PIF resulting from existing sources as well as new connections associated with interim growth within the service area.

Table 5.2 Projected PIF to the Drumbo WWTP

Parameter	Projected ADF	PIF Factor	Projected PIF
Existing Service Area	275 m^3/d	4.5	1,248 m^3/d
Residential Growth	25 m^3/d	4.5	112 m^3/d
Projected Value	300 m^3/d	4.5	1,360 m^3/d

Based on the overall estimated PIF over the historical review period and the current ADF, the projected PIF to the Drumbo WWTP is 1,360 m^3/d. As noted in Section 3.1, the firm pumping capacity of the North and Main SPSs is 1,400 m^3/d. This is adequate capacity to meet the projected PIF of 1,360 m^3/d, therefore the proposed re-rated PIF is 1,400 m^3/d.

5.2 Raw Wastewater Loadings to the Re-rated Drumbo WWTP

The 2009 to 2012 historical average loadings, as presented in Table 4.2, were adopted as the future loadings from the existing service area. Raw wastewater loadings associated with near-term residential growth were determined based on the higher value of historical per capita loadings or typical per capita loadings presented in MOE Design Guidelines and Metcalf and Eddy. Table 5.3 presents design loadings based on the proposed re-rated flows in terms of BOD_5, TSS, TKN, and TP.

Table 5.3 Loadings from Near-Term Growth Serviced by the Re-rated Drumbo WWTP

Parameter	Per Capita Loading	Design Loading from Growth (1)
BOD_5	75 g/cap·d (2)	6 kg/d
TSS	90 g/cap·d (2)	7 kg/d
TKN	13.2 g/cap·d (3)	1.1 kg/d
TP	2.1 g/cap·d (3)	0.2 kg/d

Notes:
1. Based on an estimated population growth of 80 people.
2. MOE Design Guidelines, 2008.
3. Metcalf and Eddy, 2014.

A summary of the total projected loadings to the re-rated plant is presented in Table 5.4.

Table 5.4 Raw Wastewater Loadings to the Re-rated Drumbo WWTP

Parameter	BOD_5	TSS	TKN	TP
Existing Development	31 kg/d	24 kg/d	7.4 kg/d	1.0 kg/d
Residential Growth	6 kg/d	7 kg/d	1.1 kg/d	0.2 kg/d
Total Loading (1)	37 kg/d	31 kg/d	8.5 kg/d	1.2 kg/d
Average Raw Wastewater Concentration (1)	123 mg/L	103 mg/L	28.3 mg/L	4.0 mg/L

Notes:
1. Based on a proposed re-rated ADF of 300 m^3/d.

The maximum monthly loadings were based on the maximum monthly loading factors observed historically for BOD_5, TSS, TP, and TKN. Table 5.5 presents the projected maximum monthly loadings to the re-rated Drumbo WWTP.

Table 5.5 Maximum Month Loadings to the Re-rated Drumbo WWTP

Parameter	Average Day Loadings	Maximum Month Loading Factor	Maximum Month Loading
BOD_5	37 kg/d	1.5	56 kg/d
TSS	31 kg/d	2.7	83 kg/d
TKN	8.5 kg/d	1.8	15.4 kg/d
TP	1.2 kg/d	2.5	3.0 kg/d

5.3 Summary of Proposed Flows and Loadings for the Re-rated Drumbo WWTP

Table 5.6 presents the proposed re-rated raw wastewater flows to the Drumbo WWTP.

Table 5.6 Summary of Proposed Re-rated Flows

Parameter	Proposed Re-rated Value
ADF	300 m^3/d
MDF Factor	2.5
MDF	750 m^3/d
PIF	1,400 m^3/d

Table 5.7 presents the overall design raw wastewater quality as well as average daily loadings and maximum monthly loadings projected to the re-rated Drumbo WWTP.

Table 5.7 Summary of Design Raw Wastewater Quality

Parameter	Average Concentration	Average Daily Loading [1]
BOD_5	123 mg/L	37 kg/d (56 kg/d)
TSS	103 mg/L	31 kg/d (83 kg/d)
TKN	28.3 mg/L	8.5 kg/d (15.4 kg/d)
TP	4.0 mg/L	1.2 kg/d (3.0 kg/d)

Notes:
1. Values in parentheses represent maximum month values.

5.4 Effluent Objectives and Compliance Requirements for the Re-rated Drumbo WWTP

At a pre-consultation meeting with the MOE Southwestern Region held on December 4, 2013, MOE agreed that the effluent limits for a re-rated Drumbo WWTP would be based on maintaining the same loadings as currently required under the existing C of A. Meeting notes from the MOE meeting are provided in Attachment A. The non-compliance limits for DO, TRC, and the effluent objective and non-compliance limit for *E. coli* will remain as specified in the existing C of A.

The compliance limits and objectives for the re-rated Drumbo WWTP are shown in Table 5.8.

The re-rating of the Drumbo WWTP will not require any construction and there will be no increase in the mass loading to the receiving stream; therefore, re-rating the Drumbo WWTP is a Schedule A activity under the Municipal Class EA, as noted in a letter to MOE dated December 16, 2013 and provided as Attachment B.

Table 5.8 Proposed ECA Objectives and Non-compliance Limits for Re-rated Drumbo WWTP

Parameter (1)	Effluent Objectives		Non-Compliance Limits	
	Concentration(2)	Average Loading(3)	Concentration(2)	Average Loading(3)
$cBOD_5$				
Period A	4.7 mg/L	1.4 kg/d	9.3 mg/L	2.8 kg/d
Period B	9.3 mg/L	2.8 kg/d	13.3 mg/L	4.0 kg/d
Suspended Solids (SS)				
Period A	4.7 mg/L	1.4 kg/d	9.3 mg/L	2.8 kg/d
Period B	9.3 mg/L	2.8 kg/d	13.3 mg/L	4.0 kg/d
Total Phosphorus (TP)				
Period A	0.27 mg/L	0.08 kg/d	0.46 mg/L	0.14 kg/d
Period B	0.7 mg/L	0.21 kg/d	0.90 mg/L	0.27 kg/d
Total Ammonia as N (TAN)				
Period A	1.8 mg/L	0.54 kg/d	2.7 mg/L	0.8 kg/d
Period B	3.6 mg/L	1.08 kg/d	4.5 mg/L	1.36 kg/d
E. coli (4)	200 counts/100mL	-	200 counts/100mL	-
Total Chlorine Residual (TRC)	-	-	0.01 mg/L	-
Dissolved Oxygen (DO)	-	-	> 5.0 mg/L	-

Notes:
1. Period A refers to the time that the receiving stream temperature exceeds 5°C. Period B refers to the time that the receiving stream temperature is less than or equal to 5°C.
2. Based on monthly average values.
3. Based on an average day flow of 300 m^3/d.
4. Based on monthly geometric mean density during any calendar month.

6. DRUMBO WWTP TREATMENT CAPACITY REVIEW

6.1 Transfer Tank

The 51.0 m^3 transfer tank receives flows from the North and Main SPSs and the backwash from the filters and transfers these flows to the SBRs. Flow can only be transferred to the SBRs when they are in the fill portion of the cycle.

Peak flows into the plant are controlled by the combined pumping capacity of the North and Main SPSs. Based on flow rate testing completed by Oxford County in 2012, the combined flow rate of the North and Main SPSs' duty pumps is 1,400 m^3/d. The combined flow rate of all pumps at the North and Main SPSs is 1,645 m^3/d.

The worst case scenario would involve all pumps at the North and Main SPSs delivering flow to the transfer tank at the same time that a filter backwash is occurring and neither reactor receiving flow from the transfer pumps. In this scenario, the estimated flow received at the plant would be:

Influent = (68.56 m^3/hr * 91 min / 60 min/hr) + (0.28 m^3/min * 30 min)
=112 m^3

The storage required under this worst case scenario is 2.2 times that provided by the existing transfer tank (51 m^3). With the addition of the emergency overflow basin capacity of 91 m^3, this worst case influent flow of 112 m^3 is less than the total transfer tank plus emergency overflow capacity of 142 m^3.

A more likely scenario would involve only the duty pump operating in each of the pumping stations under the same reactor conditions. In this scenario, the estimated flow received at the plant would be:

Influent = (58.35 m^3/hr * 91 min / 60 min/hr) + (0.28 m^3/min * 30 min)
= 97 m^3

Based on the total transfer tank plus emergency overflow capacity of 142 m^3, sufficient capacity is provided under all scenarios to hold the maximum capacity pumped from the North and Main SPSs; therefore, the transfer tank and emergency overflow basin have sufficient capacity to meet the requirements at the proposed re-rated ADF of 300 m^3/d. Under both of these scenarios, excess raw sewage will flow to the emergency overflow basin and be contained until the raw sewage influent flows lessen and the flow can be treated by the SBRs.

6.2 Sequencing Batch Reactors

In the current configuration of the PLC, the SBRs are operated such that the minimum cycle time for each reactor cycle is approximately 216 minutes, assuming that the reactor is filled as quickly as possible after it decants and decants as quickly as possible to the filter equalization tank after it completes its reaction cycle. The total cycle time consists of: 62.4 minutes to fill, 30 minutes react time, 60 minutes settle time, 62.4 minutes to decant, and 1.0 minute of sludge wasting.

The Drumbo WWTP currently runs approximately 3 batches per reactor per day, for a total of six batches per day. If running continuously, this will take a total time of approximately 21.6 hours, leaving an additional 2.4 hours daily when the SBR tanks are not in use.

Based on current operation, the maximum number of cycles per reactor per day is (1,440 min/d / 215.8 min/cycle) = 6.7 cycles. With two reactors, the maximum number of batches that can be treated during a day is 13.3 cycles. Therefore, the maximum hydraulic throughput of the SBRs is:

Maximum SBR throughput = 13.3 cycles * 47.4 m^3 WW treated/cycle
= 630 m^3/d

The maximum SBR hydraulic capacity in the current operating configuration of 630 m^3/d is less than the current peak rated capacity of 774 m^3/d. Based on the proposed maximum day peaking factor of 2.5 (see Section 5.1.1), the average day flow capacity of the plant in this operating mode would be (630 m^3/d / 2.5) = 252 m^3/d. This capacity must be reduced to account for the volume of filter backwash water that is recycled through the reactor.

In order to achieve the re-rated peak flow, the SBR cycle times must be reduced to less than 3 hours from the current 3.6 hours under peak flow conditions. Current operation under peak flow conditions is to half the react, settle, and waste times, thereby reducing the cycle period to 170.3 minutes (2.8 hours). This has occasionally resulted in reduced nitrification efficiency and issues with the control of solids. To maintain the required nitrification during peak flow events, the shorter react and settle times should be avoided, if possible.

An alternative to the current method of reducing the SBR cycle times during peak flow events is to have both active and standby pumps running during the filling and decanting stages. This would cut the fill and decant times in half, reducing the total cycle time to 153.4 minutes (2.6 hours). With two reactors, the maximum number of batches in this operating mode would be (1,440 min/d / 153.4 min/cycle * 2 reactors) = 18.8 cycles per day. Alternately, the existing decant and fill pumps could be replaced with larger capacity pumps to reduce the total SBR cycle time. If both transfer pumps and both decant pumps are in operation for each SBR, the maximum hydraulic throughput of the SBRs would be:

Maximum SBR throughput = 18.8 cycles * 47.4 m^3 WW treated/cycle
= 891 m^3/d

Based on the proposed maximum day peaking factor of 2.5 and the estimated current volume of filter backwash water (approximately 20 percent of the ADF), the ADF capacity of the plant is 285 m^3/d with the cycle time reduced as a result of two transfer pumps and two decant pumps in operation for each SBR.

Under peak wet weather flow conditions, additional flow could be conveyed through the SBRs by reducing the settling time from the current setting of 60 minutes. If the settling time was reduced from 60 minutes to 30 minutes during high flow events, the overall cycle time would be reduced to 123.4 minutes. With two reactors, the maximum number of batches would be (1,440 min/d / 123.4 min/cycle * 2 reactors) = 23.3 cycles per day. Therefore, the maximum hydraulic throughput of the SBRs in this operating mode would be:

Maximum SBR throughput = 23.3 cycles * 47.4 m^3 WW treated/cycle
= 1,104 m^3/d

Based on the proposed maximum day peaking factor of 2.5 and the volume of filter backwash water (estimated at approximately 20 percent of ADF), the SBR through put flow would be 353 m^3/d with the cycle time reduced if two transfer pumps and two decant pumps are in operation, as well as a reduced settling time of 30 minutes. The availability of this option provides operational flexibility during peak wet weather flow events indicating that sufficient capacity exists in the SBRs to treat the proposed ADF of 300 m^3/d.

To achieve the proposed ADF capacity of 300 m^3/d, the settling time would only need to be reduced slightly to 52 minutes from the current 60 minutes.

Table 6.1 summarizes the various SBR operation scenarios and the associated average day flow and peak flow capacities.

Table 6.1 SBR Capacity

Operation	Number of Cycles	Estimated Capacity (m^3/d)	
		Average Day Flow	Peak Flow (1)
Current Operation	13.3 cycles	210	504
Both Pumps (Active and Standby) operating for Fill and Decant of SBR	18.8 cycles	285	713
Both Pumps (Active and Standby) operating for Fill and Decant of SBR and a slight reduction in settling time (52 min)	20.0 cycles	300	750
Peak Wet Weather Flow Conditions - Both Pumps operating for Fill and Decant of SBR and running a reduced settling time (30 min)	23.3 cycles	353	883
Existing C of A Design Capacity		**272**	**774**
Proposed ECA Capacity		**300**	**750 (MDF)**

Notes:
1. Peak flows based on the assumption of an additional volume of filter backwash water (approximately 20 percent of the ADF).

6.3 Solids Control

In order to meet the stringent effluent ammonia limits in the Drumbo WWTP C of A, close control of solids retention time and solids inventory in the reactors is important. As the decant system is based on fixed level submersible pumps, sludge settling rates must be adequate to ensure that the sludge blanket is below the decant pump suction when the decant starts. If the sludge does not settle fast enough, solids will be pumped out of the reactor with the decant. When this occurs, nitrification efficiency will be reduced because the sludge inventory is not adequate to treat the incoming load. Furthermore, downstream filters could become plugged with solids, reducing their hydraulic capacity.

A "very good" settling sludge typically has a sludge volume index (SVI) of 100 mL/g or less. The SVI is a critical parameter as the flows increase at the Drumbo WWTP and should be regularly monitored. If SVIs higher than 100 mL/g are experienced, modifications to the decant pump locations, changes to plant operation to enhance settleability, or changes to the reactor cycles may be needed to maximize efficiency and capacity.

6.4 Filter Equalization Tanks

As a part of the implementation of recommendations made in the XCG capacity report dated July 5, 1999, a new filter feed equalization tank was added to the Drumbo WWTP. This new tank has a capacity of 27 m^3 and is connected via a pipe to the old filter flow equalization tank, providing a combined capacity of 57.6 m^3. If two reactors decant simultaneously (operating in storm mode), or if both decant pumps operate simultaneously to decant one reactor faster, and then the feed rate into the equalization tank will be approximately 1.52 m^3/min. The feed rate out of the tank to the filters is approximately 0.56 m^3/min, based on two filter feed pumps in operation. During the decant period, the excess treated liquid transferred into the equalization tank can be (1.52 - 0.56) m^3/min * 62.4 minutes = 60 m^3, slightly exceeding the storage volume available. With only one reactor decanting, the storage volume is more than adequate to receive the decant. The excess treated liquid transferred from a single reactor is (1.52/2 - 0.56) m^3/min * 62.4 minutes = 12.5 m^3 compared to a storage volume of 57.6 m^3.

When the filter equalization tank is full, the control system does not allow the decant pumps to operate, preventing the reactors from decanting and overflowing the equalization tank. However, based on the capacity above, with only one reactor decanting at a time, the storage volume is more than adequate to receive the decant. In general, the plant should only be decanting one reactor at a time.

6.5 Effluent Filters

In the current operating mode, two filter pumps are used to deliver reactor decant from the filter equalization tank to the effluent filters, while one filter pump remains on stand-by. Each filter pump is rated to deliver 0.28 m^3/min of flow. Therefore, the firm capacity through the effluent filters is:

Maximum filter throughput = 0.28 m^3/min * 2 filter pumps * 1,440 min/day
= 806.4 m^3/d

It is likely that the maximum hydraulic capacity of the filters is actually less than 800 m^3/d as calculated above because the filters contain only sand media which will increase the head loss through the filters compared to the multi-media of the original design. The filter capacity is further reduced by the backwash water flow from the filters that must be returned through the treatment process. Under ideal conditions of one backwash of each filter per day, backwash flow may represent up to 20 percent of the plant ADF. Therefore, the backwash flow likely reduces the filter capacity to approximately (806.4 m^3/d * 0.80) = 645 m^3/d.

The filters, in their current state, are not capable of treating the proposed re-rated maximum day flow. The capacity of the filters can be increased by returning them to their original design configuration. Alternately, a media cap of larger size, less dense material can be added to the filters, or the filter sand media can be replaced. The addition of air scouring to the backwashing process will also improve the effectiveness of backwashing and reduce the cycle frequency and volume of water required to clean the media (WEAO, 2010). These improvements would decrease the head loss in the filters and reduce backwash requirements, increasing the MDF treatment capacity of the effluent filters to more than the proposed re-rated MDF.

6.6 UV Disinfection

The UV system at the Drumbo WWTP does not have a UV intensity meter. Therefore, assumptions regarding UV intensity and dosage requirements were made based on typical literature values for activated sludge disinfection systems to estimate the treatment capacity of the system to achieve the C of A limits for *E. coli*.

Typical UV dosage requirements for disinfection of activated sludge effluents are in the range of 20 to 30 mWs/cm^2. Assuming 65 percent UV transmittance (typical of secondary effluents), a 10 percent allowance for lamp fouling, and a 60 percent allowance for loss of lamp intensity due to lamp aging, the capacity of the 10 lamp UV system at the Drumbo WWTP is estimated to be between 1,050 m^3/d (0.73 m^3/min) and 1,580 m^3/d (1.1 m^3/min). This is more than the maximum flow capacity of the filters (i.e. the firm filter feed pump capacity of 806.4 m^3/d), therefore, the UV system has sufficient capacity to accommodate the re-rated flow.

It should be noted that UV transmittance for the Drumbo WWTP effluent may exceed 65 percent as the effluent is filtered. A higher UV transmittance will increase the capacity of the UV system.

6.7 Summary of the Drumbo WWTP Capacity Review

The Drumbo WWTP was originally designed to treat an average day flow of 272 m^3/d and a peak flow of 774 m^3/d; however, the Drumbo WWTP is capable of treating flows greater than the approved C of A capacity.

Based on the capacity review of the Drumbo WWTP, there is adequate capacity available to treat the proposed re-rated flows. A summary of the capacity of each unit process is presented in Table 6.2.

The effluent filters have been modified from the original design and currently represent a hydraulic bottleneck in the plant. These filters were originally designed as multi-media filters containing layers of graded sand and anthracite. The single sand media replacement results in greater head losses, reducing filter throughput and requiring higher backwash rates than the original filter media. The capacity of the filters can be increased by returning them to their original design configuration. Alternately, a media cap of larger size, less dense material can be added to the filters, or the filter sand media can be replaced.

The capacity of the SBRs at the Drumbo WWTP, as shown in Table 6.2, depends on the cycle time and operation mode of the SBRs. There is adequate capacity available to treat the proposed re-rated flows.

Table 6.2 Summary of Unit Process Capacity of Drumbo WWTP

Process	Estimated Capacity (m^3/d)	
	Average Day Flow	**Peak Flow**
Sequencing Batch Reactors 13.3 cycles per day (current operation) 18.8 cycles per day (both pumps running for fill/decant) 20.0 cycles per day (both pumps running for fill/decant and a slight reduction in settling time)	 210 285 300	 504 713 750
Effluent Filters	-	645
UV Disinfection	-	1,050 - 1,580
Existing C of A Design Capacity	**272**	**774**
Proposed ECA Re-rated Capacity	**300**	**750 (MDF)** **1,400 (PIF)**

7. CONCLUSIONS

Based on the capacity review of the Drumbo WWTP, the following conclusions are drawn.

- Based on historical plant performance, the Drumbo WWTP has consistently been able to achieve its effluent objectives during the historical review period (2009 to 2012) even during months when flows in excess of the proposed re-rated ADF of 300 m^3/d were experienced.
- Based on both pumps running to fill and decant the SBR and a slight reduction in settling time, there is sufficient capacity in the SBRs to accommodate the proposed re-rated maximum day flow.
- The existing effluent filters are the capacity limiting process at the Drumbo WWTP. The effluent filters have been modified from the original design and currently represent a hydraulic bottleneck in the plant. The filter media should be returned to the original design configuration to increase throughput and reduce backwash requirements.
- The Drumbo WWTP, after renovation of the effluent filters, is capable of treating the proposed re-rated ADF of 300 m^3/d.
- Re-rating of the Drumbo WWTP to an ADF of 300 m^3/d is a Schedule A undertaking under the MCEA process as the increased capacity will be achieved through improvements in operations and maintenance activities only and there will be no increase in mass loadings to the receiving stream.

8. REFERENCES

Metcalf & Eddy (2014). Wastewater Engineering: Treatment and Reuse. Fifth Edition. Toronto.

Ministry of the Environment (1985). Guidelines for the Design of Sanitary Sewage Systems.

Ministry of the Environment (2008). Design Guidelines for Sewage Works.

Water Environment Association of Ontario, Ontario Ministry of the Environment, Environment Canada (2010). Optimization Guidance Manual for Sewage Works.

ATTACHMENT A
MOE PRE-CONSULTATION MEETING NOTES
(DECEMBER 4, 2013)

XCG
Environmental Engineers & Scientists
XCG CONSULTANTS LTD.
T 905 829 8880 F 905 829 8890 | toronto@xcg.com
2620 Bristol Circle, Suite 300, Oakville, Ontario, Canada L6H 6Z7

XCG File No.: 3-277-47-02

Re:	Class Environmental Assessment and Preliminary Design of the Expansion of the Drumbo WWTP Pre-Consultation Meeting with MOE SW Region
Meeting Date:	December 4, 2013
Location:	733 Exeter Road London, Ontario
Attendees:	Bob Aggerholm (BA), Ministry of the Environment (MOE) Scott Abernethy (SA), MOE Tom Clubb (TC), MOE Shahab Shafai (SS), Oxford County (Oxford) Mark Maxwell (MM), Oxford Stephen Nutt (SN), XCG Consultants Limited (XCG) Colin Clarke (CC), XCG
Notes By:	Colin Clarke (CC), XCG

Item	Action
1. **Introduction**	
• General introductions of all attendees.	Info
2. **Background**	
• SS provided background on the WWTP including the treatment process and the existing effluent limits. He identified that the rated capacity of the Drumbo WWTP is 272 m^3/d and for 2012 the ADF was 250 m^3/d (approximately 92% of rated capacity).	Info
• BA asked about the outfall location and configuration. MM identified that the outfall discharges into a wetland that conveys flow to the Cowan Drain. The outfall is an open pipe.	Info

Item	Action
• SS identified that no complaints had been received about the plant for odour or noise; however, in August 2013, there was a complaint regarding sediment in the Cowan Drain downstream of the plant. SS noted that Public Health & Emergency Services (PHES) sampled the drain and results showed no sewage contamination. PHES had no concerns with the impact of the WWTP effluent on the drain. BA noted that the complaint should be identified in the ESR.	Oxford
• MM has estimated flows based on 300 existing connections, 66 approved lots and 12 infill lots. MM identified that the resultant flows from the additional development will result in insufficient capacity at the Drumbo WWTP. Currently, there are no additional development applications for Drumbo. BA asked how these lots were approved if capacity was an issue. MM indicated that the approval was given in the mid 1990's; any new development would require that sanitary capacity is available before being registered. SS noted that Public Works can delay registration of the second phase of the existing draft approved development. It was also noted that the County will work with the Township to try and bring down peak flows caused by infiltration/inflow in the spring and fall but the reported high flows may have been related to dewatering of building sites during construction which can be better controlled in the future.	Info
• SN identified that the County is leading the EA. SS noted that GRCA wants to be included on the circulation list.	Info
• BA discussed the importance of First Nation Consultation and that communication should be clearly documented. If no written responses are received to Oxford's letters, it would be prudent to attempt following up by phone.	Oxford
• SN noted that at the Drumbo WWTP there is no capability of bypass. Any overflows are conveyed to the emergency overflow basin. These flows are stored until they can be passed through the WWTP.	Info

Item	Action
• SN noted that the plant site is restricted and that a two stage capacity increase was being proposed. The first phase would be to re-rate the plant to 300 m^3/d. This phase would require no construction and could potentially be covered under a Schedule A or Schedule B Class EA. The second phase would increase the capacity of the plant to 350 m^3/d. This expansion (Phase 1) would cover the draft plan approved lots and infills. For this expansion (Phase 1), the plant would likely require new filters and UV disinfection. The second phase would be completed as a Schedule C Class EA. BA noted that if it is a Schedule B for phase 1 then a new public notice would be required. The notice should mention that the second phase of the undertaking will be a Schedule C activity. SN to confirm the Class EA Schedule for the Phase 1 Re-rating project.	SN
• SA stated that, for Phase 1, it would be acceptable to maintain the existing approved loadings by reducing effluent concentration limits proportionately. For the final expansion, more detail will be required regarding the Cowan Drain (the receiver). If insufficient existing information is available, a monitoring program may be required for the Cowan Drain.	Info
• CC noted that there are no flow or quality data in the Water Survey of Canada or Provincial Water Quality Monitoring Network databases for the Cowan Drain. He also noted that if the discharge was classified as a dry ditch discharge and the Nith River was the ultimate receiver that data for flow and quality were available. SA stated that before a decision can be made on the receiver, additional data need to be provided regarding the Cowan Drain. MM to follow-up with the Drainage Superintendent for information and with Public Works regarding any historical observations of flow in the Cowan Drain. CC to contact GRCA and MNR regarding water quality data, flow data and species at risk information in the Cowan Drain. CC to compile background information in a memo to be distributed by mid-December. SA and CC both expect the Cowan Drain would be Policy 2 with respect to TP.	MM CC

Any errors, omissions, or discrepancies should be reported to Colin Clarke.

ATTACHMENT B
LETTER TO MOE RE: SCHEDULE A ACTIVITY (DECEMBER 16, 2013)

Oxford County
growing stronger...together
Public Works
P. O. Box 1614, 21 Reeve Street
Woodstock, Ontario N4S 7Y3
Tel: 519-539-9800 ♦ 800-755-0394
Fax: 519-421-4711
www.oxfordcounty.ca

December 16, 2013

Bob Aggerholm
Environmental Planner/ Regional EA Coordinator
733 Exeter Road
London, ON
N6E 1L3

Dear Bob,

RE: Drumbo Wastewater Treatment Plant (WWTP) Class EA

Further to our meeting of December 4, 2013 to discuss the Drumbo WWTP Class EA, the County has reviewed the capacity of the individual unit processes and equipment comprising the Drumbo WWTP and has concluded that the plant is capable of treating flows beyond the current rated capacity of 272 m^3/d and up to at least 300 m^3/d through operational changes to the existing works only. At our meeting on December 4, Scott Abernethy stated that, for an interim increase in capacity up to 300 m^3/d, the effluent loadings from the plant would be maintained at the levels specified in the existing Certificate of Approval (CofA #3-2191-90-916), with corresponding decreases in the effluent concentration limits and objectives to reflect the higher plant capacity.

The Municipal Class Environmental Assessment (Municipal Engineers Association, June 2000, as amended in 2007 and 2011) indicates that a project to "increase sewage treatment plant capacity beyond the existing rated capacity through improvements to operation and maintenance activities only, without construction of works to expand, modify or retrofit the plant or the outfall to the receiving water body, with no increase to total mass loading to receiving water body as identified in the Certificate of Approval" is a Schedule A Pre-Approved Activity.

Therefore, the County is proceeding with an Environmental Compliance Approval (ECA) application, with appropriate documentation, to increase the rated Average Day Flow (ADF) capacity of the Drumbo WWTP from 272 m^3/d to 300 m^3/d. At the same time, the County will be proceeding to complete the Schedule C Class EA that has been initiated to allow a further increase in the capacity of the Drumbo WWTP to beyond 300 m^3/d to service the planned growth in the community.

If you have any questions with respect to the planned re-rating or the Schedule C Class EA for the Drumbo WWTP, please do not hesitate to contact the undersigned at your convenience. Thank you for your assistance.

Sincerely,

Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services

cc. Robert Walton, Oxford County
Steve Nutt, XCG Consultants Ltd.

XCG CONSULTANTS LTD.
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2620 Bristol Circle, Suite 300, Oakville, Ontario, Canada L6H 6Z7

August 15, 2014

XCG File No.: 3-277-47-03

Mr. Mark Maxwell
Water & Wastewater Services
Oxford County
P.O. Box 1614
Woodstock, Ontario
N4S 7Y3

Re: Influent Flow Meter Verification - Drumbo WWTP

1. INTRODUCTION

XCG Consultants Ltd. (XCG) was retained by Oxford County (the County) to complete a verification of the influent flow meter at the Drumbo Wastewater Treatment Plant (WWTP).

Current flow metering is provided by a 150 mm (6") Krohne magnetic flow meter installed on the influent forcemain to the Drumbo WWTP. As part of the on-going Class Environmental Assessment (Class EA) for the upgrade and expansion of the Drumbo WWTP, an analysis of operational data indicated that the existing flow meter may be reporting higher than actual flow volumes. The County requested the verification of the accuracy of the influent magnetic flow meter and the SCADA flow meter readings.

This letter report presents the results of the flow verification study.

2. WORK PROGRAM

All influent flows to the WWTP pass through an influent forcemain, equipped with a magnetic flow meter, which discharges to a trash tank. The trash tank contents then overflow into a transfer tank from which the wastewater is pumped to the two sequencing batch reactors (SBRs). Figure 1 presents a process flow diagram for the Drumbo WWTP. The flow meter verification utilized information regarding the rate of increase of liquid level in the transfer tank to calculate the influent flow rate, which was then compared to the influent magnetic flow meter reading collected over the same period of time.

Data were collected by installing a temporary ultrasonic level sensor in the transfer tank and utilizing a Chessel data logger to record the level measurements. A separate channel on the data logger was used to simultaneously record the flow readings collected by the influent magnetic flow meter. Using the geometry of the tank, the level readings were converted to volumetric flow, and compared directly to the flow meter readings. A total of 10 sets of tank level / flow meter readings were recorded. Data for the verification tests were collected on May 13 and 14, 2014.

Due to the existing configuration of the WWTP, filter backwash flows and waste activated sludge (WAS) flows are directed to the trash tank and, consequently, flow by gravity to the transfer tank. Neither the filter backwash nor WAS flows are metered. As a result, when filter backwash and/or WAS flows are discharged to the trash tank, the influent flows to the transfer tank would not be equal to the flows through the influent forcemain.

During the flow meter verification testing, to capture transfer tank level / flow meter data sets that exclude the impact of filter backwash flows, filter backwashing was temporarily suspended. Although WAS is discharged directly to the trash tank, due to the capacity of the sludge wasting pumps and the short duration of WAS pumping cycles, WAS volumes were deemed to have a negligible impact on influent flows to the transfer tank. Therefore, sludge wasting continued throughout the test period.

The transfer pumps located in the transfer tank were operated in manual mode during data collection periods. This allowed the control of transfer tank fill cycles. Only data recorded during periods with the transfer pumps off were used in the flow meter verification analysis.

The collected data were analyzed and the accuracy of the influent magnetic flow meter was evaluated. The results of this analysis are summarized in the following sections.

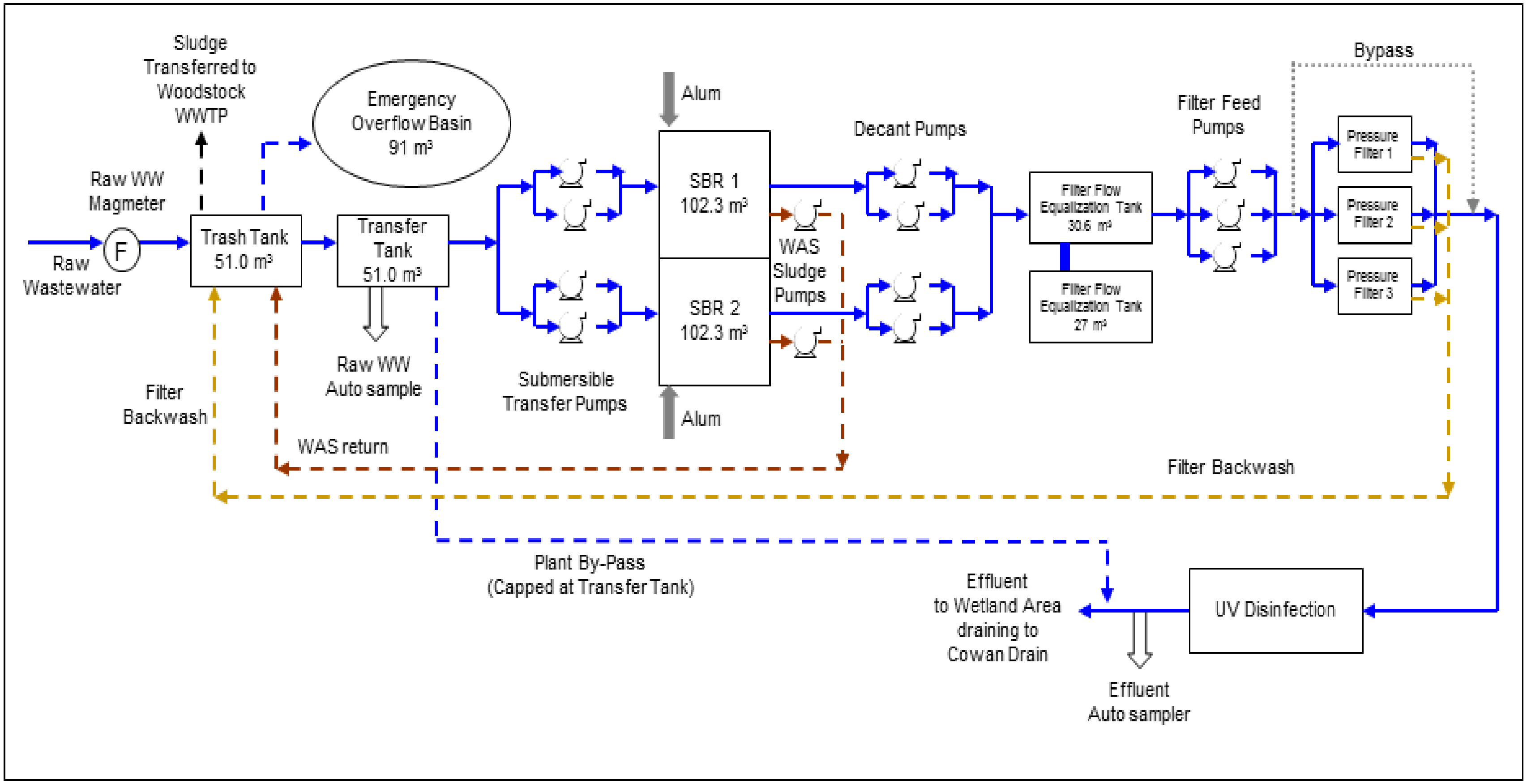

Figure 1 Process Flow Diagram for Drumbo WWTP

3. DATA ANALYSIS

The completion of data collection activities took place over a two day period and data recorded over 10 transfer tank fill cycles were used in the verification of the magnetic flow meter.

3.1 WWTP Influent Flow Meter Operation

The following observations were made regarding the influent flow meter operation:

- The Krohne magnetic flow meter provides information regarding recorded flows in two ways:
  - A 4 to 20 mA signal output, that can be connected to a SCADA system or other data logger, where 4 mA=0 m^3/hr and 20 mA=277 m^3/hr. This signal does not provide output below 4 mA (i.e. – the minimum flow value that can be transmitted is 0 m^3/hr).
  - A local display and data logger unit that displays instantaneous flow rate (m^3/hr) and three totalized flow values (m^3): “plus (+)”, “minus (-)”, and “sum” (the sum of the “plus (+)” and “minus (-)” flow values):
    - The "plus (+)" totalizer value corresponds to the totalized volume of flow recorded by signals ranging from 4 to 20 mA. It is our understanding that this is the value that is currently recorded by operations staff to report influent flow to the WWTP.
    - The "negative (-)" totalizer value corresponds to the totalized volume of flow recorded by signals less than 4 mA.
    - The "sum" totalizer value corresponds to the sum of the "plus (+)" and "negative (-)" totalizer values.
- The Chessel data logger used for this verification study used the 4 to 20 mA signal output from the flow meter. This would be equivalent to the data recorded by the "plus (+)" totalizer. Because County staff record the "plus (+)" totalizer values to record flows into the WWTP, the results obtained by the data logger used as part of this study can be directly compared to the historic flow data recorded by operations staff.
- At times when there was no flow into the WWTP (verified by observing the level in the transfer tank), the local display unit on the magmeter would occasionally display negative flow values (corresponding to signals less than 4 mA). This occurred throughout verification testing and was also noted during the initial site visit on March 24, 2014. The influent flow meter had a difference between the "plus (+)" and "sum" totalized flow values of 6.5% on March 24 and 6.1% on May 14. A possible reason for negative flow could include faulty / failing / missing check valves at one or more of the upstream pumping stations, allowing wastewater to flow back from the trash tank into the collection system or sections of the forcemain that can drain to the WWTP and, when empty, allow flow to siphon from the trash tank back into the forcemain.
- During times where the influent flow rate was constant, the displayed flow rate and the totalized flow were found to correspond correctly. The yearly instrumentation calibration report shows transmitter and flow integrator accuracy within acceptable limits (see Appendix A - influent flow meter calibration report).

3.2 Transfer Tank Fill Test Results

Volumetric flow tests were carried out and consisted of precise wet well level measurements during fill cycles across a known fixed area of the transfer tank. The changes in level measurements were timed and flow rates were determined and compared to the influent magmeter readings for accuracy.

The transfer tank measured 2.44 metres by 7.46 metres (24.5 ft.) diameter and this converts to a surface area of 18.2 square meters and a volume of ~182 litres per centimeter (0.182 m^3/cm).

Ten fill tests were selected for verification comparison. The magmeter reported flow volume between 6.16 and 7.81 m^3 during the tests while the calculated fill volumes were between 5.48 and 6.39 m^3. Table 1 presents the total flow volumes for the influent magmeter compared to the calculated volumes.

Table 1 Drumbo WWTP Volumetric vs Influent Flow Meter Tests

Test	Date	Start Time	Stop Time	Test Duration (min:sec)	Transfer Tank Volume (m^3)	Magmeter Volume (m^3)	% Difference
1	May 13	12:56:05	13:20:55	25:00	6.29	6.89	+ 9.6%
2	May 13	13:28:30	13:59:35	31:05	6.07	7.10	+ 17.0%
3	May 13	14:07:05	14:39:40	32:35	5.48	6.16	+ 12.3%
4	May 13	14:53:15	15:20:10	26:55	5.69	7.4	+ 30.0%
5	May 13	15:41:50	16:08:55	27:05	5.41	6.85	+ 26.6%
6	May 14	01:05:45	01:40:45	35:00	5.62	6.26	+ 11.3 %
7	May 14	01:49:45	02:32:00	42:15	5.77	6.63	+ 14.9
8	May 14	08:17:35	08:45:00	27:25	6.21	7.81	+ 25.8%
9	May 14	09:04:10	09:34:10	30:00	6.39	7.81	+ 22.1%
10	May 14	10:16:12	10:43:24	27:12	5.94	6.65	+ 11.9%
					Average % Difference: + *18.2%*		

Testing showed a % difference ranging from 9.6 to 30% with an average of 18.2%, with the WWTP flow meter always reading higher than the calculated fill volume into the transfer tank. This indicates that the historic raw wastewater flow data may overestimate the actual influent flows to the Drumbo WWTP by as much as 15 to 20%.

As noted in Section 3.1, the study data logger used during testing utilized the flow meter's 4 to 20 mA signal output and. As noted above, a review of the flow meter's local display unit indicate that the "plus (+)" totalized value is 6.0 to 6.5% higher than the summed totalized flow. Therefore, should the "sum" totalizer value be used as the basis for recording influent flows to the WWTP, it is possible that the error could be reduced, however it is still anticipated that the "sum" totalizer value would overestimate the actual influent flows to the Drumbo WWTP by 9 to 14%.

Three meter anomalies were observed consistently in all ten test runs, and are summarized below. A plot of Test 1 results is shown in Figure 2 that illustrates these observations.

- The recorded analog 4 to 20 mA signal from the magmeter was found to oscillate when no flow was entering the WWTP, most notably immediately following pumping station pump cycles. This pattern was consistently observed after pumping cycles on all the test runs. Observations at the flow meter's local display unit indicate that the flow meter was displaying negative flow fluctuations that followed the positive fluctuations. The resulting pattern was similar to a sinusoidal wave with an amplitude that decreased over time. Because the data logger used during this study did not record the negative portion of the oscillations, this could account for a portion of the error observed during the test runs. Using the "sum" totalizer flow value would reduce the error associated with the oscillating readings. The cause of these oscillations is unknown, but should be investigated to identify a cause.
- During periods with no influent flow, the transfer tank level continues to rise, indicating inflow into the transfer tank from an unknown source. The rate of increase in liquid level, and hence flow rate, appears to be fairly constant during the periods of no influent flow to the WWTP, indicating a fairly continuous source of inflow to the transfer tank. Possible sources could include, among others, leakage from the adjacent tanks (trash tank, SBR tanks, filter equalization tank), the plant bypass line (which, according to drawings, has been capped at the transfer tank), and backflow from the SBR tanks due to leaking check valves. If the source of inflow is anything other than the trash tank, this would impact the calculated error in the flow meter readings: the flow meter error would be greater than the estimated range 15 to 20% since subtracting of this source of inflow would decrease the measured transfer tank volume increase observed during the test runs. The source(s) of this inflow into the transfer tank should be determined.
- There is a delay in the start of the transfer tank liquid level increasing after influent flows to the WWTP are measured by the flow meter. Because the influent forcemain discharges directly to the trash tank, which in turn overflows into the transfer tank, this indicates that the liquid level in the trash tank may be decreasing between pumping station pump cycles. In such a case, the liquid level would have to increase to above the obvert of the trash tank overflow pipe before the wastewater could flow into the downstream transfer tank, resulting in a delay similar to that observed. Possible causes of the loss of liquid level in the trash tank during periods of no influent flow include potential leakage into the transfer tank, and backflow into the collection system. If the trash tank level is decreasing due to backflow into the collection system, this would account for a portion of the error observed during the test runs. Using the "sum" totalizer flow value would reduce and/or eliminate the error associated with backflow into the collection system. The operation of all pumping station check valves should be confirmed to determine if they may be allowing backflow into the collection system.

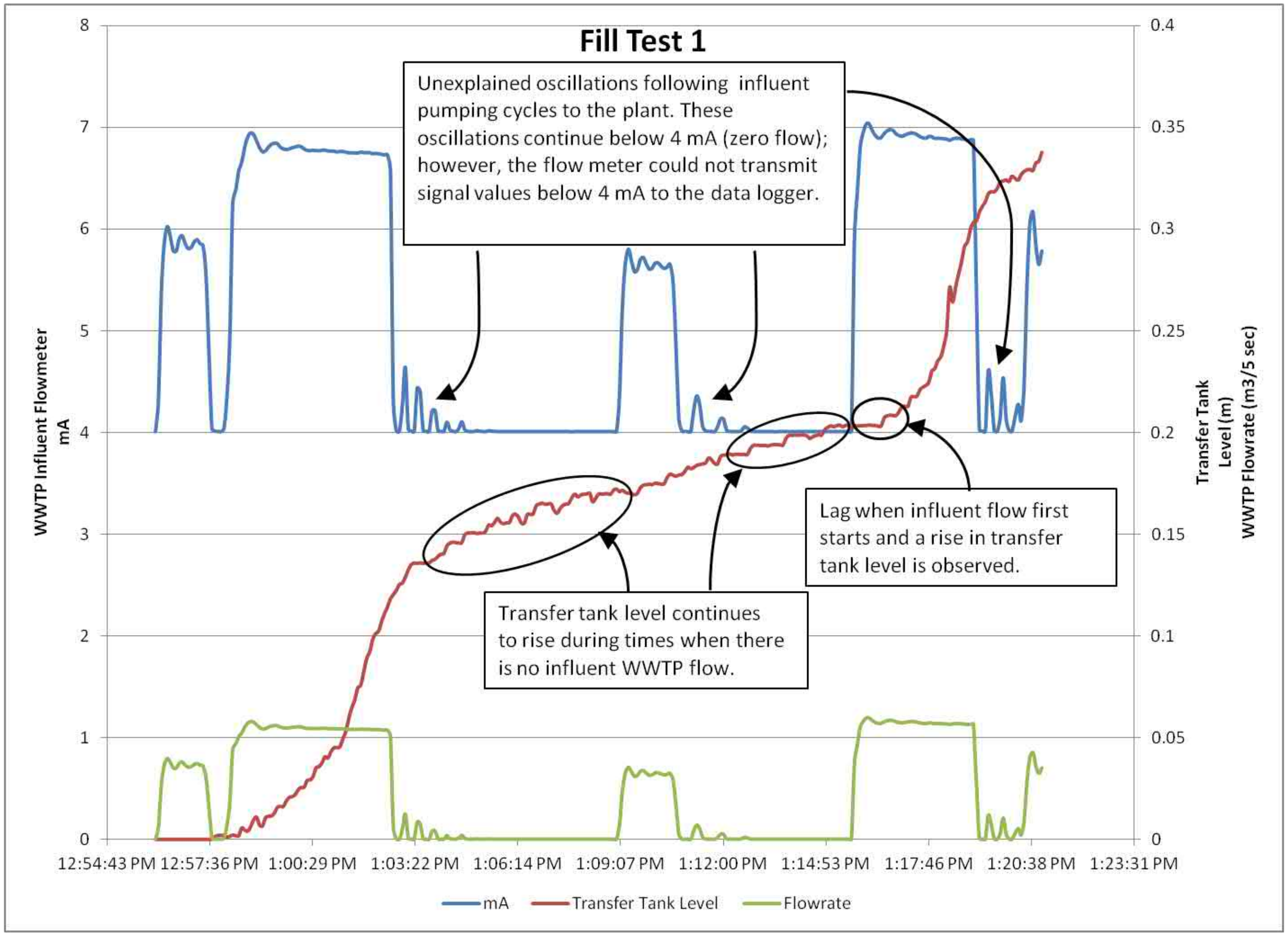

Figure 2 Test 1 Results

4. SUMMARY AND CONCLUSIONS

The following are the key findings of the flow meter verification of the influent magmeter at the Drumbo WWTP:

- The historic raw wastewater flow data may overestimate the actual influent flows to the Drumbo WWTP by as much as 15 to 20%.
- Should the "sum" totalizer value be used as the basis for recording influent flows to the WWTP, it is possible that the error could be reduced, however it is still anticipated that the "sum" totalizer value would overestimate the actual influent flows to the Drumbo WWTP by 9 to 14%.
- The recorded analog 4 to 20 mA signal from the magmeter was found to oscillate in a periodic manner when no flow was entering the WWTP, most notably immediately following pumping station pump cycles. Using the "sum" totalizer flow value would reduce the error associated with the oscillating readings. The cause of these oscillations is unknown.
- During periods with no influent flow, the transfer tank level continues to rise, indicating inflow into the transfer tank from an unknown source. Depending on the source of inflow, there is a potential impact on the calculated error in the flow meter readings, i.e. the recorded influent flow error would be greater than the estimated range of 15 to 20%. The source(s) of this inflow should be determined.
- There is a delay in the start of the transfer tank liquid level increasing after influent flows to the WWTP are measured by the flow meter. Possible causes of the loss of liquid level in the trash tank during periods of no influent flow include potential leakage into the transfer tank, and backflow into the collection system. If the trash tank level is decreasing due to backflow into the collection system, this would account for a portion of the error observed during the test runs. Using the "sum" totalizer flow value would reduce and/or eliminate the error associated with backflow into the collection system.

The following recommendations are made based on the key findings:

- Plant staff should begin recording both the "plus (+)" and "sum" totalizer readings.
- The cause of oscillations in the recorded flow readings should be investigated by the flow meter supplier to identify a cause.
- The source of inflow into the transfer tank should be determined.
- Liquid level in the trash tank should be observed to determine if it decreases during periods of no influent flows (including internal recycle streams) to the WWTP. If so, the cause of this liquid level decrease, such as backflow to the collection system or leakage into the transfer tank, should be determined.
- The operation of all pumping station check valves, where installed, should be confirmed to determine if they could be allowing backflow into the collection system.
- Consideration should be given to installing a check valve upstream of the influent magmeter.

- The existing configuration of the UV disinfection system and/or outfall should be reviewed to determine if there is a suitable location for the installation of an effluent flow meter. Data from the effluent meter could be used in conjunction with influent magmeter data to develop a correction factor that could be applied to historic data to estimate actual historic influent flows to the WWTP.

5. CLOSING

Thank you for choosing XCG Consultants Ltd. for your flow monitoring needs. Please do not hesitate to call if you have any questions regarding this flow monitoring study or if we can be of further assistance to you.

Yours sincerely,

XCG CONSULTANTS LTD.

Melody Johnson

Melody Johnson, M.A.Sc., P.Eng.
Senior Project Manager

APPENDIX A
INFLUENT FLOW METER CALIBRATION REPORT

INSTRUMENTATION CALIBRATION REPORT

CUSTOMER INFORMATION

Customer	County of Oxford
City/Town	Drumbo ON
Customer PO	
Our Job #	B13 8118

R&R Instrumentation Services Inc
24 Midale Crescent
London ON N5X 3B9
Phone (519) 642-7197; Fax: (519) 642 1311
E-Mail: rthachuk@rrinstrumentation.com

UNIT UNDER TEST (UUT)

Tag #	FIT 9
Cal Date	May 09/12
Due Date	May 09/13
Cal Freq	Yearly
Location	North Return
Description	Flow Ind. Transmitter
Manufacturer	Krohne
Model	IFC 010F/D/6
Serial #	A 0235352
Accuracy	1%
Range	0-63.09 L/s; 0 - 227.124 m^3/hr
Size	150 mm/6"
GKL	6.952

MEASURING EQUIPMENT

Manufacturer	Fluke	Krohne
Model	725	GS 8A
Serial #	7903019	404860
Cal Due Date	Nov. 2012	
Cal Reference	Fluke	
Traceability	NIST	
Accuracy	0.02% + 2 cnts	0.1%

INPUT SIM	DISPLAY m^3/hr	OUTPUT*AAV mA	UUT READING AS FOUND	UUT READING AS LEFT	% ERROR AS FOUND	% ERROR AS LEFT
0.00	0.000	4.000	4.003	4.003	0.02	0.02
1.25	13.840	4.975	4.973	4.973	-0.01	-0.01
2.50	27.730	5.953	5.953	5.953	0.00	0.00
5.00	55.520	7.911	7.908	7.908	-0.02	-0.02
10.00	110.800	11.805	11.804	11.804	-0.01	-0.01

*Actual Applied Value

$$\% \text{ Error} = \frac{\text{UUT Reading - AAV}}{\text{Span}} \times 100$$

Test Unit Results

AS FOUND	AS LEFT
Pass: ✓	Pass: ✓
Fail:	Fail:

TECHNICIAN'S NOTES

CERTIFIED BY: ____________ CET, CCST Level III Technician

INSTRUMENTATION CALIBRATION REPORT

CUSTOMER INFORMATION

Customer	County of Oxford
City/Town	Drumbo ON
Customer PO	
Our Job #	B13 8118

R&R Instrumentation Services Inc
24 Midale Crescent
London ON N5X 3B9
Phone (519) 642-7197; Fax: (519) 642 1311
E-Mail: rthachuk@rrinstrumentation.com

UNIT UNDER TEST (UUT)

Tag #	FQ 11
Cal Date	May 09/12
Due Date	May 09/13
Cal Freq	Yearly
Location	North Return
Description	Flow Integrator
Manufacturer	Krohne
Model	IFC 010F/D/6
Serial #	A 0235352
Accuracy	1%
Range	0 - 227.124 m^3/hr
Size	150 mm/6"
GKL	6.952

MEASURING EQUIPMENT

Manufacturer	Control Co.	Krohne
Model	1042	GS 8A
Serial #	101944625	404860
Cal Due Date		
Cal Reference	Transcat	
Traceability	NIST	
Accuracy	0.0001	0.1%

INPUT m^3/hr	SIM Y	OUTPUT*AAV PPM (m^3)	UUT READING AS FOUND	UUT READING AS LEFT	% ERROR AS FOUND	% ERROR AS LEFT
0.000	0.00	0.0000	0.00	0.00	0.00	0.00
13.820	1.25	0.2303	0.23	0.23	0.02	0.02
27.700	2.50	0.4617	0.46	0.46	0.01	0.01
55.540	5.00	0.9257	0.93	0.93	0.01	0.01
110.800	10.00	1.8467	1.85	1.85	0.14	0.14
227.124		3.8754				

*Actual Applied Value

$$\% \text{ Error} = \frac{\text{UUT Reading} - \text{AAV}}{\text{Span}} \times 100$$

Test Unit Results

As Left	758728.66
As Found	758724.04
Difference	4.62

AS FOUND	AS LEFT
Pass: ✓	Pass: ✓
Fail:	Fail:

TECHNICIAN'S NOTES

CERTIFIED BY: CET, CCST Level III Technician

INSTRUMENTATION CALIBRATION REPORT

CUSTOMER INFORMATION

Customer	County of Oxford
City/Town	Drumbo ON
Customer PO	
Our Job #	B13 8118

R&R Instrumentation Services Inc
24 Midale Crescent
London ON N5X 3B9
Phone (519) 642-7197; Fax: (519) 642 1311
E-Mail: rthachuk@rrinstrumentation.com

UNIT UNDER TEST (UUT)

Tag #	FIR 9
Cal Date	May 09/12
Due Date	May 09/13
Cal Freq	Yearly
Location	North Return
Description	Flow Ind. Recorder
Manufacturer	Beijer
Model	Scada Screen
Serial #	
Accuracy	1%
Range	0 - 227.124 m^3/hr

MEASURING EQUIPMENT

Manufacturer	Fluke
Model	725
Serial #	7903019
Cal Due Date	Nov. 2012
Cal Reference	Fluke
Traceability	NIST
Accuracy	0.02% + 2 cnts

INPUT mA	%	OUTPUT*AAV m^3/hr	UUT READING AS FOUND	UUT READING AS LEFT	% ERROR AS FOUND	% ERROR AS LEFT
4.000		0.00	0	0	0.00	0.00
8.000		56.75	57	57	0.11	0.20
12.000		113.50	114	114	0.22	0.39
1.000		170.25	170	170	-0.11	-0.20
20.000		227.00	227	227	0.00	0.00

*Actual Applied Value

% Error = $\frac{\text{UUT Reading - AAV}}{\text{Span}}$ x 100

Test Unit Results

AS FOUND	AS LEFT
Pass: ✓	Pass: ✓
Fail:	Fail:

TECHNICIAN'S NOTES

CERTIFIED BY: [signature] CET, CCST Level III Technician

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Fax: 519-642-1311
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rthachuk@rrinstrumentation.com

R & R INSTRUMENTATION SERVICES INC.

MAINTENANCE SERVICE REPORT

CUSTOMER County of Oxford CUST. P.O.# ____

LOCATION Drumbo PCP DATE OF SERVICE 05/09/12

JOB NO. B 13 8118

WORK DESCRIPTION Calibrate flowmeter

Calibrated

FIT - 9 Krohne mag
FQ - 9 Krohne mag
FIR - 9 Reader

TRAVEL KM 154 ____ MEALS ____ MOTEL ____

HOURS S.T. 3 O.T. ____ TOTAL HRS. ____

REPLACEMENT PARTS USED/REPAIRS ____

OTHER CHARGES ____

AUTHORIZED BY (CUSTOMER REPRESENTATIVE)	PERFORMED BY
NAME (PRINT) ____	NAME (PRINT) Bob Thachuk CET, CCST Level III
SIGNATURE ____	SIGNATURE R Thachuk
DATE ____	DATE ____

3877-10/10R.1

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2620 Bristol Circle, Suite 300, Oakville, Ontario, Canada L6H 6Z7

Date:	October 14, 2015	**XCG File No.: 3-277-47-04**
To:	Shahab Shafi and Mark Maxwell, Oxford County	
From:	Carla Fernandes and Melody Johnson, XCG Consultants Ltd.	
Re:	Drumbo WWTP Upgrade and Expansion Alternatives Development - Design Basis	

1. INTRODUCTION

Oxford County (County)'s Drumbo Wastewater Treatment Plant (WWTP) provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP is a Sequencing Batch Reactor (SBR) facility with tertiary filtration and ultra violet disinfection and has an approved average day flow (ADF) capacity of 300 m^3/d.

The County is currently undertaking a Class Environment Assessment (Class EA) study to identify the most cost effective and environmentally sustainable approach to providing wastewater servicing for the Community of Drumbo. In addition, the County recently completed the Princeton Wastewater Servicing Study that identified retaining the existing private on-site treatment systems as the preferred solution for wastewater servicing in the Village of Princeton. At this time, the County would like to develop upgrade and expansion options for the Drumbo WWTP for two servicing scenarios, namely:

- Scenario 1: Servicing projected growth in the Community of Drumbo only; and,
- Scenario 2: Servicing projected growth in both the Community of Drumbo and the Village of Princeton.

The results of this analysis may be included in the ongoing Class EA for the Drumbo WWTP.

This memorandum describes the development of the future servicing needs for the two defined servicing scenarios based on planning projections for growth within the service areas and summarizes the future design basis for both scenarios in terms of flows and loadings.

2. DESIGN FLOWS

2.1 Population Estimates and Projected Average Day Flow

The future servicing needs for the Community of Drumbo are based on historical flows (January 2012 to July 2015) from the existing service area, plus the projected flows attributed to approved residential development. There are currently 59 lots that are draft approved / registered for development and approximately 27 infill and unconnected lots. A design population density of 2.81 people per unit (ppu), as provided by the County, was applied to the draft approved and potential infill/unconnected lots (units) to determine the population growth of 242 people due to new residential development.

Projected residential flows in the Community of Drumbo were developed based on the historical wastewater generation rate of 302 L/cap/d for future growth. The projected average day residential wastewater flows are considered to be conservative since they are based on the historical average per capita flow which includes contributions from collection system inflow and infiltration (I/I).

The future servicing needs for the Village of Princeton were developed in the Princeton Wastewater Servicing Study (XCG, 2015) and are adopted for this assessment. The study identified a design ADF of 327 m^3/d based on an estimated future service population of 1,113 persons and a wastewater generation rate of 293 L/cap/d.

The estimated existing and future residential service populations and projected residential flows to the Drumbo WWTP for both scenarios are presented in Table 2.1.

Table 2.1 Design Average Day Flows to the Drumbo WWTP

Parameter	Existing	Growth	Projected
Drumbo Service Population	854	242	1,096
Drumbo ADF	258 m^3/d	73 m^3/d	331 m^3/d
Princeton Service Population (1)	821	292	1,113
Princeton ADF (1)	242 m^3/d	85 m^3/d	327 m^3/d
Scenario 1 Design ADF			331 m^3/d
Scenario 2 Design ADF			658 m^3/d

Notes:
1. Adopted from the Princeton Wastewater Servicing Study (XCG, 2015).

Based on Table 2.1, population projections and historical per capita flows, the estimated future ADF for the Drumbo WWTP is approximately 331 m^3/d for Scenario 1 (servicing of Drumbo only) and 658 m^3/d for Scenario 2 (servicing of Drumbo and Princeton).

2.2 Projected Maximum Day Flow

The design future MDF for the Community of Drumbo was based on the historical MDF plus an allowance for new growth.

To calculate the MDF allowance for new growth, a MDF peaking factor for the new residential growth flows was determined at a unit rate of 302 L/cap/d for the Dumbo service area and 293 L/cap/d for the Princeton service area. This was done by applying the historic dry weather flow (DWF) factor to the non-I/I portion of the per capita flow rate, and including an allowance for the peak I/I portion of the per capita flow.

A dry weather flow analysis for the existing Drumbo WWTP service area was completed to determine the historic DWF factor. The analysis of DWF was conducted based on flow data from January 2012 to July 2015 and meteorological data from Environment Canada. Days were considered to be "dry" when no precipitation occurred for that day and three days prior between the months of May and October, inclusive. Based on the flow analysis, the historic DWF peaking factor for the existing service area was 1.5.

Assuming a typical I/I flow rate of 90 L/cap/d (MOE, 1985), the existing per capita DWF for the residential service area was estimated to be 212 L/cap/d. These values were applied to determine the design MDF for new growth in the Community of Drumbo. By applying the historic DWF peaking factor of 1.5 to the dry weather flow portion of the per capita flow (212 L/cap/d), and including an allowance for the peak I/I portion of the per capita flow (227 L/cap/d), the overall MDF peaking factor for new growth was determined to be 1.8 in the Community of Drumbo. To determine the conceptual level design MDF for Drumbo the new growth MDF factor was applied to the increase in average day design flow, and the growth MDF value was added to the existing base MDF.

To determine the design MDF for servicing of the Village of Princeton, a typical I/I flow rate of 90 L/cap/d and an estimated DWF flow rate of 203 L/cap/d (based on information provided in the Princeton Wastewater Servicing Study) were applied. By applying the historic DWF peaking factor of 1.5 to the dry weather flow portion of the per capita flow (203 L/cap/d), and the I/I flow peak factor of 2.5 to the I/I portion of the per capita flow (90 L/cap/d), the overall MDF peaking factor for new growth was determined to be 1.8 for Village of Princeton service population. To determine the conceptual level design MDF for Princeton, the MDF factor was applied to the design ADF for the service area.

The conceptual level design MDF values for the Drumbo and Princeton service areas, as well as Scenarios 1 and 2 are presented in Table 2.2.

Table 2.2 Design Maximum Day Flow to the Drumbo WWTP

Parameter	Projected ADF	MDF Factor	Projected MDF
Existing Service Area	258 m^3/d	2.6	664 m^3/d
Drumbo Growth	73 m^3/d	1.8	131 m^3/d
Princeton Service Area	327 m^3/d	1.8	589 m^3/d
Scenario 1 Design Value	331 m^3/d	2.4	795 m^3/d
Scenario 2 Design Value	658 m^3/d	2.1	1,384 m^3/d

For the purposes of developing the conceptual level design bases for the Drumbo WWTP, a design MDF of 795 m^3/d will be used for Scenario 1 and 1,384 m^3/d for Scenario 2.

2.3 Projected Peak Instantaneous Flow

2.3.1 Existing Service Area

Historical peak instantaneous flow (PIF) data were not available for the Drumbo WWTP. Therefore, to determine the design PIF factor associated with projected future connections to the sewage collection system, the Harmon Formula was used for DWF, and a peak extraneous flow allowance of 227 L/cap/d (MOE, 1985) was applied to account for I/I. The Harmon Formula predicts the DWF PIF factor, exclusive of extraneous flows, experienced by a sewage system based on the size of the service population.

The Harmon peaking factor was calculated to be 3.8 for the future service population in the Community of Drumbo based on the design population of 1,096. By applying the Harmon peaking factor to the dry weather flow portion of the per capita flow (212 L/cap/d), and including an allowance for peak I/I flows of 227 L/cap/d (MOE, 1985), the overall design PIF generation rate was determined to be 1,033 L/cap/d for the future Drumbo service area, inclusive of existing and new growth populations.

The Harmon peaking factor was calculated to be 3.8 for the future service population in the Village of Princeton based on the design population of 1,113. By applying the Harmon peaking factor to the dry weather flow portion of the per capita flow (203 L/cap/d), and including an allowance for peak I/I flows of 227 L/cap/d (MOE, 1985), the overall design PIF generation rate was determined to be 998 L/cap/d for the design Princeton service area.

The PIF generation rate and design service population for each service area was applied to determine the conceptual level design PIF for each scenario. The conceptual level design PIF values for each service area and each scenario are presented in Table 2.3.

Table 2.3 Design Peak Instantaneous Flow to the Drumbo WWTP

Parameter	Projected ADF	PIF Factor	Projected PIF
Future Drumbo Service Area	331 m^3/d	3.4	1,132 m^3/d
Future Princeton Service Area	327 m^3/d	3.4	1,111 m^3/d
Scenario 1 Design Value	331 m^3/d	3.4	1,132 m^3/d
Scenario 2 Design Value	658 m^3/d	3.4	2,244 m^3/d

The estimated future peak DWF generation rate is 1,132 m^3/d for Scenario 1 and 2,244 m^3/d for Scenario 2.

3. DESIGN RAW WASTEWATER CHARACTERISTICS AND LOADINGS

The historical average loadings were used as the base loadings from the existing Drumbo WWTP service area. Design loadings associated with future residential growth from the Community of Drumbo were determined based on the higher value of historical per capita loadings and typical per capita loadings presented in MOE Design Guidelines (2008) and Metcalf and Eddy (2014).

Based on the recommendations in the Princeton Wastewater Servicing Study, a new collection system in Princeton, if constructed, would be a septic tank effluent gravity (STEG) and/or septic tank effluent pumping (STEP) system. Therefore, the raw wastewater design basis for Princeton takes into account the projected impact of the septic tank pre-treatment step in terms of the reduction in loadings associated with flows conveyed from STEG/STEP collection systems. Design loadings associated with future residential growth from the Village of Princeton were determined based on typical STEG/STEP system effluent biochemical oxygen demand (BOD_5) and total suspended solids (TSS) concentrations (Saunders et al., WEFTEC, 2010). Design loadings for total Kjedhal nitrogen (TKN) and total phosphorus (TP) were based on typical raw wastewater per capita loadings presented in MOE Design Guidelines (2008) and Metcalf and Eddy (2014).

Table 3.1 and Table 3.2 present future design loadings in terms of BOD_5, TSS, TKN, and TP for the Drumbo service area and the Princeton service area, respectively. Table 3.3 summarizes the design loadings and concentrations for Scenarios 1 and 2.

Table 3.1 Projected Design Loadings for the Drumbo Service Area

Source	Design Value			
	BOD_5	TSS	TKN	TP
New Growth Design Value	75 g/cap·d (2)	90 g/cap·d (2)	13.2 g/cap·d (3)	2.1 g/cap·d (3)
Existing Service Area Loading	35 kg/d	24 kg/d	8.5 kg/d	1.0 kg/d
Drumbo Growth Loading (1)	18 kg/d	22 kg/d	3.2 kg/d	0.5 kg/d
Total Design Loading	53 kg/d	46 kg/d	11.7 kg/d	1.5 kg/d

Notes:
1. Based on an estimated service population growth of 242 people.
2. MOE Design Guidelines (2008).
3. Metcalf and Eddy (2014).

Table 3.2 Projected Design Loadings for the Princeton Service Area

Source	Design Value			
	BOD_5	TSS	TKN	TP
Design Value	125 mg/L (1)	30 mg/L (1)	13.2 g/cap·d (3)	2.1 g/cap·d (3)
Princeton Loading	41 kg/d (2)	10 kg/d (2)	14.7 kg/d (4)	2.3 kg/d (4)

Notes:
1. Based on typical STEG/STEP system effluent concentrations (Saunders et al., 2010).
2. Based on a design ADF of 327 m^3/d and typical STEG/STEP effluent concentrations.
3. Metcalf and Eddy (2014).
4. Based on an estimated service population growth of 1,113 people.

Table 3.3 Projected Design Loadings and Concentrations - Scenarios 1 and 2

Source	Design Value			
	BOD_5	TSS	TKN	TP
Scenario 1 Design Loading	53 kg/d	46 kg/d	11.7 kg/d	1.5 kg/d
Scenario 1 Design Concentration	159 mg/L	138 mg/L	35.3 mg/L	4.6 mg/L
Scenario 2 Design Loading	94 kg/d	55 kg/d	26.4 kg/d	3.8 kg/d
Scenario 2 Design Concentration	143 mg/L	84 mg/L	40.1 mg/L	5.8 mg/L

4. SUMMARY AND NEXT STEPS

Table 4.1 presents the design raw wastewater flows, based on growth projections. Table 4.2 presents the overall design raw wastewater loadings and concentrations projected to the Drumbo WWTP.

Table 4.1 Summary of Design Flows

Parameter	Design Value	
	Scenario 1	Scenario 2
ADF	331 m^3/d	658 m^3/d
MDF Factor	2.4	2.1
MDF	795 m^3/d	1,384 m^3/d
PIF Factor	3.4	3.4
PIF	1,132 m^3/d	2,244 m^3/d

Table 4.2 Summary of Design Raw Wastewater Quality

Parameter	Scenario 1 Design Value		Scenario 2 Design Value	
	Loading	Concentration	Loading	Concentration
BOD_5	53 kg/d	159 mg/L	94 kg/d	143 mg/L
TSS	46 kg/d	138 mg/L	55 kg/d	84 mg/L
TKN	11.7 kg/d	35.3 mg/L	26.4 kg/d	40.1 mg/L
TP	1.5 kg/d	4.6 mg/L	3.8 kg/d	5.8 mg/L

The design flows and loadings are intended for the purposes of this alternatives review study to allow an evaluation of design options. These flows and loadings should be reviewed and revised as needed for the Class EA and preliminary design.

Internal recycle stream flows and loadings will be considered as part of the unit process capacity assessment and conceptual design.

5. REFERENCES

Metcalf and Eddy. Wastewater Engineering: Treatment and Resource Recovery. Fifth Edition. 2014.

Ministry of the Environment. MOE Guidelines for the Design of Sanitary Sewage Systems. 1985.

Ministry of the Environment. MOE Design Guidelines for Sewage Works. 2008.

Saunders, Michael L., Denn, Grant, Molatore, Tyler. Septic Tank Effluent Pump (STEP) and Gravity (STEG) Collection Systems: Myth Busting the Value of Using Septic Tanks as Part of a Wastewater Collection System? WEFTEC 2010.

XCG Consultants Ltd. Princeton Wastewater Servicing Study. May 8, 2015.

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XCG File No.: 3-277-47-04
April 18, 2016

FEASIBILITY STUDY OF ALTERNATIVE EXPANSION OPTIONS FOR THE DRUMBO WWTP

Prepared for:

OXFORD COUNTY

PUBLIC WORKS

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Attention: Mark Maxwell

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TABLE OF CONTENTS

TABLE

FIGURE

APPENDICES

1. INTRODUCTION

1.1 Background

Oxford County ("The County")'s Drumbo Wastewater Treatment Plant (WWTP) provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP is a Sequencing Batch Reactor (SBR) facility with tertiary filtration and ultraviolet disinfection and has an approved average day flow (ADF) capacity of 300 m^3/d.

The County is currently undertaking a Class Environment Assessment (Class EA) study to identify the most cost effective and environmentally sustainable approach to providing wastewater treatment to meet the future needs of the Community of Drumbo. Further, the County wishes to evaluate the potential to treat additional flow from the nearby Community of Princeton and from a proposed residential development within the Community of Princeton (herein termed the VanWees Development). In all, a total of five servicing scenarios have been developed for evaluation.

XCG Consultants Ltd. (XCG) has been retained by the County to conduct a feasibility study to identify and evaluate expansion alternatives for the Drumbo WWTP under the five different servicing scenarios. The findings of the feasibility study are presented in this Technical Memorandum (TM).

1.2 Objectives

The objectives of the Drumbo WWTP Feasibility Study are as follows:

1. Determine the conceptual level design basis for the expanded Drumbo WWTP in terms of raw wastewater flows and characteristics for each of the five servicing scenarios;
2. Identify treatment process design alternatives to accommodate future flows to the Drumbo WWTP that will meet design effluent criteria; and
3. Complete a preliminary evaluation, including conceptual level costing, of the feasible design alternatives for expansion of the Drumbo WWTP.

2. DESCRIPTION OF THE EXISTING DRUMBO WWTP

The Drumbo WWTP is a Sequencing Batch Reactor (SBR) with tertiary filtration and ultraviolet disinfection. The current rated average day flow (ADF) capacity of the plant is 300 m^3/d. The plant was recently re-rated from an original ADF design capacity of 272 m^3/d according to Amended Environmental Compliance Approval (ECA) Number 8752-9Q4H96 issued on February 9, 2015.

Raw sewage is conveyed to the Drumbo WWTP via a sewage forcemain and flow entering the Drumbo WWTP is measured with a magnetic flow meter. Sewage flows enter a 51.0 m^3 trash tank, which also serves as a holding tank for waste activated sludge (WAS) from the biological reactors. The trash tank overflows to a 51.0 m^3 transfer tank that feeds the two Sequencing Batch Reactors (SBRs) operating in parallel. In the event of high flow periods that exceed the capacity of the transfer tank and SBRs, wastewater can flow by gravity from the transfer tank to a 91 m^3 emergency overflow containment basin. Wastewater stored in the emergency overflow containment basin is pumped back to the transfer tank manually using a submersible pump when the SBRs have enough capacity to treat the stored wastewater.

Flow from the transfer tank is delivered to the SBRs by four submersible 0.76 m^3/min transfer pumps. Two pumps are dedicated to each reactor (one duty and one standby). Each SBR reactor has a total volume of approximately 102.2 m^3. Air supply to the reactors is provided by three Roots-Dresser blowers. Aluminum sulphate (alum) is added for phosphorus removal directly into each of the SBR tanks from the alum storage tanks during the SBR react cycle. Each reactor goes through a sequence of filling, reacting, settling, decanting and sludge wasting that is controlled by a programmable logic controller (PLC). Filling is initiated by the liquid level in the transfer tank and continues until the reactor is full. The react cycle is currently set with a duration of 30 minutes. 60 minutes of quiescent (unaerated) settling is provided, after which the clear, treated supernatant in the reactor is decanted by one of two 0.76 m^3/min decant pumps dedicated to each reactor (four decant pumps total, two for each reactor) into aerated flow equalization tanks with a total volume of 57.6 m^3. A volume of 47.4 m^3 is decanted from each reactor during each cycle. Following the decant stage, sludge is wasted from the reactor to the trash tank for approximately 1 minute. At the completion of the waste stage, the reactor is ready to receive feed again from the transfer tank, initiating another treatment cycle. A reactor can only receive feed from the transfer tank when it is in the fill portion of the cycle.

The decanted effluent from the equalization tank is filtered and disinfected prior to discharge. Three filter feed pumps (one active, two standby) pump the equalization tank contents to three pressure filters at a rate of 0.28 m^3/min per feed pump. The filter feed pumps are activated by liquid level in the equalization tank. Three pressure filters are provided. These filters were originally designed as multi-media filters, but are currently operated as single media (sand) filters. At any given time, one of the three filters operates in the backwash cycle while the other two filters remain in service. Backwash flow is recycled to the trash tank at the head of the plant. Filter effluent flow is measured with a magnetic flow meter, then is disinfected by an ultraviolet (UV) disinfection system and discharged to the Cowan Drain.

A process flow schematic of the treatment train at the Drumbo WWTP is shown in Figure 2.1.

Existing effluent objectives and non-compliance criteria for the Drumbo WWTP are defined in the Amended Environmental Compliance Approval (ECA) Number 8752-9Q4H96, issued on February 9, 2015. The ECA specifies objectives and limits for carbonaceous biochemical oxygen demand ($cBOD_5$), total suspended solids (TSS), total phosphorus (TP), total ammonia as nitrogen (TAN), *E. coli*., dissolved oxygen (DO), and pH. The ECA effluent requirements for the Drumbo WWTP are summarized in Table 2.1.

Table 2.1 Existing Effluent Objectives and Non-compliance Criteria

Parameter	Effluent Objective (1)	Compliance Limit	
	Concentration	Concentration (2)	Total Loading (3)
$cBOD_5$	4.7 mg/L	9.3 mg/L	2.8 kg/d
TSS	4.7 mg/L	9.3 mg/L	2.8 kg/d
TP	0.27 mg/L	0.46 mg/L	0.14 kg/d
Total Ammonia Nitrogen May 1 to October 31 November 1 to April 30	 1.8 mg/L 3.6 mg/L	 2.7 mg/L 4.5 mg/L	 0.8 kg/d 1.36 kg/d
E .coli (4)	150 organisms/100 mL	200 organisms/100 mL	-
DO	6.0 mg/L	5.0 mg/L	-
pH	6.5 – 8.5	6.0 – 9.5 (5)	

Notes:
1. Effluent objective concentrations apply to any single sample unless otherwise indicated.
2. Based on monthly average values.
3. Based on monthly average values.
4. Based on monthly geometric mean density.
5. Effluent pH to be maintained within the compliance limits at all times.

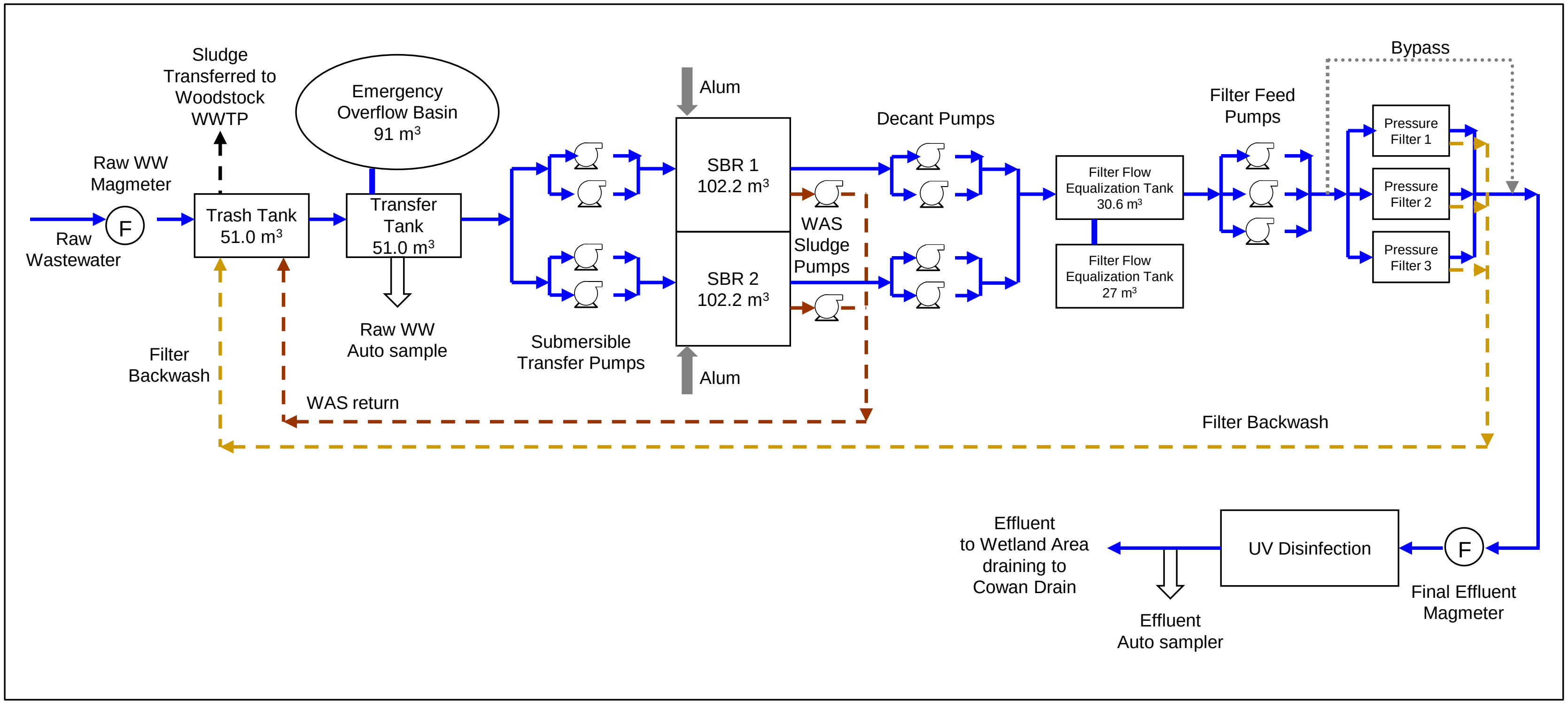

Figure 2.1 Process Flow Diagram for Drumbo WWTP

3. DESIGN BASIS

For purposes of the Feasibility Study, two different options were considered for servicing the existing Community of Princeton and the proposed VanWees Development, namely:

- Preliminary treatment (i.e. a septic tank) is provided at each wastewater connection prior to discharge to the collection system. Wastewater is transferred to the collection system using a septic tank effluent gravity (STEG) or septic tank effluent pumping (STEP) arrangement; or,
- There is no preliminary treatment provided at each residential user. Raw wastewater flows to a conventional collection system and is transferred to the Drumbo WWTP for treatment.

Overall, the Feasibility Study will assess expansion options for the Drumbo WWTP for five servicing scenarios, namely:

- Scenario 1: Servicing projected growth in the Community of Drumbo only;
- Scenario 2: Servicing the Community of Drumbo and the Community of Princeton, assuming a septic tank effluent gravity (STEG) or septic tank effluent pumping (STEP) collection system is constructed in Princeton;
- Scenario 3: Servicing the Community of Drumbo and the Community of Princeton, assuming a conventional collection system is constructed in Princeton;
- Scenario 4: Servicing the Community of Drumbo, the Community of Princeton, and the VanWees Development assuming a STEP/STEG system is constructed in Princeton and for the VanWees Development; and,
- Scenario 5: Servicing the Community of Drumbo, the Community of Princeton, and the VanWees Development assuming a conventional collection system is constructed in Princeton and the VanWees Development.

The following sub-sections provide population projections, design flows and loadings associated with each of the above five servicing scenarios. These design bases are used for the development of conceptual level expansion requirements for the Drumbo WWTP.

3.1 Design Flows

Extraneous flows in a STEP/STEG system are expected to be low relative to a conventional collection system. As such, peak flows to the treatment plant may be reduced if a STEP/STEG system is installed to service the existing Community of Princeton and the VanWees Development. However, for purposes of the Feasibility Study to develop a conservative design basis, it is assumed that peak flows (maximum day and peak instantaneous) from a STEP/STEG system will be similar to those associated with a conventional collection system.

Design average day, maximum day, and peak instantaneous flows were developed for the following scenarios:

- Scenario 1 (Drumbo only);
- Scenarios 2 and 3 (Drumbo and Princeton); and,
- Scenarios 4 and 5 (Drumbo, Princeton and the proposed VanWees Development).

3.1.1 Population Estimates and Projected Average Day Flow

The future servicing needs for the Community of Drumbo are based on historical flows (2012 - 2015) from the existing service area, plus the projected flows attributed to anticipated growth. There are currently 59 lots that are draft approved / registered for development and approximately 27 infill and unconnected lots in Drumbo. A design population density of 2.81 people per unit (ppu), as provided by the County, was applied to the draft approved and potential infill/unconnected lots (units) to estimate a population growth of 242 people from new residential development.

Projected residential flows in the Community of Drumbo were developed based on the historical wastewater generation rate of 288 L/cap/d for future growth. The projected average day residential wastewater flows are considered to be conservative since they are based on the historical average per capita flow which includes contributions from collection system inflow and infiltration (I/I).

From the recently completed Princeton Wastewater Servicing Study (XCG, 2015), the existing population and future service population within the Community of Princeton were estimated to be 854 and 1,113 persons, respectively. The VanWees Development was considered separately from the Community of Princeton. Two phases of development are proposed for this development: Phase 1, consisting of 100 units, and Phase 2, consisting of 224 units. The assumed population density for the entire development (Phase 1 and Phase 2) was 3.25 ppu (Dillon, 2015). Based on the development proposal, the ultimate service population of the VanWees Development was estimated to be 1,053 persons. For purposes of this report, all analysis is based on the ultimate service population of the VanWees Development.

For the Community of Princeton, the Wastewater Servicing Study estimated an average wastewater generation rate of 293 L/cap/d (XCG, 2015), while wastewater generation from the VanWees Development was assumed to be 350 L/cap/d (Dillon, 2016). For the purposes of this study, a design per capita wastewater generation from the Community of Princeton and the VanWees Development was developed using existing water use records for the Community of Princeton, and including an allocation for I/I flow. By this method, the estimated per capita wastewater flow from the Community of Princeton and the VanWees Development is 288 L/cap/d, which is equivalent to the design wastewater generation rate for the Community of Drumbo. For purposes of this report, a per capita average wastewater flow of 288 L/cap/d has also been assumed for both the Community of Princeton and the VanWees Development.

The estimated existing and future residential service populations and projected residential flows to the Drumbo WWTP for all servicing scenarios are presented in Table 3.1.

Table 3.1 Design Average Day Flows to the Drumbo WWTP

	Parameter	Existing	Growth	Projected
	Drumbo Service Population	877	242	1,119
A	Drumbo ADF	253 m^3/d	69 m^3/d	322 m^3/d
	Princeton Service Population (1)	821	292	1,113
B	Princeton ADF (2)	237 m^3/d	84 m^3/d	321 m^3/d (4)
	VanWees Service Population (3)	-	1,053	1,053
C	VanWees ADF (3)	-	303 m^3/d	303 m^3/d
	Scenario 1 Design ADF (A)			322 m^3/d
	Scenario 2 / Scenario 3 Design ADF (A+B)			643 m^3/d
	Scenario 4 / Scenario 5 Design ADF (A+B+C)			947 m^3/d

Notes:
1. From the Princeton Wastewater Servicing Study (XCG, 2015).
2. Assuming a per capita flow of 288 L/cap/d.
3. From Dillon, 2015.
4. Includes an allocation of 1 m^3/d additional flow from an existing greenhouse.

From Table 3.1, the estimated future ADF for the Drumbo WWTP is approximately 322 m^3/d for Scenario 1 (servicing of Drumbo only), 643 m^3/d for Scenario 2 and Scenario 3 (servicing of Drumbo and Princeton), and 947 m^3/d for Scenario 4 and Scenario 5 (servicing of Drumbo, Princeton, and the ultimate VanWees Development).

3.1.2 Projected Maximum Day Flow

The design future maximum day flow (MDF) for the Drumbo WWTP service area was based on the historical MDF plus an allowance for new growth from the Community of Drumbo. Allowances for maximum day flows from the Community of Princeton and the VanWees Development were included, as necessary, for each scenario. As noted previously, for the purposes of the Feasibility Study, it was assumed that the same peaking factors apply to a STEP/STEG system as to a conventional collection system to service the community of Princeton, which will result in a conservative estimate of the peak flows for the STEP/STEG system.

A dry weather flow analysis for the existing Drumbo WWTP service area was completed to determine the historical DWF factor. The analysis of DWF was conducted based on flow data from 2012 to 2015 and meteorological data from Environment Canada. Days were considered to be “dry” when no precipitation occurred for that day and three days prior between the months of May and October, inclusive. Based on the flow analysis, the historical DWF peaking factor for the existing service area was 1.5. This DWF was assumed to apply to new growth and new services in the Community of Drumbo, the Community of Princeton, and the VanWees Development.

Assuming a typical I/I flow rate of 90 L/cap/d (MOE, 1985), the design per capita DWF for the residential service area is 198 L/cap/d. These values were applied to determine the design MDF for new growth and new services in the Community of Drumbo, the

Community of Princeton, and the VanWees Development. By applying the historical DWF peaking factor of 1.5 to the dry weather flow portion of the per capita flow (198 L/cap/d), and including an allowance for the peak I/I portion of the per capita flow (227 L/cap/d), the overall MDF peaking factor was determined to be 1.8 for new growth in Drumbo and new service areas.

The conceptual level design MDF values for each servicing scenario are presented in Table 3.2.

Table 3.2 Design Maximum Day Flow to the Drumbo WWTP

	Parameter	Projected ADF	MDF Factor	Projected MDF
A	Existing Service Area	253 m^3/d	2.6	664 m^3/d
B	Drumbo Growth	69 m^3/d	1.8	125 m^3/d
C	Princeton Service Area	321 m^3/d	1.8	579 m^3/d
D	VanWees Development	303 m^3/d	1.8	545 m^3/d
	Scenario 1 Design MDF (A+B)	322 m^3/d	2.4	789 m^3/d
	Scenario 2 / 3 Design MDF (A+B+C)	643 m^3/d	2.1	1,368 m^3/d
	Scenario 4 / 5 Design MDF (A+B+C+D)	947 m^3/d	2.0	1,913 m^3/d

For the purposes of developing the conceptual level design bases for the Drumbo WWTP, the design future MDFs for the Drumbo WWTP are 789 m^3/d for Scenario 1 (servicing of Drumbo only), 1,368 m^3/d for Scenario 2 and Scenario 3 (servicing of Drumbo and Princeton), and 1,913 m^3/d for Scenario 4 and Scenario 5 (servicing of Drumbo, Princeton, and the VanWees Development).

3.1.3 Projected Peak Instantaneous Flow

Historical peak instantaneous flow (PIF) data were not available for the Drumbo WWTP. Therefore, to determine the design PIF factor associated with projected future connections to the sewage collection system, the Harmon Formula was used for DWF, and a peak extraneous flow allowance of 227 L/cap/d (MOE, 1985) was applied to account for I/I. The Harmon Formula predicts the DWF PIF factor, exclusive of extraneous flows, experienced by a sewage system based on the size of the service population. As with the maximum day flow, the same peaking factor was applied to the STEP/STEG system as to the conventional collection system in Princeton.

The Harmon peaking factor was calculated based on the entire service population, and therefore depended on the specific servicing scenario. The Harmon peaking factor was calculated to be to be 3.8 for Scenario 1, 3.5 for Scenario 2 and Scenario 3, and 3.4 for Scenario 4 and Scenario 5. By applying the Harmon peaking factor to the dry weather flow portion of the per capita flow (198 L/cap/d), and including an allowance for peak I/I flows of 227 L/cap/d (MOE, 1985), the overall design PIF generation rate was determined for each scenario.

The PIF generation rate and design service population for each service area was applied to determine the conceptual level design PIF for each scenario. The conceptual level design PIF values for each servicing scenario are presented in Table 3.3.

Table 3.3 Design Peak Instantaneous Flow to the Drumbo WWTP

Scenario	Projected ADF	PIF Factor	Projected PIF
Scenario 1 Design PIF	322 m^3/d	3.4	1,096 m^3/d
Scenario 2 / 3 Design PIF	643 m^3/d	3.2	2,053 m^3/d
Scenario 4 / 5 Design PIF	947 m^3/d	3.1	2,956 m^3/d

The estimated future PIF is 1,096 m^3/d for Scenario 1 (servicing of Drumbo only), 2,053 m^3/d for Scenario 2 and Scenario 3 (servicing of Drumbo and Princeton), and 2,956 m^3/d for Scenario 4 and Scenario 5 (servicing of Drumbo, Princeton, and the VanWees Development).

3.2 Design Raw Wastewater Characteristics and Loadings

The historical average loadings were used as the base loadings from the existing Drumbo WWTP service area. Design loadings associated with new growth and new services were determined based on the higher value of historical per capita loadings and typical per capita loadings presented in MOE Design Guidelines (2008) and Metcalf and Eddy (2014).

There is currently no collection system in Princeton or the proposed VanWees Development. For purposes of this feasibility study, two types of collection systems were considered:

- A conventional collection system (Scenarios 3 and 5); and,
- An alternate collection system in which preliminary treatment (i.e. a septic tank) is provided at each wastewater connection prior to discharge to the collection system and wastewater is transferred to the collection system using a STEG or STEP arrangement (Scenarios 2 & 4).

Design loadings associated with future residential growth from the Community of Princeton and the VanWees Development were determined based on typical STEG/STEP system effluent BOD_5 and TSS concentrations (Saunders *et al*., WEFTEC, 2010). Design loadings for TKN and TP were based on typical raw wastewater per capita loadings presented in MOE Design Guidelines (2008) and Metcalf and Eddy (2014).

Table 3.4 present future design loadings in terms of BOD_5, TSS, TKN, and TP for the Drumbo service area. Table 3.5 presents the same information for the Community of Princeton and VanWees Development service areas for each type of collection system. Table 3.6 summarizes the design loadings and concentrations for all scenarios.

Table 3.4 Projected Design Loadings for the Drumbo Service Area

Source	Design Value			
	BOD_5	TSS	TKN	TP
New Growth Design Value	75 g/cap·d (2)	90 g/cap·d (2)	13.2 g/cap·d (3)	2.1 g/cap·d (3)
Existing Service Area Loading	43.4 kg/d	30.6 kg/d	10.7 kg/d	1.0 kg/d
New Growth Loading (1)	18.2 kg/d	21.8 kg/d	3.2 kg/d	0.5 kg/d
Total Design Loading - Drumbo Service Area	61.6 kg/d	52.4 kg/d	13.9 kg/d	1.5 kg/d

Notes:
1. Based on an estimated service population growth of 242 people.
2. MOE Design Guidelines (2008).
3. Metcalf and Eddy (2014).

Table 3.5 Projected Design Loadings for the Princeton and VanWees Service Areas

Source	Design Value			
	BOD_5	TSS	TKN	TP
Design Value with Pre-treatment (STEP/STEG)	125 mg/L (1)	30 mg/L (1)	13.2 g/cap·d (3)	2.1 g/cap·d (3)
Design Value without Pre-treatment (Conventional)	75 g/cap·d (2)	90 g/cap·d (2)	13.2 g/cap·d (3)	2.1 g/cap·d (3)
Scenario 2 (4) (Princeton – STEP/STEG)	40.3 kg/d	9.7 kg/d	14.7 kg/d	2.3 kg/d
Scenario 3 (5) (Princeton – Conventional)	83.5 kg/d	100 kg/d	14.7 kg/d	2.3 kg/d
Scenario 4 (6) (Princeton/VanWees – STEP/STEG)	78.1 kg/d	18.7 kg/d	28.6 kg/d	4.5 kg/d
Scenario 5 (7) (Princeton/VanWees – Conventional)	163 kg/d	195 kg/d	28.6 kg/d	4.5 kg/d

Notes:
1. Based on typical STEG/STEP system effluent concentrations (Saunders et al., 2010).
2. MOE Design Guidelines (2008).
3. Metcalf and Eddy (2014).
4. Based on a design ADF of 321 m^3/d, a design population of 1,113 persons, and typical STEG/STEP effluent quality.
5. Based on an estimated service population of 1,113 people and typical wastewater quality without pre-treatment.
6. Based on a design ADF of 624 m^3/d, a design population of 2,166 persons, and typical STEG/STEP effluent quality.
7. Based on an estimated service population of 2,166 people and typical wastewater quality without pre-treatment.

Table 3.6 Summary Projected Design Loadings and Concentrations

	Design Value			
	BOD_5	TSS	TKN	TP
Scenario 1 - Drumbo Only	61.6 kg/d (191 mg/L)	52.4 kg/d (162 mg/L)	13.9 kg/d (43.0 mg/L)	1.5 kg/d (4.7 mg/L)
Scenario 2 - Drumbo + Princeton (STEP/STEG)	101 kg/d (157 mg/L)	62.0 kg/d (96 mg/L)	28.6 kg/d (44.3 mg/L)	3.8 kg/d (6.0 mg/L)
Scenario 3 - Drumbo + Princeton (Conventional)	145 kg/d (224 mg/L)	153 kg/d (236 mg/L)	28.6 kg/d (44.3 mg/L)	3.8 kg/d (6.0 mg/L)
Scenario 4 - Drumbo + Princeton + VanWees (STEP/STEG)	139 kg/d (147 mg/L)	71.1 kg/d (75.1 mg/L)	42.4 kg/d (44.8 mg/L)	6.1 kg/d (6.4 mg/L)
Scenario 5 - Drumbo + Princeton + VanWees (Conventional)	224 kg/d (236 mg/L)	247 kg/d (261 mg/L)	42.4 kg/d (44.8 mg/L)	6.1 kg/d (6.4 mg/L)

Notes:
Estimated concentrations shown in parentheses.

3.3 Summary of the Raw Wastewater Design Basis

Table 3.7 summarizes the design raw wastewater flows, based on growth projections, for each servicing scenario. Table 3.8 summarizes the overall design raw wastewater loadings and concentrations projected to the Drumbo WWTP for each servicing scenario.

Table 3.7 Summary of Design Flows

Parameter	Design Value				
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
ADF	322 m^3/d	643 m^3/d	643 m^3/d	947 m^3/d	947 m^3/d
MDF Factor	2.4	2.1	2.1	2.0	2.0
MDF	789 m^3/d	1,368 m^3/d	1,368 m^3/d	1,913 m^3/d	1,913 m^3/d
PIF Factor	3.4	3.2	3.2	3.1	3.1
PIF	1,096 m^3/d	2,053 m^3/d	2,053 m^3/d	2,956 m^3/d	2,956 m^3/d

Table 3.8 Summary of Design Raw Wastewater Quality

Parameter	Design Value				
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**
BOD_5	61.5 kg/d (191 mg/L)	101 kg/d (157 mg/L)	145 kg/d (225 mg/L)	139 kg/d (147 mg/L)	224 kg/d (236 mg/L)
TSS	52.4 kg/d (163 mg/L)	62.0 kg/d (96.4 mg/L)	153 kg/d (237 mg/L)	71.1 kg/d (75.1 mg/L)	247 kg/d (261 mg/L)
TKN	13.8 kg/d (42.8 mg/L)	28.5 kg/d (44.3 mg/L)	28.5 kg/d (44.3 mg/L)	42.4 kg/d (44.8 mg/L)	42.4 kg/d (44.8 mg/L)
TP	1.5 kg/d (4.7 mg/L)	3.8 kg/d (6.0 mg/L)	3.8 kg/d (6.0 mg/L)	6.1 kg/d (6.4 mg/L)	6.1 kg/d (6.4 mg/L)

Notes:
Estimated concentrations shown in parentheses.

3.4 Design Effluent Requirements

For purposes of this feasibility study, final effluent quality objectives and compliance limits were developed using an assessment of background water quality and flows in the Drumbo WWTP effluent receiver (Cowan Drain). The approach used in this assessment is consistent with the approach typically used to complete assimilative capacity studies to support the development of effluent requirements for WWTP expansions. However, the results of this assessment have not been submitted to the MOECC for review or approval.

Based on the results of the water quality sampling program, the receiver is Policy 2 with respect to TP and un-ionized ammonia. As a result, effluent TP loading cannot exceed the current ECA loading limits. In addition, to address un-ionized ammonia, it was assumed that the existing ECA's seasonal TAN loading limits would apply for all scenarios. In addition, the receiver is Policy 2 for *E. coli* at one of the two monitoring sites. Therefore, to not further degrade receiver quality, effluent *E. coli* must be at or below the Provincial Water Quality Objective (PWQO) of 200 cfu/100 mL.

The receiver is Policy 1 with respect to dissolved oxygen and BOD_5. Since the facility will likely continue to have a dissolved oxygen requirement, and given the low BOD_5 concentrations in the receiver, the existing BOD_5 objective and limit were carried forward for all scenarios. There is no PWQO for TSS. The existing TSS objective and limit are generally lower than concentrations observed in the receiving stream and, therefore, these existing values were carried forward for all scenarios.

A summary of the proposed effluent objectives and limits for each servicing scenario is given in Table 3.9 and Table 3.10, respectively. Conceptual level designs for the expanded Drumbo WWTP were developed to meet the proposed effluent objectives.

Table 3.9 Design Effluent Compliance Objective Concentrations

Effluent Parameter	Scenario 1	Scenario 2 & 3	Scenario 4 & 5
$cBOD_5$ (mg/L)	4.7		
TSS (mg/L)	4.7		
TP (mg/L)	0.25	0.13	0.09
TAN (May 1 – Oct. 31) (mg/L)	1.7	0.8	0.6
TAN (Nov. 1 – Apr. 30) (mg/L)	3.3	1.7	1.1
E. Coli (CFUs/100 mL)	< 150		
Dissolved Oxygen (mg/L)	> 6		
pH	6.5 – 8.5 (inclusive)		

Table 3.10 Design Effluent Compliance Limits

Effluent Parameter	Scenario 1	Scenario 2 & 3	Scenario 4 & 5
$cBOD_5$ Concentration (mg/L) Load (kg/d)	 9.3 (3.0)	 9.3 (6.0)	 9.3 (8.0)
TSS Concentration (mg/L) Load (kg/d)	 9.3 (3.0)	 9.3 (6.0)	 9.3 (8.0)
TP Concentration (mg/L) Load (kg/d)	 0.43 (0.14)	 0.22 (0.14)	 0.15 (0.14)
TAN (May 1 – Oct. 31) Concentration (mg/L) Load (kg/d)	 2.5 (0.8)	 1.2 (0.8)	 0.8 (0.8)
TAN (Nov. 1 – Apr. 30) Concentration (mg/L) Load (kg/d)	 4.2 (1.36)	 2.1 (1.36)	 1.4 (1.36)
E. Coli (CFUs/100 mL)	< 200		
Dissolved Oxygen (mg/L)	> 5		
pH	6.0 – 9.5 (inclusive)		

4. ALTERNATIVE TREATMENT DESIGN CONCEPTS

Due to site limitations at the existing Drumbo WWTP site, projected effluent requirements, and the configuration of the existing treatment process, only two alternative design concepts based on two treatment technology options were considered in this Feasibility Study for the expansion of the Drumbo WWTP, namely:

- Option A - Expand the existing SBR treatment process; and,
- Option B - Convert the existing SBR to a Membrane Bioreactor (MBR) process.

The following sub-sections discuss the site limitations at the current site, the assumptions made, and the conceptual level expansion requirements for the Drumbo WWTP for each servicing scenario / treatment technology combination. Also presented are the results of a preliminary screening to eliminate those expansion options that are not considered to be feasible.

4.1 Site Limitations

The Drumbo WWTP is currently located on a small site in the northwest area of the community on the same lot as the water treatment plant and one active production well (Well 3). The site is located within 100 m of existing and proposed residential development, and adjacent to a Grand River Conservation Authority (GRCA) defined wetland. The regulated area surrounding the wetland extends onto the site. Based on its proximity to residential areas, all conceptual level designs have included an allowance for odour control. As well, all proposed plant expansions are sited on land outside of the GRCA regulated area. Figure 4.1 presents an overview of the existing Drumbo WWTP site, showing the extent of the regulated area, as well as the location of the water treatment plant and Well 3.

Figure 4.1 Overview of Drumbo WWTP Site

Because the WWTP is within 100 m of Well 3, a drinking water production well for the Community of Drumbo, the Drumbo WWTP has been identified as a significant drinking water threat under the 2006 Clean Water Act. Figure 4.2 provides a map produced by the County showing the location of the treatment plant relative to Well 3.

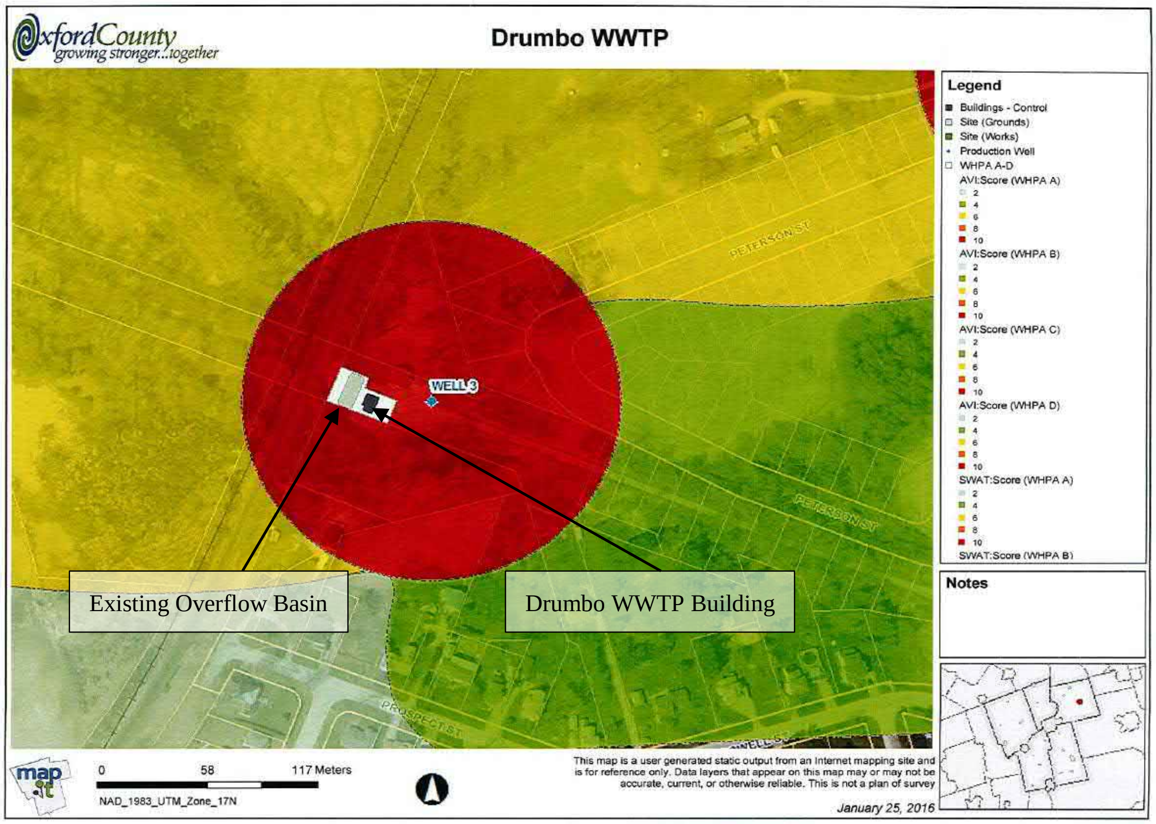

Figure 4.2 Location of Production Well 3 and the Wellhead Protection Zone Relative to the Drumbo WWTP

As a result of the proximity of the WWTP to Well 3, the County has noted that any expansion to the Drumbo WWTP would be subject to policies within the approved Grand River Source Protection Plan ("the Plan"), which comes into effect on July 1, 2016. Briefly, the Plan directs the MOECC to review and, where necessary, amend the ECA to incorporate terms and conditions to ensure any expansion of the WWTP would not result in a significant drinking water threat. Conditions imposed by the MOECC may include, but are not limited to:

- More frequent cleaning/inspection;
- More stringent specifications on construction materials;
- More robust spill response plans and procedures; and,
- Additional reporting requirements for spills.

Correspondence from the County regarding the impact of the proximity of Well 3 on any proposed expansion of the Drumbo WWTP is provided in Appendix A.

Conceptual level designs developed as part of this study have assumed that no capital works will be constructed closer to Well 3 than the existing WWTP infrastructure. However, any expansion is subject to approval from the MOECC prior to implementation. Actual expansion of the Drumbo WWTP at the existing location may be restricted or may be subject to additional improvements based on its location within the wellhead protection zone and its proximity to existing and proposed residential development in Drumbo.

4.2 Approach and Assumptions

The following section provides a process-by-process review of available treatment options that would be applicable for the expansion of the Drumbo WWTP. For the purposes of developing alternative design concepts, the following assumptions were made.

- All designs include the provision of fine screening as preliminary treatment to be constructed onsite at the Drumbo WWTP;
- Influent raw wastewater quality is as specified in Section 3;
- Allowances for internal recycle stream flows and loads have been included, as required.
- Secondary treatment would be provided by an expansion of the existing SBR treatment process, or conversion to a MBR treatment process, as noted previously;
- Any proposed expansion of secondary treatment at the plant must be located on the existing site near the current location of the secondary treatment processes (at the western portion of the lot);
- The treatment system must be capable of meeting effluent objectives as specified in Section 3.4;
- The existing trash tank would be refurbished into a holding tank for waste sludge from the secondary treatment process. The current sludge disposal practice would continue (hauled to the Woodstock WWTP for further stabilization and disposal);
- The existing 91 m^3 earthen emergency overflow basin would be decommissioned and the plant designed to treat the estimated future peak flows;
- Existing infrastructure would be reused where possible; and,
- No new below-grade infrastructure (e.g. tanks, equipment, pipes, etc.) or buildings would be constructed closer to production Well 3 than the existing infrastructure.

4.3 Conceptual Level Expansion Requirements

4.3.1 Preliminary Treatment

Three sewage pumping stations (SPSs) transfer raw sewage in the Community of Drumbo: Main SPS, East SPS, and North SPS. Only two of these pumping stations (Main SPS and North SPS) discharge directly to the Drumbo WWTP. Raw sewage enters the 51 m^3 trash tank, which also receives waste activated sludge from the SBRs. Settled sludge in the trash tank is removed periodically and trucked to the Woodstock WWTP for treatment and disposal.

The trash tank overflows to a 51 m^3 transfer tank that feeds the two Sequencing Batch Reactors (SBRs). In the event of high flow periods that exceed the capacity of the transfer tank and SBRs, wastewater flows by gravity from the transfer tank to a 91 m^3 emergency overflow basin. Wastewater stored in the emergency overflow containment basin flows by gravity back to the transfer tank and to the SBRs when the SBRs have enough capacity to treat the stored wastewater. There is currently no preliminary treatment at the Drumbo WWTP (i.e. screening or grit removal) except that provided by settling in the trash tank.

Conceptual-level design for expansion of the Drumbo WWTP will include the provision of preliminary treatment. It is assumed preliminary treatment will be provided through installation of fine screens upstream of the secondary treatment process. The size of the screens was selected depending on the secondary treatment process. Specifically, it was assumed a 3mm spiral screen would be installed upstream of an SBR process, or a 2mm monoscreen (with an organics wash) would be installed upstream of an MBR process. Additional details of the proposed preliminary treatment design are included in Appendix B.

The design capacity of the fine screens was sized based on the projected PIF to the plant for the given servicing scenario, as defined in Table 3.7. Proposed designs also include a screenings handling system (i.e. bagging system), and a building to house all preliminary treatment equipment. It is assumed that full redundancy of the preliminary treatment screens would be provided, as would odour control for the building. For conceptual level site layouts, it was assumed that preliminary treatment would be constructed on the existing Drumbo WWTP site, directly east of the existing plant. Further, it was assumed screened wastewater would flow by gravity to the secondary treatment processes. Additional hydraulic analysis is needed to determine if raw wastewater must be pumped from the proposed headworks location to the secondary treatment processes.

Screened effluent will bypass around the trash tank directly to the transfer tank, where it will be fed to the liquid treatment train. The existing trash tank would be repurposed as a sludge holding tank for waste biological solids produced in the liquid treatment train. Waste biological solids will continue to be hauled to the Woodstock WWTP for digestion and disposal. Additional details regarding future solids handling are included in Section 4.3.4.

4.3.2 Secondary Treatment

The Drumbo WWTP currently treats raw wastewater using SBRs, where biological treatment and solids separation (i.e. settling) occur in the same tank. Excess biological solids are settled in the onsite trash tank and hauled to the Woodstock WWTP for stabilization and disposal.

The existing treatment plant site is restricted for space. Retrofitting the existing treatment process to include primary clarification or to provide secondary settling in separate tanks would result in costly retrofits to existing infrastructure and require additional footprint which is not available at the site; therefore, secondary treatment processes with primary clarification, such as conventional activated sludge, or construction of separate secondary settling tanks, such as extended aeration, were not considered for implementation at the Drumbo WWTP. Instead, the following secondary treatment options were investigated as potential treatment alternatives for the Drumbo WWTP:

- Sequencing Batch Reactor (SBR); and,
- Membrane Bioreactor (MBR).

All five servicing scenarios were assessed using each secondary treatment alternative (SBR or MBR).

4.3.2.1 Sequencing Batch Reactors and Tertiary Filtration

Review of Treatment Technology and Historical Performance

Currently, the Drumbo WWTP operates as an SBR process with chemical addition (alum) and tertiary filtration. Final effluent concentrations of TAN and TP have been below effluent limits specified in ECA No. 8752-9Q4H96 (issued February 9, 2015).

A summary of the historical final effluent quality ($cBOD_5$, TSS, TAN, and TP) achieved by the Drumbo WWTP is given in Table 4.1. Proposed effluent objectives and limits for the various servicing scenarios, as presented in Table 3.9 and Table 3.10, are also shown for comparison.

Table 4.1 Historical Effluent Quality from the Drumbo WWTP

	$cBOD_5$ (mg/L)	TSS (mg/L)	TAN (mg/L) May 1 - Oct. 31	TAN (mg/L) Nov. 1 - Apr. 30	TP (mg/L)
2012 (1)	2.3 (3.0)	4.6 (7.0)	1.1 (2.2)	1.2 (2.0)	0.20 (0.36)
2013 (1)	2.4 (4.2)	5.6 (7.5)	1.4 (2.2)	2.0 (3.3)	0.17 (0.26)
2014 (1)	2.3 (3.0)	5.4 (7.5)	1.2 (1.7)	2.5 (4.3)	0.20 (0.32)
2015 (1)	2.7 (3.5)	5.2 (7.2)	1.9 (2.6)	1.6 (2.9)	0.23 (0.32)
Overall (1)	2.4 (4.2)	5.2 (7.5)	1.4 (2.6)	1.9 (4.3)	0.20 (0.36)
Proposed Effluent Objectives and Limits					
Scenario 1	4.7 obj. 9.3 limit	4.7 obj. 9.3 limit	1.7 obj. 2.5 limit	3.3 obj. 4.2 limit	0.25 obj. 0.43 limit
Scenario 2 / 3			0.8 obj. 1.2 limit	1.7 obj. 2.1 limit	0.13 obj. 0.22 limit
Scenario 4 / 5			0.6 obj. 0.8 limit	1.1 obj. 1.4 limit	0.09 obj. 0.15 limit

Notes:
1. Maximum month concentrations shown in parentheses.

Based on the information presented in Table 4.1, the following observations can be drawn.

- Historical average and maximum month effluent concentrations of $cBOD_5$ have been below the proposed effluent objective for all servicing scenarios;
- Historical average and maximum month effluent concentrations of TSS have been below the proposed effluent limit for all servicing scenarios; however, exceedances of the effluent objectives are evident. These exceedances are due to limitations in the design of the existing effluent pressure filters;
- Historical effluent average and maximum month TAN concentrations over the summer period are comparable to the proposed Scenario 1 effluent objectives and limits, respectively. There were several months, however, where the effluent from the existing SBR process exceeded the proposed Scenario 1 effluent limits (in both summer and winter);

- Proposed effluent TAN objectives for Scenarios 2, 3, 4, and 5 for both summer and winter seasons are lower than the average historical effluent TAN concentration that has been achieved, particularly over the summer period;
- Historical monthly TAN concentrations frequently exceeded the proposed effluent TAN limit for Scenarios 2, 3, 4, and 5 for both summer and winter seasons;
- Historical average and maximum month TP concentrations are comparable to the proposed Scenario 1 effluent objectives and limits, respectively; and,
- The proposed effluent TP objectives and limits for Scenarios 2, 3, 4 and 5 are significantly lower than historical effluent TP concentrations.

Based on the historical performance of the SBR and tertiary filter system at the Drumbo WWTP, the existing SBR and tertiary filtration system will require expansion to meet the more stringent effluent requirements associated with any of the growth scenarios. For all but Scenario 1, replacement of the existing filtration system and/or implementation of dual stage filtration may be required to meet effluent TP requirements. To develop conservative estimates of conceptual level capital costs, it is assumed that the existing filters would be decommissioned, and new tertiary filters would be constructed for all SBR expansion scenarios.

Conceptual Level Expansion Requirements

A summary of the average day flows and loads to the Drumbo WWTP for each design scenario is summarized in Table 4.2. This table contains information previously reported in Table 3.7 and Table 3.8.

For purposes of conceptual level design, raw wastewater flows and loads have been increased from those presented in Table 4.2 to include contributions from filter backwash. The backwash flow was estimated as 8% of the influent flow on an average day or maximum day, as required. Backwash loads of TSS and TP were estimated from historical final effluent quality, and recorded SBR decant quality.

Table 4.2 Summary of SBR Design Basis

Parameter	Design Value (1)				
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
ADF	322 m^3/d	643 m^3/d	643 m^3/d	947 m^3/d	947 m^3/d
MDF	789 m^3/d	1,368 m^3/d	1,368 m^3/d	1,913 m^3/d	1,913 m^3/d
PHF (2)	1,041 m^3/d	1,950 m^3/d	1,950 m^3/d	2,808 m^3/d	2,808 m^3/d
BOD_5	61.5 kg/d	101 kg/d	145 kg/d	139 kg/d	224 kg/d
TSS	52.4 kg/d	62.0 kg/d	153 kg/d	71.1 kg/d	247 kg/d
TKN	13.8 kg/d	28.5 kg/d	28.5 kg/d	42.4 kg/d	42.4 kg/d
TP	1.5 kg/d	3.8 kg/d	3.8 kg/d	6.1 kg/d	6.1 kg/d

Notes:
1. Conceptual level designs include an allocation for backwash flows and loads, where required.
2. Assumed PHF is 95% of the projected PIF.

Conceptual level SBR designs were developed for each scenario presented above. For Scenarios 1 and 2, it was assumed that the existing SBR tanks would be retained and that additional required SBR tanks would be identical in size and operation to the existing SBR tanks. For Scenarios 3, 4, and 5, the required SBR volume was much higher and it was determined that retaining the existing SBR tanks would not be cost effective. Therefore, for those design scenarios, it was assumed two new, larger, continuous-fill SBR tanks would be constructed.

Each design was evaluated based on the biological and hydraulic treatment capacity. For purposes of conceptual level design, the following assumptions were made.

- Biological treatment capacity would be sufficient to treat maximum month loadings at the minimum month winter (10°C) and summer temperatures (13°C). A typical maximum month factor of 1.5 was assumed for all parameters;
- Hydraulic capacity would be sufficient to treat design MDFs;
- Chemical phosphorus removal through alum addition, similar to the existing process, would be continued at future flows. As such, the future mixed liquor volatile suspended solids to mixed liquor suspended solids (MLVSS:MLSS) ratio was assumed to be comparable to the historical MLVSS:MLSS ratio of 0.69;
- Inclusion of additional aeration capacity was provided, as required; and,
- For Scenario 1 and Scenario 2, conversion of existing diffusers from coarse bubble to fine bubble was included.

An overview of the SBR expansion requirements for all scenarios is presented in Table 4.3. A detailed summary of the conceptual level SBR design for each scenario, along with SBR supplier design information, is provided in Appendix D.

Generally, the proposed design parameters, such as the hydraulic retention time (HRT) and the organic loading rate (OLR), are comparable to typical design values. Conceptual level site layouts for all SBR design options are presented in Appendix C. Based on the site constraints, there is insufficient space on the current site to accommodate the new SBR tankage for Scenarios 3, 4, or 5. In addition, preliminary desk-top modelling indicates that it may be difficult to consistently meet the proposed effluent TAN requirements for Scenarios 2, 3, 4 and 5, even with an expanded SBR process. As a result, these scenarios are not considered to be feasible and not considered further.

For purposes of designing future tertiary filtration facilities for Scenario 1, the following assumptions were made:

- To develop a conservative estimation of capital costs, the existing tertiary filters will be decommissioned, and filtration capacity will be expanded through the installation of a new tertiary filtration system.
- To minimize solids concentrations in the decant stream, the existing decant rate (12.6 L/s) will not be altered in future designs for Scenario 1.
- For Scenario 1 during ‘storm mode’ operation, only one SBR tank will be in decant at a given time. As such, a design peak filter capacity of 12.6 L/s (approximately 1,089 m^3/d) is required.

An allowance for new tertiary filtration at the Drumbo WWTP has been included in the conceptual level capital costs.

Table 4.3 Sequencing Batch Reactor Process Design Requirements

Parameter	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Typical Design Guideline [1]
ADF to Drumbo WWTP (m^3/d)	322	643	643	947	947	-
No. of Existing Tanks	2	2	0 (decommission existing tanks)			-
Existing Tank Volume - each (m^3)	102.2	102.2	-	-	-	-
No. of New Tanks	1	2	2	2	2	-
New Tank Volume - each (m^3)	102.2	102.2	554 [5]	496 [5]	904 [5]	-
Total Volume (m^3)	307	409	1,108	992	1,808	-
SBR Cycle under average flow conditions (mins) [2]						-
Fill	167 (69)	91 (46)	- (-)	- (-)	- (-)	
Idle	87 (0)	27 (0)	- (-)	- (-)	- (-)	
React (Air on)	210 (30)	150 (30)	144 (108)	144 (108)	144 (108)	
React (Air off)	0 (0)	0 (0)	24 (18)	24 (18)	24 (18)	
Settle	60 (45)	60 (45)	60 (45)	60 (45)	60 (45)	
Decant	62 (62)	62 (62)	60 (45)	60 (45)	60 (45)	
Waste	1 (1)	1 (1)	- (-)	- (-)	- (-)	
Target Operating MLSS (mg/L)	3,500	3,500	5,008 [3]	4,643 [3]	5,055 [3]	2,000 - 5,000
Max Month BOD Load (kg/d) [4]	92.3	152	218	209	335	-
Max Month SRT (days)	15.8	13.1	23.8 [5]	23.9 [5]	26.6 [5]	10 - 30
Average Day HRT (hrs) [6]	21.1	14.1	35.8 [5]	19.9 [5]	40.6 [5]	15 - 40
Average Day OLR (kg BOD_5/m^3)	0.20	0.25	0.13	0.14	0.12	0.1 - 0.3
Average Day F/Mv (kg BOD_5/kg MLVSS) [7]	0.08	0.10	0.04	0.05	0.03	0.04 - 0.10

Notes:
1. Metcalf and Eddy, 2014.
2. It is assumed continuous-flow SBRs will be constructed for treatment at Scenarios 3, 4, and 5. Considering these tanks, there is no defined fill or idle time. Further, the waste cycle will occur during the decant cycle.
3. MLSS at bottom (decanted) water level, as reported by the supplier.
4. At maximum month loading conditions, assuming a max month factor of 1.5.
5. SBR supplier quote available in Appendix D. Tank volume adjusted from the quote as required based on the projected ADF. Process performance parameters assumed unchanged as reported by the supplier.
6. Allowance for backwash flow has been included in HRT calculations.
7. Assumed historical MLSS:MLVSS ratio of 0.69.

4.3.2.2 Membrane Bioreactor

Review of Treatment Technology and Potential Performance

A typical MBR process can be designed to achieve the required level of treatment to meet the proposed effluent $cBOD_5$, TSS and TAN objectives for all growth scenarios under consideration. Effluent TP concentrations of less than 0.1 mg/L are readily achieved with the MBR process with chemical precipitation. As the MBR process is capable of producing tertiary quality effluent, no separate tertiary treatment is needed; however, disinfection of the treated effluent would still be required. A typical MBR process installation consists of the following equipment:

- Membranes;
- Permeate and air headers;
- Process (permeate/backpulse) pump skid;
- Membrane air scour blowers;
- Mixed liquor recirculation (RAS) pumps;
- Biological equipment (fine-bubble diffusers and process blowers);
- Membrane cleaning chemical dosing pumps (sodium hypochlorite and citric acid); and,
- Master control panel.

Conceptual Level Design Basis and Assumptions

Implementation of an MBR process at the Drumbo WWTP would require the conversion of existing SBR and equalization tankage into aerated bioreactors. Membranes could be installed in existing tankage (thereby reducing the bioreactor volume available) or in an above-grade containerized unit. Membranes installed in existing tankage could be isolated and cleaned (i.e. chemically washed) without removal from the tank. To install membranes within the existing tankage, tanks would first need to be exposed (i.e. top removed), drained and cleaned. In addition, a means would need to be provided to remove the membranes from the tanks for future replacement and repairs. Given the existing layout of the Drumbo WWTP (all tanks enclosed and covered by concrete slabs), this could add significantly to the complexity of the design and construction of any retrofits. Therefore, for the purposes of this study, it was assumed that all membranes would be installed in new above-grade containerized units.

The capacity of an MBR process is driven by the biological treatment capacity of the reactors, and the peak flow flux capacity of the membranes. For purposes of this design, an MBR supplier was contacted to provide a conceptual level sizing for the Drumbo WWTP expansion. The following assumptions were made for development of the conceptual level design:

- The existing SBR tanks (102.2 m^3 each), transfer tank (51.0 m^3), and one of the filter flow equalization tanks (31.0 m^3) have sufficient depth for conversion to aerobic bioreactors. As such, a total volume of approximately 286 m^3 is available for biological treatment;
- The remaining flow equalization tank (27.0 m^3) is too shallow for efficient aeration, and therefore has not been considered as part of biological capacity calculations;
- Hydraulic capacity of the membranes would be sufficient to treat PHFs estimated from Table 3.7 at minimum month winter temperatures (10°C);

- Biological treatment capacity would be sufficient to treat maximum month loadings at the minimum month winter temperatures (10°C) and summer temperatures (13°C). A typical maximum month factor of 1.5 was assumed for all parameters;
- Chemical phosphorus removal through alum addition, similar to the existing process, would be continued at future flows. As such, the future MLVSS:MLSS ratio is assumed to be consistent with the historical MLVSS:MLSS ratio (0.69);
- Design yield was estimated to be 0.87 kg TSS/kg BOD_5 based on a typical volatile solids yield of 0.6 kg VSS/kg BOD_5 (Metcalf & Eddy, 2003), and the historical MLVSS:MLSS ratio of 0.69;
- If required, additional bioreactor volume will be provided by constructing additional tanks of equal size to the existing SBR tanks;
- Existing coarse bubble diffusers in the SBR and transfer tanks would be replaced with fine bubble diffusers; and,
- Existing blowers would be reused or replaced as required.

For purposes of this conceptual level design, it was assumed that three membrane bioreactor trains would be provided. Individually, each train would have the capacity to treat the projected ADF for a given scenario. Together, two trains would have the capacity to treat projected peak flows. The third train is provided for redundancy. A summary of the conceptual level MBR design for each scenario is presented in Table 4.4. Membrane requirements are presented in Table 4.5. Conceptual level site layouts for all MBR options are presented in Appendix C. Details of the proposed membrane design from the supplier are included in Appendix E.

Table 4.4 Membrane Bioreactor Tank Design Requirements

Parameter	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Typical Design Guideline
ADF to Drumbo WWTP (m^3/d)	322	643	643	947	947	-
Existing Bioreactor Volume (m^3)	204 (4)	286 (2)	286 (2)	286 (2)	286 (2)	-
Additional Bioreactor Volume (m^3)	-	-	102	-	204	-
Total Bioreactor Volume (m^3)	204	286	388	286	490	-
Design BOD Load (kg/d) (1)	92.3	152	218	209	335	-
ADF (m^3/d)	322	643	643	947	947	-
Target Operating MLSS (mg/L)	9,000	9,000	9,000	9,600 (6)	9,000	8,000 - 10,000
SRT (days) (3)	22.9	19.5	18.4	15.1	15.1	>15 (5)
WAS (kg/d)	80.3	132	190	182	426	-

Notes:
1. At maximum month loading conditions, assuming a max month factor of 1.5.
2. Combined volume from existing SBR tanks (102.2 m^3 each), transfer tank (51 m^3) and one filter equalization tank (31 m^3)
3. Assuming a WAS yield (0.87 g TSS/g BOD_5), and MLSS Concentration.
4. Combined volume from existing SBR tanks (102.2 m^3 each).
5. MOE Design Guidelines (2008). Based on an EA plant with nitrification.
6. Target operating MLSS concentration increased to achieve minimum SRT under maximum month conditions.

Table 4.5 Membrane Design Requirements (1)

Parameter	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Peak Hour Flow (2) (m^3/d)	1,041	1,950	1,950	2,808	2,808
Number of Membrane Trains in Service (3)	2	2	2	2	2
Number of Cassettes per Train	1	1	1	1	1
Number of Modules per Cassette (4)	26	34	34	48	48

Notes:
1. Design requirements provided by the manufacturer.
2. Assumed to be 95% of the projected PIF.
3. A total of three trains will be installed, two in service and one in backup.
4. 48 modules are available per cassette in the provided design.

In summary:

- To provide sufficient biological treatment, additional bioreactor volume is required for Scenarios 3 and 5. No additional below-grade tankage is required for Scenarios 1, 2 or 4.
- Installation of an MBR process will require installation of membranes in an above-ground container, an increase of blower capacity, and installation of cleaning chemicals, permeate pumps, and other appurtenances. For purposes of this conceptual level design, an allowance for expansion of the existing WWTP building to house this equipment has been included.

4.3.3 Disinfection

Due to the age of the existing UV disinfection system, it is assumed a new disinfection system will be provided for all scenarios, and will be sized to treat projected peak flows. Actual peak flows through the disinfection system will depend on the impact of equalization tanks and SBR or MBR operation. A summary of the estimated peak flow based on the treatment technology and design scenario is given in Table 4.6.

Table 4.6 Summary of Projected Peak Disinfection Flow

	Scenario 1	Scenario 2 / 3	Scenario 4 / 5
MBR	1,096 m^3/d	2,053 m^3/d	2,956 m^3/d
SBR	1,089 m^3/d	- (1)	- (1)

Notes
1. Use of SBR technology for treatment of Scenarios 2, 3, 4, and 5 has been previously eliminated from consideration due to space constraints and effluent requirements.

For purposes of this conceptual level design, it was assumed that additional UV capacity would be provided by installing a new UV disinfection system in place of the existing system. Additional details are included in Appendix F.

4.3.4 Solids Handling

Waste solids from the SBR process are wasted to the trash tank upstream of the SBR transfer tanks. Accumulated sludge and other solids are removed by truck and taken to the Woodstock WWTP for further treatment and disposal. Sludge is removed by the County's sewage vacuum truck (with a capacity of approximately 19 m^3) or by a contracted certified waste hauler as needed. From 2012 to 2014, the County hauled an average of approximately 1,778 m^3 per year of primary and secondary sludge.

As discussed, the proposed expanded Drumbo WWTP would install preliminary treatment (i.e. fine screens) upstream of the plant. The existing trash tank would then be disconnected from the liquid treatment train, and repurposed to act as a stand-alone sludge holding tank. Screened raw influent would be directed to the secondary treatment process (either SBR or MBR technology).

Sludge storage facilities are typically designed to provide a minimum of three days storage to account for a long weekend, when the plant may not be staffed. As previously noted, the existing 27 m^3 transfer tank was assumed too shallow for use as a bioreactor in the conceptual MBR design for all scenarios. It is assumed that this tank can be refurbished to provide additional sludge storage for scenarios with the greatest waste flows (i.e. Scenarios 3, 4, and 5). For the remaining Scenarios (1 and 2), only the refurbished trash tank would be used as a sludge storage tank.

The trash tank will be retrofitted with coarse bubble aeration to reduce the potential for odours. In addition, an allowance for odour control at the trash tank and the 27 m^3 transfer tank has been provided. Waste sludge would continue to be trucked to the Woodstock WWTP for digestion and disposal.

Historical WAS solids concentrations from the existing SBR treatment process was approximately 1.7%. WAS concentration from the proposed MBR treatment process would be approximately 0.8 - 1.0%. It is assumed that solids could be thickened in the retrofitted trash tank to approximately 2.0% by periodic settling and decanting. However, since the tank must be pumped down during the decanting process, the effective available storage volume is reduced. Typical design guidelines recommend decanted tanks are designed with an additional 25 percent volume allowance. As such, the effective storage volume of the trash tank was assumed to be approximately 38 m^3.

A summary of the design waste sludge generation rates and available storage capacity for all design scenarios is presented in Table 4.7.

Table 4.7 Waste Sludge Generation Rates

Parameter	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Influent BOD_5 Load (kg/d)					
Average Day	61.5	101	145	139	224
Maximum Month (1)	92.3	152	218	209	335
WAS Yield (kg TSS/kg BOD_5)	0.87				
Sludge Storage Volume (m^3)					
Repurposed trash tank (2)	38	38	38	38	38
Repurposed transfer tank	-	-	27	27	27
Total Sludge Storage Volume	38	38	65	65	65
WAS TS (kg/d)					
Average Day	53.5	87.9	126	121	195
Maximum Month	80.3	132	190	182	291
WAS Flow (m^3/d) (3)					
Average Day	2.7	4.4	6.3	6.1	9.8
Maximum Month	4.0	6.6	9.5	9.1	14.6
Estimated Storage Capacity (days) (4)					
Average Day	14.1	8.6	10.3	10.7	6.6
Maximum Month	9.5	6.6	6.8	7.1	4.5

Notes:
1. Assumed typical maximum month factor (1.5)
2. Assumed 25% volume allowance for decanting.
3. At an assumed WAS solids concentration of 2%
4. Assuming an available storage volume of 38 m^3.

Results from Table 4.7 indicate the proposed storage capacity ranges from 4.5 days under maximum month loading conditions at Scenario 5, to 14.1 days under average day loading conditions at Scenario 1. Overall, it appears the proposed sludge storage volume would provide adequate storage for all future servicing scenarios; however, the frequency of sludge haulage would vary. Based on the volumetric capacity of the existing Oxford County disposal truck (approximately 19 m^3), the disposal requirements range from approximately one disposal trip/week under average day flows in Scenario 1 to over five disposal trips/week under maximum month flows in Scenario 5.

5. PRELIMINARY EVALUATION OF DESIGN OPTIONS

Expansion of the secondary treatment process at the Drumbo WWTP would be accomplished through expansion of the existing SBR treatment process, or through conversion to an MBR treatment process. In addition, the following plant improvements are common to all conceptual level designs:

- Construction of preliminary treatment (fine screens), and gravity flow from the headworks building to secondary treatment;
- Conversion of the existing trash tank into a sludge holding tank; and,
- Replacement of UV disinfection process.

Given the space restrictions at the existing plant site and the stringent proposed effluent quality, it was determined that expansion of the SBR treatment process to service Scenarios 2, 3, 4, and 5 is not feasible. As such, there remain a total of six feasible expansion options, namely:

- Option 1A – Design Scenario 1 (Drumbo only) and expansion of existing SBR treatment process;
- Option 1B – Design Scenario 1 (Drumbo only) and conversion to an MBR treatment process;
- Option 2B – Design Scenario 2 (Drumbo + Princeton (STEP/STEG)) and conversion to an MBR treatment process;
- Option 3B – Design Scenario 3 (Drumbo + Princeton (conventional collection system)) and conversion to an MBR treatment process;
- Option 4B – Design Scenario 4 (Drumbo + Princeton and VanWees Development (STEP/STEG)) and conversion to an MBR treatment process; and,
- Option 5B – Design Scenario 5 (Drumbo + Princeton and VanWees Development (conventional collection system)) and conversion to an MBR treatment process.

5.1 Conceptual Level Cost Analysis

Conceptual level capital and operating costs were developed for each feasible design option. Conceptual level capital costs for all scenarios include the following items:

- Construction of preliminary treatment consisting of fine screening housed in a new building with odour control and gravity flow from preliminary to secondary treatment;
- Expanded secondary and tertiary treatment capacity (and all related equipment and appurtenances) via either MBR or SBR / tertiary filtration technology;
- Replacement of existing UV disinfection system; and,
- Conversion of the existing trash tank into a WAS storage tank and provision of associated odour control.

It is important to note that only costs directly related to the expansion of the Drumbo WWTP have been considered for this Feasibility Study. These costs do not include the cost of constructing a collection system to service Princeton or the VanWees Development, or the costs of transferring flows from the VanWees Development and/or Princeton to the Drumbo WWTP site.

Conceptual level capital cost estimates are generally considered to be accurate to -25% to +40%. Actual costs will depend on site specific factors such as soil and groundwater conditions, the engineering design approach, construction conditions at the time of tendering, and the extent of additional expansion to the works that may be included in the final design. As specific construction requirements that may be required due to the WWTP's proximity to production Well 3 are unknown at this time, a conservative contingency allowance of 50 percent was assumed. An additional contingency allowance of 12 percent was also assumed for engineering, permits, and approvals.

Future operating costs were estimated from historical operating costs from the Drumbo WWTP and past experience at similar sized treatment plants. Detailed capital and O&M cost estimates are included in Appendix G. Conceptual level life cycle cost analyses were based on an inflation rate of 3 percent and an interest rate of 5 percent.

A summary of the conceptual level life cycle cost analyses is provided in Table 5.1.

Table 5.1 Conceptual Level Cost Estimate for Drumbo WWTP Design Options

Parameter	Design Option 1A	Design Option 1B	Design Option 2B	Design Option 3B	Design Option 4B	Design Option 5B
Total Capital Cost (1)	$3.13M	$6.01M	$6.24M	$6.63M	$7.72M	$8.36M
Annual O&M Costs:	**$99K**	**$152K**	**$202K**	**$202K**	**$250K**	**$250K**
25-Year NPV O&M Cost (2)	$1.74M	$2.66M	$3.54M	$3.54M	$4.38M	$4.38M
25-Year Life Cycle Cost (2)	$4.86M	$8.67M	$9.79M	$10.17M	$12.10M	$12.75M

Notes:

All costs are conceptual level opinions of probable costs and are considered to be accurate to within -25 to +40 percent and are exclusive of HST.

1. Includes a 50% allowance for contingency and 12% allowance for approvals, permits and engineering.
2. Based on interest rate of 5%, and inflation rate of 2%.

5.2 Qualitative Evaluation of Plant Expansion Options

The qualitative evaluation criteria presented in Table 5.2 were used to assess each of the feasible options. The results of a preliminary evaluation of the various options is shown in Table 5.3. It is important to note that all layouts are conceptual only, and that the location of new infrastructure needs to be further assessed with consideration for setback from neighbours and the location of the on-site production well.

Table 5.2 Plant Expansion Qualitative Evaluation Criteria

Criteria	Details
Operational Complexity/Familiarity of Operations Staff with Process	This criterion assesses the operational complexity of the alternatives in terms of operator attention and staffing requirements.
Constructability	This criterion assesses the ability to maintain the performance of the treatment process during construction, and the impact of expansion on site footprint (including the potential to reuse existing plant tankage).
Compatibility with Existing Infrastructure	This criterion assesses the compatibility of the alternative with existing infrastructure in terms of the applications/use of existing equipment and the ability for retrofit.
Disruption of Adjacent Community during Construction/Operation	This criterion assesses the potential nuisance impacts on adjacent land owners and residents as a result of plant expansion construction and operation.
Impact on Sludge Management	This criterion refers to the effects of the proposed treatment process on the generation and handling of secondary and primary sludge from the Drumbo WWTP.
Opportunities for Future Expansion	This criterion assesses how easily the capacity of the proposed treatment process can be expanded beyond the design basis.
Economic Environment	This criterion assesses the estimated capital costs and annual operating and maintenance costs for each secondary treatment option.

The following observations can be made from the qualitative evaluation of plant expansion options.

- Relative to MBRs, SBRs represent a less complex and less expensive treatment technology. County operating staff are experienced working with the current SBR treatment process.
- Relative to MBRs, SBR treatment technology occupies a larger footprint, cannot produce an effluent quality meeting all of the proposed effluent limits, and cannot easily be expanded. Due to these limitations, use of SBR technology for Scenarios 2, 3, 4 and 5 is not considered to be feasible.
- Installation of preliminary treatment creates the potential for additional odours and increased truck traffic.
- Sludge production will increase with increasing flows. Relative to current operation, future sludge production (per treated m^3) is expected to be comparable.
- Due to receiver constraints, plant expansion beyond an ADF of about 950 m^3/d is limited, due to effluent TAN and TP quality that would be required at higher flows.

Table 5.3 Plant Expansion Qualitative Evaluation

<table>
<tr><th>Criteria</th><th>Design Option 1A</th><th>Design Option 1B</th><th>Design Option 2B</th><th>Design Option 3B</th><th>Design Option 4B</th><th>Design Option 5B</th></tr>
<tr><td>Operational Complexity/ Familiarity of Operations Staff with Process</td><td>• Medium Complexity
• Operations staff are familiar with operation/control of SBR treatment process.</td><td colspan="5">• High Complexity.
• Membranes represent a barrier to flow through the plant, requiring complex control of permeate pump operation.
• Membranes have intensive maintenance requirements.
• Operations staff do not have experience operating an MBR process.</td></tr>
<tr><td>Constructability</td><td>• Existing treatment process can be maintained while upgrades are constructed.</td><td>• Existing treatment process can be maintained while membranes are installed.
• Upgrade of existing tankage for bioreactor volume may temporarily reduce plant capacity.</td><td>• Existing treatment process can be maintained while membranes are installed.
• Upgrade of existing tankage for bioreactor volume may temporarily reduce plant capacity.</td><td>• Existing treatment process can be maintained while membranes are installed.
• Construction of additional bioreactor volume first should maintain plant capacity during plant expansion.</td><td>• Existing treatment process can be maintained while membranes are installed.
• Upgrade of existing tankage for bioreactor volume may temporarily reduce plant capacity.</td><td>• Existing treatment process can be maintained while membranes are installed.
• Construction of additional bioreactor volume first should maintain plant capacity during plant expansion.</td></tr>
<tr><td>Compatibility with Existing Infrastructure</td><td>• Good compatibility with the existing infrastructure.
• Need to construct one additional SBR tank, and expand tertiary filtration capacity.</td><td>• Good compatibility with existing infrastructure.
• Some existing tankage may not be useable for bioreactor volume (too shallow), but can continue use as equalization volume.
• No new tankage required. Membranes can be installed above grade.</td><td>• Good compatibility with existing infrastructure.
• Some existing tankage may not be useable for bioreactor volume (too shallow), but continue use as equalization volume.
• No new tankage required. Membranes can be installed above grade.</td><td>• Good compatibility with existing infrastructure.
• Some existing tankage may not be useable for bioreactor volume (too shallow), but can continue use as equalization volume.
• Need to construct one additional bioreactor tank. Membranes can be installed above grade.</td><td>• Good compatibility with existing infrastructure.
• Some existing tankage may not be useable for bioreactor volume (too shallow), but can continue use as equalization volume.
• No new tankage required. Membranes can be installed above grade.</td><td>• Good compatibility with existing infrastructure.
• Minor volumes of existing tankage may not be useable for bioreactor volume (too shallow), but can continue use as equalization volume.
• Need to construct two additional bioreactor tanks. Membranes can be installed above grade.</td></tr>
<tr><td>Disruption of Adjacent Community during Construction/Operation</td><td>• Installation of preliminary treatment creates potential for additional odours and increased truck traffic.
• Additional SBR tank requirement creates greater potential for disruption through construction process.</td><td>• Installation of preliminary treatment creates potential for additional odours and increased truck traffic.
• Minor increases to secondary treatment plant footprint should limit impact on adjacent community.</td><td>• Installation of preliminary treatment creates potential for additional odours and increased truck traffic.
• Minor increases to secondary treatment plant footprint should limit impact on adjacent community.</td><td>• Installation of preliminary treatment creates potential for additional odours and increased truck traffic.
• Additional bioreactor volume requirement creates greater potential for disruption during the construction process.</td><td>• Installation of preliminary treatment creates potential for additional odours and increased truck traffic.
• Minor increases to secondary treatment plant footprint should limit impact on adjacent community.</td><td>• Installation of preliminary treatment creates potential for additional odours and increased truck traffic.
• Additional bioreactor volume requirement creates greater potential for disruption during the construction process.</td></tr>
<tr><td>Impact on Sludge Management</td><td colspan="6">• All conceptual level design options include a dedicated sludge holding tank.
• Relative to current operation, sludge production (per treated m^3) expected to be comparable.
• Sludge haulage requirements will increase with increasing plant loads.</td></tr>
<tr><td>Opportunities for Future Expansion</td><td>• Based on existing site and receiver constraints, plant capacity cannot be easily expanded through construction of additional SBR reactors.</td><td>• Capacity can be increased through construction of additional bioreactor volume onsite, installation of additional membranes, and/or installation of LEAP treatment system.</td><td>• Capacity can be increased through construction of additional bioreactor volume onsite, installation of additional membranes, and/or installation of LEAP treatment system.</td><td>• Capacity can be increased through construction of additional bioreactor volume onsite, installation of additional membranes, and/or installation of LEAP treatment system.</td><td>• Due to receiver constraints, ability to expand beyond 947 m^3/d is limited namely due to required effluent quality in terms of TAN and TP.</td><td>• Due to receiver constraints, ability to expand beyond 947 m^3/d is limited namely due to required effluent quality in terms of TAN and TP.</td></tr>
<tr><td>Economic Environment</td><td>• Low capital and operating costs.</td><td>• High capital and operating costs.</td><td>• High capital and operating costs.</td><td>• High capital and operating costs.</td><td>• High capital and operating costs.</td><td>• High capital and operating costs.</td></tr>
</table>

6. SUMMARY OF KEY FINDINGS

Future expansion of the Drumbo WWTP is subject to significant site restrictions due to its location. Specifically, the site is located:

- Within 100 m of Well 3, a drinking water production well for Drumbo;
- Within 100 m of existing and proposed residential development; and,
- Adjacent to a GRCA defined wetland.

Further, the proposed effluent quality of an expanded Drumbo WWTP is very stringent. As a result of the site limitations and effluent quality requirements, the following assumptions were made for purposes of developing conceptual level designs of the expanded treatment plant:

- All designs require the provision of fine screening as preliminary treatment to be constructed onsite at the Drumbo WWTP;
- Influent raw wastewater quality is as specified in Section 3;
- Allowances for internal recycle stream flows and loads have been included, as required;
- Secondary treatment would be provided by an expansion of the existing SBR treatment process, or conversion to a MBR treatment process;
- Any proposed expansion of secondary treatment at the plant must be located on the existing site near the current location of the secondary treatment processes (at the western portion of the property);
- The treatment system must be capable of meeting effluent objectives as specified in Section 3.4;
- The existing trash tank would be refurbished into a holding tank for waste sludge from the secondary treatment process. The current sludge disposal practice would continue (hauled to the Woodstock WTP for further stabilization and disposal;
- The existing 91 m^3 earthen emergency overflow basin would be decommissioned and the plant designed to treat the estimated future peak flows;
- Existing infrastructure would be reused where possible; and,
- No new below-grade infrastructure (e.g. tanks, equipment, pipes, etc.) or buildings would be constructed closer to production Well 3 than the existing infrastructure.

It is important to note that, based on the location of the Drumbo WWTP within the wellhead protection zone of Well 3, it will be subject to the Grand River Source Protection Plan (Plan). The Plan comes into effect on July 1, 2016 and may impact expansion and site construction at the Drumbo WWTP. A greater contingency (50%) has been added to all conceptual level costs to account for this uncertainty.

Conceptual level designs for the expansion of the Drumbo WWTP were developed for five servicing scenarios and two secondary treatment options; SBR and MBR. Specifically, the servicing scenarios were as follows:

- Scenario 1: Servicing projected growth in the Community of Drumbo only;

- Scenario 2: Servicing the Community of Drumbo and the Community of Princeton, assuming a septic tank effluent gravity (STEG) or septic tank effluent pumping (STEP) collection system is constructed in Princeton;
- Scenario 3: Servicing the Community of Drumbo and the Community of Princeton, assuming a conventional collection system is constructed in Princeton;
- Scenario 4: Servicing the Community of Drumbo, the Community of Princeton, and the VanWees Development assuming a STEP/STEG system is constructed in Princeton and for the VanWees Development; and,
- Scenario 5: Servicing the Community of Drumbo, the Community of Princeton, and the VanWees Development assuming a conventional collection system is constructed in Princeton and the VanWees Development.

All conceptual level designs included the following treatment processes.

- Installation of new preliminary treatment consisting of fine screens, complete with odour control and all appurtenances. The opening size of the fine screen will depend on the selected secondary treatment technology. It is assumed screened raw wastewater will flow via gravity to the secondary treatment processes;
- Expansion of the existing SBR secondary treatment process and construction of a new tertiary filtration process, or conversion to an MBR treatment process;
- Replacement of the existing UV disinfection system; and,
- Conversion of the existing trash tank into a secondary sludge thickening and holding tank.

A preliminary evaluation determined that, based on site footprint restrictions and effluent quality requirements, it is not feasible to expand the SBR treatment process at the Drumbo WWTP for servicing scenarios 2, 3, 4, or 5. The SBR treatment process can be expanded to treat projected growth in Drumbo only (Scenario 1). Expansion of the Drumbo WWTP using MBR technology was found to be feasible for all design scenarios.

A qualitative evaluation and conceptual level costs were developed for the six feasible design options. Specifically, these options are:

- Option 1A – Design Scenario 1 (Drumbo only) and expansion of existing SBR treatment process;
- Option 1B – Design Scenario 1 (Drumbo only) and conversion to an MBR treatment process;
- Option 2B – Design Scenario 2 (Drumbo + Princeton (STEP/STEG)) and conversion to an MBR treatment process;
- Option 3B – Design Scenario 3 (Drumbo + Princeton (conventional collection system)) and conversion to an MBR treatment process;
- Option 4B – Design Scenario 4 (Drumbo + Princeton and VanWees Development (STEP/STEG)) and conversion to an MBR treatment process; and,
- Option 5B – Design Scenario 5 (Drumbo + Princeton and VanWees Development (conventional collection system)) and conversion to an MBR treatment process.

Through this evaluation, the following observations are made regarding the expansion of the Drumbo WWTP:

- Relative to MBRs, SBRs represent a less complex and less expensive treatment technology. County operating staff are experienced working with the current SBR treatment process;
- Relative to MBRs, SBR treatment technology occupies a larger footprint, cannot produce an effluent quality meeting all of the proposed effluent limits, and cannot easily be expanded. Due to these limitations, use of SBR technology for Scenarios 2, 3, 4 and 5 is not considered to be feasible;
- Installation of preliminary treatment creates the potential for additional odours and increased truck traffic;
- Sludge production will increase with increasing flows. Relative to current operation, future sludge production (per treated m^3) is expected to be comparable; and,
- Due to receiver constraints, plant expansion beyond an ADF of about 950 m^3/d is limited, due to effluent TAN and TP quality that would be required at higher flows.

A summary of conceptual level costs for the feasible design options is provided in Table 6.1. These costs do not include the cost of constructing a collection system to service Princeton or the VanWees Development, or the costs of transferring flows from the VanWees Development and/or Princeton to the Drumbo WWTP site.

Table 6.1 Conceptual Level Cost Estimate for Drumbo WWTP Design Options

Parameter	Design Option 1A	Design Option 1B	Design Option 2B	Design Option 3B	Design Option 4B	Design Option 5B
Total Capital Cost (1)	$3.13M	$6.01M	$6.24M	$6.63M	$7.72M	$8.36M
Annual O&M Costs:	**$99K**	**$152K**	**$202K**	**$202K**	**$250K**	**$250K**
25-Year NPV O&M Cost (2)	$1.74M	$2.66M	$3.54M	$3.54M	$4.38M	$4.38M
25-Year Life Cycle Cost (2)	$4.86M	$8.67M	$9.79M	$10.17M	$12.10M	$12.75M

Notes:

All costs are conceptual level opinions of probable costs and are considered to be accurate to within -25 to +40 percent and are exclusive of HST.

1. Includes a 50% allowance for contingency and 12% allowance for approvals, permits and engineering.
2. Based on interest rate of 5%, and inflation rate of 2%.

7. REFERENCES

Dillon Consulting. Princeton Wastewater Servicing Study. January, 2016.

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Water Environment Association of Ontario/Ontario Ministry of the Environment. Optimization Guidance Manual for Sewage Works. 2010.

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XCG Consultants Ltd. Drumbo WWTP Capacity Review. May 2014.

APPENDIX A
IMPACT OF WELL 3 ON THE PROPOSED EXPANSION OF THE DRUMBO WWTP

Oxford County growing stronger...together
PUBLIC WORKS
P. O. Box 1614, 21 Reeve Street, Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 • Fax: 519-421-4711
Website: www.oxfordcounty.ca

January 25, 2016

Shahab Shafai, P.Eng.
Manager of Environmental Services
Oxford County
21 Reeve Street, P.O.Box. 1614
Woodstock, ON N4S 7Y3

RE: Drumbo Wastewater Treatment Plant Class EA

The Risk Management Office has conducted a preliminary review of the above noted planned Class EA and has the following comments:

The Drumbo Wastewater Treatment Plant (WWTP) is located within the WHPA-A (100 m zone) for well 3 of the Drumbo Drinking Water System (map attached). The vulnerability score in that area is 10 and as such the WWTP has been identified as a significant drinking water threat under the Clean Water Act, 2006 (the Act).

Under the Act, the establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage is considered a significant drinking water threat activity. Specifically, there are 3 components of the WWTP that have been flagged as significant drinking water threats, under specific circumstances:

1) Collection system piping,
2) Discharge, and
3) Tankage for treatment or storage, whether above or below grade

The detailed significant threat circumstances are included in Appendix A.

The above-noted activities associated with the WWTP will be subject to the policies in the Grand River Source Protection Plan (the Plan), which will come into effect on July 1, 2016. The Plan contains policies for both existing and future activities. Unless otherwise noted in the specific policies, it is intended that replacements, modifications and expansions to existing significant threat activities be considered as part of the existing significant threat activity and, therefore, evaluated in accordance with the policies pertaining to existing threats. Therefore, the WWTP upgrade will be subject to policies OC-MC-3.5 and OC-MC-3.7. Policies OC-MC-3.5 and OC-MC-3.7 direct the MOECC to review and where necessary amend the ECA to incorporate terms and conditions to ensure the activity ceases to be considered a significant drinking water threat. The policy excerpts are included in Appendix B for reference.

Conditions imposed by the MOECC may include requirements such as more frequent cleaning/inspection, more stringent specifications on construction material types, more robust spill response plans and procedures and additional reporting requirements for spills. It is recommended that you consult with the MOECC early in the Class EA process.

For further questions or clarifications please contact the undersigned at 519-539-9800 extension 3116.

Deborah Goudreau, P.Eng.
Manager of Water Services
Oxford County

Copy: Mark Maxwell, P.Eng., Oxford County

Appendix A

Tables of Drinking Water Threats *Clean Water Act, 2006*

Excerpt from Table 2 – Drinking Water Threats – Pathogens:

Drinking Water Threat:	Reference Number	Under the following circumstances
The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	1958	1. The system is a wastewater collection facility that collects or transmits sewage containing human waste, but does not include any part of the facility that is a sewage storage tank or works used to carry out a designed bypass. 2. The discharge from the system may result in the presence of one or more pathogens in groundwater or surface water.
	1959	1. The system is a wastewater treatment facility that discharges to surface water through a means other than a designed bypass. 2. A discharge may result in the presence of one or more pathogens in groundwater or surface water.
	1960	1. The system is a sewage treatment tank or sewage storage tank in either a wastewater collection facility or wastewater treatment facility, and any part of the tank is at or above grade. 2. A spill from the tank may result in the presence of one or more pathogens in groundwater or surface water.
	1961	1. The system is a sewage treatment tank or sewage storage tank in a wastewater collection facility or a wastewater treatment facility and the tank is below grade. 2. A spill from the tank may result in the presence of one or more pathogens in groundwater or surface water.

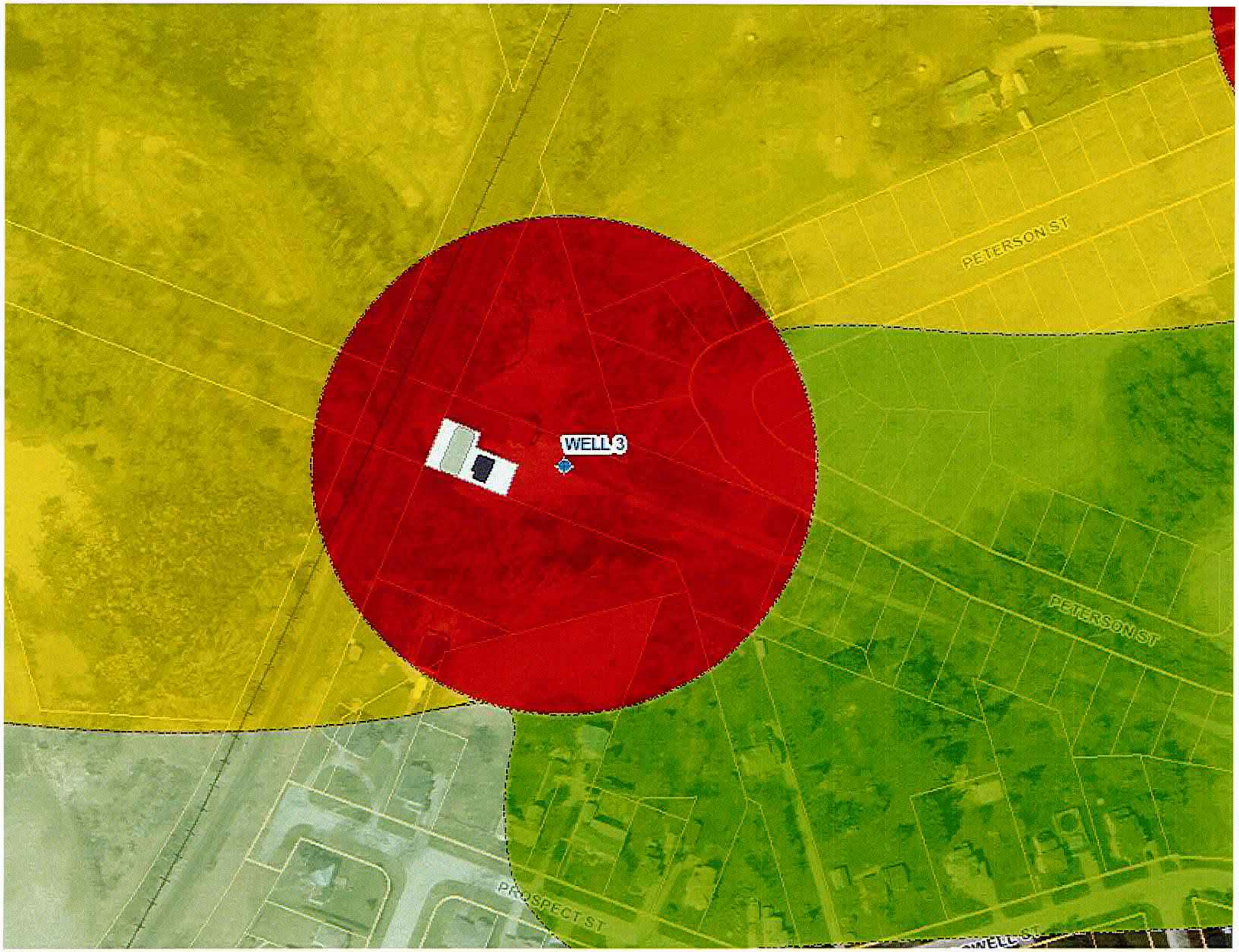
Appendix B

Grand River Source Protection Plan Volume II – Approved

Excerpt from Chapter 12:

Policy Number	Source Protection Plan Policies within the County of Oxford
Sewage System or Sewage Works- Storage of Sewage (e.g., treatment plant tanks) Sewage System or Sewage Works- Sewage Treatment Plant Effluent Discharges	
OC-MC-3.5 *Existing* *Prescribed Instr.* *WHPA-A- v.10;* *WHPA-B- v.10 WHPA-B-v.8;* *WHPA-C-v.8*	For any existing sewage treatment plant effluent discharges or storage of sewage, where these activities are significant drinking water threats, the Ministry of the Environment and Climate Change shall review, and where necessary, amend Environmental Compliance Approvals to incorporate terms and conditions that, when implemented, ensure these activities cease to be significant drinking water threats.
OC-MC-3.6 *Future* *Prescribed Instr.* *WHPA-A- v.10;* *WHPA-B- v.10 WHPA-B-v.8;* *WHPA-C-v.8*	For any new sewage treatment plant effluent discharge or storage of sewage, where these activities would be significant drinking water threats, the Ministry of the Environment and Climate Change shall prohibit these activities through the Environmental Compliance Approvals process to ensure these activities never become significant drinking water threats.
Sewage System or Sewage Works – Sanitary Sewers and Related Pipes	
OC-MC-3.7 *Existing/Future* *Prescribed Instr.* *WHPA-A- v.10;* *WHPA-B- v.10*	For any existing or new sanitary sewer and related pipes, where this activity is, or would be a significant drinking water threat, the Ministry of the Environment and Climate Change shall ensure that the Environmental Compliance Approval for this activity is prepared, or, where necessary, amended to incorporate terms and conditions that, when implemented ensure this activity ceases to be or will never become a significant drinking water threat. The terms and conditions may include, but not necessarily be limited to, requirements for regular maintenance and inspections by the holder of the Environmental Compliance Approval.

Drumbo WWTP



Legend

- Buildings - Control
- Site (Grounds)
- Site (Works)
- Production Well
- WHPA A-D

AVI:Score (WHPA A): 2, 4, 6, 8, 10

AVI:Score (WHPA B): 2, 4, 6, 8, 10

AVI:Score (WHPA C): 2, 4, 6, 8, 10

AVI:Score (WHPA D): 2, 4, 6, 8, 10

SWAT:Score (WHPA A): 2, 4, 6, 8, 10

SWAT:Score (WHPA B)

Notes

0 58 117 Meters

NAD_1983_UTM_Zone_17N

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. This is not a plan of survey

January 25, 2016

APPENDIX B
DETAILS OF PRELIMINARY TREATMENT DESIGN

Drumbo WWTP

Ontario

Represented by

Tonia Van Dyk

C & M Environmental

Barrie, Ontario

(705) 725-9377

tvandyk@cmeti.com

Furnished by

Ryan Spanton

rspanton@westech-inc.com

WesTech

WesTech Opportunity Number: 1660076
Thursday, February 04, 2016

Item A – One (1) CleanFlo™ Spiral Screen Model FSI4

General Design Criteria (EACH) - Peak Flow 1,098 m^3/day		
Application	**Domestic Sewage Screening**	
Description	**Dimension/Capacity**	**Units**
Peak Flow	1,098	m^3/day (0.29 MGD)
Downstream Water Level	71	mm (2.79 inches) @ peak flow
Clean Screen Headloss	128	mm (5.05 inches)
Max Allowed Upstream Level	459	mm (18.06 inches)
Screen Opening	3	mm (1/8 inch), Perforated type
Angle of Inclination	35	Degrees from horizontal
Channel Width	508	mm (20 inches)
Channel Depth	915	mm (36 inches)
Discharge Height	1485	mm (58 inches) from top of channel
Discharge Height w/ Bagger	1270	mm (50 inches) from top of channel
Washwater Requirements		
Basket Spray:	0.25	L/s @ 2.8 bar (4 gpm @40 psi)
Compaction Zone Flush	0.13	L/s @ 2.8 bar (2 gpm @ 40 psi)

General Design Criteria EACH - Peak Flow 2,190 m^3/day		
Application	**Domestic Sewage Screening**	
Description	**Dimension/Capacity**	**Units**
Peak Flow	2.190	m^3/day (0.58 MGD)
Downstream Water Level	113	mm (4.43 inches) @ peak flow
Clean Screen Headloss	203	mm (8.01 inches)
Max Allowed Upstream Level	459	mm (18.06 inches)
Screen Opening	3	mm (1/8 inch), Perforated type
Angle of Inclination	35	Degrees from horizontal
Channel Width	508	mm (20 inches)
Channel Depth	915	mm (36 inches)
Discharge Height	1485	mm (58 inches) from top of channel
Discharge Height w/ Bagger	1270	mm (50 inches) from top of channel
Washwater Requirements		
Basket Spray:	0.25	L/s @ 2.8 bar (4 gpm @40 psi)
Compaction Zone Flush	0.13	L/s @ 2.8 bar (2 gpm @ 40 psi)

General Design Criteria(EACH) - Peak Flow 2,831 m^3/day

Application	**Domestic Sewage Screening**	
Description	**Dimension/Capacity**	**Units**
Peak Flow	2,831	m^3/day (0.75 MGD)
Downstream Water Level	134	mm (5.29 inches) @ peak flow
Clean Screen Headloss	239	mm (9.39 inches)
Max Allowed Upstream Level	459	mm (18.06 inches)
Screen Opening	3	mm (1/8 inch), Perforated type
Angle of Inclination	35	Degrees from horizontal
Channel Width	508	mm (20 inches)
Channel Depth	915	mm (36 inches)
Discharge Height	1485	mm (58 inches) from top of channel
Discharge Height w/ Bagger	1270	mm (50 inches) from top of channel
Washwater Requirements		
Basket Spray:	0.25	L/s @ 2.8 bar (4 gpm @40 psi)
Compaction Zone Flush	0.13	L/s @ 2.8 bar (2 gpm @ 40 psi)

Screen Detailed Scope of Supply (EACH)

Item	Description	Material
Screenings basket	Semi-cylindrical	304SS
Conveyor tube	Wear bars	304SS
Side Seals	Fasten to basket to prevent screen bypass	Neoprene
Spiral screw	Shaftless, Protective prime coating	Carbon Steel
Brushes	Attached in basket, 180° Sections, Dual sided support of shaftless spiral	Nylon Bristles, Plastic Core, SS fasteners
Discharge Zone	Dual chambered, Hinged access door	304SS
Ball Valve(s)	Manual	
Hose	Drain connection, Direct pressate back to channel	Plastic
Drive Unit	1.5 HP motor suitable for 575/3/60 electric supply	
Screen Support	Support stand, Allows rotation out of channel	304SS
Fasteners	Assembly fasteners	304SS
Anchor Rods	Anchor rods	304SS
Spray System	Dewatering zone drain flush	304SS
Spray Bar	Basket mounted	304SS
Washing System Piping	Connect all unit spray locations, includes solenoids	304SS

Electrodical Devices (EACH)		
Item	Qty	Description
Microswitch	1	Safety microswitch, mounted to discharge access door
Float Switch	1	Mercury-free type, Stainless steel mounting bracket
Solenoid Valve	2	NEMA 4X 120V solenoid to control water spray
Emergency Stop	1	NEMA 4X Local pushbutton, Field mounted at the unit

Control Panel (EACH)

- One (1) NEMA 4X type 304 stainless steel main control panel suitable for 600/3/60 electrical supply. Control panel shall contain the following devices for operation of the screen unit:
    1. Step down control transformer and through door disconnect with handle.
    2. Branch circuit protection.
    3. Full voltage reversing motor starter.
    4. Emergency stop pushbutton.
    5. Screen HOA switch.
    6. Screen FOR switch, spring return Reverse to Off.
    7. Basket spray HOA switch.
    8. Compaction zone spray HOA switch.
    9. Load monitor for overload protection.
    10. Hour meter for each motor.
    11. Control power and run indicating lights.
    12. Alarm light indicating overcurrent and starter overload.
    13. Alarm reset pushbutton.
    14. Programmable control relay provides control logic functions.
    15. Run and alarm auxiliary contacts
    16. Panel Heater with thermostat
    17. CSA Label

Spares (TOTAL)

- One (1) set of spare brushes

Field Service		
Item	Qty	Description
Trips	1	Trip for installation inspection, start-up, and operator training
Days	1	Day for installation inspection, start-up, and operator training

Item A-1 – Bagging System

A continuous bagger assembly collects dewatered screenings at discharge in refillable bag cassettes.

Item A-2 – Ultrasonic Level Sensor

One (1) Milltronics Pointek ULS200 ultrasonic sensor with stainless steel mounting bracket. (Replaces float switch).

Item A-3 – Weather Protection System

Conveyor tube wrapped with self-regulating heat trace cable supplied with insulation and protective type 304 stainless steel jacket. Electrical wiring routed to a factory mounted conduit box for field connection. One (1) NEMA 4X ambient temperature thermostat and GFCI circuit breaker mounted in the control panel included to control heat tracing.

Quality Assurance Program

WesTech prides itself on its quality products and customer service. Recognizing the importance of continuous improvement, WesTech has developed a quality management system in order to meet our customer's needs for exceptional quality and service. This system is based on, and complies with, the International Organization for Standardization's ISO-9001 standard, and its technical U.S. equivalent ANSI/ASQC Q9001.

Items Not By WesTech

Electrical wiring, conduit or electrical equipment, piping, valves, or fittings, lubricating oil or grease, shop or field painting, field welding, erection, detail shop fabrication drawings, performance testing, unloading, storage, concrete work, field service, (except as specifically noted).

NOTE: ANY ITEM NOT LISTED ABOVE TO BE FURNISHED BY OTHERS.

CLARIFICATIONS

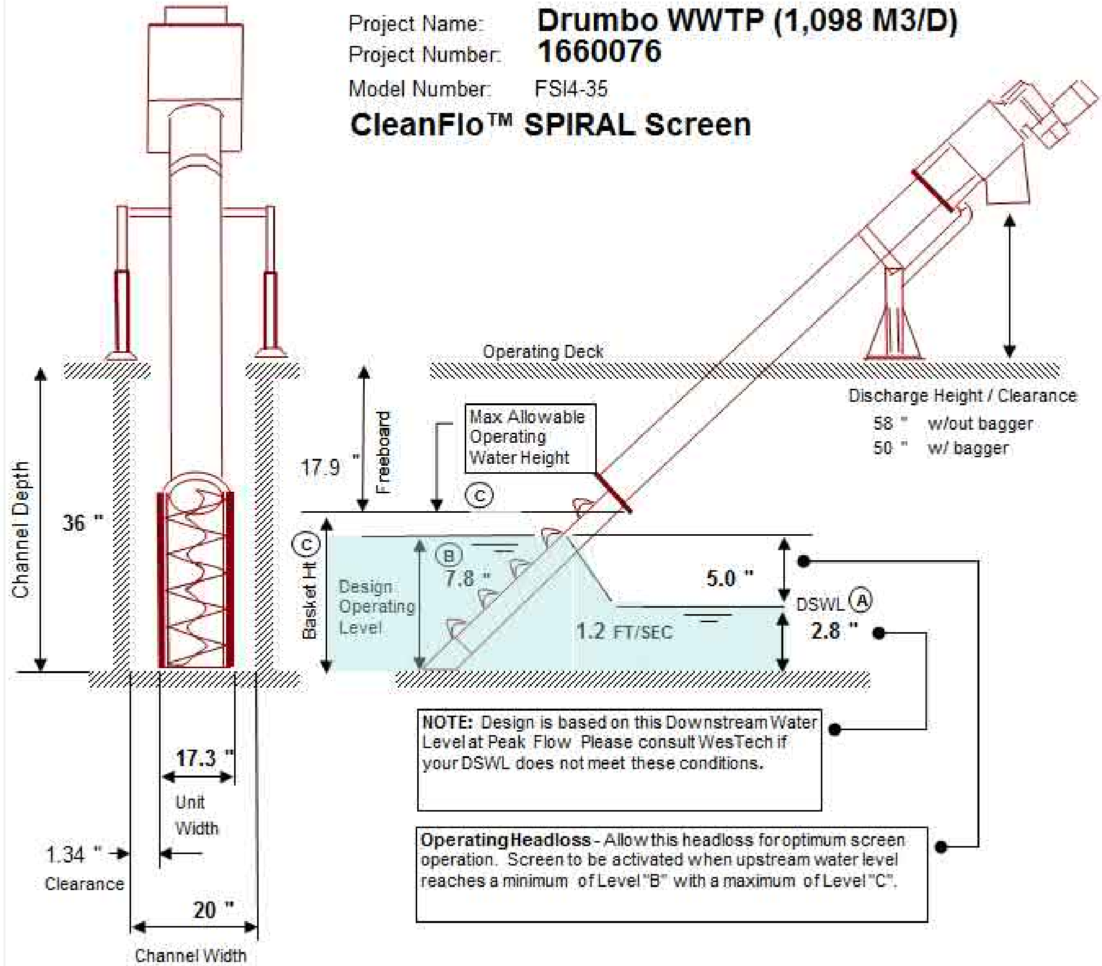
1) Unit anchorage designed around RedHead A7 adhesive system. Adhesive and applicator by others.
2) Any item not listed above to be furnished by others.

This proposal section has been reviewed for accuracy and approved for issue:

By: <u>Todd Campbell</u> Date: February 4, 2016

Project Name: **Drumbo WWTP (1,098 M3/D)**
Project Number: **1660076**
Model Number: FSI4-35

CleanFlo™ SPIRAL Screen



Basis of Design

Peak Design Flow (PDF)	0.29 MGD
Down Stream Water Level @ PDF......	2.79 "
Screen Opening	0.12 in
Channel Width	20 "
Channel Depth	36 "
Basket Height C	18.06 " Note: Operating Height Not to Exceed Basket Ht
Screen Angle	35 °

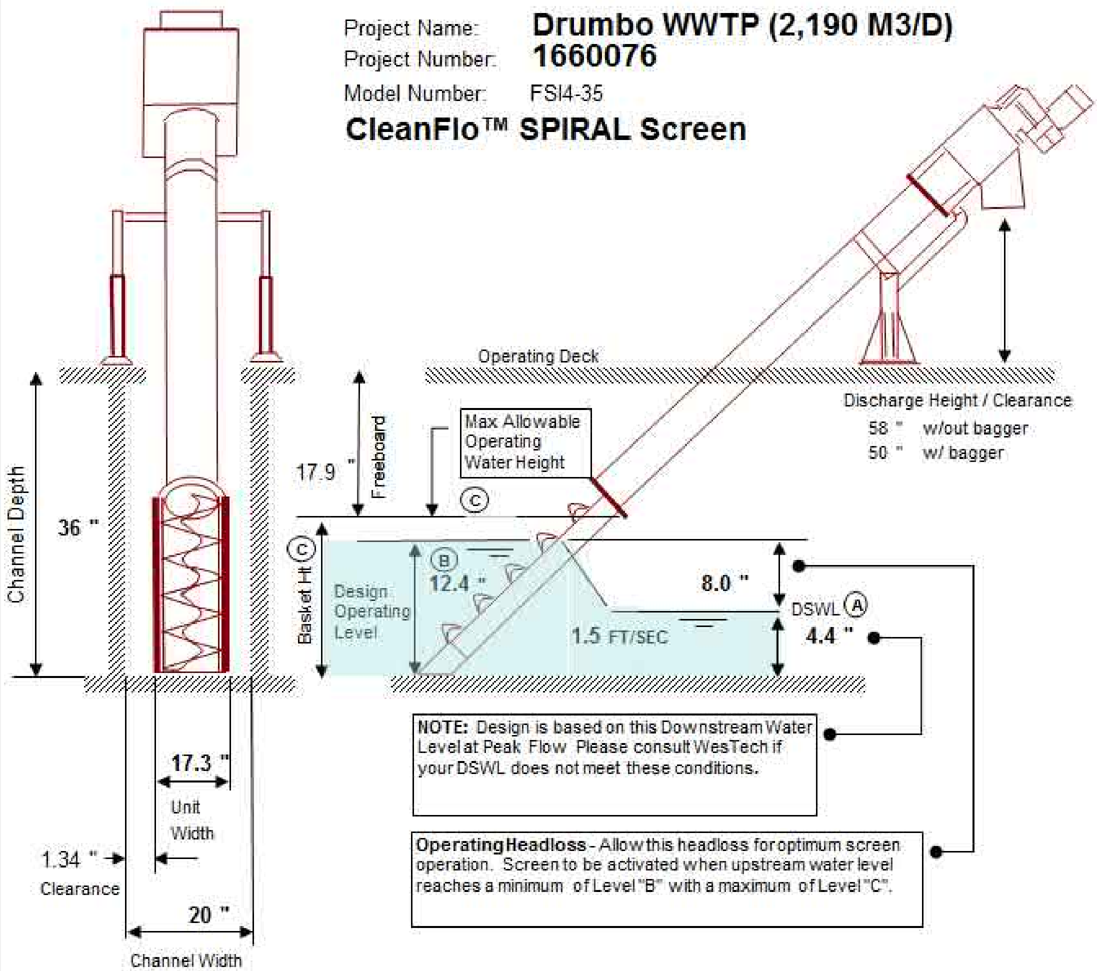
Resultant Operating Conditions

Min Operating Headloss	5.05 " (B - A)
Max Operating Headloss	15.27 " (C - A)
Freeboard at Max USWL	17.94 "
Upstream Flow Velocity at Level "B"...	0.18 ft/sec

WESTECH

Project Name: **Drumbo WWTP (2,190 M3/D)**
Project Number: **1660076**
Model Number: FSI4-35

CleanFlo™ SPIRAL Screen



Basis of Design

Peak Design Flow (PDF)	0.58	MGD
Down Stream Water Level @ PDF	4.43	"
Screen Opening	0.12	in
Channel Width	20	"
Channel Depth	36	"
Basket Height C	18.07	" Note: Operating Height Not to Exceed Basket Ht
Screen Angle	35	°

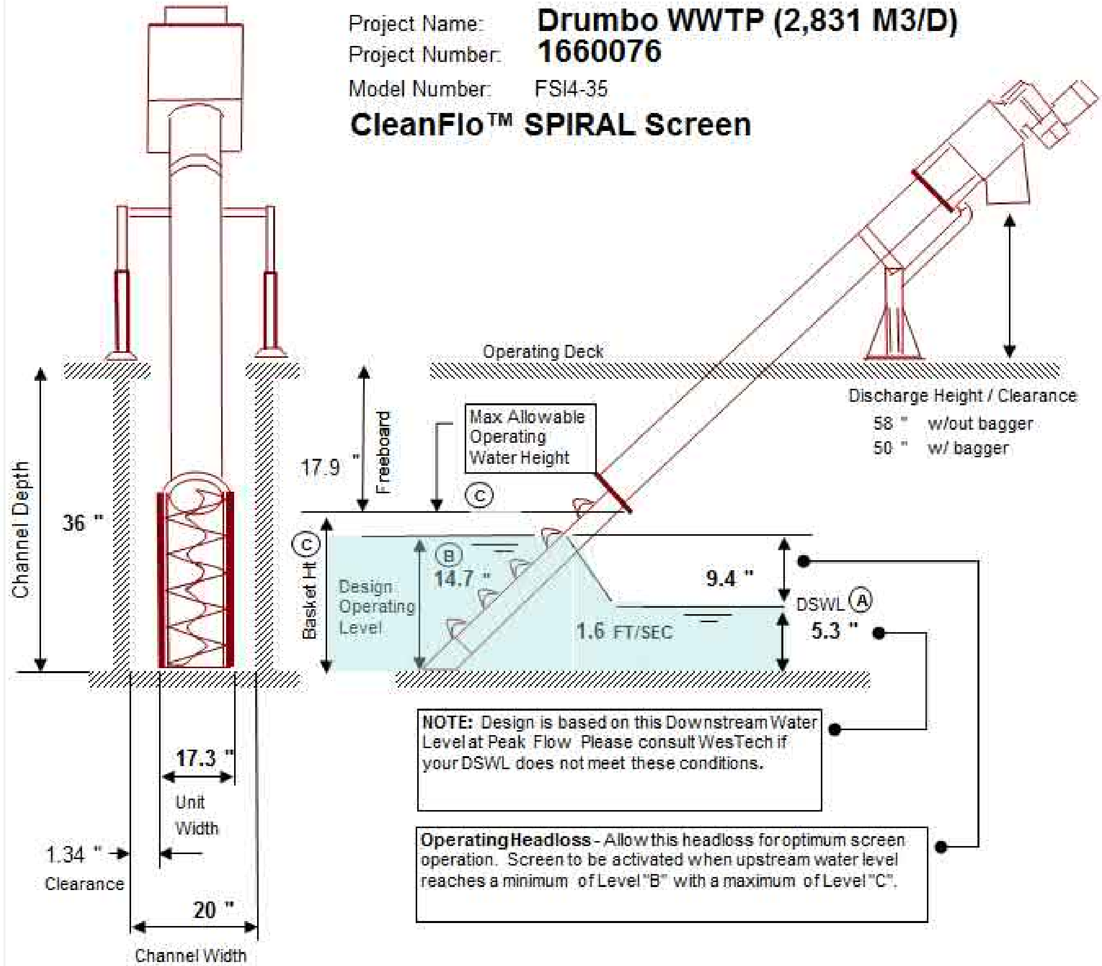
Resultant Operating Conditions

Min Operating Headloss	8.01	" (B - A)
Max Operating Headloss	13.64	" (C - A)
Freeboard at Max USWL	17.93	"
Upstream Flow Velocity at Level "B"	0.36	ft/sec

WesTech

Project Name: **Drumbo WWTP (2,831 M3/D)**
Project Number: **1660076**
Model Number: FSI4-35

CleanFlo™ SPIRAL Screen



Basis of Design

Peak Design Flow (PDF)	0.75	MGD
Down Stream Water Level @ PDF	5.29	"
Screen Opening	0.12	in
Channel Width	20	"
Channel Depth	36	"
Basket Height C	18.07	" Note: Operating Height Not to Exceed Basket Ht
Screen Angle	35	°

Resultant Operating Conditions

Min Operating Headloss	9.39	" (B - A)
Max Operating Headloss	12.78	" (C - A)
Freeboard at Max USWL	17.93	"
Upstream Flow Velocity at Level "B"	0.46	ft/sec

WESTECH

Item B – One (1) CleanFlo™ Monoscreen® Unit Model RSM 20-40-2

General Design Criteria – Peak Flow 1,098 m³/day		
Application	**Domestic Sewage Screening**	
Description	**Dimension/Capacity**	**Units**
Peak Flow	1,098	m^3/day (0.29 MGD)
Downstream Water Level	300	mm (11.8inches) @ peak flow
Max Upstream Water Level	550	mm (21.7inches)
Maximum Headloss	250	mm (9.8inches)
Channel Width	500	mm (16 inches)
Channel Depth	1400	mm (55.1inches)
Screen Opening	2	mm
Discharge Height	2040	mm (6.7 feet) from base of screen

General Design Criteria – Peak Flow 2,190 m³/day		
Application	**Domestic Sewage Screening**	
Description	**Dimension/Capacity**	**Units**
Peak Flow	2,190	m^3/day (0.58 MGD)
Downstream Water Level	300	mm (11.8inches) @ peak flow
Max Upstream Water Level	550	mm (21.7inches)
Maximum Headloss	250	mm (9.8inches)
Channel Width	500	mm (16 inches)
Channel Depth	1400	mm (55.1inches)
Screen Opening	2	mm
Discharge Height	2040	mm (6.7 feet) from base of screen

General Design Criteria – Peak Flow 2,831 m^3/day

Application	Domestic Sewage Screening	
Description	**Dimension/Capacity**	**Units**
Peak Flow	2,831	m^3/day (0.75 MGD)
Downstream Water Level	300	mm (11.8inches) @ peak flow
Max Upstream Water Level	550	mm (21.7inches)
Maximum Headloss	250	mm (9.8inches)
Channel Width	500	mm (16 inches)
Channel Depth	1400	mm (55.1inches)
Screen Opening	2	mm
Discharge Height	2040	mm (6.7 feet) from base of screen

Screen Detailed Scope of Supply (Each)

Item	Description	Material
Frame	Screen frame	304SS
Seal Plate	Directs material onto first step profile	304SS
Side Seals	Fasten to basket to prevent screen bypass	Neoprene
Lamella plates	Alternating movable and stationary 0.12 inch thick, progressive step profile, serrations on downstream side	304SS
Spacers	Supplied between adjacent plates	
Drive Unit	1.1 kW (1.5 HP) 575/3/60 Motor	
Drive Shaft	Includes NO submerged bearings, chains, or sprocket systems	Carbon Steel
Enclosure	Screen enclosure above top of channel	304SS
Backstop	Mechanical shaft mounted backstop (if required)	
Lubrication System	Lubrication lines from drive shaft bearings to common point, both sides of screen	
Grease Cups	Electro-mechanical grease cups for automatic lubrication of chains	
Screen Legs	Support screen, allow pivoting out of channel	304SS
Fasteners	Assembly fasteners	304SS
Anchor Rods	Anchor rods	304SS

Electrical Devices

Item	Qty	Description
Home Position Switch	1	Home position switch, mounted at unit drive assembly
Level Controller	1	Milltronics HydroRanger 200 ultrasonic level controller
ULC Enclosure	1	NEMA 4X polycarbonate enclosure
Handheld Programmer	1	Handheld programmer for ultrasonic level controller
Transducer	2	Milltronics ultrasonic level transducer with integral 10m cable, C1D1
Mounting Bracket	2	Type 304SS mounting bracket for ultrasonic level transducers
Emergency Stop	1	NEMA 4X Local pushbutton, Field mounted at the unit

Control Panel

Item	Description
Panel:	NEMA 4X Stainless Steel Main Control, 600/3/60 Electric Supply
Control Relay/PLC:	Programmable control relay to provide control logic functions.
HMI:	None
Emergency Stop	Local pushbutton
Switches	HOA switches for Screen FOR switch for screen, spring return Reverse to Off
Motor Starter	Full voltage reversing motor starter
	Step down control transformer and through door disconnect with handle
	Branch circuit protection
	Load monitor for overload protection
	Hour meter for each motor
	Control power and run indicating lights
	Alarm light indicating overcurrent and starter overload
	Alarm reset pushbutton
	Panel heater with thermostat
	Run and alarm auxiliary contacts
	CSA Label

Spares (TOTAL)

- None

Field Service

Item	Qty	Description
Trips	1	Trip(s) for installation inspection, start-up, and operator training
Days	1	Day(s) for installation inspection, start-up, and operator training

Optional Items - None

Quality Assurance Program

WesTech prides itself on its quality products and customer service. Recognizing the importance of continuous improvement, WesTech has developed a quality management system in order to meet our customer's needs for exceptional quality and service. This system is based on, and complies with, the International Organization for Standardization's ISO-9001 standard, and its technical U.S. equivalent ANSI/ASQC Q9001.

Items Not By WesTech

Electrical wiring, conduit or electrical equipment, piping, valves, or fittings, lubricating oil or grease, shop or field painting, field welding, erection, detail shop fabrication drawings, performance testing, unloading, storage, concrete work, field service, (except as specifically noted).

NOTE: ANY ITEM NOT LISTED ABOVE TO BE FURNISHED BY OTHERS.

CLARIFICATIONS

1) Unit anchorage designed around RedHead A7 adhesive system. Adhesive and applicator by others.
2) Any item not listed above to be furnished by others.

This proposal section has been reviewed for accuracy and approved for issue:

By: **Todd Campbell**   Date: February 4, 2016

Item C – One (1) CleanWash™ Screw Wash Press Model No. SWP15-30

General Design Criteria (Each)

Application	**Screenings Washing and Dewatering**	
Description	**Dimension/Capacity**	**Units**
Unit Capacity	0.51	m^3/hr. (18 $ft.^3$/ hr.) screenings
Inlet Length	300	mm (11.8 inches)
Screw OD	140	mm (5.5 inches)
Spray Wash	0.6-1.6	L/s @ 2.8-4.1 bar (10-25 gpm @ 40-60 psi)
Compaction Flush	0.9- 2.0	L/s @ 2.8-4.1 Bar (15-32 gpm @ 40-60 psi)

Screenings Washer Detailed Scope of Supply (Each)

Item	**Description**	**Material**
Washer Body	Washer body	304SS
Perforations	5mm countersunk in inlet, washing and compaction zones	
Access Panels	Removable for inspection and maintenance	304SS
Screw	Shafted dewatering screw	304SS
Scraper	Scrapers located in inlet/washing zone transition	Polyurethane
Inlet hopper	Inlet hopper	304SS
Discharge Piping	Schedule 10	304SS
Spray Wash System	High intensity spray wash system	304SS
Wear Strips	Replaceable wear strips in dewatering zone	Hardox
Drive Unit	1.1 kW (1.5 HP) motor suitable for 575/3/60 electric supply	
Ball Valves	2 ½ inch ball valves	Brass
Fasteners	Assembly fasteners	304SS
Anchor Rods	Anchor rods	304SS

Electrical Devices (Each)

Item	**Qty**	**Description**
Solenoid Valves	2	NEMA 4X solenoid valves to control water spray functions
Emergency Stop	1	NEMA 4X Local pushbutton, Field mounted at the unit

Control Panel Adders (Total)

- The following items will be included in the screen control panel for operation of the washer/compactor:
  1. Drive motor starter.
  2. Screw, spray wash, and flush HOA switches.
  3. Current monitor for overload protection.
  4. Hour meter for screen motor.
  5. Run indicating lights.
  6. Alarm light indicating overcurrent and starter overload.
  7. Control relays and timers for control logic functions.
  8. Run and alarm auxiliary contacts

Spare Parts

None

Field Service

Include with Screen Scope of Supply

Item C-1 – Bagging System

A continuous bagger assembly collects dewatered screenings at discharge in refillable bag cassettes

Quality Assurance Program

WesTech prides itself on its quality products and customer service. Recognizing the importance of continuous improvement, WesTech has developed a quality management system in order to meet our customer's needs for exceptional quality and service. This system is based on, and complies with, the International Organization for Standardization's ISO-9001 standard, and its technical U.S. equivalent ANSI/ASQC Q9001.

Items Not By WesTech

Electrical wiring, conduit or electrical equipment, piping, valves, or fittings, lubricating oil or grease, shop or field painting, field welding, erection, detail shop fabrication drawings, performance testing, unloading, storage, concrete work, field service, (except as specifically noted).

NOTE: ANY ITEM NOT LISTED ABOVE TO BE FURNISHED BY OTHERS.

CLARIFICATIONS

1) Unit anchorage designed around RedHead A7 adhesive system. Adhesive and applicator by others.
2) Any item not listed above to be furnished by others.

This proposal section has been reviewed for accuracy and approved for issue:

By: **Todd Campbell**   Date: February 4, 2016

Pricing

Proposal Name: Drumbo WWTP
Proposal Number: 1660076

1. Bidder's Contact Information

Company Name	WesTech Engineering, Inc.
Contact Name	Ryan Spanton
Phone	801.265.1000
Email	rspanton@westech-inc.com
Address: Number/Street	3665 S West Temple
Address: City, State, Zip	Salt Lake City, UT 84115

2. Pricing

Currency		CAN Dollars
A	(1) CleanFlo™ Spiral Screen Model FSI4	$75,000
A-1	Bagging System	$2,400
A-2	Ultrasonic Level Sensor	$2,800
A-3	Weather Protection System	$10,000
B	(1) CleanFlo™ Monoscreen® Unit Model RSM 20-40-2	$101,000
C	(1) CleanWash™ Screw Wash Press Model No. SWP15-30	$41,000
C-1	Bagging System	$2,400

Field Service

Daily Rate	$960.00

Prices do not include field service unless noted, but it is available at the daily rate plus expenses. The customer will be charged for a minimum of three days for time at the jobsite. Travel will be billed at the daily rate. Any canceled charges due to the customer's request will be added to the invoice. The greater of visa procurement time or a two week notice is required prior to trip departure date.

Taxes (sales, use, VAT, IVA, IGV, duties, fees, import, etc.)	Not Included

3. Payment Terms

Submittal Approval	15%
Release for Fabrication	35%
Net 30 days from Shipment	50%

4. Schedule

Submittals, after PO receipt	6 to 8 weeks
Ready to Ship, after Submittal approval	18 to 20 weeks

Terms & Conditions: This proposal, including all terms and conditions contained herein, shall become part of any resulting contract or purchase order. Changes to any terms and conditions, including but not limited to submittal and shipment days, payment terms, and escalation clause shall be negotiated at order placement, otherwise the proposal terms and conditions contained herein shall apply.

Freight: Prices quoted are **F.O.B. shipping point** with freight allowed to a readily accessible location nearest to jobsite. All claims for damage or loss in shipment shall be initiated by purchaser.

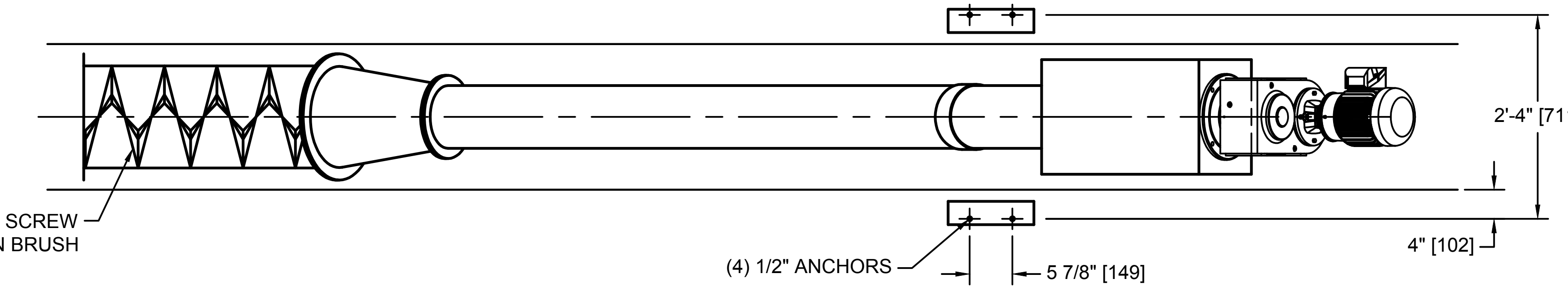
Paint: If your equipment has paint included in the price, please take note to the following. Primer paints are designed to provide only a minimal protection from the time of application (usually for a period not to exceed 30 days). Therefore, it is imperative that the finish coat be applied within 30 days of shipment on all shop primed surfaces. Without the protection of the final coatings, primer degradation may occur after this period, which in turn may require renewed surface preparation and coating. If it is impractical or impossible to coat primed surfaces within the suggested time frame, WesTech strongly recommends the supply of bare metal, with surface preparation and coating performed in the field. All field surface preparation, field paint, touch-up, and repair to shop painted surfaces are not by WesTech.

BASIS OF DESIGN - 1,098 M3/DAY

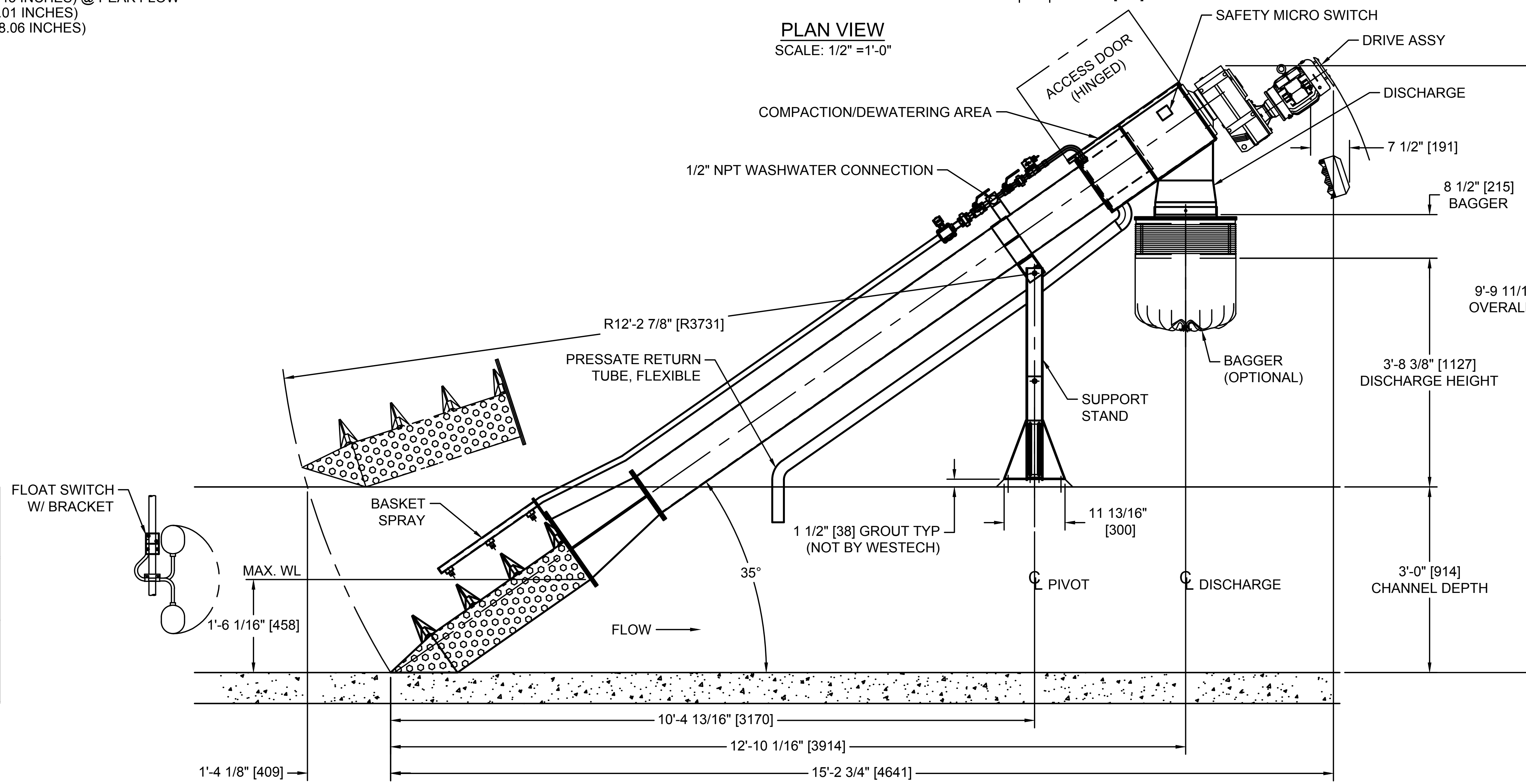
APPLICATION:	DOMESTIC SEWAGE SCREENING
PEAK FLOW RATE:	1,098 M3/DAY (0.29 MGD)
DOWNSTREAM WATER LEVEL:	71MM (2.79 INCHES) @ PEAK FLOW
CLEAN SCREEN HEADLOSS:	128MM (5.05 INCHES)
MAX ALLOWED UPSTREAM LEVEL:	459MM (18.06 INCHES)

BASIS OF DESIGN - 2,190 M3/DAY

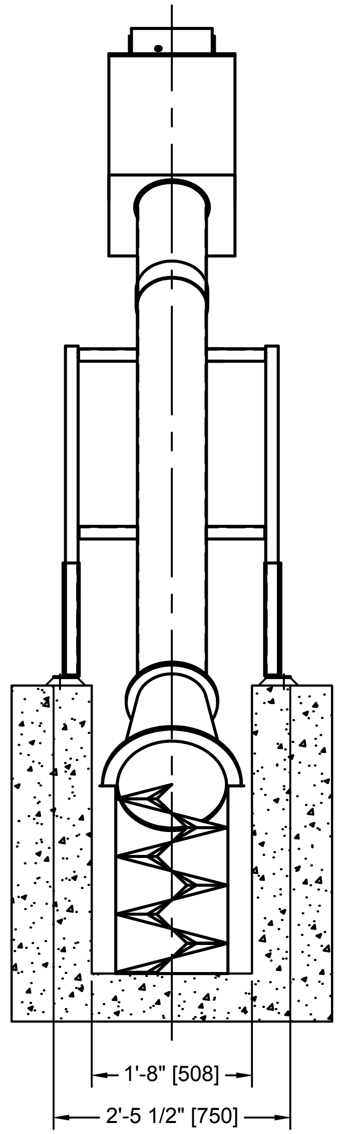
APPLICATION:	DOMESTIC SEWAGE SCREENING
PEAK FLOW RATE:	2,190 M3/DAY (0.58 MGD)
DOWNSTREAM WATER LEVEL:	113MM (4.43 INCHES) @ PEAK FLOW
CLEAN SCREEN HEADLOSS:	203MM (8.01 INCHES)
MAX ALLOWED UPSTREAM LEVEL:	459MM (18.06 INCHES)



PLAN VIEW
SCALE: 1/2" =1'-0"



ELEVATION VIEW
SCALE: 1/2" =1'-0"



FRONT ELEVATION VIEW
SCALE: 1/2" =1'-0"

NOTES:

1. WASHWATER REQUIREMENTS:
   COMPACTION FLUSH - 0.13 L/S @ 2.8 BAR (2 GPM @ 30-40 PSI)
   BASKET SPRAY - 0.25 L/S @ 2.8 BAR (8 GPM @ 30-40 PSI)
2. MOTOR - 0.75Kw (1 HP), 575 VOLT, 3 PHASE, 60 HZ
3. SCREEN OPENING - 1/4" PERFORATED
4. ALL INTERCONNECTING PIPING AND WIRING BY OTHERS (NOT BY WESTECH). PROVIDE FLEXIBLE CONNECTIONS TO THE UNIT IN ORDER TO ALLOW PIVOTING OF THE SCREEN.
5. DIMENSION SHOWN IN FEET-INCHES [mm]

BASIS OF DESIGN - 2,831 M3/DAY

APPLICATION:	DOMESTIC SEWAGE SCREENING
PEAK FLOW RATE:	2,831 M3/DAY (0.75 MGD)
DOWNSTREAM WATER LEVEL:	134MM (5.29 INCHES) @ PEAK FLOW
CLEAN SCREEN HEADLOSS:	239MM (9.39 INCHES)
MAX ALLOWED UPSTREAM LEVEL:	459MM (18.06 INCHES)

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE

REFERENCE DOCUMENTS

STATUS: INFORMATION ONLY

PROJECT: 1660076 DRUMBO WWTP

TITLE: **CLEANFLO SPIRAL SCREEN**
FSI4

DESIGNER	CHECKER	APPROVER	DATE
BE14	ID	ID	2016-02-04

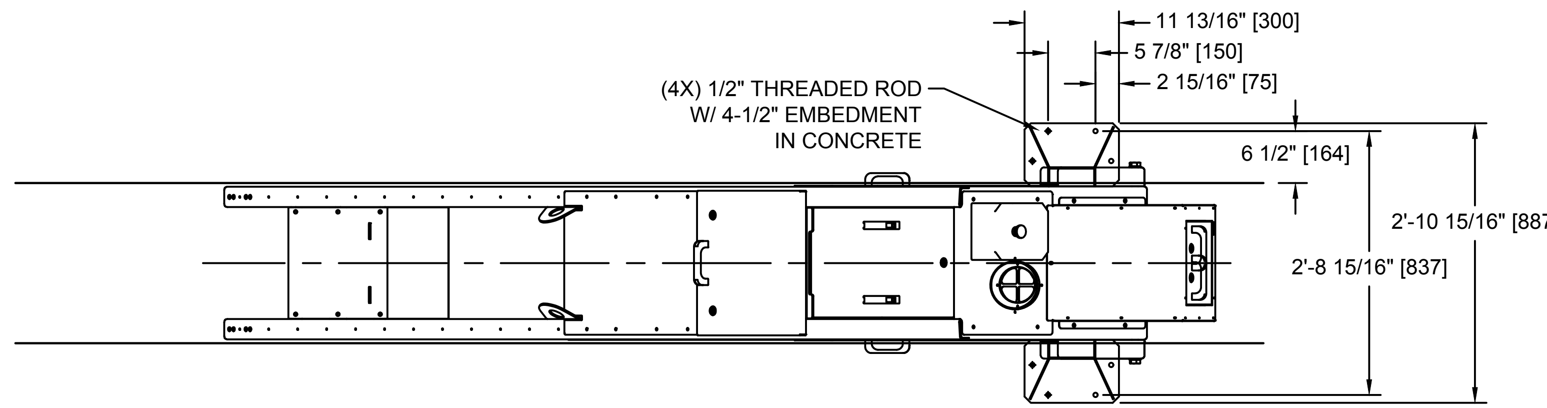
DOCUMENT NUMBER	SHEET	REV
1660076-1000	1 OF 1	-

BASIS OF DESIGN - PEAK FLOW 1,098 M3/DAY

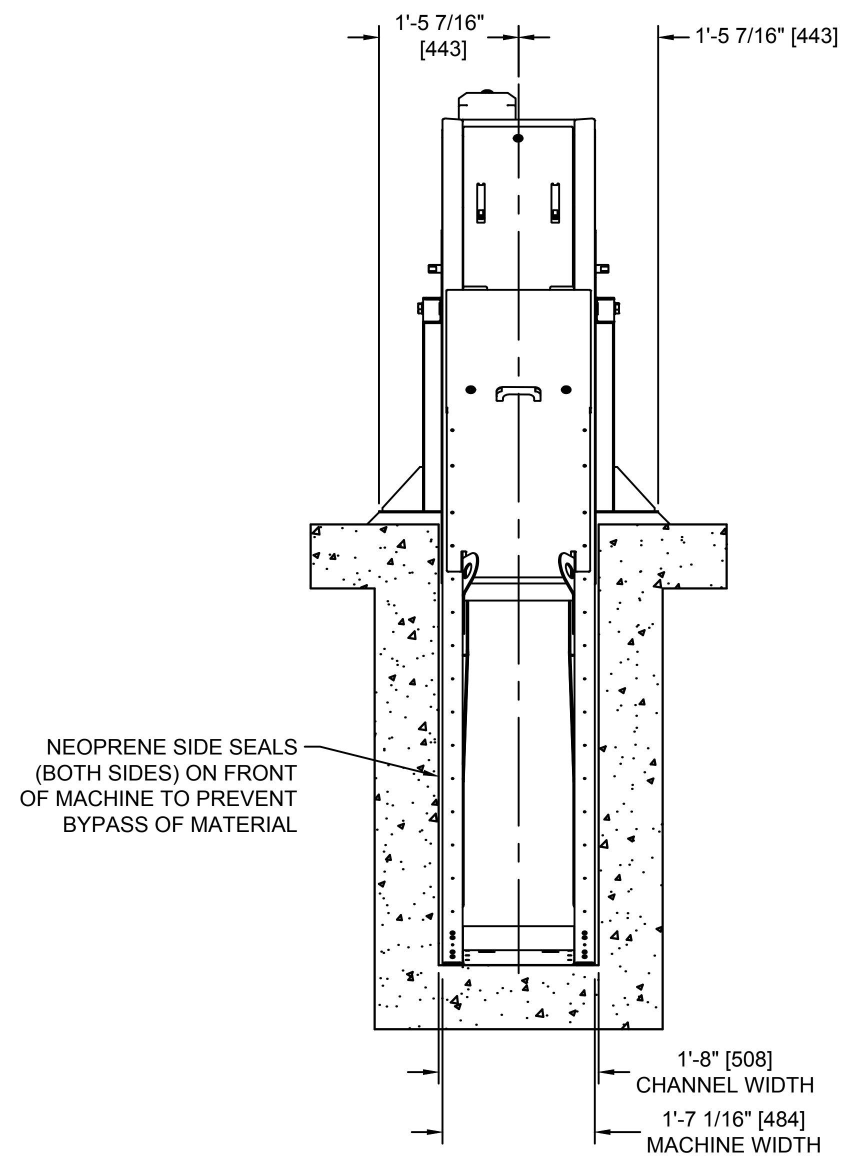
APPLICATION:	DOMESTIC SEWAGE SCREENING
PEAK FLOW RATE:	1,098 M3/DAY (0.29 MGD)
DOWNSTREAM WATER LEVEL:	300MM (11.81 INCHES) @ PEAK FLOW
MAX UPSTREAM WATER LEVEL:	550MM (21.7 INCHES)
MAXIUMUM HEADLOSS:	250MM (9.8 INCHES)

BASIS OF DESIGN PEAK FLOW 2,190 M3/DAY

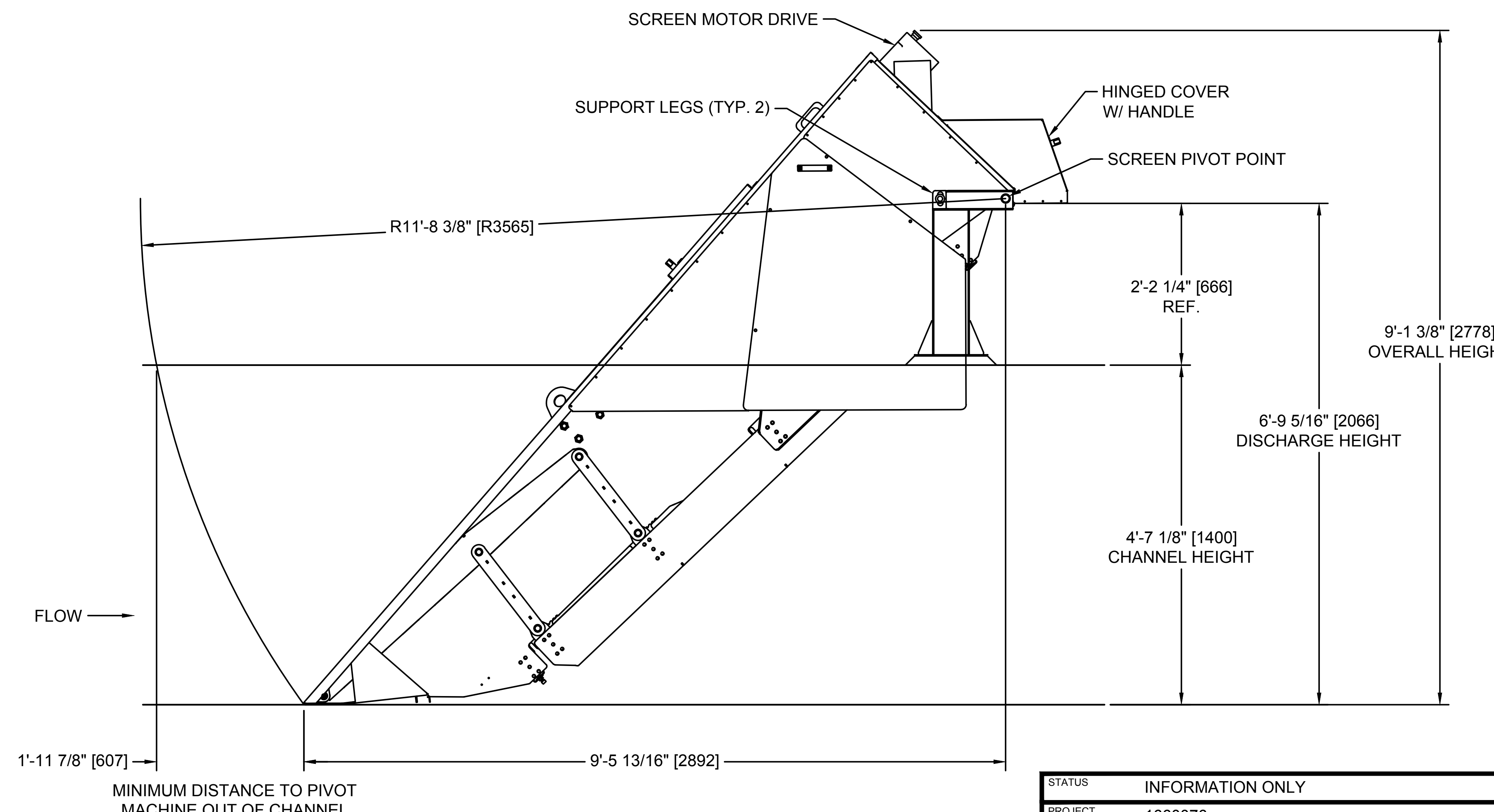
APPLICATION:	DOMESTIC SEWAGE SCREENING
PEAK FLOW RATE:	2,910 M3/DAY (0.58 MGD)
DOWNSTREAM WATER LEVEL:	300MM (11.81 INCHES) @ PEAK FLOW
MAX UPSTREAM WATER LEVEL:	550MM (21.7 INCHES)
MAXIUMUM HEADLOSS:	250MM (9.8 INCHES)



PLAN VIEW
SCALE: 1/2" =1'-0"



FRONT ELEVATION VIEW
SCALE: 1/2" =1'-0"



ELEVATION VIEW
SCALE: 1/2" =1'-0"

BASIS OF DESIGN - PEAK FLOW 2,831 M3/DAY

APPLICATION:	DOMESTIC SEWAGE SCREENING
PEAK FLOW RATE:	2,831 M3/DAY (0.75 MGD)
DOWNSTREAM WATER LEVEL:	300MM (11.8 INCHES) @ PEAK FLOW
MAX UPSTREMA WATER LEVEL:	550MM (21.7 INCHES)
MAXIMUM HEADLOSS:	250MM (9.8 INCHES)

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE	REFERENCE DOCUMENTS

STATUS: INFORMATION ONLY

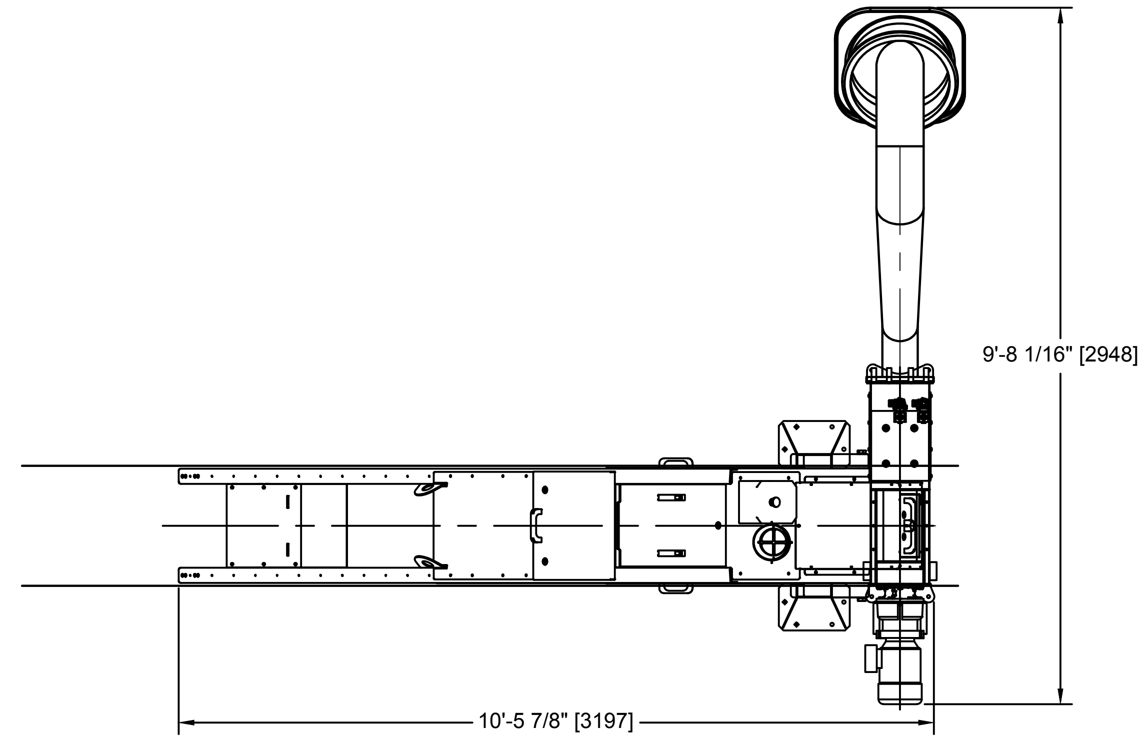
PROJECT: 1660076
DRUMBO WWTP

WESTECH

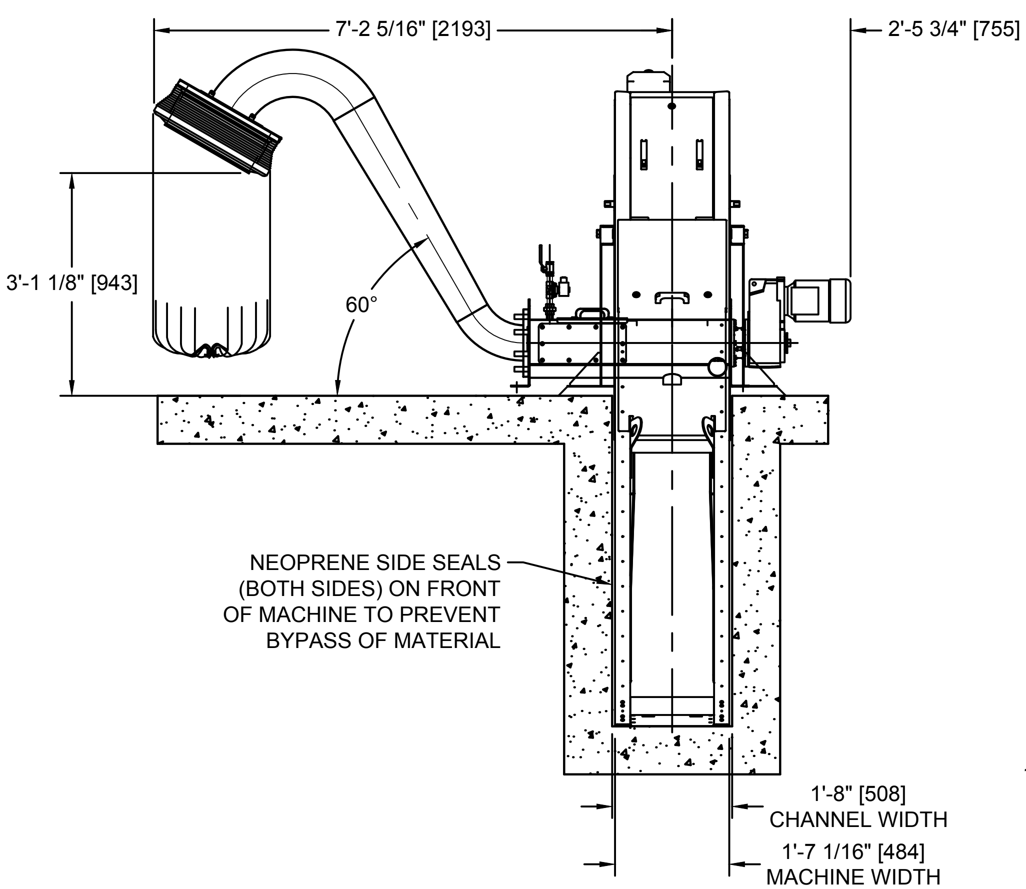
TITLE: **CLEANFLO MONOSCREEN**
RSM20-40-2

DESIGNER	CHECKER	APPROVER	DATE
BE14	ID	ID	2016-02-04

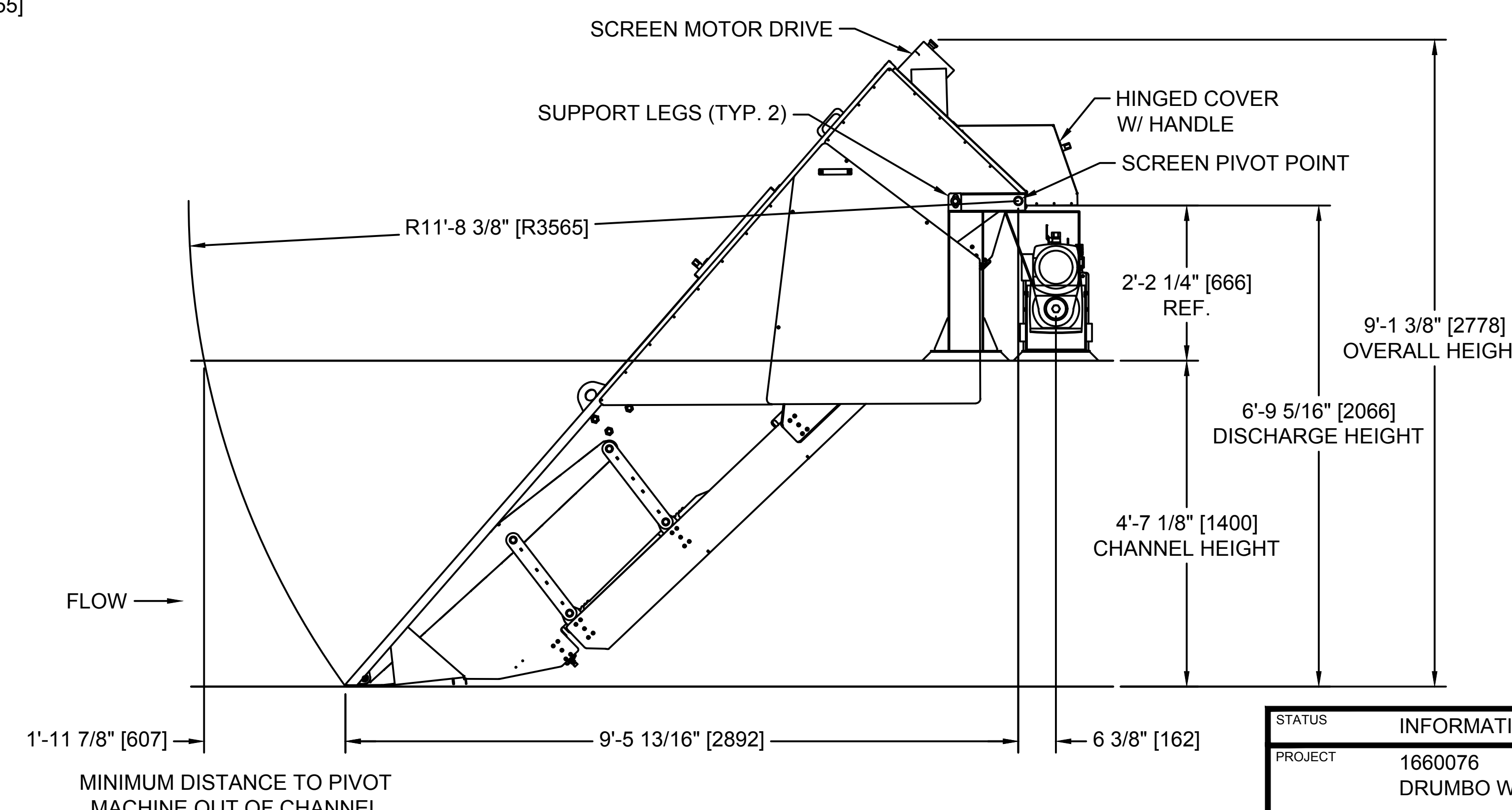
DOCUMENT NUMBER	SHEET	REV
1660076-2000	1 OF 2	-



PLAN VIEW
SCALE: 3/8" =1'-0"



FRONT ELEVATION VIEW
SCALE: 3/8" =1'-0"



ELEVATION VIEW
SCALE: 3/8" =1'-0"

STATUS INFORMATION ONLY

PROJECT 1660076
DRUMBO WWTP

WESTECH

TITLE **CLEANFLO MONOSCREEN W/ CLEANWASH SWP**
RSM20-40-2 W/ SWP15-30

DESIGNER	CHECKER	APPROVER	DATE
BE14	ID	ID	2016-02-04

DOCUMENT NUMBER	SHEET	REV
1660076-2000	2 OF 2	-

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE	REFERENCE DOCUMENTS

THIS LINE ———————— IS 1" LONG WHEN PRINTED ON 11" X 17" PAPER. ADJUST SCALE ACCORDINGLY.

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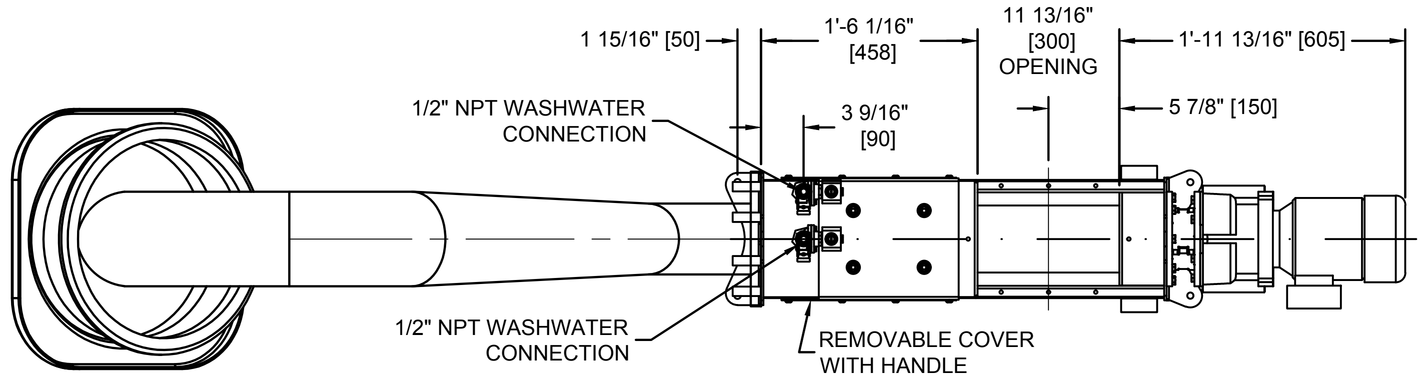
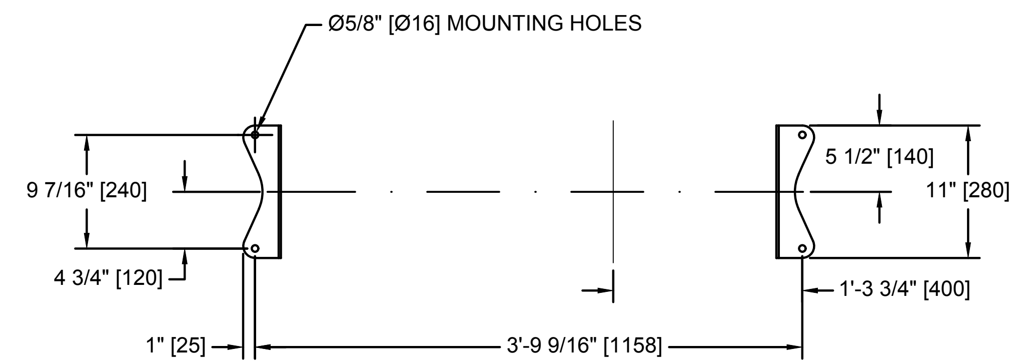
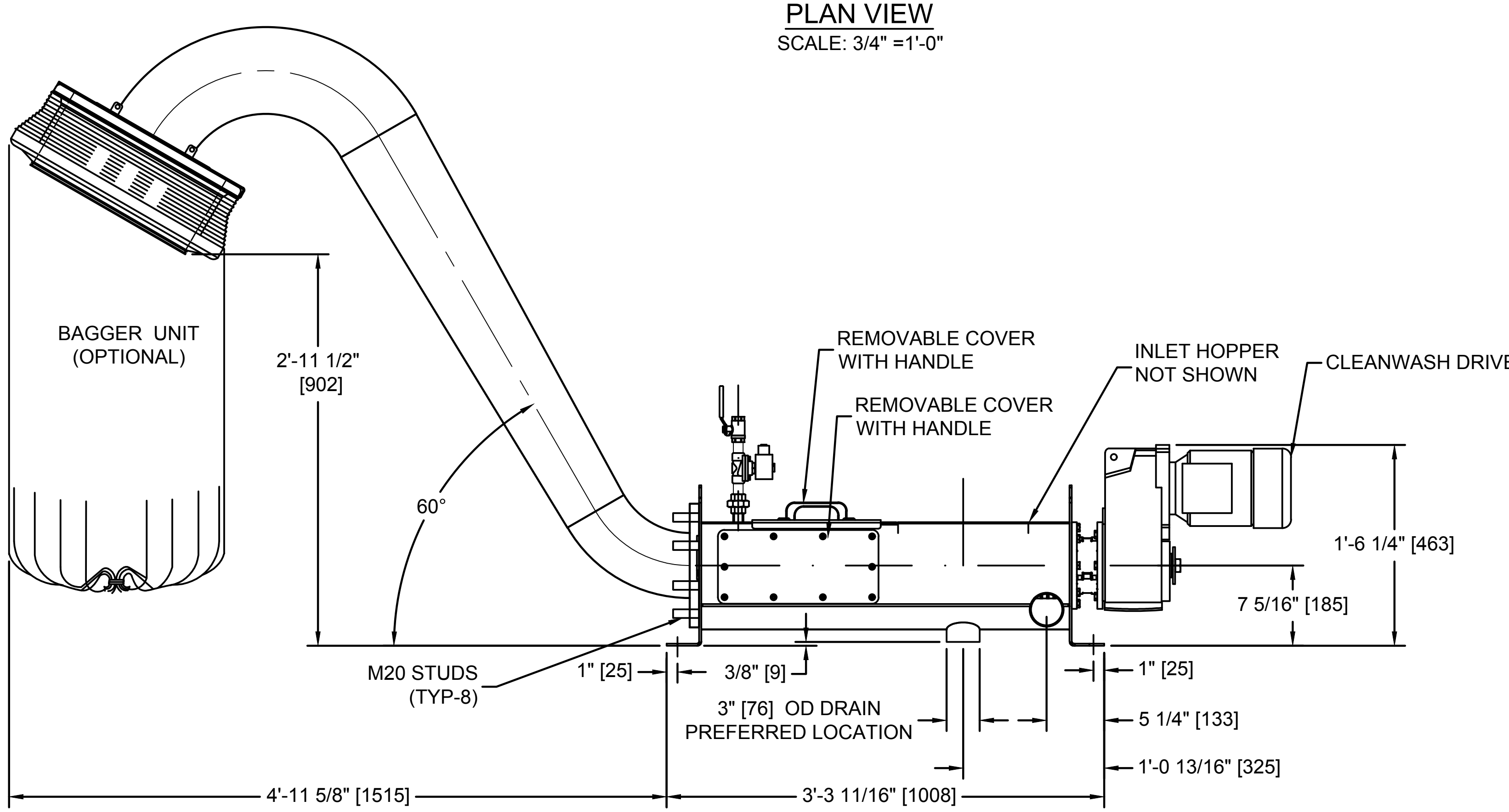


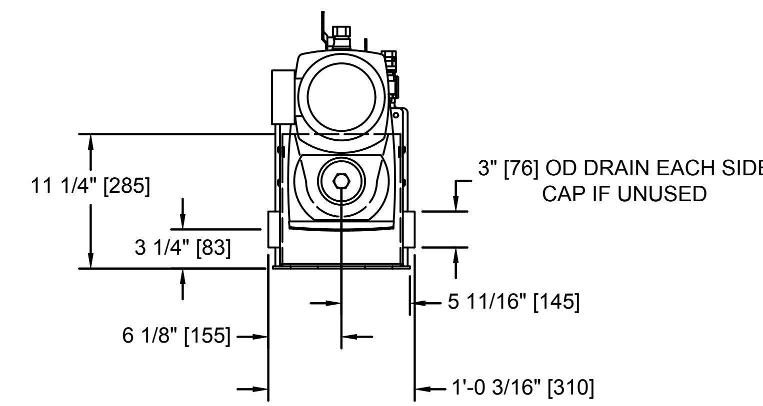
PLAN VIEW
SCALE: 3/4" =1'-0"



ANCHOR DETAIL
SCALE: 3/4" =1'-0"



ELEVATION VIEW
SCALE: 3/4" =1'-0"



ELEVATION VIEW
SCALE: 3/4" =1'-0"

BASIS OF DESIGN (EACH)

APPLICATION:	SCREENINGS WASHING AND DEWATERING
UNIT CAPACITY:	0.51 M3/HR. (18 FT.3/HR.) SCREENINGS
INLET LENGTH:	300MM (11.81 INCHES)
SCREW OD:	140MM (5.5 INCHES)
SPRAY WASH:	0.63 - 1.58 L/S @ 2.76- 4.14 BAR (10-25 GPM @ 40-60 PSI)
COMPACTION FLUSH:	0.95 - 2.02 L/S @ 2.76- 4.14 BAR (15-32 GPM @ 40-60 PSI)

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE	REFERENCE DOCUMENTS

STATUS INFORMATION ONLY

PROJECT 1660076
DRUMBO WWTP

WESTECH

TITLE **CLEANWASH SWP**
SWP15-30

DESIGNER	CHECKER	APPROVER	DATE
BE14	ID	ID	2016-02-04

DOCUMENT NUMBER	SHEET	REV
1660076-3000	1 OF 1	-

WesTech

The Innovative
Shaftless Spiral Screen

» CleanFlo™ SPIRAL

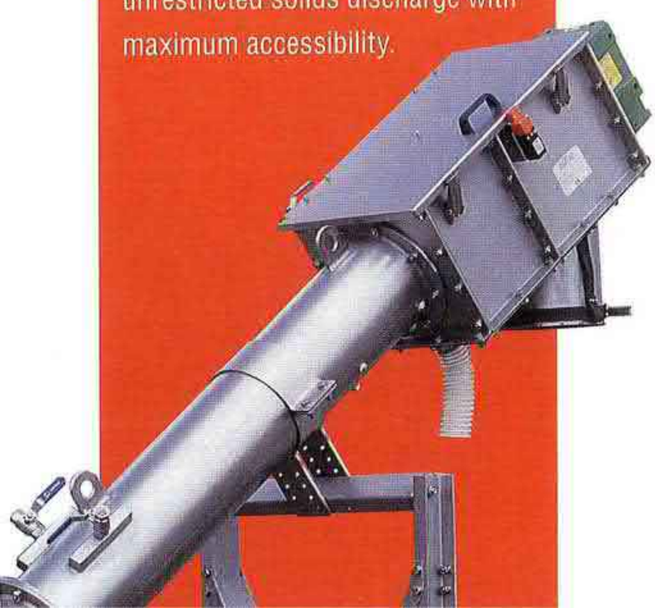
CleanFlo™ SPIRAL Screen

WesTech CleanFlo™ Spiral systems are designed to address the screening needs of industrial and municipal process treatment plants. Built to withstand tough duty in real-world applications, these quality units offer many design and operational benefits.

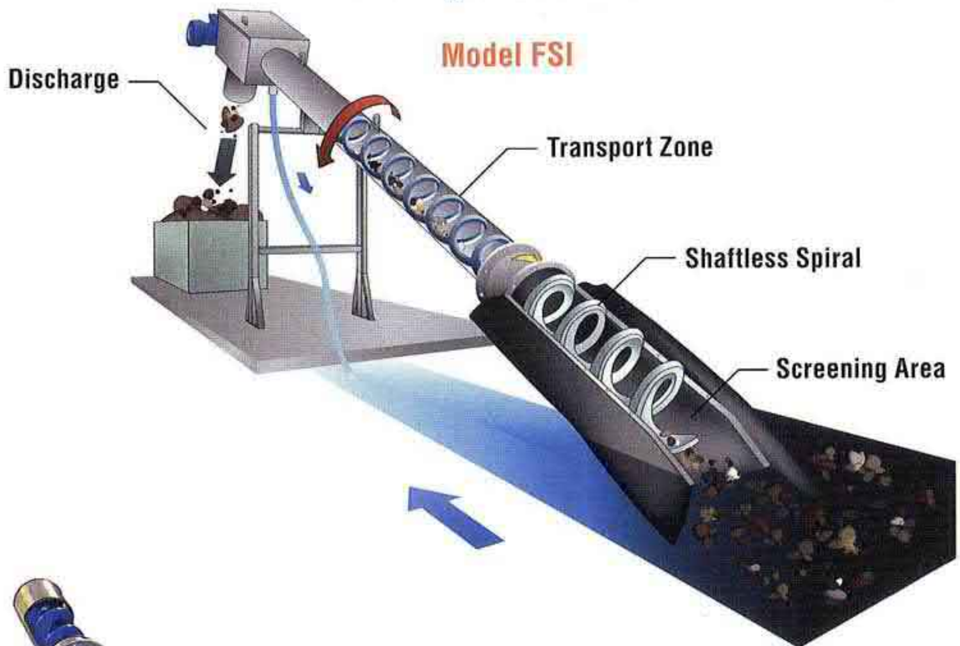
Shaftless Spiral technology enables efficient transport of stringy material or sludge. The shaftless, high-strength alloy steel spiral eliminates entanglement of solids around a shaft. No intermediate or end bearings are required, which reduces maintenance requirements.

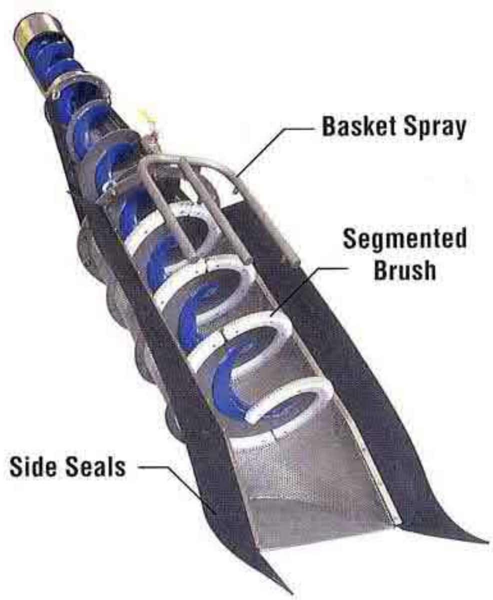
Screening Products - By combining a segmented brush with the spiral, the screen is cleaned as the spiral conveys collected material to the discharge. Side seals prevent bypass, yet are flexible enough to allow pivoting of the screen from the channel. The spiral is supported by easily replaceable wear bars in the transport zone.

Expanded Discharge Zone with hinged top access provides unrestricted solids discharge with maximum accessibility.



Easily Installed in Channels...





Screening, washing, and compaction all are integrated into a single unit driven by one motor located at the top of the mechanism.

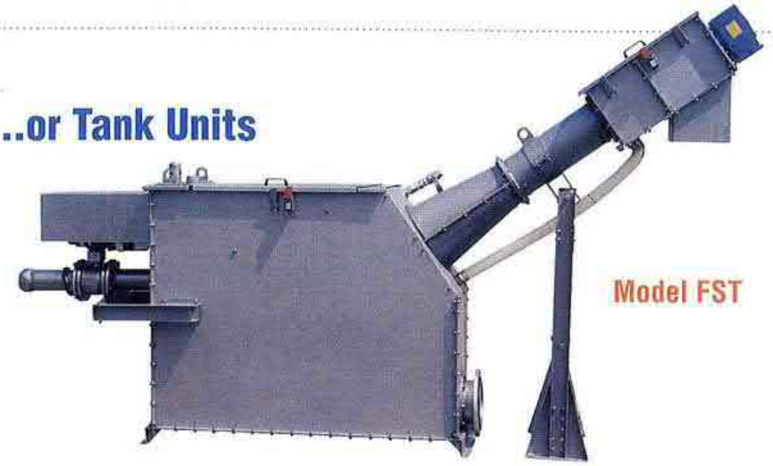
Standards:

- Wedgewire and perforated plate available in a wide range of screen openings
- Throughputs up to 9 MGD
- Variable lengths up to 30 ft
- 35 or 45 degree screen inclination
- Pivoting mounting stand
- Screenings pass paint filter test

Optional Equipment:

- Bagging device to encapsulate screenings, contain odors, and improve overall hygiene.
- Heat trace for transport and washing systems.

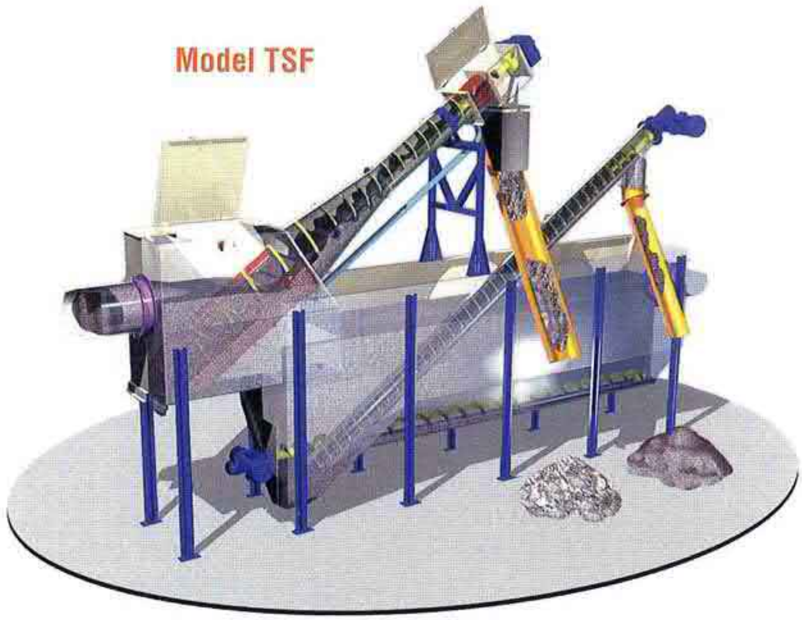
...or Tank Units



Package plants are available for municipal plant inlet screening, industrial wastewater pretreatment, or septage receiving stations. All the features of the in-channel units are provided in a self-contained stainless steel tank.

Options include:

- Automatic tank wash down
- Card readers and automated billing systems
- Flow recording, conductivity, and pH sensors
- Automatic flow control valves



A complete inlet works combining fine screening, aerated grit removal, and optional grease removal all pre-engineered into a compact, stainless steel tank. TSF units are ideal for pumped flows or when space is limited. A minimum of civil work is required to complete the installation.

- Compacted dry screenings
- Grit removal efficiencies from 75 to 95%
- Can be installed above or below grade
- Totally enclosed
- Stainless steel construction

Other Products

Shaftless Screw Compactor

- Absence of intermediate and end bearings
- Multiple inlet hoppers available
- Conveying lengths up to 100 ft and more
- No mechanical components in contact with the handled product
- Low speed

Screw Press/Separator

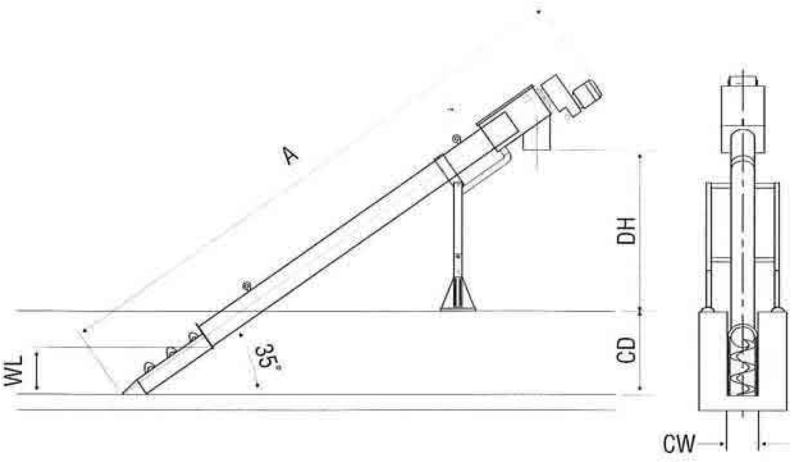
Separation of solids from effluent with compaction and dewatering of the extracted solids

Applications Include:

- ANIMAL WASTE
- FOOD PROCESSING
- SLAUGHTERHOUSE
- TANNERIES
- CHEMICAL
- PAPER MILL

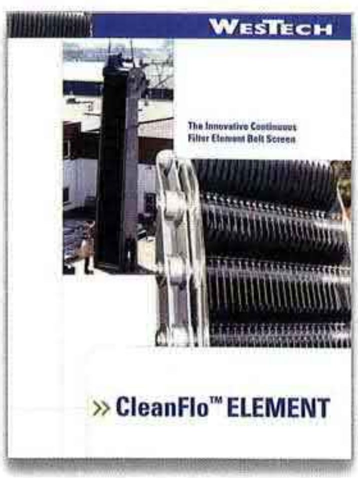
Model Selection
For optimal machine selection, the following criteria are relevant:

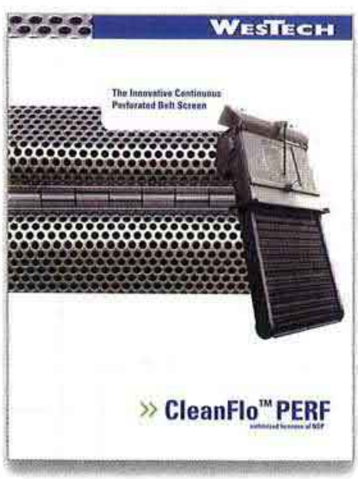
- Screening opening
- Maximum and minimum throughput capacity
- Downstream water level
- Upstream water level (if limited to a certain level)
- Minimum/maximum channel width
- Required discharge height (distance between channel bottom and solids discharge point)
- Discharge capacity (size and weight of solids)
- Characteristics of solids

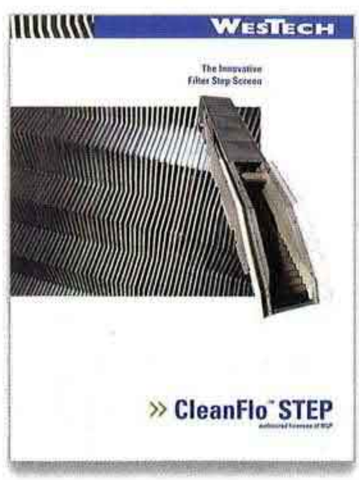


Standard Dimensions at 35° Inclination	FSI2	FSI3	FSI4	FSI5	FSI6	FSI7
A	199"	199"	199"	199"	209"	222"
CD	31"	31"	31"	36"	39"	42"
CW	12"	14"	18"	22"	26"	33"
WL max	17"	17"	18"	23"	27"	31"
DH	59"	59"	59"	59"	59"	59"

Other WesTech Screening Products







WesTech
an employee owned company

PO Box 65068 • Salt Lake City, Utah 84165-0068
Phone: (801) 265-1000 • Fax (801) 265-1080
e-mail: info@westech-inc.com
www.westech-inc.com

ISO 9001 CERTIFIED WesTech QUALITY SYSTEM

Represented by:

CleanFlo Spiral (Channel Mitt™) In Channel Spiral Screen

The semi-cylindrical spiral screen is a versatile and inexpensive solution for small flows up to 7-8 MGD. The screen is composed of a perforated or wedgewire basket (depending on screening orifice size) connected to the end of a conveying tube. The basket rests on the floor of the channel and captures material in the wastestream as flow passes through the basket. A shaftless spiral screw extends throughout the length of the unit and is used to transport the screened material from the basket, out of the channel to the discharge point of the unit. The screen is installed at an angle with most standardized for 35° or 45° inclination from horizontal. Most units are provided with a compaction/dewatering zone and the screens typically produce a discharge that is 20-25% dry solids. If greater dryness or washing is required, the screen can be designed to feed a separate washer/compactor unit. The screen is supplied with a support stand that allows the unit to be pivoted out of the channel for maintenance purposes.

The screen is generally operated by an upstream liquid level sensor. As material collects in the basket reducing the open area, the level upstream of the screen will rise. The maximum allowable upstream level from the unit is determined by the model's basket height. A water level above the basket height will flow over the side seals of the basket and bypass the unit. The level activation point is typically set to the basket height or just below it. Utilizing the full basket height has several benefits. First, it maximizes the available open area and flow capacity of the unit. Secondly, at flows lower than the capacity, it will allow for the maximum collection of material on the basket prior to activation of the unit. Minimizing the run time of the screen in this way maximizes the life of the screen and replaceable components, and can also improve solids dryness as detention time in the conveying tube is increased. Finally, allowing the upstream level to reach the full basket height improves the conveyance of the material, as the differential head will hold the material to the basket face causing it to be more easily transported by the shaftless screw.

There are a variety of features that make the WesTech CleanFlo Spiral unique among spiral screens.

With spiral screens, brushes are attached to the ends of the spiral screw in the basket area to clean the basket during operation. The WesTech design utilizes sectioned brushes. The sectioned brushes each cover 180° of the spiral, and allow for individual pieces to be replaced due to localized wear. The individual pieces also make replacement of the brush much easier since each section may be replaced from the face of the spiral. Brushes with bristles pinched into a channel section cover the entire basket length or multiple spiral pitches requiring them to be wrapped/unwrapped around the spiral during replacement. This typically requires removal of the screen basket or other disassembly that is not necessary with the WesTech sectioned pieces. The WesTech brush bolts straight to the spiral flight with stainless steel bolts and lock nuts, and does not require additional clips or fastening devices that may pull loose during operation, or become lost during replacement.

Spiral screens provide compaction by terminating the spiral flights in a perforated drum or tube section. This ensures that material is carried into the dewatering zone faster than it is removed to the discharge of the unit. The subsequent compression dewaters the screenings. On most units, the dewatered material is finally pushed out of the perforated section to a vertical discharge. The conveyor tube at the discharge is the same or only slightly large diameter than at the compression area. This means that the compressed material will remain confined around the shaft extending from the spiral screw to the gear reducer. Reversed pitch flights and stationary cutters are required in this case to physically cut the material away from the shaft. On the WesTech unit, the dewatered material is transitioned from the cylindrical compaction drum, to a much larger rectangular cross sectional chamber. This expansion prevents material from being pressed against the shaft, allowing it to discharge from the unit by gravity without requiring additional physical means of separation. The pictures included illustrate the compaction and discharge zones of the unit externally, and with the overhead access door opened.

The WesTech standard spiral is composed of continuously formed sections from low carbon steel that runs the length of the conveyor tube and basket. In the transition cone area and basket,

3625 SOUTH WEST TEMPLE SALT LAKE CITY, UTAH 84115 FAX (801) 265-1080 PHONE (801) 265-1000

additional type 304 stainless steel flighting is welded to the section increasing the OD of the spiral. This creates a spiral height larger than most other manufacturer's spirals fabricated with concentric sections that do not maintain a constant ID through the basket area. The larger flight height assists in the reduction of "roll back" of material in the basket area, especially at inclinations greater than 40°. The standard spiral is supplied with a protective epoxy primer coating.

WesTech Engineering, Inc.

3625 South West Temple Salt Lake City, Utah 84115 Fax (801) 265-1080 Phone (801) 265-1000

WesTech
Municipal and Industrial Process Equipment

CleanFlo™ Spiral Screen

Shaftless Spiral Technology

Understanding Screenings Transport

Semi-cylindrical Spiral screens are designed with a fixed screening basket located in a channel at an angle that can range from 35 to 50 degrees from vertical. Flow passes through the screen while solids are retained on the interior of the basket screen surface. WesTech's CleanFlo™ Spiral design utilizes a full diameter shaftless spiral screw with attached brushes to clean the screen when activated by high water level. The shaftless screw acts as a conveyor pushing material up the incline of the basket screen, out of the water, and transported to the discharge point where it is compacted and dewatered prior to discharge.

The transport of material is achieved as captured material rests principally against the basket and is pushed by the spiral flight in a conveying fashion.

As material is being conveyed a portion will be in contact with the pushing face of the screw. The amount (or height) of contact is proportional to the screen inclination. If the material rises to a point higher than the flight height then a "recycle" condition can occur wherein material climbs over the spiral flight, or "clings" to the flight during the spiral rotation. Either effect can allow a portion of material to fall back through the open center of the shaftless spiral.

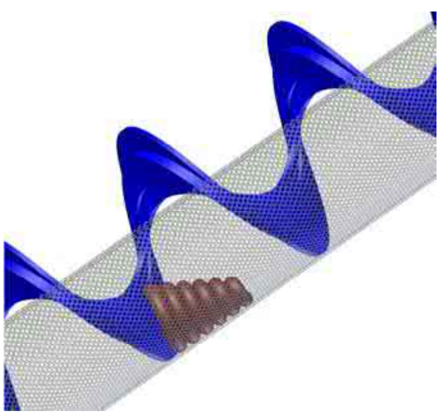


Figure 1 – Solids being pushed up the screen panel.

A small amount of recycle can be beneficial as it creates a churning action that aids in breaking up of attached organics and providing a washing action as screenings are recycled in the basket zone.

Screen designs utilizing a central shaft experience similar "rollback" where the stringy material rolls back down the incline entangling around the shaft requiring manual cleaning and removal.

As the screen angle of inclination increases over 35°, the amount of material recycled due to rollback is increased. Too much recycled material will cause the screen to operate more frequently and for longer durations, decreasing the overall efficiency. The CleanFlo™ Spiral screen is designed with certain features to aid in minimizing and controlling the amount of rollback.

Not All Shaftless Spirals are Created Equal

Most shaftless spiral screen companies manufacturer their spiral screw by enlarging the ID of the spiral in the basket area to facilitate a concentric increase in the overall OD of the spiral. This creates a relatively small flight height in the basket, with a large

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open center that material can "recycle" through.

The WesTech CleanFlo™ Spiral screen shaftless spiral is fabricated with a continuous

Figure 2 – Continuous ID spiral flight is painted blue. Added flight height in the cone and basket is highlighted in gray.

ID throughout the length of the unit (Figure 3). Additional flight height is welded to the OD in the transition cone and basket areas. This larger flight improves the conveyance of material out of the basket, limiting the rollback of material over the flight and through the ID of the spiral.

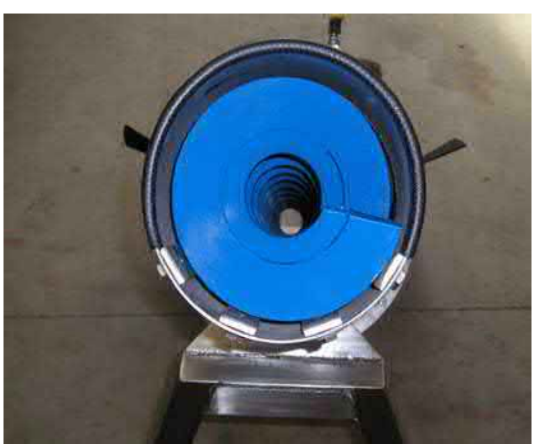


Figure 3 – End view of WesTech spiral from conveyor tube to basket illustrating continuous ID.

Recommended Operating Procedures

It is recommended that the water level setpoint for operation of the unit be set as close to the full basket height as possible. At a minimum we would like to see that level set to half the basket height. Utilizing the full basket allows more material to be captured closer to the top of the basket, minimizing transport and utilizes to a greater degree the natural differential water head to pin material against the basket of the unit allowing it to be more easily conveyed by the spiral flight.

Further Considerations

A basket mounted spray bar is recommended for use on installation angles greater than 35°. The spray bar is provided to aid in pushing material off the spiral flight and into the basket to improve the efficiency of the screen by further controlling the amount of recycle or rollback.

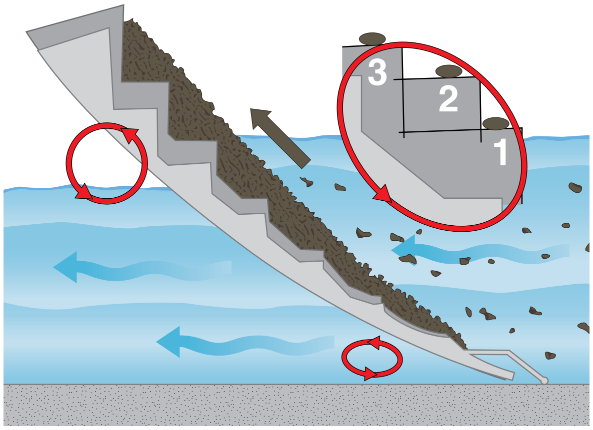
Figure 4 – Cutaway view of a WesTech unit and spiral.

WesTech and MEVA provide the next step in fine screening and dewatering technology. The CleanFlo™ Monoscreen® and CleanFlo™ Rotoscreen® are designed for wastewater and process water treatment which require a high level of separation. Matched with our CleanWash™ SWP/CPS dewatering unit, the combination maximizes the solids capture rate for your headworks operation while minimizing the amount of solids for disposal.

CleanFlo™ Monoscreen®

The CleanFlo™ Monoscreen® improves upon the operational simplicity and cost effectiveness of a traditional step screen through the unique patented design of its step blades. The blade and drive system create a progressive step motion allowing the screenings to be more evenly distributed while minimizing water level surges. The net result is a Screening Capture Ratio (SCR) of 82.5%, a level required on the most demanding of pre-membrane applications.

- **50% Higher Capture Rate**
- **Slot Widths 1 - 6 mm**
- **Patented Fine Screen**
- **Few Moving Parts**
- **High Capacity**



The blades in the lower part of the unit move in an elliptical horizontal motion, while the blades in the upper section move in the traditional circular motion. This progressive motion moves the captured solids (precoat solids) up the screen at a slower and more even rate.

CleanWash^{TM} SWP – Screw Wash Press

1.0 AT A GLANCE

CleanWash^{TM} design features:

- High reliability with robust construction.
- Stainless Steel construction.
- Screw from high strength alloy steel (stainless steel optional).
- Reduction of volume, weight, and odor causing material.
- Washing of fecal content in screenings.
- When fitted with optional CPS unit increased washing and dewatering performance and positive means to transport material to discharge point.

2.0 APPLICATION

Screenings Washing, Compaction, and Transportation.

3.0 SIZING

Five (5) models available with capacities from 0.5 ft3/hr to 275 ft3/hr of wet screenings.

4.0 INSTALLATIONS

Over 210 installations in USA.

5.0 CONFIGURATIONS

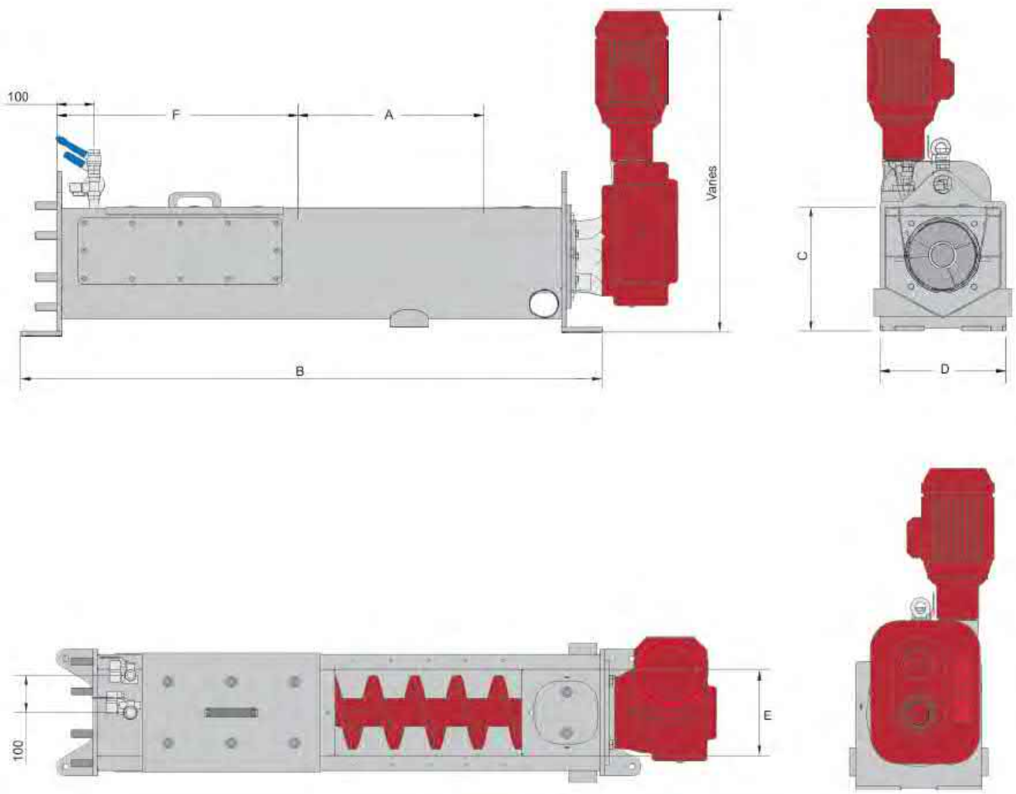
Each model is available with varying inlet lengths to match the equipment feeding the unit.
Discharge pipes can be configured to suite site specific discharge points.

6.0 HOW IT WORKS

Waste materials from screening removal units are discharged into the CleanWash^{TM} SWP inlet hopper. The slowly rotating shafted screw moves the screenings into the wash/press zone. Wash water is added in the wash/press zone, where dissolved solids such as fecal matter are washed out of the screenings. The dissolved solids and water are pressed out of the screenings. The wash water is directed back to the waste water treatment process. The washed and compacted screenings are pushed out the transportation tube to the discharge point.

The SWP is designed with a double wall trough making it very "torque resistant" for heavy operations with screenings of high dry solids content. This design allows the SWP to be provided with large inlet opening and allows for the inner trough to be fully perforated allowing for maximum dewatering.

A robust axial bearing and gearbox absorb the forces form the press. The press zone is easily and safely accessible through a hatch in the top of the casing.



	SWP 15	SWP 20	SWP 25	SWP 30	SWP 40
Capacity (Ft^3Hr)*	17 - 35	35 - 52	52 - 70	70 - 105	105 – 275
Inlet Opening (A)	12 – 35	8 – 118	8 – 118	20 – 79	
Total Length (B)	40 – 52	54 – 160	54 – 160	57 – 164	70 – 115
Height (C)	11.4	13	15	17	25
Width (D)	11	13.4	16	18	24
Inlet Width (E)	8	9	12	14	18
Wash Zone (F)	18	26	26	29	35.4

All measurements in inches
*Wet material, capacity depending on degree of filling.

Headworks Process Equipment

ISO 9001 WesTech CERTIFIED QUALITY SYSTEM

WesTech

Process Equipment. Process Driven.

Get More Out of Your Headworks

WesTech engineers and manufactures a full line of headworks equipment. Our experience and our service-driven approach help you find the right solutions to get the most out of your headworks. The more debris and grit you can remove, the more efficient your downstream equipment and processes will become. Your wastewater treatment facility will save time and money with WesTech preliminary treatment equipment.

Getting the Job Done with Experience and Options

Since every job is unique, we take a comprehensive approach by assessing conditions and determining the particular requirements of downstream equipment and processes. The result is improved solids removal even when circumstances are less than ideal.

With multiple options in equipment selection, WesTech provides the best solution to your particular needs. With hands-on experience and hundreds of installations, we are committed to providing timely and practical consultation from initial design through project startup.

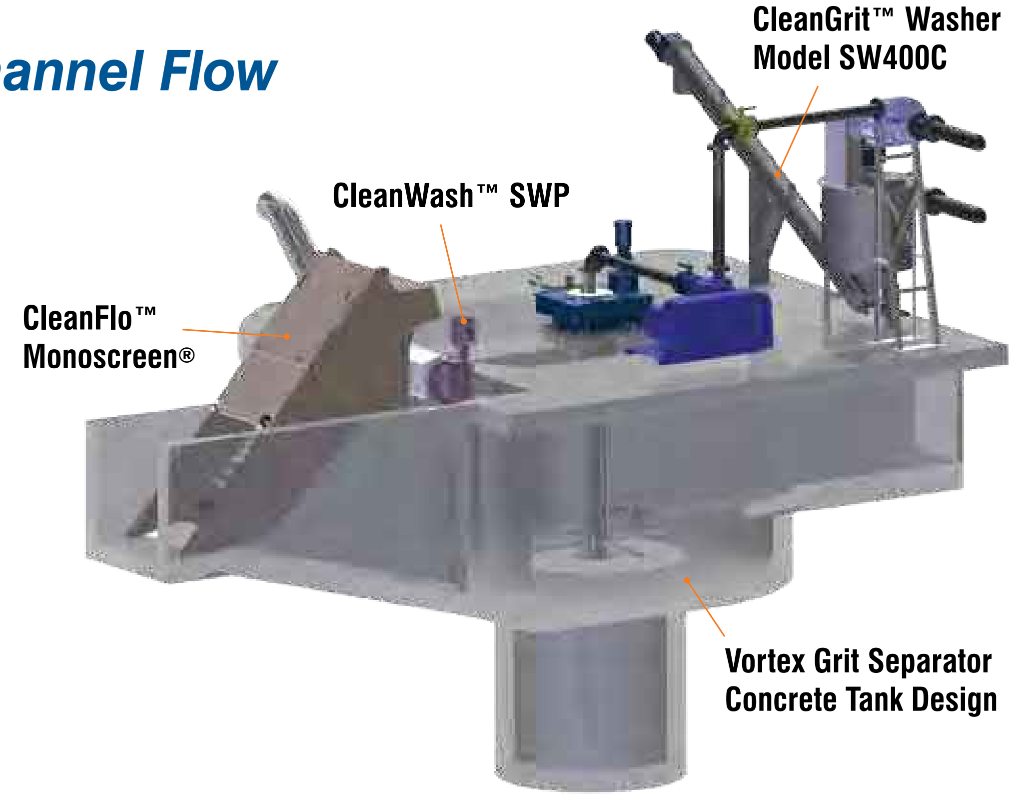
Building Upon the Past, Designing for the Future

WesTech's efficient and intelligent designs are a result of years of engineering and manufacturing within municipal and industrial markets. This experience creates the best solution — and the best value — for our customers.

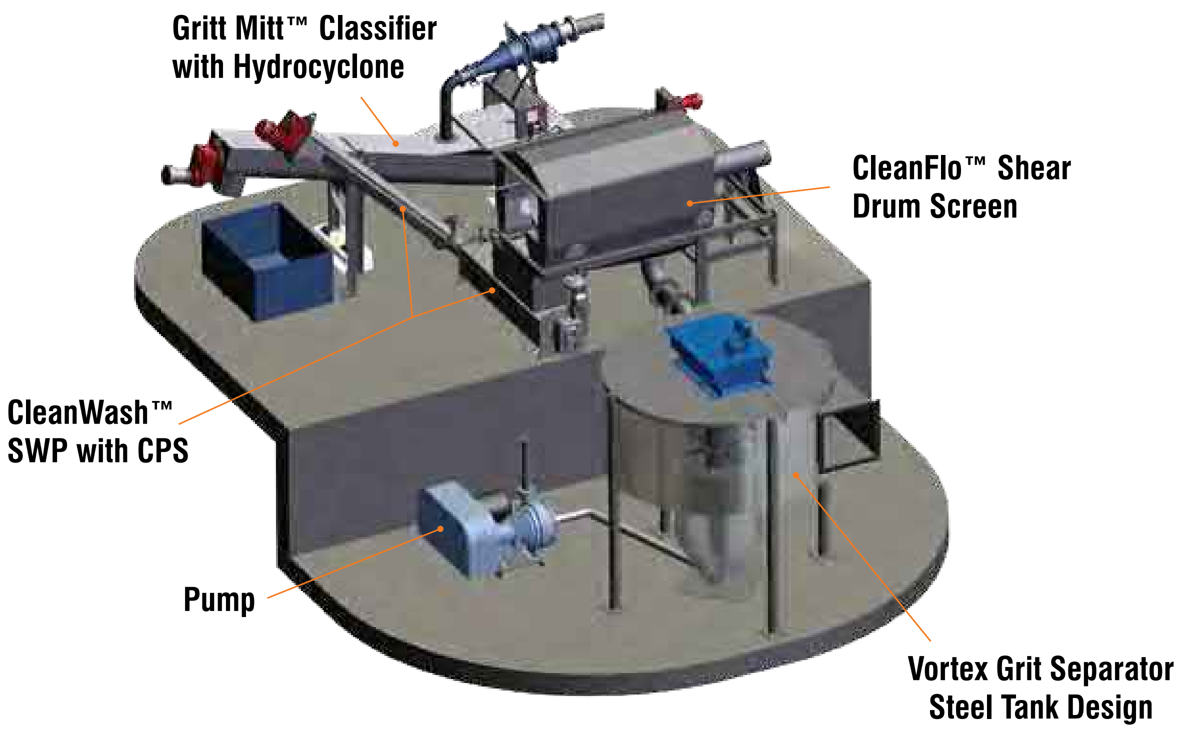
- **Shaftless spiral screens**
- **High capture filter step screens**
- **Internally fed rotary drum screens**
- **Controllable pressure for maximum screenings washing and dewatering**

WesTech provides single-source systems for your headworks specifications. Whether in-channel gravity or pumped flows, WesTech can apply the right equipment solution for both large and small installations.

In-Channel Flow



Pumped Flow



Screening

Screening is the first step in every headworks operation. The efficient removal of solids ensures proper protection to your downstream equipment and plant processes.

CleanFlo™ Spiral

For plants with flows under 10 MGD, the WesTech CleanFlo Spiral screens, conveys, and dewaters simply and economically in a single unit. The stainless steel screen basket is automatically cleaned by durable segmented brushes attached to the shaftless spiral auger. An expanded discharge zone provides unrestricted solids discharge and the hinged top mounted door allows clean and easy access.

- **Shaftless spiral operation**
- **Openings 3 – 6 mm**
- **Installed in channels or tanks**

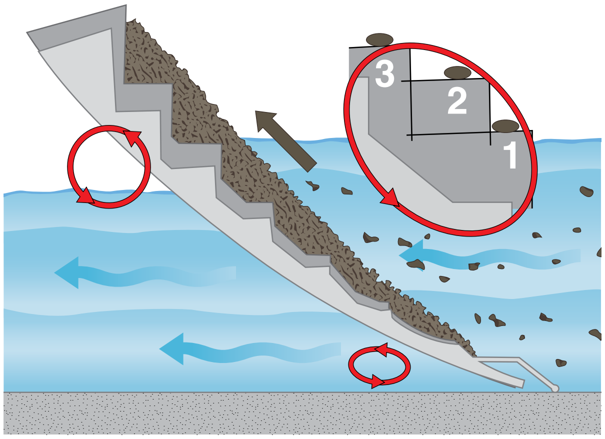
CleanFlo™ Vertical Spiral

Specifically designed in a vertical orientation, the CleanFlo Vertical Spiral is ideal for pump wetwells or confined short channels. The screen is composed of a cylindrical 3 or 6 mm perforated basket with an integral shaftless spiral and conveyor tube. The unit provides screening and conveyance of solids and can provide additional dewatering of material.

- **Vertical conveyance**
- **Optional rail support allows removal without entering wetwell**
- **Pump station screen**
- **Comminutor replacement**

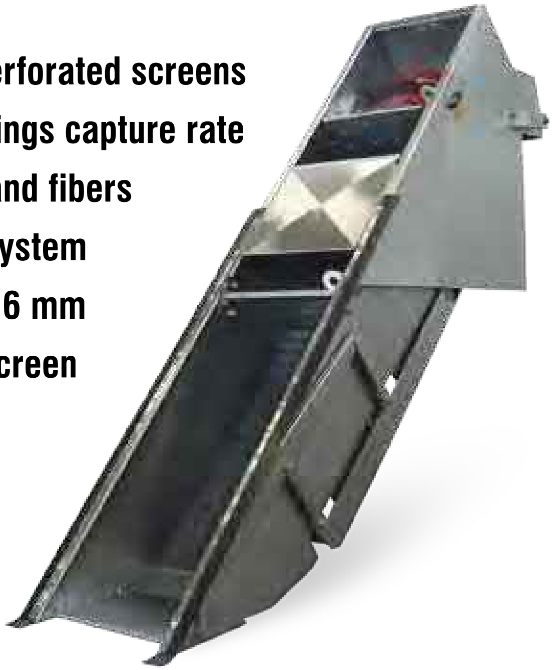
CleanFlo™ Monoscreen®

The CleanFlo Monoscreen works on the same principle as a precoat filter. The screened material forms a mat that bridges the bars. The formation of this mat efficiently captures particles smaller than the bar opening, while still allowing flow to pass. The unique motion and progressive step design of the Monoscreen minimizes the "cleaning breakthrough effect" resulting in a 50% higher capture rate than traditional step screens.



The blades in the lower part of the unit move in an elliptical horizontal motion, while the blades in the upper section move in the traditional circular motion. This progressive motion moves the captured solids (precoat solids) up the screen at a slower and more even rate.

- **Outperforms perforated screens**
- **Highest screenings capture rate**
- **Removes hair and fibers**
- **Linkage drive system**
- **Slot widths 1 – 6 mm**
- **Patented fine screen**



CleanFlo™ Rotoscreen®

Designed specifically for facilities with limited space, the CleanFlo Rotoscreen delivers powerful results while managing high flow.

- **Ideal for limited space**
- **Slot widths 1 – 6 mm**
- **Robust screen design**
- **High capacity**
- **Available with simple chain drive or linkage system**

Screening

Internally Fed Rotary Drum Screens CleanFlo™ Shear

Drum screens eliminate debris carryover. Other moving media screens experience some carryover due to inefficient cleaning, lower seals, or poor distribution. Drum screens keep all of the debris inside the rotating drum until it is discharged.

- **Rugged direct drive unit**
- **Protects debris-sensitive membranes**
- **Ease of maintenance**
- **Low operating costs**

Direct Drive for Drum Screens

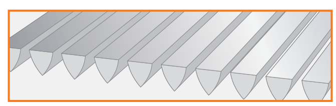
By eliminating the chain drive, WesTech removes common problems such as chain stretch, chain corrosion, chain lubrication, and tracking problems.

Maintenance is simplified and the annual or biannual expense of chain replacement is eliminated.

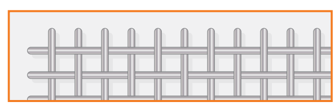
Applications:

- **Pre-MBR screening — no bypass or carryover of solids for maximum protection of membranes**
- **Preliminary treatment**
- **Sludge thickening — with chemical addition**
- **Single screen throughput up to 20 MGD**

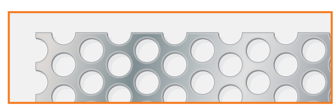
Screen Mediums



Wedge Wire
0.010 – 0.120”



Woven Mesh
0.5 – 1 mm



Perforated Plate
0.6 – 25 mm

CleanFlo™ Infloscreen

Internally fed drum screening with the convenience of in-channel installation.

- **In-channel installation**
- **Inclined and horizontal orientations**
- **Low operating costs**

Deep Channel Screens
CleanFlo™ MultiRake Bar Screen

The CleanFlo MultiRake Bar Screen is a strong, versatile, and economical fine or coarse screen with bar spacing available from 6 – 50 mm (0.25 – 2 inches). The screen is ideal for a wide range of channel sizes — up to 13 feet wide and 50 feet in depth, with installation angles from 70 – 80 degrees.

A single screen has the ability to handle flows over 150 MGD. The rake speed is available at a fixed rate or adjustable via VFD control. This ensures fast cleaning and eliminates the risk of flooding during high flow events.

- **Strong multiple rake design**
- **Eliminate upstream coarse screens**
- **High screenings load without high headloss**
- **Rake speed up to 50 ft/min**
- **Designed to automatically clear jams**
- **Variable speed operation to handle storm flows / high flow events**

CleanFlo™ Element Screen

The CleanFlo Element Screen features a unique self-cleaning action of the filter elements, making the screen suitable for a wide range of flows. The Cleanflo Element is ideal for screening of particles from 1 – 30 mm in size in deep channels.

Like most screens, the operation is intermittent and based on water level. As debris builds on the screen media and the water level rises, the screen media advances to present a clean screen surface to the incoming flow. Slowly, the debris will be lifted to the top of the screen. At this point the fingers of the screen retract within each other and are efficiently scraped clean.

- **No submerged bearings**
- **Self-cleaning elements**
- **Inclinations up to 85 degrees**

Screenings Washing and Dewatering

CleanWash™ SWP/CPS

Unlike screw wash presses in which the design of the discharge pipe creates the back pressure necessary to dewater screenings, WesTech's CleanWash Screw Wash Press and Counter Pressure Screw regulates just the right amount of back pressure to meet the highly variable influent. The positive conveyance of the screenings after each washing cycle delivers up to 70% dry solids without fear of plugging through 10, 20 or even 30 feet of discharge piping.

75% less weight per cubic foot

- **Superior dewatering**
- **Dry solids content of up to 70%**
- **Volume reduction of up to 80%**
- **No plug = No plugging**
- **Patented CPS design**

CleanWash™ SWP

Using a conventional discharge pipe, the CleanWash SWP is capable of producing light gray, relatively odorless material without using expensive, maintenance-intensive mechanical agitators.

Grit Removal

Vortex Grit Separator

The WesTech Vortex Grit Separator is a forced-vortex type grit separator. The influent enters the vortex chamber tangentially and flows around the upper chamber, exiting at either 270 or 360 degrees from the influent point.

The main advantage of this type of separator is that its footprint is much less than other types of grit separators such as aerated grit chambers and detritors.

Pump Options

Self-Priming Pump

Air Lift Pump

Flooded Suction Pump

ZICKERT Shark™ Grit Removal

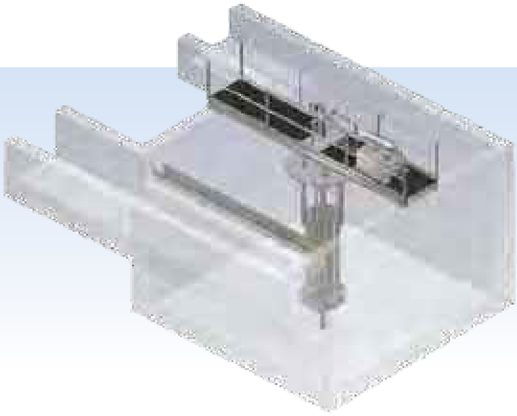
The ZICKERT Shark bottom scraper is a proven design to continuously remove and transport grit to a hopper or sump. The Shark is based on the forward and return movement of the hydrodynamically designed scraper profiles.

- **Few moving parts**
- **Low maintenance**
- **Optional grease removal skimmer**
- **Easy to adapt to existing tanks**
- **Replaces submerged screws or chain and flight systems**

The specially designed scrapers are welded together to form a single unit so it functions as a moving floor in the tank. The Shark is easy to install and requires very little maintenance.

Aerated Grit Chamber

This style of grit separator uses air injection to create a rolling pattern in the chamber causing heavy solids to settle to the floor and lighter organics to remain in suspension.



Grit Washing and Dewatering

CleanGrit™ Washer

WesTech CleanGrit products remove organic matter from grit collected at the headworks of a wastewater plant. Unwashed grit can consist of up to 80% organics.

Removal of the organic matter from grit will reduce disposal costs and nuisance odor complaints while improving biological plant processes. WesTech offers the largest variety of grit washing systems available in the North American market.

- **Less than 5% organics discharge**
- **Dry solids discharge greater than 85%**
- **Odor reduction**
- **Reduce grit disposal by 50%**

CleanGrit™ SW400C

The CleanGrit™ Model SW400C rinses organic matter from dewatered grit or a concentrated grit slurry by incorporating a hydrocyclone. Organic matter is loosened mechanically by an agitator and rinsed by an upcurrent backwash water process. Cleaned grit is discharged by the shaftless spiral conveyor for disposal.

The CleanGrit Model SW400C is our most compact model to wash organic material from dewatered grit.

CleanGrit™ SWA Series

The CleanGrit SWA Series is designed to dewater and wash grit from grit collection tanks, without the need for a hydrocyclone.

The SWA series features multiple sizes of washing tanks and disposal screws to meet a wide variety of flows and solids loading.

- **Flows of up to 500 gpm**
- **Solids handling capacities of up to 100 cubic feet per hour**

Gritt Mitt™ Classifiers

The WesTech grit removal system is not only available with the CleanGrit Washer but is also offered with either the WesTech Gritt Mitt Shaftless or Shafted Grit Classifier. The WesTech classifiers are designed with a range of hopper sizes, screw diameters, and screw lengths to meet any specification. The classifier system produces very good quality dewatered grit suitable for most landfills.

The WesTech classifier can be equipped with a hydrocyclone to optimize performance in systems with mechanical grit pumps.

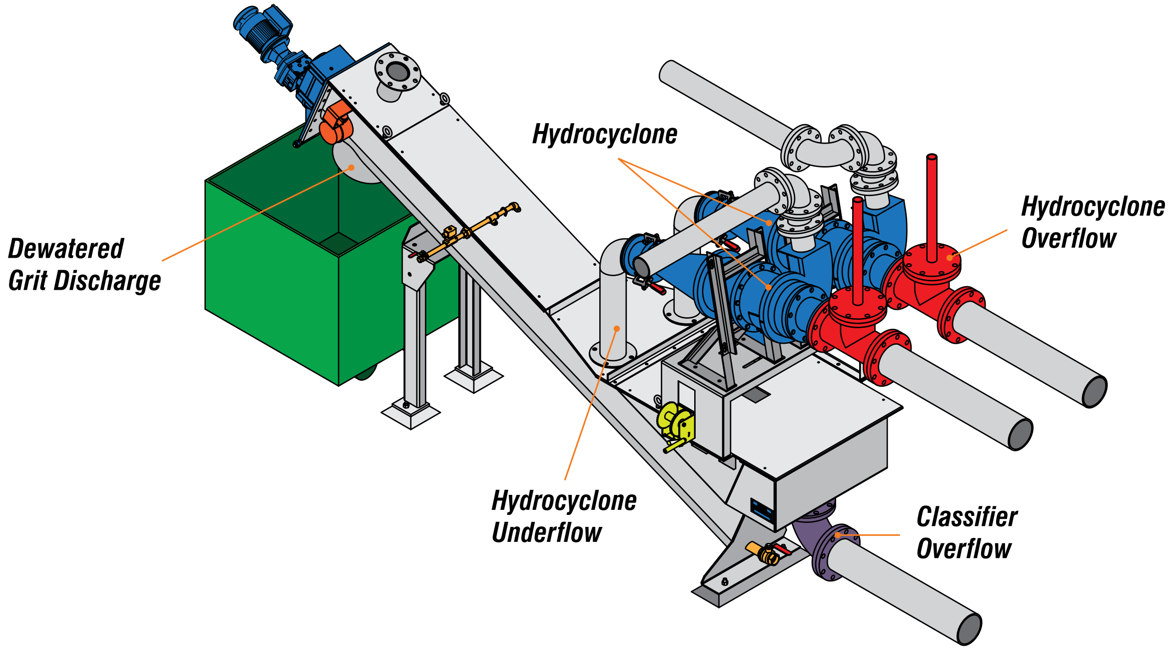
The cyclone reduces the flow entering the classifier hopper by 80 – 90% and allows a smaller footprint to be used to handle the same pumped flow.

Gritt Mitt™ Shaftless Classifier

- **No submerged bearing**
- **Hardened carbon steel or stainless steel shaftless screw**
- **Screw supported by stainless steel wear bars**

Gritt Mitt™ Shafted Classifier

- **Heavy duty design perfect for high capacity applications**
- **Continuous operation allows increased solids transport**
- **Optional wear shoes available**



Specialty Systems

CleanFlo™ All-In-One

The CleanFlo All-In-One unit combines screening, grit removal, and solids dewatering all in a single system. The CleanFlo All-In-One is suitable for indoor or outdoor installation with capacities from 0.3 – 3 MGD.

- **Integrated approach**
- **Small footprint**
- **Eliminates complex concrete structures**

Septage Receiving

WesTech supplies packaged systems specifically designed for septage receiving applications. These versatile units can be especially beneficial when haulers discharge downstream of the plant headworks, or at remote plant entry points.

Optional features include:

- **Magnetic flow meter**
- **Hauler access station**
- **Management software for full integration, tracking, billing and record keeping**
- **Automated rock removal**

WesTech
Process Equipment. Process Driven.

Tel: 801.265.1000
westech-inc.com
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Salt Lake City, Utah, USA

Represented by:

APPENDIX C
CONCEPTUAL LEVEL SITE LAYOUTS

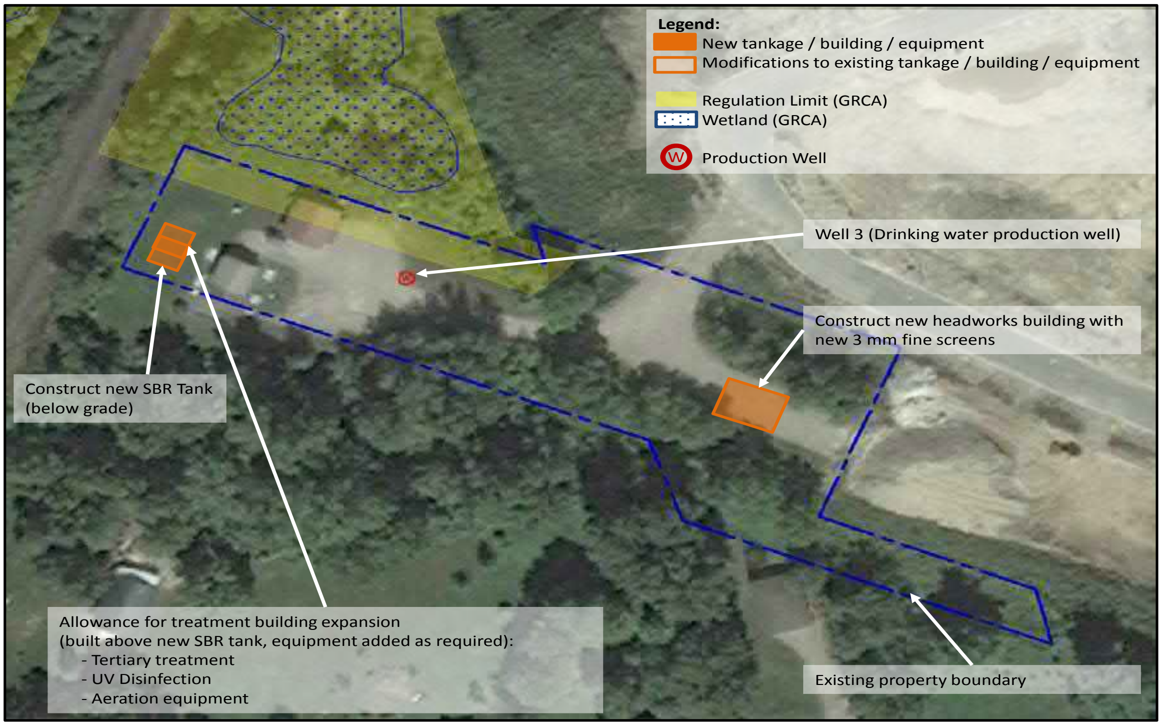

Figure C.1 Design Option 1A - SBR Expansion, Drumbo Only Service

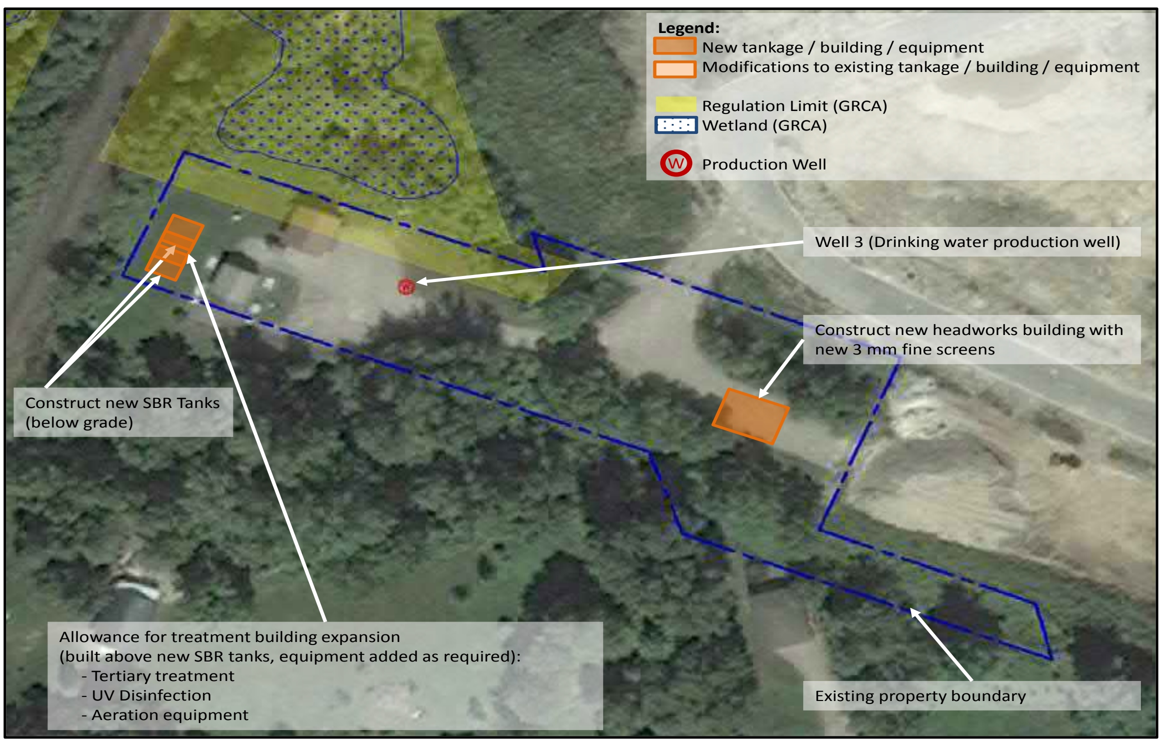

Figure C.2 Design Option 2A - SBR Expansion, Drumbo and Princeton Service (STEP/STEG)

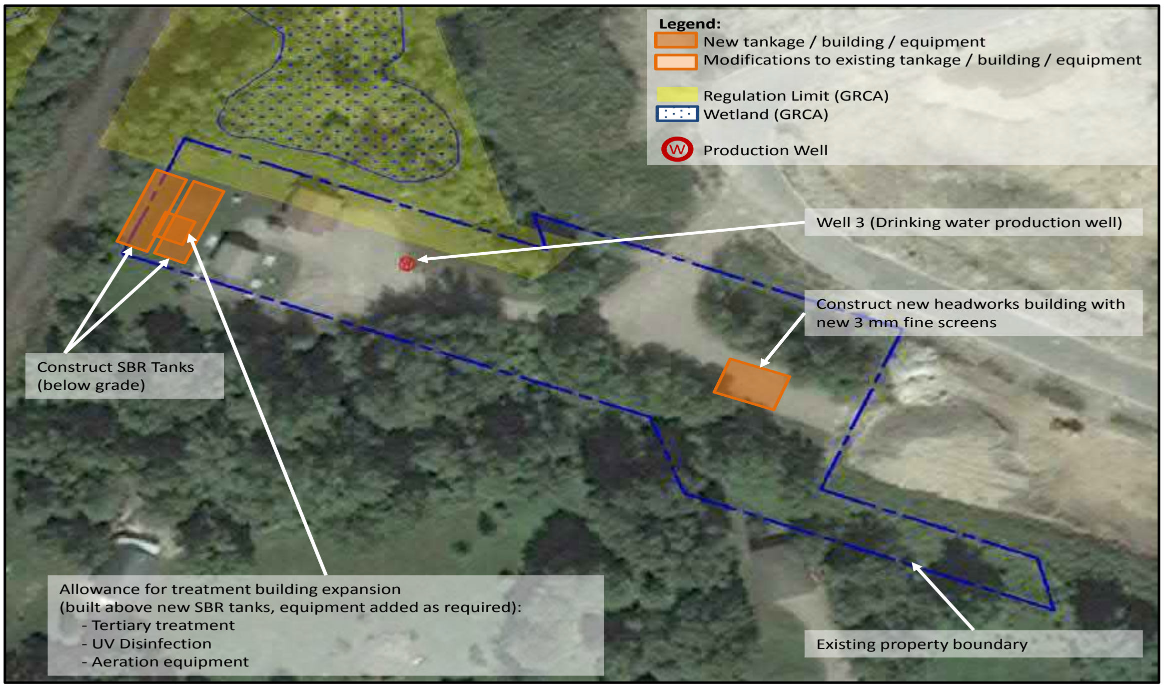

Figure C.3 Design Option 3A - SBR Expansion, Drumbo and Princeton Service (Conventional)

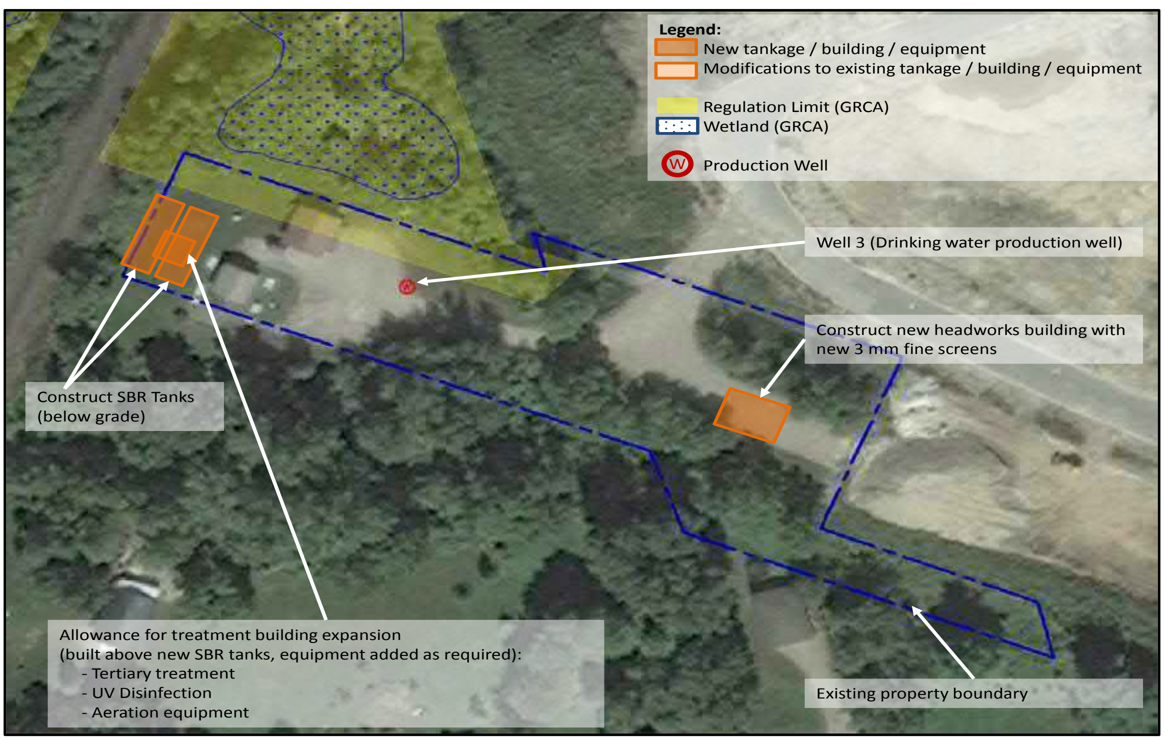

Figure C.4 Design Option 4A - SBR Expansion, Drumbo, Princeton, and VanWees Service (STEP/STEG)

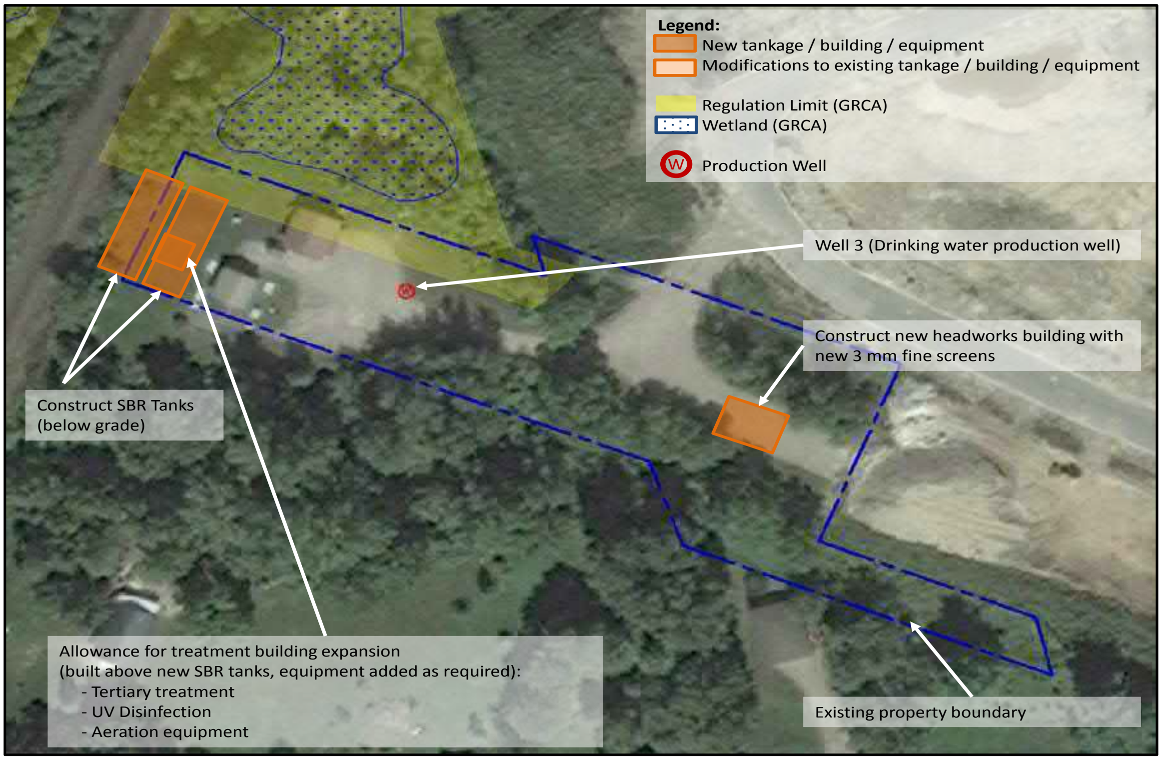

Figure C.5 Design Option 5A - SBR Expansion, Drumbo, Princeton, and VanWees Service (Conventional)

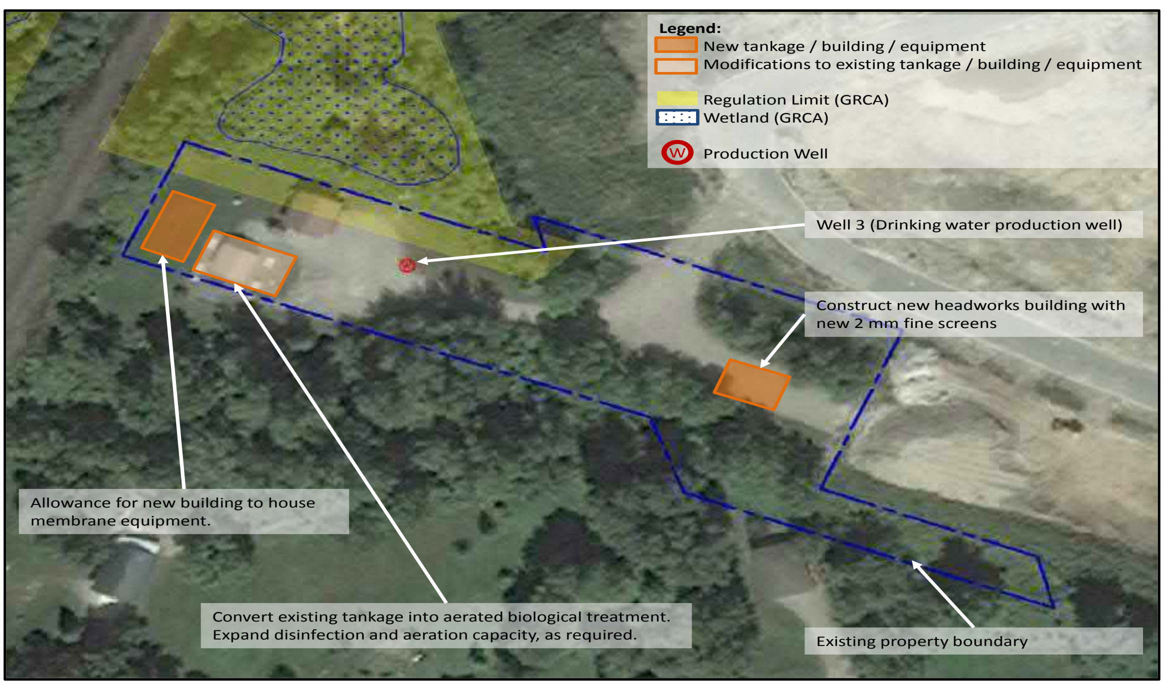

**Figure C.6 MBR Expansion for: Drumbo Only Service (Design Option 1B)
Drumbo and Princeton Service (STEP/STEG) (Design Option 2B)
Drumbo, Princeton and VanWees Service (STEP/STEG) (Design Option 4B)**

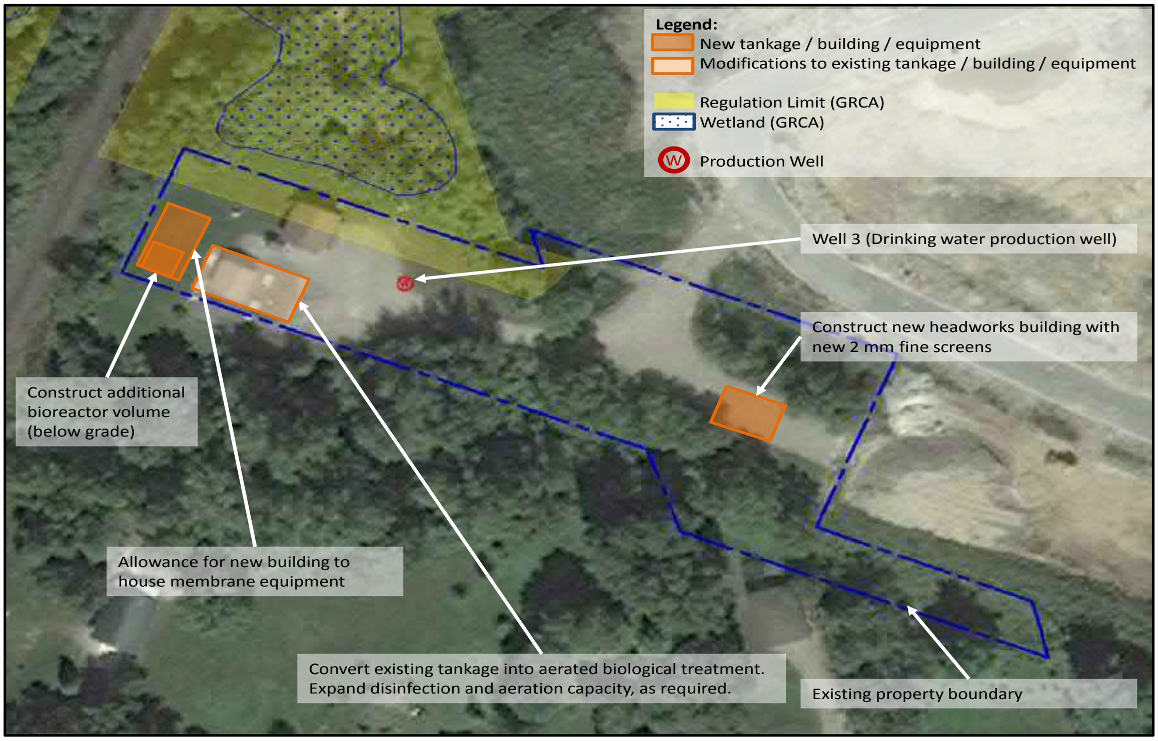

Figure C.7 Design Option 3B - MBR Expansion, Drumbo and Princeton Service (Conventional)

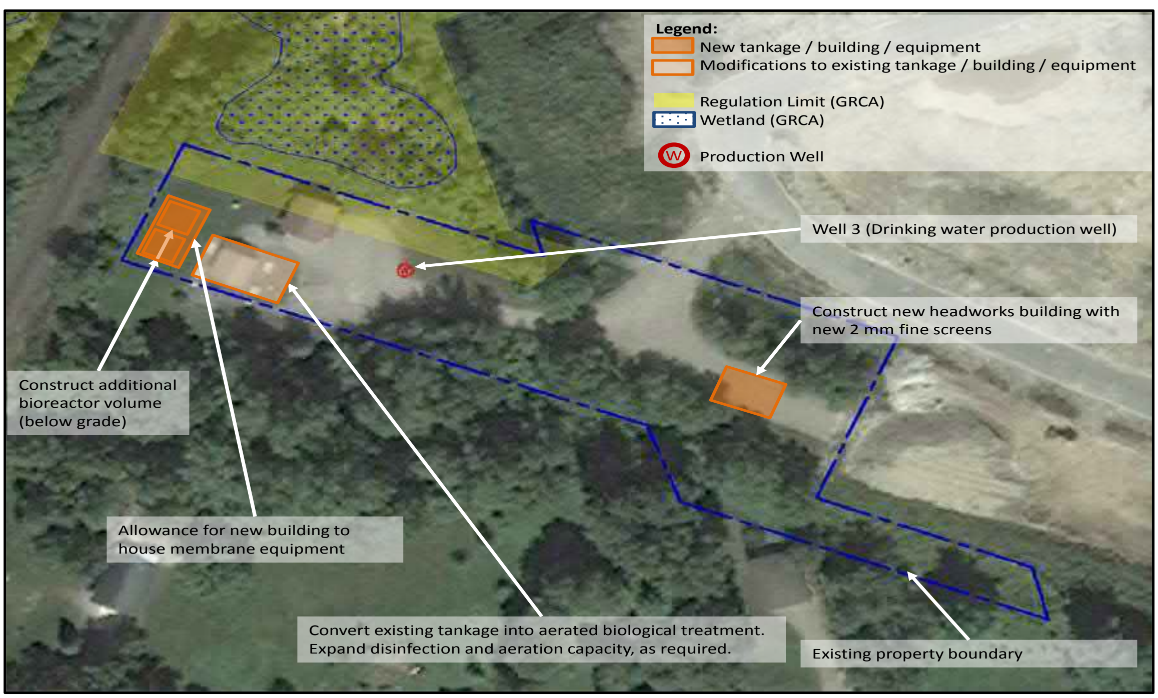

Figure C.8 Design Option 5B - MBR Expansion, Drumbo, Princeton, and VanWees Service (Conventional)

APPENDIX D
DETAILS OF SBR DESIGN

SBR CONCEPTUAL LEVEL DESIGN DETAILS

Considering Scenario 1 and Scenario 2, conceptual level costs were minimized if the existing SBR treatment process was expanded through construction of additional reactors. For purposes of a conceptual level design, the following additional assumptions were made:

- The future target operating MLSS concentration would be 3,500 mg/L. This MLSS concentration allows for future operational flexibility while also ensuring there is sufficient volume to settle biological solids below the fixed decant level;
- For operational simplicity, the dimensions and operation of each new SBR tank would be identical to the existing tanks;
- The treated volume per cycle would be unchanged from existing operation (47.4 m^3/cycle). The decant rate (and therefore the decant time) would also be unchanged to minimize solids in the decant stream; and,
- Remaining SBR steps (i.e. fill, react, settle, and idle) could be altered as required to provide adequate biological or hydraulic treatment capacity. However, a minimum ‘settle’ time of 45 minutes was required. Further, at least one SBR must always be in the ‘fill’ step.

For Scenario 1 and Scenario 2, the preferred design alternative was selected as the minimum number of SBR tanks which provided adequate biological and hydraulic treatment capacity. A summary of the preferred design for Scenarios 1 and 2 are given in Table D.1 and Table D.2, respectively.

Table D.1 Summary of Preferred Design Alternative for Scenario 1

Parameter	Winter	Summer	Typical Design Values (2)
No. of SBRs	3 (two existing, one new)		-
Minimum Temperature (°C)	10	13	-
SBR Cycle (mins) (1) Fill Idle React (Aerate) Settle Decant Waste	 167 (69) 87 (0) 210 (30) 60 (45) 62.4 (62.4) 1 (1)		-
MLSS (mg/L)	3,500		2,000 – 5,000
MLVSS (mg/L)	2,415		-
SRT (days) Average Day Loading Maximum Month Loading	 27.3 15.8	 28.4 16.4	10 – 30
Aeration Time (hrs) Required (3) Available	 4.45 5.13	 3.95 5.13	-
Hydraulic Capacity (m^3/d) Required Available	 853 986		-
HRT (hrs)	21.1		15 – 40
OLR (kg BOD_5/m^3)	0.20		0.1 – 0.3
F/Mv (kg BOD_5/kg MLVSS)	0.08		0.04 – 0.10

Notes:
1. Proposed SBR ‘storm mode operation’ (i.e. hydraulic capacity) is shown in parentheses
2. Metcalf and Eddy, 2014.
3. Aeration time required under maximum month loading conditions.

Table D.2 Summary of Preferred Design Alternative for Scenario 2

Parameter	Winter	Summer	Typical Design Values (2)
No. of SBRs	4 (two existing, two new)		-
Minimum Temperature (°C)	10	13	-
SBR Cycle (mins) (1) Fill Idle React (Aerate) Settle Decant Waste	 91 (46) 27 (0) 150 (30) 60 (45) 62.4 (62.4) 1 (1)		-
MLSS (mg/L)	3,500		2,000 – 5,000
MLVSS (mg/L)	2,415		-
SRT (days) Average Day Loading Maximum Month Loading	 23.9 13.1	 25.0 13.6	10 – 30
Aeration Time (hrs) Required (3) Available	 3.29 3.32	 2.84 3.32	-
Hydraulic Capacity (m^3/d) Required Available	 1,479 1,480		-
HRT (hrs)	14.1		15 – 40
OLR (kg BOD_5/m^3)	0.25		0.1 – 0.3
F/Mv (kg BOD_5/kg MLVSS)	0.10		0.04 – 0.10

Notes:
1. Proposed SBR 'storm mode operation' (i.e. hydraulic capacity) is shown in parentheses
2. Metcalf and Eddy, 2014.
3. Aeration time required under maximum month loading conditions.

The following conclusions can be drawn from Table D.1 and Table D.2 above:

- The projected number of SBR tanks required to treat plant influent flow increases as the flows and/or loads to the Drumbo WWTP increase.
- Generally, typical design parameters, such as the hydraulic retention time (HRT) and the organic loading rate (OLR), are well within typical design values.
- The proposed operational details for 'storm-mode' in each scenario show the preferred solution has the hydraulic capacity to treat the projected MDF. Actual operational details are flexible.

Considering Scenarios 3, 4, and 5, conceptual level costs were minimized through construction of a new SBR treatment process on the existing Drumbo WWTP site. Specifically, conceptual level expansion of the treatment process for these scenarios considered the installation of a Sanitaire ICEAS™ advanced SBR process. SBRs are designed as 'continuous-fill' and therefore do not require a specific fill stage. Further, wasting is designed to take place during the settle phase. A summary of important design details for each Scenario 3, 4, and 5 are given in Table D.3, Table D.4, and Table D.5, respectively.

Table D.3 Summary of Preferred Design Alternative for Scenario 3

Parameter	Proposed Design	Typical Design Values (2)
No. of SBRs	2 (both new)	-
Reactor Volume (each) (m^3)	554	
Minimum Temperature (°C)	10	-
SBR Cycle (mins) (1) Air-off Air-on Settle Decant	 24 (18) 144 (108) 60 (45) 60 (45)	-
MLSS (mg/L) (3)	5,008	2,000 – 5,000
MLVSS (mg/L) (4)	3,456	-
SRT (days) (5) Average Day Loading Maximum Month Loading	 35.1 23.4	10 – 30
Average Day HRT (hrs)	35.8	15 – 40
Average Day OLR (kg BOD_5/m^3)	0.13	0.1 – 0.3
Average Day F/Mv (kg BOD_5/kg MLVSS)	0.04	0.04 – 0.10

Notes:
1. Proposed SBR ‘storm mode operation’ (i.e. hydraulic capacity) is shown in parentheses
2. Metcalf and Eddy, 2014.
3. As reported by the supplier, at the low water level.
4. Assuming a future MLVSS:MLSS ratio of 0.69, similar to the historical ratio.
5. As reported by the supplier. Assuming a maximum month factor of 1.5.

Table D.4 Summary of Preferred Design Alternative for Scenario 4

Parameter	Proposed Design	Typical Design Values (2)
No. of SBRs	2 (both new)	-
Reactor Volume (each) (m^3)	496 (6)	
Minimum Temperature (°C)	10	-
SBR Cycle (mins) (1) Air-off Air-on Settle Decant	 24 (18) 144 (108) 60 (45) 60 (45)	-
MLSS (mg/L) (3)	4,643	2,000 – 5,000
MLVSS (mg/L) (4)	3,204	-
SRT (days) (5) Average Day Loading Maximum Month Loading	 35.9 23.9	10 – 30
Average Day HRT (hrs)	19.9	15 – 40
Average Day OLR (kg BOD_5/m^3)	0.14	0.1 – 0.3
Average Day F/Mv (kg BOD_5/kg MLVSS)	0.05	0.04 – 0.10

Notes:
1. Proposed SBR ‘storm mode operation’ (i.e. hydraulic capacity) is shown in parentheses
2. Metcalf and Eddy, 2014.
3. As reported by the supplier, at the decanted water level.
4. Assuming a future MLVSS:MLSS ratio of 0.69, similar to the historical ratio.
5. As reported by the supplier. Assuming a maximum month factor of 1.5.
6. Required tank volume adjusted from the quote as required based on the projected ADF. Process performance parameters assumed as reported by the supplier.

Table D.5 Summary of Preferred Design Alternative for Scenario 5

Parameter	Proposed Design	Typical Design Values [2]
No. of SBRs	2 (both new)	-
Reactor Volume (each) (m^3)	904 [6]	
Minimum Temperature (°C)	10	-
SBR Cycle (mins) [1] Air-off Air-on Settle Decant	 24 (18) 144 (108) 60 (45) 60 (45)	-
MLSS (mg/L) [3]	5,055	2,000 – 5,000
MLVSS (mg/L) [4]	3,488	-
SRT (days) [5] Average Day Loading Maximum Month Loading	 39.5 26.3	10 – 30
Average Day HRT (hrs)	40.6	15 – 40
Average Day OLR (kg BOD_5/m^3)	0.12	0.1 – 0.3
Average Day F/Mv (kg BOD_5/kg MLVSS)	0.03	0.04 – 0.10

Notes:
1. Proposed SBR 'storm mode operation' (i.e. hydraulic capacity) is shown in parentheses
2. Metcalf and Eddy, 2014.
3. As reported by the supplier, at the low water level.
4. Assuming a future MLVSS:MLSS ratio of 0.69, equal to the historical ratio.
5. As reported by the supplier. Assuming a maximum month factor of 1.5.
6. Required tank volume adjusted from the quote as required based on the projected ADF. Process performance parameters assumed as reported by the supplier.

The following conclusions can be drawn from Table D.3, Table D.4, and Table D.5:

- The preferred design alternative for Scenario 3, Scenario 4, and Scenario 5, consider the construction of only 2 SBR tanks. The size of the SBR tanks in each scenario are dependent on the projected flows and loads to the Drumbo WWTP. Existing tankage can be repurposed into equalization volume, as required.
- Generally, the proposed design parameters, such as the hydraulic retention time (HRT) and the organic loading rate (OLR), are comparable to typical design values.

Sanitaire ICEAS™ Advanced SBR

SANITAIRE®
a xylem brand

Harnessing a simple and reliable solution for quality water

The Sanitaire ICEAS Advanced SBR is a continuous flow biological treatment system that provides multiple advantages over conventional activated sludge and other SBRs by bringing together process, aeration, decanting and control in a single treatment tank. It is fully automated and includes a completely integrated process design consisting of the aeration system, blowers, pumps, mixers, effluent decanters, monitoring and control equipment and comprehensive process control system.

Simplifying operations for reliable results

The ICEAS SBR is designed to reduce complexity of operation. Unlike conventional activated sludge plants, there is no need for primary or secondary settlement tanks or return sludge pumps. All treatment is done in a single basin. Continuous inflow distributes variations in flows and loads evenly across all basins - simplifying day to day operations and operational changes as well as accommodating single basin operation for low flow and maintenance conditions.

The intelligently designed process control system with simple, intuitive time-based control and trending capability provide a full system overview, making it easy to optimize plant performance, predict maintenance and reduce operating costs – taking the complexity out of SBRs.

The ICEAS SBR can handle flows from 25,000 GPD to over 100 MGD. It can be designed to accommodate up to six times average daily flow while assuring high effluent quality across the entire flow range with the unique basin design and actively controlled decanter. Sanitaire's proprietary Sludge Inventory Management System (SIMS) automatically maintains the preset solids retention time, resulting in reliable settling characteristics and effluent quality, all while reducing operator attention requirements.

The ICEAS process also effectively removes nitrogen and phosphorus from wastewater through biological nutrient removal (BNR) process.

Sanitaire ICEAS SBR has proven performance in nearly 1,000 treatment system installations worldwide.

1 Blowers 2 Pre-react 3 Mixer 4 Aeration 5 WAS Pump
6 Decanter 7 Process control

ICEAS products: Sanitaire Silver Series aeration system, Flygt compact mixers, Flygt submersible N-Pumps, Sanitaire decanters, ICEAS control systems.

Designed with life-time efficiency in mind

Sanitaire is focused on producing cost-saving water technologies that use less energy throughout the lifetime of the project by not only using highly efficient aeration grids and blower technology but also cutting edge controls and instrumentation which use innovative algorithms to control the aeration and process, minimizing energy use by up to 50%.

Using Sanitaire's continuous inflow distribution technology, the peak load is spread across all basins simplifying operation and saving up to 30% on the footprint. Continuous inflow also reduces up-front capital expenditure by requiring less equipment, and provides for reduced construction costs. With almost 1000 installations, our experienced design team can put together an optimized, flexible solution to meet not only your current needs but also provide the expandability to meet your future emerging requirements.

A partner from start to finish

Xylem products have been helping to solve water and wastewater challenges for decades. With a broad portfolio of advanced solutions and technologies, we apply our process capability, engineering expertise and regulatory insight to help design systems that are right for you. As your single source provider, we work to reduce your risks by providing equipment-control integration, and the support needed to ensure a successful installation and ownership. Xylem stands behind our solutions with both equipment warranties and process performance guarantees.

The ICEAS phases

With its continuous flow process, Sanitaire ICEAS SBR features three distinct treatment phases:

React phase: Screened and de-gritted wastewater flows continuously into the pre-react zone and enters the main react zone through submerged ports in the non-hydrostatic baffle wall. Biological oxidation and reduction occur through aeration, anoxic and anaerobic sequences within the react phase to predictively achieve the desired treatment.

Settle phase: Basin agitation from the react phase (i.e. aeration and mixing) is stopped to allow the solids to settle to the bottom of the basin. Raw wastewater continues to flow into the pre-react zone while the main react zone settles. As the solids settle, a clear layer of water develops on top of the basin.

Decant phase: The decanter descends gradually downward to draw off the clarified supernatant. Wastewater continues to flow into the pre-react zone as the treated and clarified effluent is decanted from the main react zone at a constant rate. Waste activated sludge is typically removed from the basin during this phase.

Xylem |'zīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

We're 12,000 people unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

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Let's Solve Water

Xylem, Inc.
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Charlotte, NC 28273
Tel 704.409.9700
Fax 704.295.9080
www.xyleminc.com

DESIGN PROPOSAL

Drumbo, ON (Option 1) Sanitaire #26599-16a

Table A: INFLUENT WASTEWATER CHARACTERISTICS AND SITE CONDITIONS

Average Dry Weather Flow	643	M^3/DAY
Peak Dry Weather Flow	1,286	M^3/DAY
Peak Wet Weather Flow	1,929	M^3/DAY
BOD_5 (20°C)	337	mg/l
BOD_5 (20°C)	217	kg/day
Suspended Solids	356	mg/l
TKN	66	mg/l
Total Phosphorus	9	mg/l
Max Wastewater Temperature	20	°C
Min Wastewater Temperature	10	°C
Ambient Air Temperature	-6 - 32	°C
Site Elevation	311	M

Table B: ICEAS® EFFLUENT QUALITY (MONTHLY AVERAGE)

BOD_5 (20°C)	9	mg/l
Suspended Solids	9	mg/l
NH_3-N	1	mg/l
Total Phosphorus	0.2	mg/l

*Requires chemical precipitation

Table C: ICEAS PROCESS DESIGN CRITERIA

F / M	0.051	kg BOD5/ kg MLSS / day
SVI (after 30 minutes settling)	150	ml/g
MLSS at Bottom Water Level	5,008	mg/l
Waste Sludge Produced (Approx.)	174	kg/day
Volume of Sludge Produced (Approx., 0.85% solids)	21	M^3/DAY
Normal Decant Rate	2.36	M^3/min
Peak Decant Rate	3.22	M^3/min
Hydraulic Retention Time	1.49	Days
Sludge Age	23.8	Days
Alkalinity	270	mg/l
Chemical Dosage (as Alum)	15	mg/l

Bold, italicized text indicate assumptions made by Sanitaire

CYCLE	AIR-OFF	AIR-ON	SETTLE	DECANT	TOTAL
Normal	24 min	144 min	60 min	60 min	4.8 hour
Storm	18 min	108 min	45 min	45 min	3.6 hour

Table D: KEY ICEAS DESIGN DETAILS

Number of ICEAS Basins	2	
Top Water Level	4.6	M
Basin Width (Inside)	6.3	M
Basin Length (Inside)	19.1	M
Bottom Water Level	3.6	M

ICEAS EQUIPMENT			Motor HP	No. Req.
Decanter Mechanism	1.52 m Weir length			2
Decanter Drive Unit			1/4	2
ICEAS Blower	459 M^3/HR	49.6 KPAG	20	2
ICEAS Fine Bubble Aeration System				2
Air Control Valve	100 mm			2
Waste Sludge Pump	416 L/min		2.4	2
Submersible Mixer			8.0	2
ICEAS Controls				1

ICEAS POWER REQUIREMENTS		**(At Average Aeration Depth)**			Kwh/Day
Decant Drive Unit	0.2 BHP	2 run	@	5 Hrs/day	1.5
ICEAS Air Blowers	16.2 BHP	1 run*	@	24 Hrs/day	290.1
Waste Sludge Pump	1.9 BHP	2 run	@	0.4 Hrs/day	1.2
Submersible Mixer	6.4 BHP	2 run	@	2 Hrs/day	19.1
				KWH/DAY	311.9
			AVERAGE	KWH/HR	13.00

* Shared ICEAS Blowers

DESIGN PROPOSAL

Drumbo, ON (Option 2) Sanitaire #26599-16a

Table A: INFLUENT WASTEWATER CHARACTERISTICS AND SITE CONDITIONS

Average Dry Weather Flow	853	M^3/DAY
Peak Dry Weather Flow	1,706	M^3/DAY
Peak Wet Weather Flow	2,559	M^3/DAY
BOD_5 (20°C)	224	mg/l
BOD_5 (20°C)	191	kg/day
Suspended Solids	120	mg/l
TKN	67	mg/l
Total Phosphorus	9	mg/l
Max Wastewater Temperature	20	°C
Min Wastewater Temperature	10	°C
Ambient Air Temperature	-6 - 32	°C
Site Elevation	311	M

Table B: ICEAS® EFFLUENT QUALITY (MONTHLY AVERAGE)

BOD_5 (20°C)	9	mg/l
Suspended Solids	9	mg/l
NH_3-N	1	mg/l
Total Phosphorus	0.2	mg/l

*Requires chemical precipitation

Table C: ICEAS PROCESS DESIGN CRITERIA

F / M	0.072	kg BOD5/ kg MLSS / day
SVI (after 30 minutes settling)	150	ml/g
MLSS at Bottom Water Level	4,643	mg/l
Waste Sludge Produced (Approx.)	103	kg/day
Volume of Sludge Produced (Approx., 0.85% solids)	18	M^3/DAY
Normal Decant Rate	3.12	M^3/min
Peak Decant Rate	4.27	M^3/min
Hydraulic Retention Time	0.83	Days
Sludge Age	23.9	Days
Alkalinity	449	mg/l
Chemical Dosage (as Alum)	160	mg/l

Bold, italicized text indicate assumptions made by Sanitaire

CYCLE	AIR-OFF	AIR-ON	SETTLE	DECANT	TOTAL
Normal	24 min	144 min	60 min	60 min	4.8 hour
Storm	18 min	108 min	45 min	45 min	3.6 hour

Table D: KEY ICEAS DESIGN DETAILS

Number of ICEAS Basins	2	
Top Water Level	4.6	M
Basin Width (Inside)	5.7	M
Basin Length (Inside)	17.2	M
Bottom Water Level	3.0	M

ICEAS EQUIPMENT			Motor HP	No. Req.
Decanter Mechanism	2.29 m Weir length			2
Decanter Drive Unit			1/2	2
ICEAS Blower	578 M^3/HR	47.6 KPAG	25	2
ICEAS Fine Bubble Aeration System				2
Air Control Valve	150 mm			2
Waste Sludge Pump	416 L/min		2.4	2
Submersible Mixer			8.0	2
ICEAS Controls				1

ICEAS POWER REQUIREMENTS		**(At Average Aeration Depth)**			Kwh/Day
Decant Drive Unit	0.4 BHP	2 run	@	5 Hrs/day	3.0
ICEAS Air Blowers	18.5 BHP	1 run*	@	24 Hrs/day	330.5
Waste Sludge Pump	1.9 BHP	2 run	@	0.4 Hrs/day	1.0
Submersible Mixer	6.4 BHP	2 run	@	2 Hrs/day	19.1
				KWH/DAY	353.6
			AVERAGE	KWH/HR	14.73

* Shared ICEAS Blowers

DESIGN PROPOSAL

Drumbo, ON (Option 3) Sanitaire #26599-16a

Table A: INFLUENT WASTEWATER CHARACTERISTICS AND SITE CONDITIONS

Average Dry Weather Flow	853	M^3/DAY
Peak Dry Weather Flow	1,706	M^3/DAY
Peak Wet Weather Flow	2,559	M^3/DAY
BOD_5 (20°C)	350	mg/l
BOD_5 (20°C)	298	kg/day
Suspended Solids	383	mg/l
TKN	67	mg/l
Total Phosphorus	9	mg/l
Max Wastewater Temperature	20	°C
Min Wastewater Temperature	10	°C
Ambient Air Temperature	-6 - 32	°C
Site Elevation	311	M

Table B: ICEAS® EFFLUENT QUALITY (MONTHLY AVERAGE)

BOD_5 (20°C)	9	mg/l
Suspended Solids	9	mg/l
NH_3-N	1	mg/l
Total Phosphorus	0.2	mg/l
*Requires chemical precipitation		

Table C: ICEAS PROCESS DESIGN CRITERIA

F / M	0.045	kg BOD5/ kg MLSS / day
SVI (after 30 minutes settling)	150	ml/g
MLSS at Bottom Water Level	5,055	mg/l
Waste Sludge Produced (Approx.)	240	kg/day
Volume of Sludge Produced (Approx., 0.85% solids)	29	M^3/DAY
Normal Decant Rate	3.12	M^3/min
Peak Decant Rate	4.27	M^3/min
Hydraulic Retention Time	1.69	Days
Sludge Age	26.6	Days
Alkalinity	270	mg/l
Chemical Dosage (as Alum)	25	mg/l

Bold, italicized text indicate assumptions made by Sanitaire

CYCLE	AIR-OFF	AIR-ON	SETTLE	DECANT	TOTAL
Normal	24 min	144 min	60 min	60 min	4.8 hour
Storm	18 min	108 min	45 min	45 min	3.6 hour

Table D: KEY ICEAS DESIGN DETAILS

Number of ICEAS Basins	2	
Top Water Level	4.6	M
Basin Width (Inside)	7.7	M
Basin Length (Inside)	23.2	M
Bottom Water Level	3.7	M

ICEAS EQUIPMENT			Motor HP	No. Req.
Decanter Mechanism	2.29 m Weir length			2
Decanter Drive Unit			1/4	2
ICEAS Blower	612 M^3/HR	49.6 KPAG	25	2
ICEAS Fine Bubble Aeration System				2
Air Control Valve	150 mm			2
Waste Sludge Pump	416 L/min		2.4	2
Submersible Mixer			8.0	2
ICEAS Controls				1

ICEAS POWER REQUIREMENTS		**(At Average Aeration Depth)**			Kwh/Day
Decant Drive Unit	0.2 BHP	2 run	@	5 Hrs/day	1.5
ICEAS Air Blowers	21.9 BHP	1 run*	@	24 Hrs/day	391.4
Waste Sludge Pump	1.9 BHP	2 run	@	0.6 Hrs/day	1.7
Submersible Mixer	6.4 BHP	2 run	@	2 Hrs/day	19.1
				KWH/DAY	413.7
			AVERAGE	KWH/HR	17.24

* Shared ICEAS Blowers

APPENDIX E
DETAILS OF MBR DESIGN

From:	Totten, Geoff (GE Power)
To:	Graham Seggewiss
Cc:	scott@proaquasales.com
Subject:	RE: MBR Conceptual Design Request
Date:	February-03-16 3:50:42 PM
Attachments:	image001.png image002.png

Graham,

As a follow-up to our discussion and your email below, I've provided a conceptual budget estimate for the membrane system below.

In terms of equipment cost, we would be approximately $960,000 for the base Option (lowest peak flow). For the other two options that have the higher peak flow we would simply need to fill in some of the empty membrane space within each cassette and potentially upsize the process pumps so additional cost for the higher peak should be <100K.

Membrane System Scope would include:

Membrane cassettes/modules
Permeate and air headers above membrane tanks
Process (permeate/backpulse) Pump skid
Membrane air scour blowers
Mixed Liquor recirculation (RAS) Pumps
Biological equipment (fine-bubble diffusers and Process blowers)
Membrane cleaning chemical dosing pumps (sodium hypo and citric acid)
Startup/Commissioning assistance
Master control panel

With regards to the higher loading condition you had inquired about (ie 1.5x the influent conditions previously provided and outlined in table below). Assuming this peak loading was associated with the ADF condition of 855 m3/d we would be able to treat this within the existing SBR and Filter EQ tanks. I have added another row in the table to show the resulting effluent concentration after the LEAPprimary screen. The solids coming off the LEAPprimary screen will be 20-30% dry solids.

	Concentration (mg/L)			
	BOD_5	**TSS**	**TP**	**TKN**
Historic (2012-2015)	129	91	3.75	31
Design Scenario Min.	149	80	6.3	44.7
Design Scenario Max.	233	255	6.3	44.7
X1.5	350	382	9.5	67.1
LEAPprimary Effluent	245	149	9.5	67.1

Once you narrow down the design scenario's we can put together a detailed budget proposal outlining the equipment and design.

Regards,
Geoff

APPENDIX F
DETAILS OF UV DISINFECTION DESIGN

From:	Ed Broeders
To:	Graham Seggewiss
Subject:	RE: Conceptual Level UV Disinfection
Date:	January-20-16 2:43:23 PM
Attachments:	image001.png image002.png image003.png TrojanUV3000PTP & TrojanUV3000B Brochure.pdf 3M0516D01 UV3400K 1 Channel 1 Bank 2 Lamps Weir.pdf 3M0008D01 UV3400K-1 1 Channel 1 Bank 4 Lamps Weir (1).pdf 3M0518D01 UV3600K 1 Channel 1 Bank 4 Lamps Weir.pdf 3M0010D01 UV3600K-1 1 Channel 1 Bank 4 Lamps Weir.pdf

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Graham,

I've taken a quick look at this and offer the following recommendations:

Based on peak flows as specified and a minimum UVT value of 65% (which should be the case for tertiary quality effluent).

In all cases, the suggested solution is the **Trojan UV3000PTP system**. This system is available either in a stainless steel channel or in a concrete channel. For the stainless channel, transition boxes are used to attach to pipes, if appropriate. See the attached brochure and drawings.

Option 1 – Peak Flow 2,100 m3/d (87.50 m3/hr)

Recommended model: **UV3400K** w/stainless steel channel or **UV3400K-1** concrete channel
This model can handle up to 88.33 m3/hr at 65% UVT
Budgetary pricing:

- UV3400K = $34,000.
- UV3400K-1 = $23,000.

Option 2 – Peak Flow 3,150 m3/d (131.25 m3/hr)

Recommended model: **UV3600K** w/stainless steel channel or **UV3600K-1** concrete channel
This model can handle up to 132.49 m3/hr at 65% UVT
Budgetary pricing:

- UV3600K = $41,000.
- UV3600K-1 = $29,000.

The standard scope of supply for the PTP system includes:

- UV Modules
- Support rack for mounting UV modules
- Monitoring System (including UV Sensor)
- Power Distribution Receptacles
- Level Control Weir
- Stainless Steel Channel and inlet/outlet transition boxes (K-Models only)
- Maintenance / Cleaning Rack
- Operator's Kit

- Standard Spare Parts (4 lamps, 4 sleeves and 4 lamp holders) per ban
- Freight to the Job Site (North America only) and standard warranty
- Start-up and commissioning service by certified technician (1 trip/1 day)

The drawings attached, particularly for the K-1 models for use in concrete channels, will tell you the size of channel required. Then you can check if the existing channel can accommodate these systems or not.

Let me know if you have any further questions

Regards,
Ed

Ed Broeders, P.Eng.
Municipal Area Manager
H2Flow Equipment Inc.
470 North Rivermede Rd. Unit #7
Concord, Ontario, Canada L4K 3R8
Tel: (905) 660-9775 x28 Fax: (905) 660-9744 Cell: (647) 282-4062
ed@h2flow.com www.h2flow.com

From: Graham Seggewiss [mailto:graham.seggewiss@xcg.com]
Sent: Wednesday, January 20, 2016 11:16 AM
To: Ed Broeders
Subject: RE: Conceptual Level UV Disinfection

Hi Ed,

At this time, let's assume there is no redundancy required.

Thanks,

Graham Seggewiss, M.A.Sc., E.I.T
Process Specialist
XCG Consulting Limited

TROJANUV3000™PTP | TROJANUV3000™B

WASTEWATER DISINFECTION

TrojanUV3000™PTP | TrojanUV3000™B

Simple, Dependable UV Solutions

Proven, chemical-free disinfection from the industry leader

Trojan Technologies is an ISO 9001: 2000 registered company that has set the standard for proven UV technology and ongoing innovation for more than 30 years. With unmatched scientific and technical expertise, and a global network of water treatment specialists, representatives and technicians, Trojan is trusted more than any other firm as the best choice for municipal UV solutions. Trojan has the largest UV installation base – over 6,000 municipal installations worldwide.

In North America alone, almost one in five wastewater treatment plants rely on our proven, chemical-free disinfection solutions.

The TrojanUV3000™PTP (Packaged Treatment Plant) and TrojanUV3000™B are two of the reasons why. These simple, robust, and operator-friendly systems have demonstrated their effective, reliable performance in over 2,000 installations around the world. The TrojanUV3000™PTP is pre-engineered for quick, inexpensive installation with pipe runs using pre-fabricated, flanged stainless steel channels, or into existing chlorine contact basins and effluent channels. The TrojanUV3000™B offers increased capacity and is available with a controller that enables flow pacing to maximize operating efficiency and extend lamp life. The system turns UV lamp banks on and off automatically to ensure the required dose is met using the fewest lamps and least electricity.

TROJANUV3000™PTP | TROJANUV3000™B

Robust, operator-friendly solutions designed for economical disinfection

System Monitor/Control Center

TrojanUV3000™PTP – Optional

The optional System Monitor includes a submersible UV sensor, and provides digital output of UV intensity at each bank. Elapsed time display provides continuous readout of actual hours of operation (lamp hours). A dry contact enables a remote low UV intensity alarm.

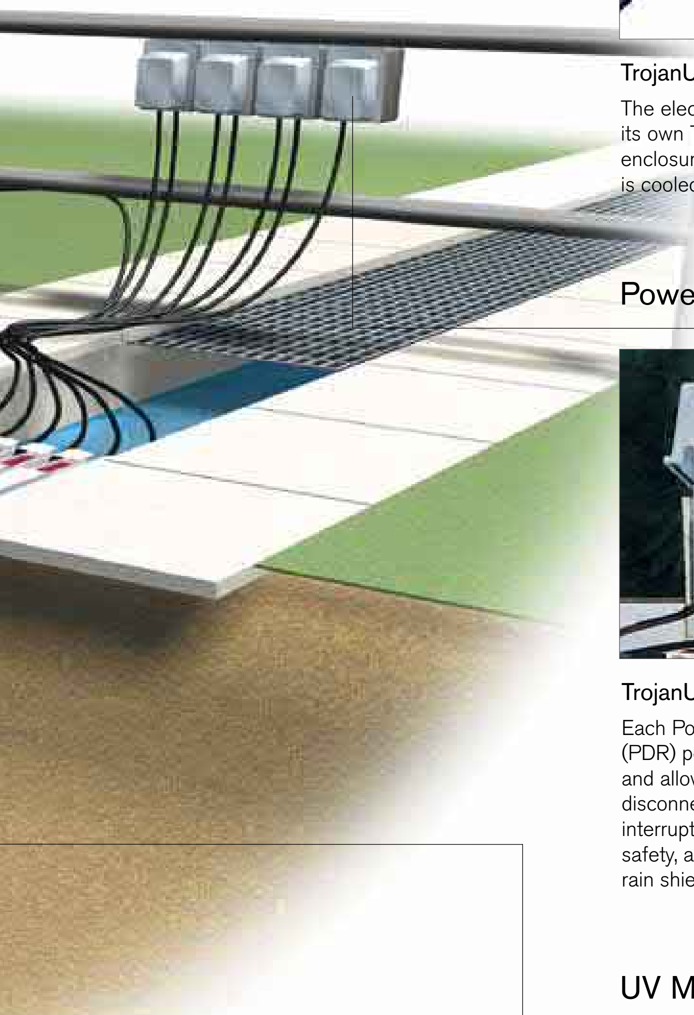
TrojanUV3000™B

The System Control Center (SCC) provides control of all UV functions, tracks lamp hours, and uses a submersible UV sensor (one per bank) to monitor UV intensity. The SCC is capable of "flow pacing" – automatically turning banks of UV lamps off or on in response to changes in the flow rate in order to conserve power and prolong lamp life.

Water Level Control

TrojanUV3000™PTP

A fixed weir maintains the correct channel effluent depth over different flow rates, with maximum headloss of 1.5 inches (3.8 cm) at peak flow. Equipped with a drain for easy channel cleaning, and available for both concrete channels and stainless steel channel option.



Electronic Ballast

TrojanUV3000™PTP/B

The electronic ballast is mounted within its own TYPE 6P (IP67)-rated watertight enclosure within the module frame, and is cooled by convection.

Power Distribution

TrojanUV3000™PTP

Each Power Distribution Receptacle (PDR) powers two (2) UV modules and allows for quick and safe electrical disconnect. The duplex ground fault interrupter receptacles ensure operator safety, and are mounted inside Type 3R rain shield boxes.

TrojanUV3000™B

The Power Distribution Center (PDC) is constructed of stainless steel and is mounted across the channel. The PDC distributes power to individual modules and allows electrical isolation of each module for easy service.

TrojanUV3000™B

Available with a fixed weir or Automatic Level Control (ALC) gate in the channel to maintain the appropriate water level over the lamps. Trojan engineers will work with you to select the appropriate level control device for your application.

UV Modules

TrojanUV3000™PTP/B

UV lamps are mounted on stainless steel frames. Lamps are enclosed in quartz sleeves, and submerged horizontally and parallel to water flow. A bank is made up of multiple modules placed in parallel positions. All wiring, from ballasts to lamps, runs inside the module frame. A display showing individual lamp status is provided on top of each module.

Stainless Steel Effluent Channel

TrojanUV3000™PTP - Optional

An optional Type 304 stainless steel channel, complete with UV Module Support Rack, can be used. Channel can be installed as a freestanding structure connected to flanged pipes using the optional transition boxes.

Key Benefits

TrojanUV3000™PTP / TrojanUV3000™B

Increased operator, community and environmental safety.
The TrojanUV3000™PTP and TrojanUV3000™B use environmentally friendly ultraviolet light – the safest alternative for wastewater disinfection. No disinfection by-products are created, and no chlorine compounds must be transported, stored or handled by plant staff.

Proven disinfection based on actual dose delivery testing (bioassay validation), and over 2,000 TrojanUV3000™PTP and TrojanUV3000™B installations worldwide. Verified field performance data eliminates sizing assumptions resulting from theoretical dose calculations.

Reduced engineering and installation costs. The TrojanUV3000™PTP can be equipped with pre-fabricated stainless steel channels and transition boxes for in-line integration with existing flanged piping – thus minimizing engineering and installation costs. Both systems can be easily retrofitted into existing chlorine contact tanks and effluent channels, and come pre-tested, pre-assembled and pre-wired to minimize installation costs.

Designed for simplicity and reliability. Using Trojan's most proven, modular design and robust components, including low-pressure lamps, these systems are straightforward to operate and require minimal operator involvement.

Operator-friendly maintenance. Trojan lamps are guaranteed for 12,000 hours (15 months) of operation, and can be replaced, without tools, in less than three minutes per lamp. Modules are electrically separate, allowing a single module to be removed without disrupting flow or taking the system off-line.

Outdoor installation flexibility. All components of the TrojanUV3000™PTP and TrojanUV3000™B systems can be installed outdoors, eliminating the need and costs of a building, shelter, and air conditioning for ballast cooling.

Well suited to changing regulations. Trojan UV systems do not have any negative impact on receiving waters, making them a strategic, long-term choice as regulations become increasingly stringent.

Guaranteed performance and comprehensive warranty. Trojan UV systems include a Lifetime Disinfection Performance Guarantee, the best lamp warranty in the industry, and offer lamps from multiple approved suppliers. Ask for details.

Advanced, Self-Contained UV Modules

Compact footprint simplifies installation and eliminates air conditioning costs

Benefits:

- Space-saving, electronic ballasts are housed right in the modules, not in separate external cabinets, to minimize footprint size, installation time and costs
- Convection cooling of the ballast eliminates costs associated with air conditioning or forced-air cooling
- Lamps are protected in a fully-submersible, Type 316 stainless steel frame
- All wiring and cables are safely enclosed inside the waterproof module frame – fully protecting them from effluent and UV light
- Modules are electrically separated from each other, allowing them to be individually removed for maintenance and a spare module quickly inserted to maintain maximum performance

The advanced, self-contained modules of the TrojanUV3000™PTP and TrojanUV3000™B incorporate convection-cooled ballasts and feature a UV lamp status indicator (below) for at-a-glance confirmation that all lamps are operating.

- Streamlined module minimizes headloss and prevents build-up of debris on the lamps
- All module wiring is pre-installed and factory-tested

Trojan's Innovative Ballasts and Enclosures Provide Significant Advantages	
Module-Mounted Ballasts	▪ Take up less space and reduce footprint, minimizing installation time and costs
Convection Cooling	▪ Housing the ballasts in the module allows for natural convection cooling to dissipate the heat of the ballasts into the air ▪ The ballasts are kept sealed and protected ▪ No air conditioning or forced-air cooling required
Clean, Water-Tight Protection	▪ Some suppliers use external cabinets with forced-air cooling. This introduces dust and moisture onto circuit boards and other electronic components, greatly reducing the life of these components ▪ Internal housing in Trojan's sealed module keeps all components dry and clean
Internal Cabling	▪ All lamp-ballast wiring is contained within the module frame. This configuration protects wires and cables from exposure to effluent, debris fouling and UV light ▪ Internal cabling allows all electrical connections within the module to be factory-tested

Proven Performance, Components and Design

Validated through regulatory-endorsed bioassay testing and over 1,000 installations worldwide

Benefits:

- Performance data is generated from actual field testing (bioassay validation) over a range of flow rates, effluent quality and UVTs
- Provides regulatory-endorsed, physical verification that systems will perform as expected – ensuring public and environmental safety
- Most accurate assessment of system sizing needs
- Low-pressure lamps and ballasts have proven their outstanding reliability in thousands of installations
- Open-channel design allows cost-effective installation into existing effluent channels & chlorine contact basins
- Systems can be installed outdoors to reduce building capital costs
- Modular design is scalable for precise sizing, and expandable to meet new regulatory or capacity requirements

The TrojanUV3000™PTP and TrojanUV3000™B feature a gravity-fed, open-channel design that delivers cost savings at installation through simple retrofits into existing effluent channels and chlorine contact tanks. Rugged, proven components make operation and maintenance extremely cost-effective.

Designed & Built for Easy Maintenance

User-friendly design requires minimal service and operator involvement

Benefits:

- Trojan lamps are warranted for 12,000 hours (15 months)
- Routine maintenance can be scheduled and completed without disrupting disinfection
- Replacement of UV lamps can be completed without tools and requires less than 3 minutes per lamp

Lightweight, self-contained modules are operator-friendly and make routine maintenance quick and easy. Modules can be individually removed for periodic sleeve cleaning and lamp replacement after 12,000 hours (15 months). An optional, mobile cleaning rack simplifies maintenance procedures.

Highly Flexible Installation Configurations

TrojanUV3000™PTP is pre-engineered for cost-effective integration with piping or channels

Benefits:

- Systems are pre-designed to meet disinfection requirements with minimal engineering costs
- Systems can be installed in series to treat higher flows or provide additional redundancy
- Pre-engineered stainless steel channels with built-in weirs are installed as a freestanding structure
- Stainless steel channels are easily integrated with existing flanged piping using Trojan's highly flexible transition boxes (Figure 1)
- Optional turn boxes minimize system footprint by connecting stainless steel channels and allowing two banks in series to be installed side-by-side (Figure 2)
- Transition boxes allow flanged pipe connection on any of three sides for flexible integration (Figure 3)

Figure 1: Banks in Series – Side View

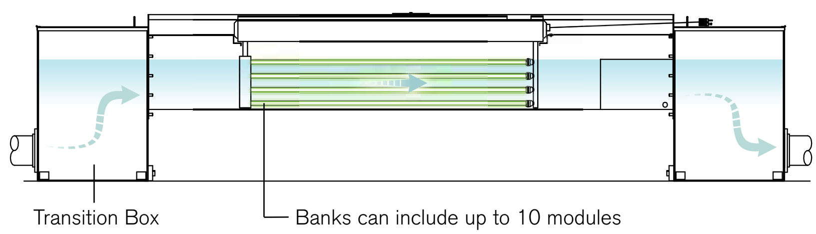


Figure 2: Banks in Series With Turn Box – Overhead View

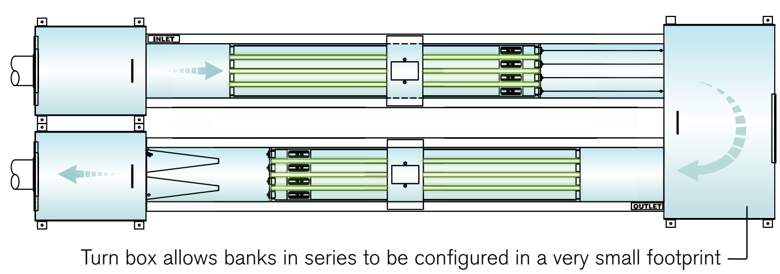
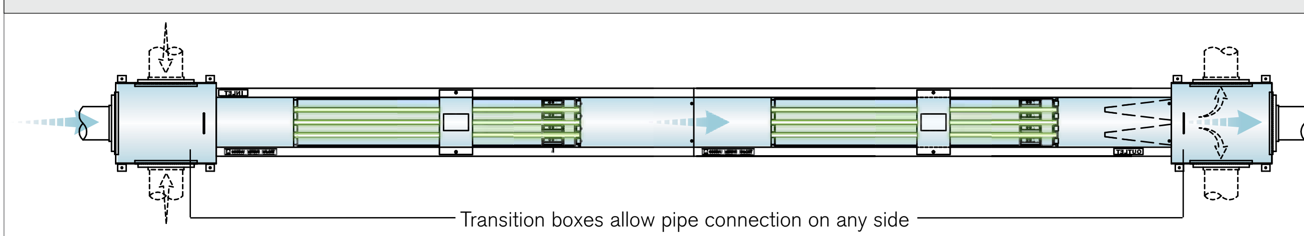


Figure 3: Banks in Series – Overhead View



The TrojanUV3000™PTP is pre-engineered for simple, effective, low cost wastewater disinfection. The optional 304 stainless steel channels feature a UV module support rack, and can be installed as a freestanding unit. Trojan turn boxes and transition boxes allow systems to be incorporated with maximum flexibility and minimal footprint.

Flow Pacing Reduces O&M Costs

TrojanUV3000™B system controller offers flow-pacing for increased operating efficiency

Benefits:

- The System Control Center (SCC) provides monitoring and control of all UV functions
- The SCC provides digital display of bank status, lamp hours, and UV intensity (mW/cm^2)
- The SCC allows the TrojanUV3000™B to be flow paced – meaning the UV lamps of individual banks are turned on and off automatically in response to variations in flow rate (based on a flow meter signal)
- Flow pacing maximizes operating efficiency by matching UV output to disinfection requirements, and reducing electrical consumption during periods of low flow by turning lamps off (Figures 1 & 2)
- Flow pacing also increases the operating life of UV lamps, thereby reducing the frequency, expense and labor required for lamp replacement

The System Control Center of the TrojanUV3000™B monitors lamp hours and uses a submerged UV Sensor to feed accurate data on UV intensity for at-a-glance system status. The SCC also allows flow pacing to minimize operating and maintenance costs by turning banks on and off based on flow requirements

Flow Pacing Optimizes System Efficiency

Figure 1: Operation During Periods of High Flow

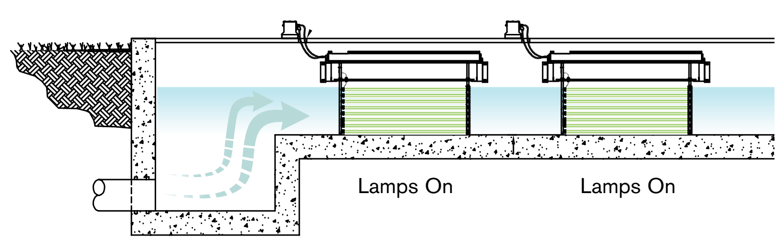
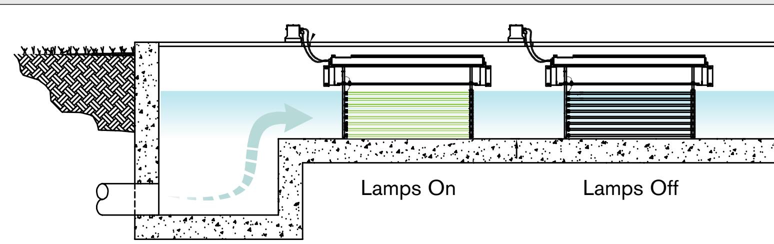


Figure 2: Operation During Periods of Low Flow



TROJANUV3000™PTP | TROJANUV3000™B

System Specifications

System Characteristics	TrojanUV3000™PTP	TrojanUV3000™B
Typical Applications	Up to 3 MGD (473 m^3/hr)	1 – 5 MGD (158 – 789 m^3/hr)
Lamp Type	Low-pressure	
Ballast Type	Electronic; non-variable	
Input Power Per Lamp	45 or 87.5 Watts	87.5 Watts
Lamp Configuration	Horizontal, parallel to flow	
Module Configuration	2 or 4 lamps per module	4, 6 or 8 lamps per module
Bank Configuration	Up to 10 modules per bank	Up to 20 modules per bank
Channel Configurations		
Lamp Banks in Series	Up to 2	Up to 3
Channel Options	Stainless Steel (Trojan option) or Concrete (by others)	Concrete (by others)
Flanged Transition Connections	Optional for stainless steel channels	—
U-Turn Connector Box	Optional for stainless steel channels	—
Level Control Device Options	Fixed weir	ALC gate or fixed weir
Enclosure Ratings		
System Monitor/Control Center	304 stainless steel	
Ballast Enclosure	TYPE 6P (IP67)	
Ballast Cooling Method	Convection; no air conditioning or forced air required	
Installation Location	Indoor or outdoor	
System Monitoring & Controls		
Controller	Optional; Monitoring only	Monitoring and bank control
UV Intensity Monitoring	Optional	Optional
Flow Pacing	—	Optional
Inputs Required	None	4-20 mA flow signal for Flow Pacing
Local Status Indication	Lamp Age (hours) UV Intensity (mW/cm^2) Bank Status (on/off) Low Intensity Alarm Lamp Failure Alarm	
Remote Alarms	UV Intensity (4-20 mA) Common Alarm (discrete)	
Location	Indoor or outdoor	
Maximum Distance from UV Channel	15 ft. (4.5 m)	20 ft. (6 m)
Electrical Requirements		
Power Distribution	Individual GFI Receptacles	Power Distribution Centre
Quantity Required	1 receptacle per 2 modules	1 PDC per bank
Power Input	120V, single phase	120V, single phase 208V, 3-phase 240V, single phase

Find out how your wastewater treatment plant can benefit from the TrojanUV3000™PTP or TrojanUV3000™B – call us today.

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Hach/Trojan Technologies (China): 86-10-65150290

MWW-004 (0311)

TROJANUV
WATER CONFIDENCE™

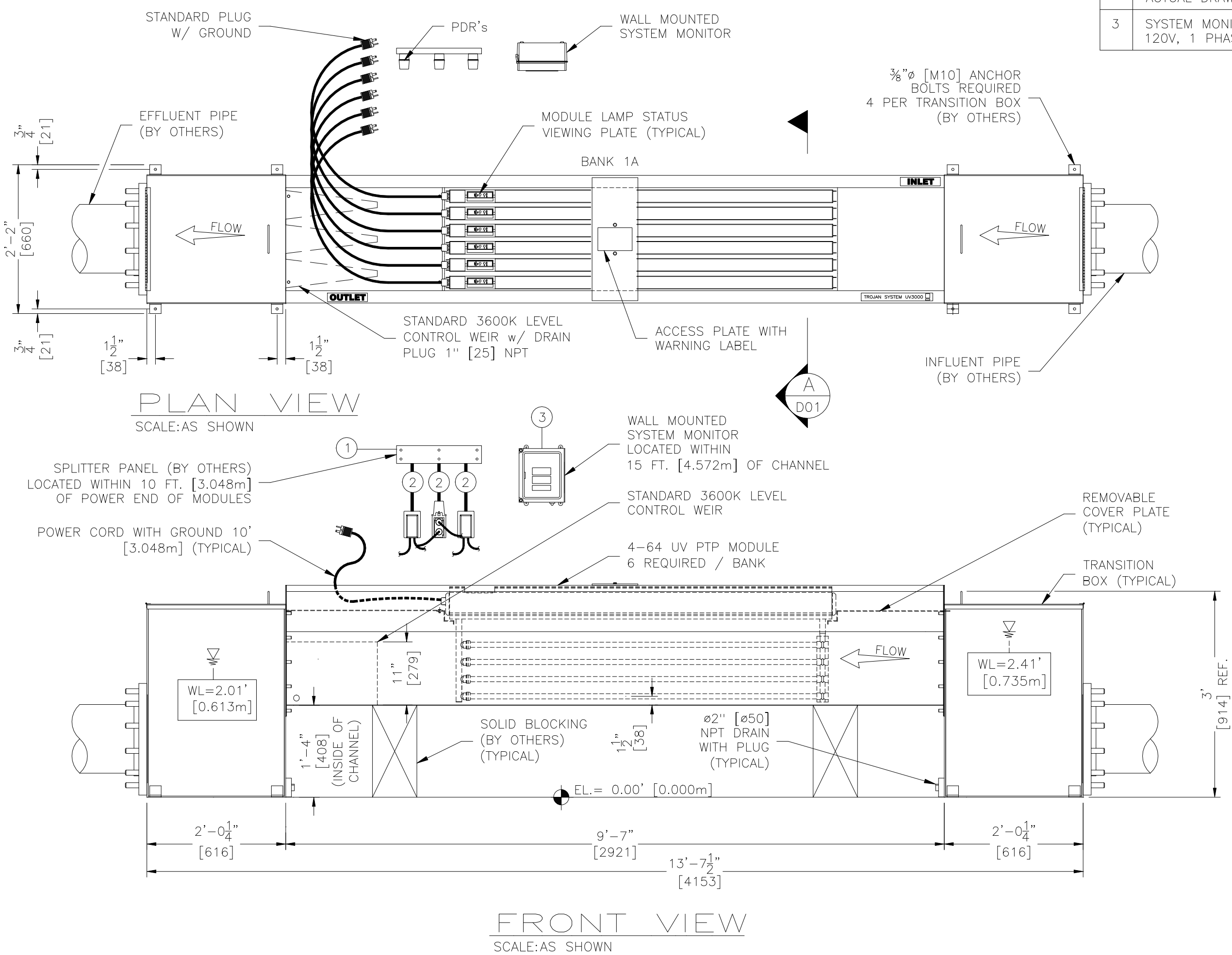
NOTES:

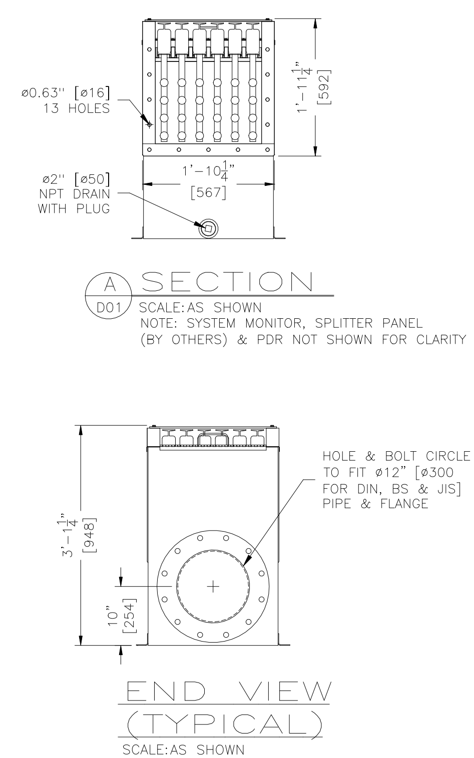
: DO NOT SLOPE CHANNEL FLOOR.
: CHANNEL WIDTH & DEPTH MUST BE KEPT WITHIN A TOLERANCE OF + OR – ¼" [6].
: ANCHOR BOLTS ARE NOT SUPPLIED BY TROJAN TECHNOLOGIES.
: BOLTS, WASHERS & NUTS FOR CONNECTION OF CHANNEL TO TRANSITION BOXES ARE PROVIDED BY TROJAN TECHNOLOGIES.
: SYSTEM CONDUIT, WIRING, DISTRIBUTION PANELS & INTERCONNECTIONS BY OTHERS.
: ELECTRICAL REQUIREMENTS SHOWN ARE TO SUPPLY TROJAN UV EQUIPMENT ONLY. ELECTRICAL INRUSH FACTOR TO BE ADDED AS PER LOCAL CODE.
: ANY EXTRA OUTLETS NOT BEING USED BY TROJAN EQUIPMENT HAVE NOT BEEN INCLUDED IN THE INTERCONNECT AMPERAGE.
: CONTRACTOR TO REVIEW ALL TROJAN TECHNOLOGIES INSTALLATION INSTRUCTIONS PRIOR TO EQUIPMENT INSTALLATION.
: ACCESS IS REQUIRED FOR MODULE REMOVAL – NOTE THE CHANNEL WIDTH AND ENSURE ADEQUATE ACCESS IS PROVIDED TO ALL MODULES.
: DO NOT ENCASE THE STEEL CHANNEL IN CONCRETE.
: [ ] INDICATES MILLIMETERS UNLESS OTHERWISE SPECIFIED.

TROJAN UV3000™ PTP

EQUIPMENT INTERCONNECTIONS

No.	DESCRIPTION	FROM	TO
1	SPLITTER PANEL POWER SUPPLY 120V, 1 PHASE, 2 WIRE, ACTUAL DRAW 19.1 AMPS / SPLITTER PANEL	DISTRIBUTION PANEL (DP) (NOT SHOWN) (BY OTHERS)	SPLITTER PANEL (BY OTHERS)
2	POWER DISTRIBUTION RECEPTACLE (PDR) POWER SUPPLY 120V, 1 PHASE, 2 WIRE, ACTUAL DRAW 6.3 AMPS / PDR	SPLITTER PANEL (BY OTHERS)	PDR
3	SYSTEM MONITOR POWER SUPPLY 120V, 1 PHASE, 2 WIRE, 5 AMPS	DP (NOT SHOWN) (BY OTHERS)	SYSTEM MONITOR





MULTIPLE CHANNELS IN PARALLEL (OPTION):

: ADDITIONAL UNITS CAN BE INSTALLED PARALLEL TO THE UNIT SHOWN.
: ACCESS IS REQUIRED BETWEEN CHANNELS FOR MODULE REMOVAL – NOTE THE CHANNEL WIDTH AND ENSURE ADEQUATE ACCESS IS PROVIDED BETWEEN TRANSITION BOXES AND CHANNELS.

TROJAN UV

CONFIDENTIALITY NOTICE

DESCRIPTION: LAYOUT, UV3000PTP–UV3600K 1 CHANNEL 1 BANK 4 LAMPS WEIR		STANDARD DRAWING NO. 3M0518
DRAWN BY : LZ/JMM/SPM	DATE : 12JN21	REFERENCE NO. N/A
CHECKED BY : SAH	DATE : 12JN22	
APPROVED BY : CAP	DATE : 12JN22	DWG NO. D01 / REV. D
SCALE (8½x11) : NOT TO SCALE	LOG NUMBER : N/A	

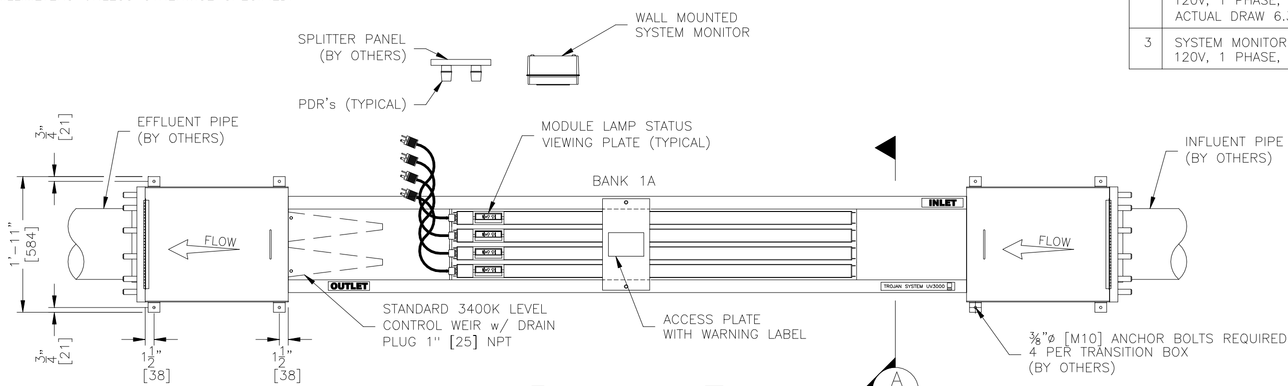
NOTES:

: DO NOT SLOPE CHANNEL FLOOR.
: CHANNEL WIDTH & DEPTH MUST BE KEPT WITHIN A TOLERANCE OF + OR – ¼" [6mm].
: ANCHOR BOLTS ARE NOT SUPPLIED BY TROJAN TECHNOLOGIES.
: BOLTS, WASHERS & NUTS FOR CONNECTION OF CHANNEL TO TRANSITION BOXES ARE PROVIDED BY TROJAN TECHNOLOGIES.
: SYSTEM CONDUIT, WIRING, DISTRIBUTION PANELS & INTERCONNECTIONS BY OTHERS.
: ELECTRICAL REQUIREMENTS SHOWN ARE TO SUPPLY TROJAN UV EQUIPMENT ONLY. ELECTRICAL INRUSH FACTOR TO BE ADDED AS PER LOCAL CODE.
: ANY EXTRA OUTLETS NOT BEING USED BY TROJAN EQUIPMENT HAVE NOT BEEN INCLUDED IN THE INTERCONNECT AMPERAGE.
: CONTRACTOR TO REVIEW ALL TROJAN TECHNOLOGIES INSTALLATION INSTRUCTIONS PRIOR TO EQUIPMENT INSTALLATION.
: ACCESS IS REQUIRED FOR MODULE REMOVAL – NOTE THE CHANNEL WIDTH AND ENSURE ADEQUATE ACCESS IS PROVIDED TO ALL MODULES.
: DO NOT ENCASE THE STEEL CHANNEL IN CONCRETE.
: [ ] INDICATES MILLIMETERS UNLESS OTHERWISE SPECIFIED.

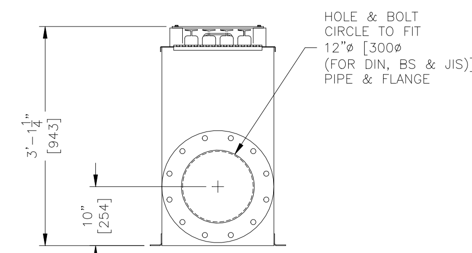
TROJAN UV3000™ PTP

EQUIPMENT INTERCONNECTIONS

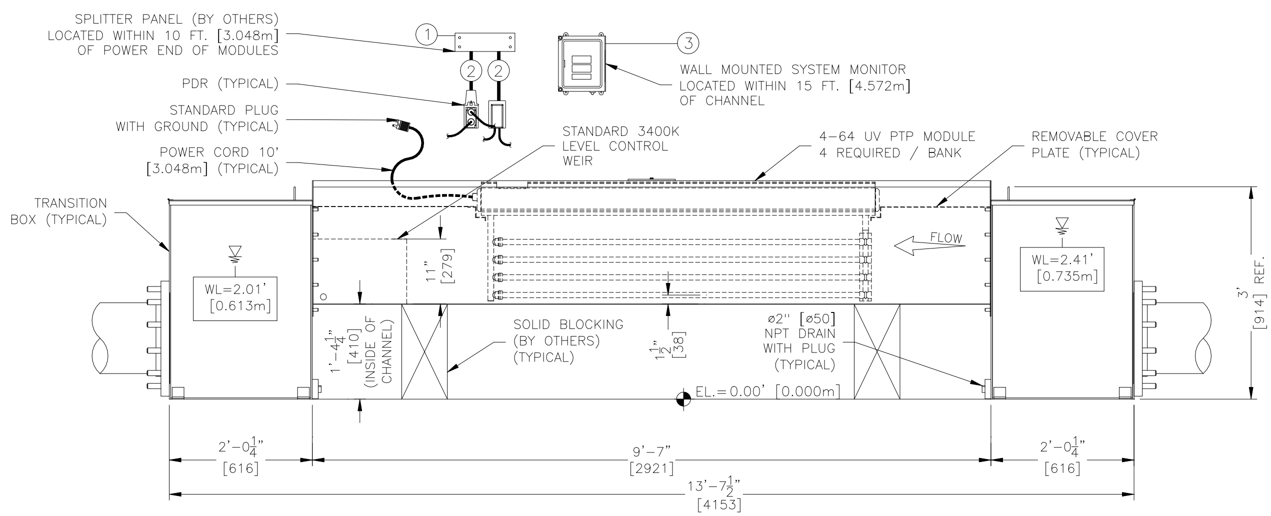
No.	DESCRIPTION	FROM	TO
1	SPLITTER PANEL POWER SUPPLY 120V, 1 PHASE, 2 WIRE, ACTUAL DRAW 12.7 AMPS / SPLITTER PANEL	DISTRIBUTION PANEL (DP) (NOT SHOWN) (BY OTHERS)	SPLITTER PANEL (BY OTHERS)
2	POWER DISTRIBUTION RECEPTACLE (PDR) POWER SUPPLY 120V, 1 PHASE, 2 WIRE, ACTUAL DRAW 6.3 AMPS / PDR	SPLITTER PANEL (BY OTHERS)	PDR
3	SYSTEM MONITOR POWER SUPPLY 120V, 1 PHASE, 2 WIRE, 5 AMPS	DP (NOT SHOWN) (BY OTHERS)	SYSTEM MONITOR



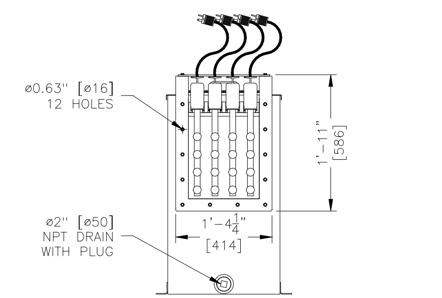
PLAN VIEW
SCALE:AS SHOWN



END VIEW (TYPICAL)
SCALE:AS SHOWN



FRONT VIEW
SCALE:AS SHOWN



A
D01
SECTION
SCALE:AS SHOWN
NOTE: PDR, SPLITTER PANEL (BY OTHERS) & SYSTEM MONITOR NOT SHOWN FOR CLARITY

MULTIPLE CHANNELS IN PARALLEL (OPTION):

: ADDITIONAL UNITS CAN BE INSTALLED PARALLEL TO THE UNIT SHOWN.
: ACCESS BETWEEN EVERY 2 PARALLEL CHANNELS IS REQUIRED FOR MODULE REMOVAL – NOTE THE CHANNEL WIDTH AND ENSURE ADEQUATE ACCESS IS PROVIDED BETWEEN TRANSITION BOXES AND CHANNELS.
: ACCESS BETWEEN A MAXIMUM OF 2 CHANNELS IS NOT REQUIRED FOR MODULE REMOVAL. TRANSITION BOXES CAN BE INSTALLED ADJACENT TO EACH OTHER.

TROJAN UV

CONFIDENTIALITY NOTICE

DESCRIPTION: LAYOUT, UV3000PTP-UV3400K 1 CHANNEL 1 BANK 2 LAMPS WEIR		STANDARD DRAWING NO. 3M0516
DRAWN BY : LZ/JMM/SPM	DATE : 12JN21	REFERENCE NO. N/A
CHECKED BY : SAH	DATE : 12JN22	
APPROVED BY : CAP	DATE : 12JN22	DWG NO. D01 / REV. D
SCALE (8½x11) NOT TO SCALE	LOG NUMBER : N/A	

APPENDIX G
DETAILED CONCEPTUAL LEVEL COSTING

Conceptual Level Capital Cost Estimates						
	Option 1A	Option 1B	Option 2B	Option 3B	Option 4B	Option 5B
General / Miscellaneous	$ 410,000	$ 765,000	$ 795,000	$ 842,000	$ 977,000	$ 1,057,000
Headworks	$ 526,920	$ 694,940	$ 694,940	$ 694,940	$ 694,940	$ 694,940
Disinfection	$ 34,100	$ 34,100	$ 52,700	$ 52,700	$ 63,550	$ 63,550
Tertiary Filtration	$ 184,800	$ -	$ -	$ -	$ -	$ -
Secondary Treatment (SBR or MBR)	$ 614,005	$ 2,053,225	$ 2,151,435	$ 2,251,210	$ 2,868,529	$ 3,007,704
Other Plant Improvements	$ 160,000	$ 160,000	$ 160,000	$ 250,000	$ 160,000	$ 340,000
Subtotal	$ 1,929,825	$ 3,707,265	$ 3,854,075	$ 4,090,850	$ 4,764,019	$ 5,163,194
Contingency (50%)	$ 964,913	$ 1,853,633	$ 1,927,038	$ 2,045,425	$ 2,382,010	$ 2,581,597
Engineering (12%)	$ 231,579	$ 444,872	$ 462,489	$ 490,902	$ 571,682	$ 619,583
Total	**$ 3,126,000**	**$ 6,006,000**	**$ 6,244,000**	**$ 6,627,000**	**$ 7,718,000**	**$ 8,364,000**

Conceptual Level O&M Cost Estimates						
	Option 1A	Option 1B	Option 2B	Option 3B	Option 4B	Option 5B
Salaries/benefits/materials/contractor	$ 52,000	$ 52,000	$ 52,000	$ 52,000	$ 52,000	$ 52,000
Testing	$ 6,306	$ 6,306	$ 6,306	$ 6,306	$ 6,306	$ 6,306
Chemicals (Alum)	$ 10,303	$ 10,303	$ 20,573	$ 20,573	$ 30,300	$ 30,300
Utilities - Alternate (from Arthur)	$ 16,078	$ 16,078	$ 32,106	$ 32,106	$ 47,286	$ 47,286
Biosolids Hauling	$ 6,806	$ 6,806	$ 13,591	$ 13,591	$ 20,017	$ 20,017
Additional allowance for matls and services	$ 7,870	$ 7,870	$ 15,716	$ 15,716	$ 23,147	$ 23,147
Membrane cleaning chemicals	$ -	$ 3,080	$ 6,150	$ 6,150	$ 9,058	$ 9,058
Membrane replacement allowance	$ -	$ 43,200	$ 43,200	$ 43,200	$ 43,200	$ 43,200
Membrane energy cost allowance	$ -	$ 6,300	$ 12,580	$ 12,580	$ 18,528	$ 18,528
Total Annual O&M	$ 99,000	$ 152,000	$ 202,000	$ 202,000	$ 250,000	$ 250,000
25 Year NPV O&M	$ 1,735,000	$ 2,664,000	$ 3,541,000	$ 3,541,000	$ 4,382,000	$ 4,382,000
25 Year Lifecycle	$ 4,861,000	$ 8,670,000	$ 9,785,000	$ 10,168,000	$ 12,100,000	$ 12,746,000

Inflation Rate	2.00%
Interest Rate	5.00%
Adjusted Rate	2.94%

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2620 Bristol Circle, Suite 300, Oakville, Ontario, Canada L6H 6Z7

XCG File No.: 3-277-47-02
September 13, 2016
FINAL DRAFT V2

DRUMBO WASTEWATER TREATMENT PLANT CLASS ENVIRONMENTAL ASSESSMENT TECHNICAL MEMORANDUM 1 EXISTING CONDITIONS

Prepared for:

OXFORD COUNTY PUBLIC WORKS
P.O. Box 1614, 21 Reeve Street
Woodstock, ON
N4S 7Y3

Attention: Mark Maxwell

Prepared by:

XCG CONSULTING LIMITED
2620 Bristol Circle, Suite 300
Oakville, ON
L6H 6Z7

TABLE OF CONTENTS

TABLES

FIGURES

APPENDIX

1. INTRODUCTION

1.1 Background

Oxford County ("The County")'s Drumbo Wastewater Treatment Plant (WWTP) provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP is a Sequencing Batch Reactor (SBR) facility with tertiary filtration and ultraviolet disinfection and has an approved average day flow (ADF) capacity of 300 m^3/d.

The County is currently undertaking a Class Environment Assessment (Class EA) study to identify the most cost effective and environmentally sustainable approach to providing wastewater treatment to meet the future needs of the Community of Drumbo. Further, the County wishes to evaluate the potential to treat additional flow from the nearby Community of Princeton and from a proposed new residential development within the Community of Princeton.

XCG Consulting Limited (XCG) has been retained by the County to provide engineering support through the Class EA process.

1.2 Objectives

The objective of this Technical Memorandum (TM1) is to present the existing conditions in the Communities of Drumbo and Princeton. Specifically, the following details are presented:

1. An overview of the Community of Drumbo, the existing wastewater treatment plant, , existing site constraints, and receiving water quality; and,
2. An overview of existing conditions within the Community of Princeton, including current wastewater servicing.

2. COMMUNITY OF DRUMBO

The Community of Drumbo is located east of the City of Woodstock (Woodstock) and approximately eight kilometers north of the Community of Princeton in the Township of Blandford-Blenheim (Township). Drumbo is a relatively small community with approximately 338 residential buildings and an estimated population of 877.

The purpose of this section is to present an overview of the existing conditions in the Community of Drumbo.

2.1 Existing Wastewater Servicing in Drumbo

The Drumbo WWTP is a Sequencing Batch Reactor (SBR) with tertiary filtration and ultraviolet disinfection. The current rated average day flow (ADF) capacity of the plant is 300 m^3/d. The plant was recently re-rated from an original ADF design capacity of 272 m^3/d according to the Amended Environmental Compliance Approval (ECA) Number 8752-9Q4H96 issued on February 9, 2015.

Raw sewage is conveyed to the Drumbo WWTP via sewage forcemains and flow entering the Drumbo WWTP is measured with a magnetic flow meter. Sewage flows enter a 51.0 m^3 trash tank, which also serves as a holding tank for waste activated sludge (WAS) from the biological reactors. The trash tank overflows to a 51.0 m^3 transfer tank that feeds the two Sequencing Batch Reactors (SBRs) operating in parallel. In the event of high flow periods that exceed the capacity of the transfer tank and SBRs, wastewater can flow by gravity from the transfer tank to a 91 m^3 emergency overflow containment basin. Wastewater stored in the emergency overflow containment basin is pumped back to the transfer tank manually using a submersible pump when the SBRs have enough capacity to treat the stored wastewater.

Flow from the transfer tank is delivered to the SBRs by four submersible 0.76 m^3/min transfer pumps. Two pumps are dedicated to each reactor (one duty and one standby). Each SBR reactor has a total volume of approximately 102.2 m^3. Air supply to the reactors is provided by three Roots-Dresser blowers. Aluminum sulphate (alum) is added for phosphorus removal directly into each of the SBR tanks from the alum storage tanks during the SBR react cycle. Each reactor goes through a sequence of filling, reacting, settling, decanting and sludge wasting that is controlled by a programmable logic controller (PLC). Filling is initiated by the liquid level in the transfer tank and continues until the reactor is full. The react cycle is currently set with a duration of 45 minutes. 83 minutes of quiescent (unaerated) settling is provided, after which the clear, treated supernatant in the reactor is decanted by one of two 0.76 m^3/min decant pumps dedicated to each reactor (four decant pumps total, two for each reactor) into aerated flow equalization tanks with a total volume of 57.6 m^3. A volume of 47.4 m^3 is decanted from each reactor during each cycle. Following the decant stage, sludge is wasted from the reactor to the trash tank for approximately 1 minute. At the completion of the waste stage, the reactor is ready to receive feed again from the transfer tank, initiating another treatment cycle. A reactor can only receive feed from the transfer tank when it is in the fill portion of the cycle.

The decanted effluent from the equalization tank is filtered and disinfected prior to discharge. Three filter feed pumps (two active, one standby) discharge the equalization tank contents to three pressure filters at a rate of approximately 0.28 m^3/min per feed pump. Two feed pumps are activated by a lead pump float, and will continue to operate until the stop float resets. A high level float will initiate operation of the third pump.

Tertiary filters were designed as multi-media filters, however operators have indicated only a single media (sand) currently exists within the filter. One filter is backwashed at the beginning of each discharge period for approximately thirty minutes. As per the plant operational manual, backwash occurs at approximately 0.28 m^3/min and is returned to the trash tank at the head of the plant. Filter effluent flow is measured with a magnetic flow meter, then is disinfected by an ultraviolet (UV) disinfection system and discharged to the Cowan Drain.

Table 2.1 summarizes details of each treatment process at the Drumbo WWTP. A process flow schematic of the Drumbo WWTP is shown in Figure 2.1.

Table 2.1 Summary of Existing Process Design – Drumbo WWTP

Unit Process	Design Parameters [1]
Trash Tank	
Dimensions	12.2 m x 1.5 m x 2.8 m
Volume	51 m^3
Transfer Tank	
Volume	51 m^3
No. of Transfer Pumps	Four (4)
Transfer Pump Capacity (each)	12.6 L/s
Emergency Overflow Basin	
Volume	91 m^3
Sequence Batch Reactors (SBR)	
Number	Two (2)
Volume (each reactor)	102.2 m^3
Treated volume per cycle	47.4 m^3
Diffuser Type	Coarse bubble
SBR Blowers	
Number	Three (2 duty, 1 standby)
Capacity	68 L/s (each)
Filter Feed Equalization Tank	
Number	Two (2)
Volume	30 m^3 and 27.6 m^3
No. of Filter Feed Pumps	Three (3) (2 duty, 1 standby)
Feed Pump Capacity	4.7 L/s
Diffuser Type	Coarse Bubble
Filter EQ Tank Blowers	
Number	One (1)
Capacity	94 L/s
Chemical Pumps (Alum)	
Number	2 (1 duty, 1 standby)
Capacity	454 L/d, each

Table 2.1 Summary of Existing Process Design – Drumbo WWTP (cont'd)

Unit Process	Design Parameters (1)
Tertiary Filtration Type Number Total Filtration Area (each)	 Mixed media pressure filters Three (3) 0.5 m^2
UV Disinfection Type Channel Dimensions	 Fischer & Porter 0.4 m wide x 2.32 m long

Note:
1. Developed using information from; amended Environmental Compliance Approval (ECA) No. 8752-9Q4H96, issued February, 2015, 1992 plant as-built drawings, and 1992 plant manual.

2.2 Existing Effluent Quality Requirements

Existing effluent objectives and non-compliance criteria for the Drumbo WWTP are defined in the Amended Environmental Compliance Approval (ECA) Number 8752-9Q4H96, issued on February 9, 2015. The ECA specifies objectives and limits for carbonaceous biochemical oxygen demand ($cBOD_5$), total suspended solids (TSS), total phosphorus (TP), total ammonia as nitrogen (TAN), *E. coli*., dissolved oxygen (DO), and pH. The ECA effluent requirements for the Drumbo WWTP are summarized in Table 2.2.

Table 2.2 Existing Effluent Objectives and Non-compliance Criteria

Parameter	Effluent Objective (1)	Compliance Limit	
	Concentration	Concentration (2)	Total Loading (3)
$cBOD_5$	4.7 mg/L	9.3 mg/L	2.8 kg/d
TSS	4.7 mg/L	9.3 mg/L	2.8 kg/d
TP	0.27 mg/L	0.46 mg/L	0.14 kg/d
Total Ammonia Nitrogen May 1 to October 31 November 1 to April 30	 1.8 mg/L 3.6 mg/L	 2.7 mg/L 4.5 mg/L	 0.8 kg/d 1.36 kg/d
E .coli (4)	150 organisms/100 mL	200 organisms/100 mL	-
DO	6.0 mg/L	5.0 mg/L	-
pH	6.5 – 8.5	6.0 – 9.5 (5)	

Notes:
1. Effluent objective concentrations apply to any single sample unless otherwise indicated.
2. Based on monthly average values.
3. Based on monthly average values.
4. Based on monthly geometric mean density.
5. Effluent pH to be maintained within the compliance limits at all times.

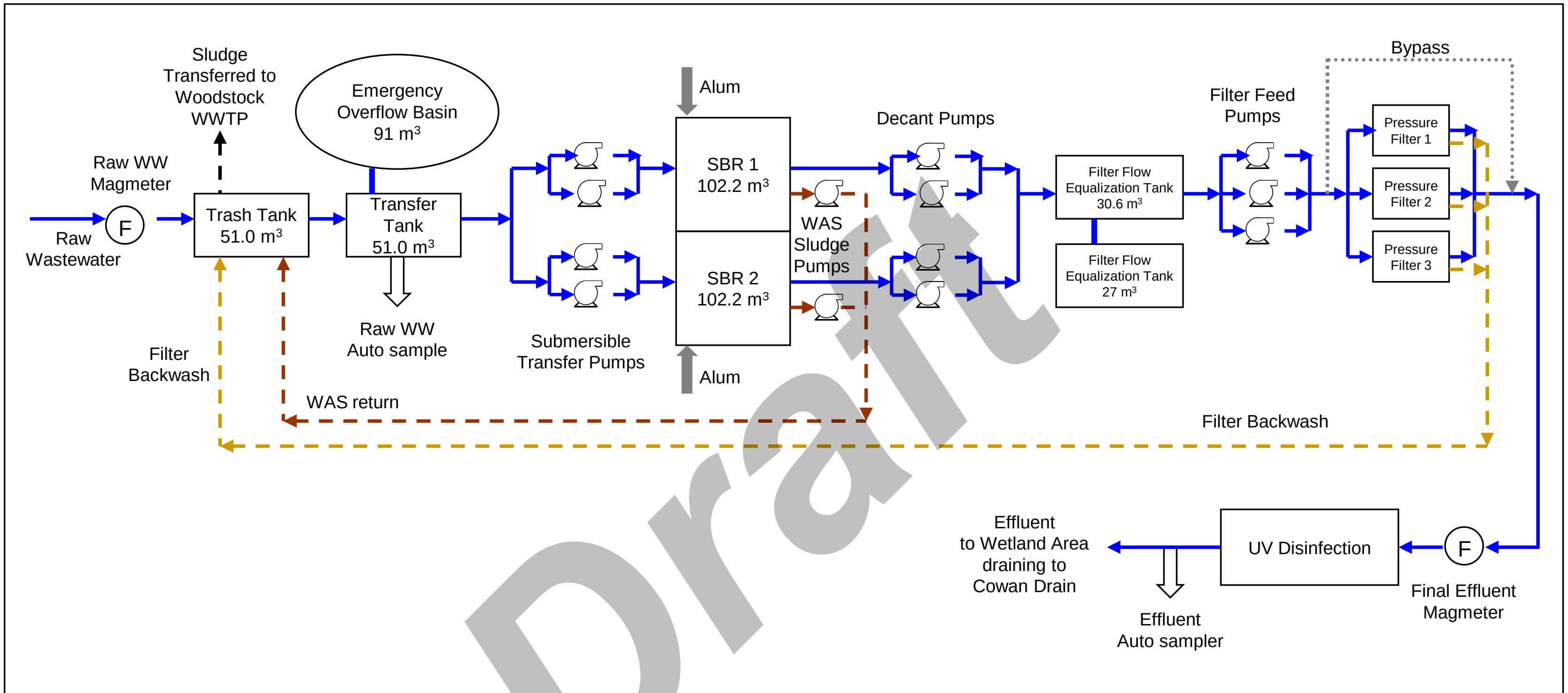

Figure 2.1 Process Flow Diagram for Drumbo WWTP

2.3 Historical Plant Flow

Three sewage pumping stations (SPSs) transfer raw sewage from the service area to the Drumbo WWTP: Main SPS, East SPS, and North SPS. Only two of these pumping stations (Main SPS and North SPS) discharge directly to the Drumbo WWTP.

Influent and effluent flow at the Drumbo WWTP is measured by magnetic flow meters. On a monthly basis, total flow measured by the influent and effluent meters agree within 5%.

Table 2.3 presents a summary of flow at the plant over the historical period from January 2012 to December 2015 as measured by the influent flow meter. Figure 2.2 shows the ADF and MDF to the Drumbo WWTP for the same period. Plant flows reported in Table 2.3 have been adjusted based on recommendations from the recently completed flow meter verification study (XCG, 2014) using flow data collected in 2015.

Table 2.3 Summary of Historical Plant Wastewater Flow (2012 – 2015)

Year	Average Day Flow (m^3/d) (1)	Maximum Day Flow (1)	
		(m^3/d)	Factor
2012	244	565	2.3
2013	271	664	2.4
2014	266	596	2.2
2015	228	434	1.9
Overall	253	664 (2)	2.4 (2)

Notes:
1. Historical influent flow measurements have been adjusted based on recommendations of a flow meter verification study (XCG, 2014).
2. Represents the largest MDF and MDF factor observed over the historical period.

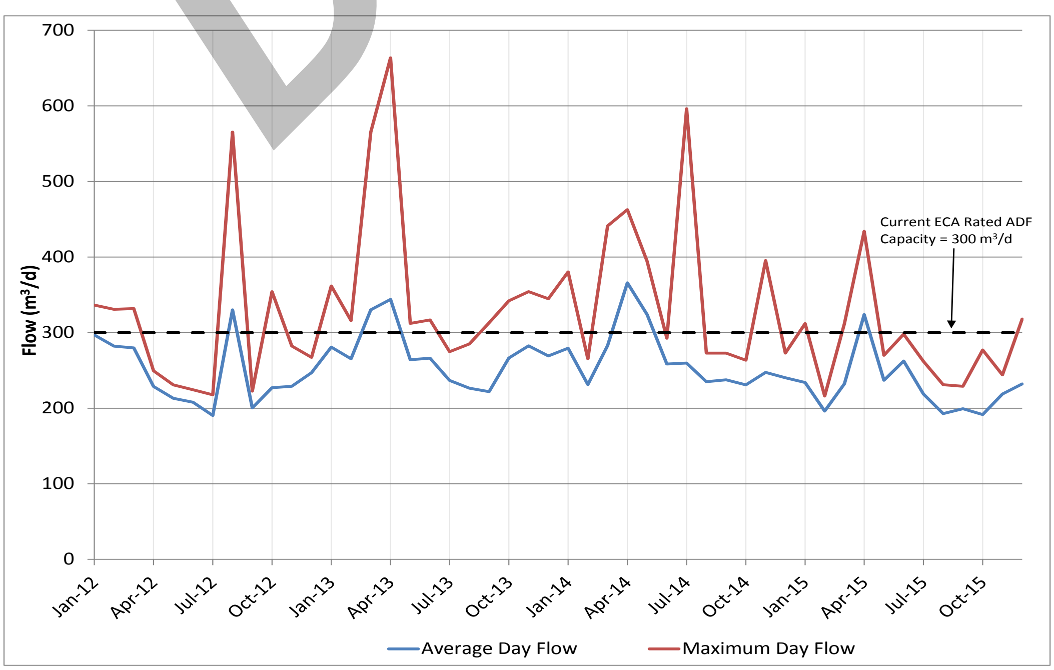

Figure 2.2 Summary of Drumbo WWTP Plant Flows (2012 – 2015)

The average flow over the historical review period was 253 m^3/d, which represents approximately 84 percent of the ECA rated ADF capacity of 300 m^3/d.

Per capita flows were calculated based on annual average wastewater flows, and serviced population estimates provided by the County from 2012 – 2015. The estimated service populations presented in Table 2.4 are based on a combination of billing data, reserve capacity calculations, and total system connections.

Table 2.4 Estimated Historical Service Population and Per Capita Flow (2012 – 2015)

Year	Estimated Serviced Population (1)	Flows per Capita (L/cap·d) (2)
2012	888	275
2013	882	307
2014	882	302
2015	854	267
Overall (2012 – 2015)	**877**	**288**

Notes:
1. Estimated historical serviced populations from Oxford County based on a combination of billing data, reserve capacities, and total connections.
2. Based on historical average day flows and estimated service populations.

The typical range of per capita flows is 225 to 450 L/cap·d, exclusive of extraneous flows (MOE, 2008), and the typical average per capita inflow/infiltration (I/I) is 90 L/cap·d (MOE, 1985). This provides a range of per capita flows of 315 to 540 L/cap·d, inclusive of extraneous flows. Based on results presented in Table 2.4, the historical average per capita flow to the Drumbo WWTP is 288 L/cap·d, inclusive of I/I.

Historical records of peak instantaneous flow are not available for either the raw influent or final effluent plant.

2.4 Historical Raw Wastewater Quality

Raw wastewater entering the Drumbo WWTP includes wastewater from domestic and commercial sources in the community. Raw sewage samples are collected using a 24-hour composite sampler from the SBR transfer tank. Samples are collected bi-weekly and sent to an external accredited laboratory for analysis.

Backwash from the tertiary filters is recycled to the trash tank at the head of the plant upstream of the raw influent sampling point. The backwash flow will contribute to measured solids, organic, and nutrient loadings in the raw influent samples. Similarly, WAS from the SBR tanks is co-settled in the trash tank, and may impact raw influent sample results. Neither tertiary filter backwash nor WAS flow is recorded by the plant influent flow meter.

Although the raw sewage sample is a composite sample, the trash and transfer tanks are not typically mixed. As such, settling may occur in these tanks which may impact characterization of raw influent BOD_5, TSS, and TKN concentrations. These operational factors may contribute to the uncertainty of characterization of the raw influent wastewater.

A summary of annual raw wastewater characteristics over the historical period (2012 – 2015) is given in Table 2.5.

Table 2.5 Historical Raw Wastewater Characteristics (2012 – 2015)

Year	Average Concentration (mg/L)			
	BOD_5	TSS	TKN	TP
2012	145	107	31	4.8
2013	118	82	33	4.0
2014	126	87	29	3.7
2015	122	83	34	4.1
Overall	**129**	**91**	**32**	**4.1**
Typical Raw Sewage Concentrations (1)	*110 mg/L (low) 190 mg/L (med) 350 mg/L (high)*	*120 mg/L (low) 210 mg/L (med) 400 mg/L (high)*	*20 mg/L (low) 40 mg/L (med) 70 mg/L (high)*	*4.0 mg/L (low) 7.0 mg/L (med) 12.0 mg/L (high)*

Notes:
1. Metcalf & Eddy (2003) for untreated domestic wastewater.

Results shown in Table 2.5 indicate that, with respect to BOD_5, TKN, and TP, raw wastewater to the Drumbo WWTP has historically been of low to medium strength. With respect to TSS, raw wastewater concentrations are below typical concentrations for domestic wastewater.

2.5 Historical Final Effluent Quality

The ECA objectives and non-compliance limits for the Drumbo WWTP were previously presented in Table 2.1. Over the historical period, 24-hour composite effluent samples were collected on a bi-weekly basis (from January 2012 to March 2015) and on a weekly basis (beginning April 2015) and submitted to an external accredited laboratory for analysis. A summary of the historical effluent quality is given in Table 2.6. Maximum month effluent concentrations are given in parentheses. A summary of final effluent loading is provided in Table 2.7.

It is important to note that from October 2000 to February 2015, the Drumbo WWTP was operated under the Amended Certificate of Approval (C of A) No. 3-2191-90-916. Currently, the plant is operated under the Amended ECA No. 8752-9Q4H96, issued February, 2015. The following is a list of important comparisons between these documents:

- Effluent concentrations limits for TSS, TP, TAN and *E. coli* were specified in both documents; however, effluent objectives and limits varied slightly between the documents; and,
- While operated under C of A No. 3-2191-90-916, effluent concentration limits for BOD_5 were specified. Since implementation of ECA No. 8752-9Q4H96, effluent concentration limits for $cBOD_5$ have been specified.

For purposes of simplicity for this review, evaluation of historical plant effluent quality has used objectives and limits established by ECA No. 8752-9Q4H96.

Table 2.6 Historical Final Effluent Concentrations (2012 – 2015)

Year	Average Concentration (mg/L) (1)				
	$cBOD_5$	TSS	TAN (May – Oct)	TAN (Nov – Apr)	TP
2012	2.3 (3.0)	4.6 (7.0)	1.1 (2.2)	1.2 (2.0)	0.20 (0.36)
2013	2.4 (4.2)	5.6 (7.5)	1.4 (2.2)	2.0 (3.3)	0.17 (0.26)
2014	2.3 (3.0)	5.4 (7.5)	1.2 (1.7)	2.5 (4.3)	0.20 (0.32)
2015	2.7 (3.5)	5.2 (7.2)	1.9 (2.6)	1.6 (2.9)	0.23 (0.32)
Overall	**2.4 (4.2)**	**5.2 (7.5)**	**1.4 (2.6)**	**1.9 (4.3)**	**0.20 (0.36)**
Effluent Objectives and Non-compliance Criteria (2)	*4.7 mg/L (obj.) 9.3 mg/L (lim.)*	*4.7 mg/L (obj.) 9.3 mg/L (lim.)*	*1.8 mg/L (obj.) 2.7 mg/L (lim.)*	*3.6 mg/L (obj.) 4.5 mg/L (lim.)*	*0.27 mg/L (obj.) 0.46 mg/L (lim.)*

Notes:
1. Maximum month concentration shown in parentheses.
2. As per amended ECA No. 8752-9Q4H96 issued February 9, 2015.

Table 2.7 Historical Final Effluent Loading (2012 – 2015)

Year	Effluent Loading (kg/d)				
	$cBOD_5$	TSS	TAN (May – Oct)	TAN (Nov – Apr)	TP
2012	0.6 (0.8)	1.1 (1.6)	0.2 (0.5)	0.3 (0.6)	0.05 (0.07)
2013	0.6 (1.2)	1.5 (2.0)	0.3 (0.6)	0.6 (0.9)	0.04 (0.07)
2014	0.6 (1.1)	1.4 (1.7)	0.3 (0.5)	0.7 (1.6)	0.05 (0.07)
2015	0.6 (0.9)	1.2 (2.3)	0.4 (0.5)	0.4 (0.6)	0.05 (0.06)
Overall	**0.6 (1.2)**	**1.3 (2.3)**	**0.3 (0.5)**	**0.5 (1.6)**	**0.05 (0.07)**
Effluent Non-compliance Criteria (1)	*2.8 kg/d (lim.)*	*2.8 kg/d (lim.)*	*0.8 kg/d (lim.)*	*1.36 kg/d (lim.)*	*0.14 kg/d (lim.)*

Notes:
1. As per amended ECA No. 8752-9Q4H96 issued February 9, 2015.

The following observations can be made from the data presented in the tables above:

- Annual effluent and maximum month concentrations of $cBOD_5$ have remained consistently below effluent objectives established by ECA No. 8752-9Q4H96.
- Maximum month concentrations of TSS, TAN, and TP have occasionally exceeded effluent objective concentrations, but annual average concentrations have remained consistently below effluent limits established by ECA No. 8752-9Q4H96.
- Effluent loading of all parameters has remained below the effluent non-compliance limit established by ECA No. 8752-9Q4H96.

Figure 2.3, Figure 2.4, Figure 2.5, and Figure 2.6 present the average final effluent concentrations for $cBOD_5$, TSS, TAN, and TP, respectively, on a monthly basis. The objectives and compliance limits as specified by ECA No. 8752-9Q4H96 are also provided for reference.

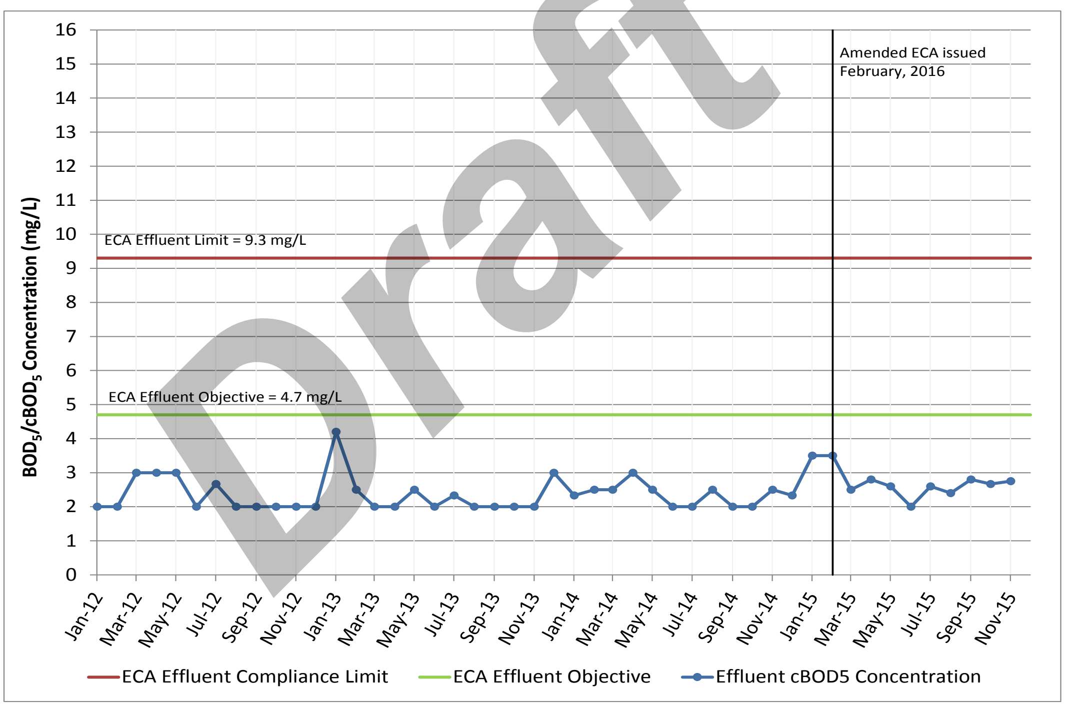

Figure 2.3 Average Monthly Final Effluent $cBOD_5$ Concentration

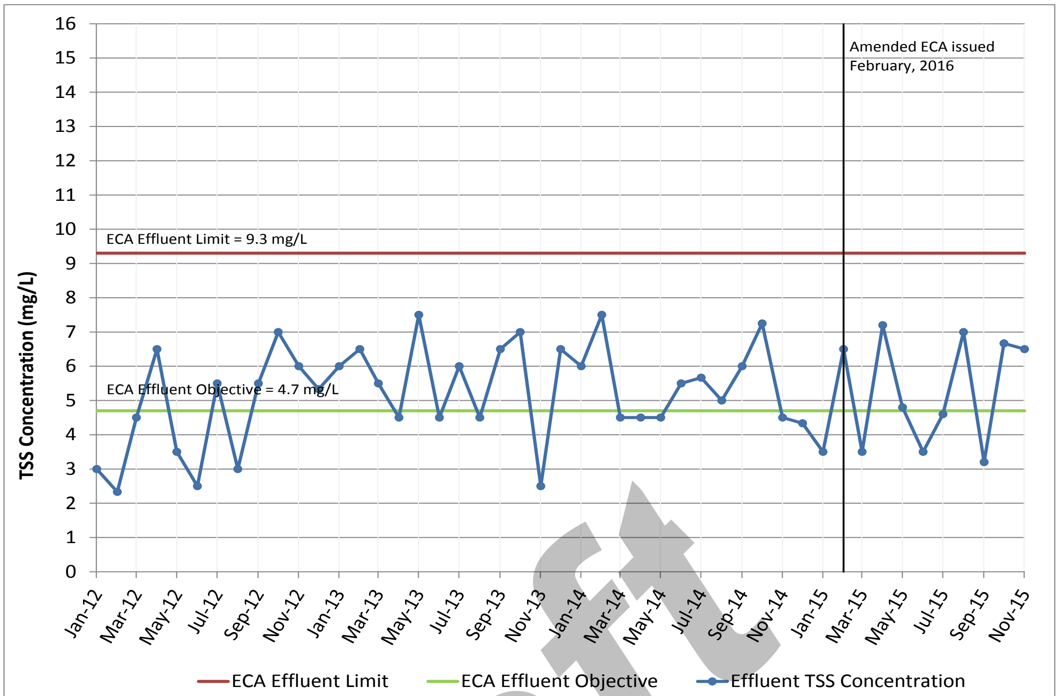

Figure 2.4 Average Monthly Final Effluent TSS Concentration

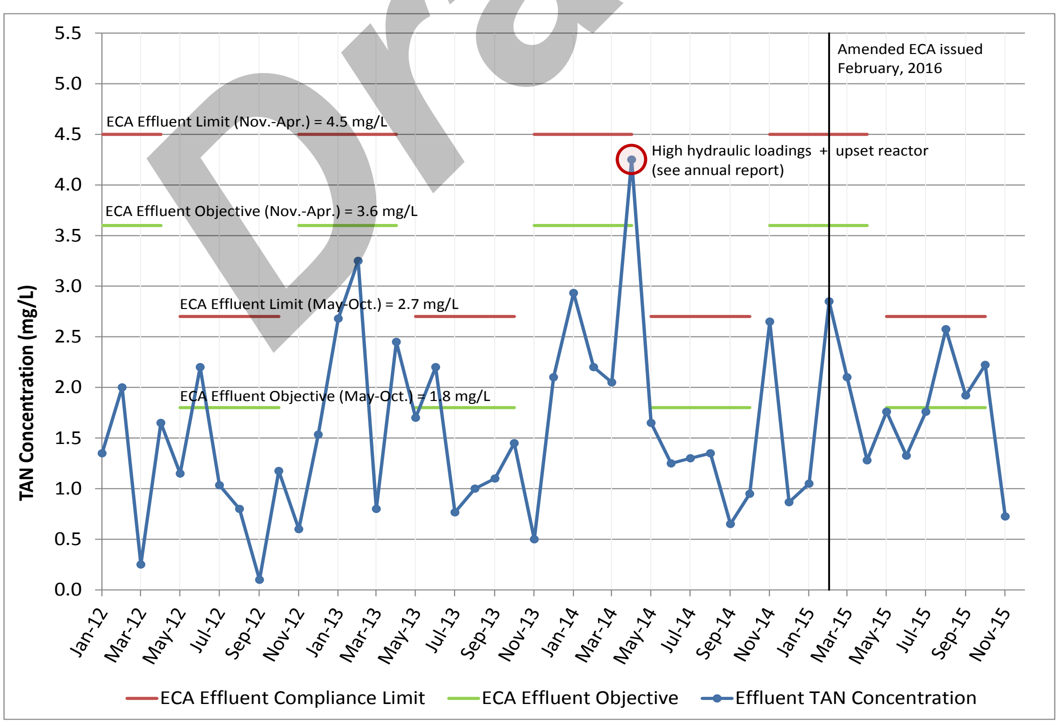

Figure 2.5 Average Monthly Final Effluent TAN Concentration

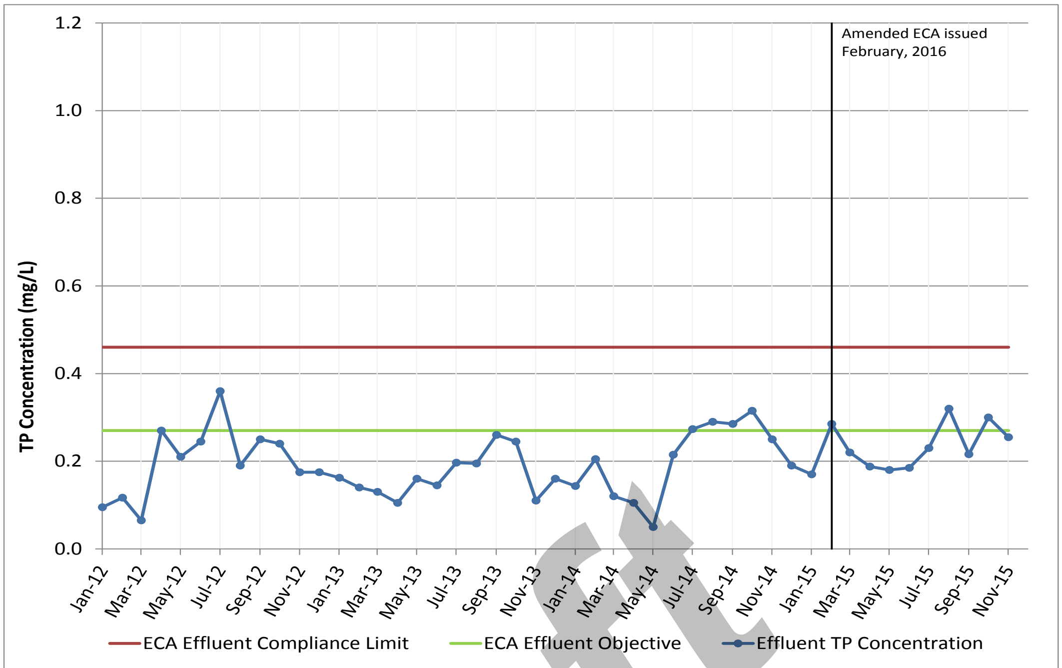

Figure 2.6 Average Monthly Final Effluent TP Concentration

The following observations can be made from the preceding figures.

- Since January 2012, all monthly effluent $cBOD_5$ concentrations have been below the effluent concentration objective established by ECA No. 8752-9Q4H96 in February, 2015.
- Since January 2012, all monthly effluent TSS concentrations have been below the effluent concentration limit established by ECA No. 8752-9Q4H96 in February, 2015.
- Approximately 57% of monthly average TSS concentrations have exceeded the effluent concentration objective over the entire review period, including approximately 60% since implementation of ECA No. 8752-9Q4H96 in February, 2015.
- Since January 2012, all monthly effluent TAN concentrations have been below the effluent concentration limit established by ECA No. 8752-9Q4H96 in February, 2015.
- Approximately 13% of monthly average TAN concentrations have exceeded the effluent concentration objective over the entire review period, including approximately 30% since implementation of ECA No. 8752-9Q4H96 in February, 2015.
- The greatest monthly average TAN concentration occurred April 2014. The 2014 annual report notes this was likely due to very high hydraulic loadings and an upset reactor partially stemming from a malfunctioning valve allowing storm water into the sanitary collection system.

- Since January 2012, all monthly effluent TP concentrations have been below the effluent concentration limit established by ECA No. 8752-9Q4H96 in February, 2015.
- Approximately 17% of monthly average TP concentrations have exceeded the effluent concentration objective over the entire review period, including approximately 30% since implementation of ECA No. 8752-9Q4H96 in February, 2015.

2.6 Treatment Plant Site Constraints

The Drumbo WWTP is currently located on a small site in the northwest area of the community on the same lot as the water treatment plant and one active production well (Well 3). The site is located within 100 m of existing and proposed residential development, and adjacent to a Grand River Conservation Authority (GRCA) defined wetland. The regulated area surrounding the wetland extends onto the site. Figure 2.7 presents an overview of the existing Drumbo WWTP site, showing the extent of the regulated area, as well as the location of the water treatment plant and Well 3.

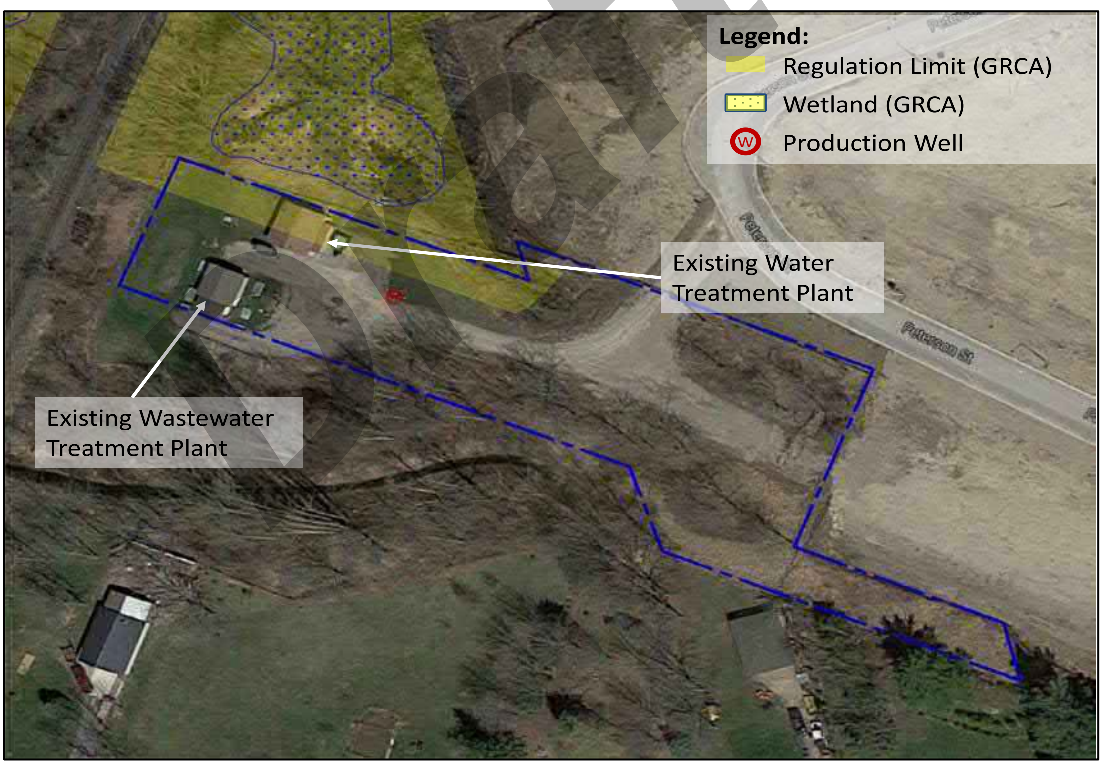

Figure 2.7 Overview of Drumbo WWTP Site

Because the WWTP is within 100 m of Well 3, a drinking water production well for the Community of Drumbo, the Drumbo WWTP has been identified as a significant drinking water threat under the 2006 Clean Water Act. Figure 2.8 provides a map produced by the County showing the location of the treatment plant relative to Well 3.

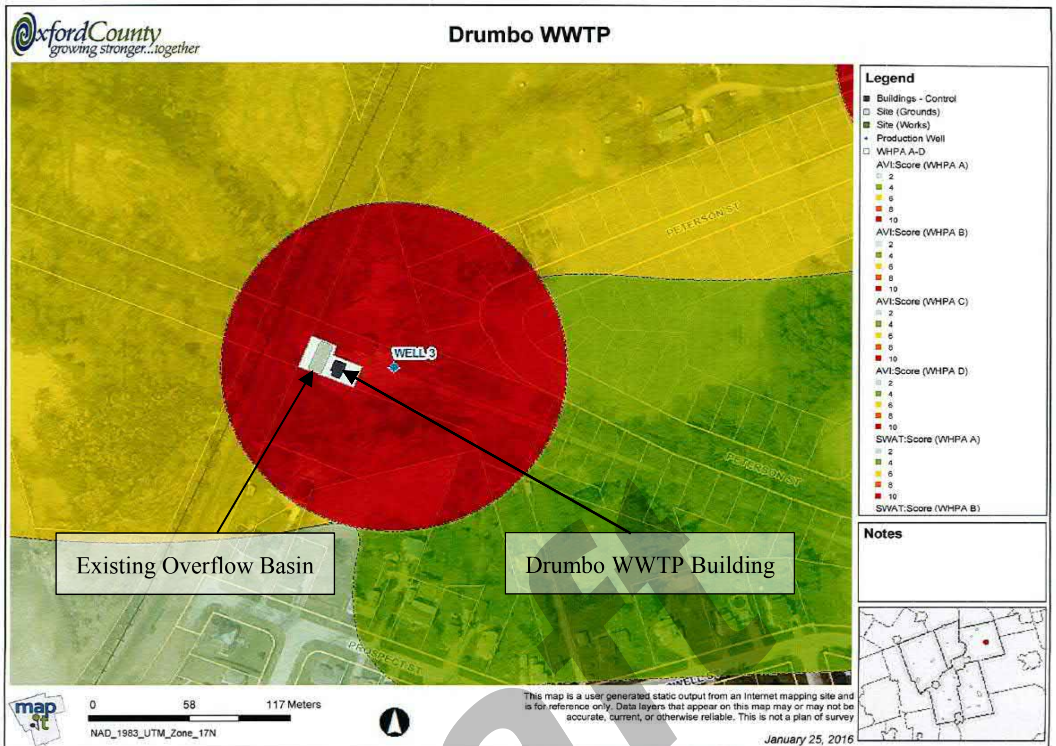

Figure 2.8 Location of Production Well 3 and the Wellhead Protection Zone Relative to the Drumbo WWTP

As a result of the proximity of the WWTP to Well 3, the County has noted that any expansion to the Drumbo WWTP would be subject to policies within the approved Grand River Source Protection Plan ("the Plan"), which comes into effect on July 1, 2016. Briefly, the Plan directs the MOECC to review and, where necessary, amend the ECA to incorporate terms and conditions to ensure any expansion of the WWTP would not result in a significant drinking water threat. Conditions imposed by the MOECC may include, but are not limited to:

- More frequent cleaning/inspection;
- More stringent specifications on construction materials;
- More robust spill response plans and procedures; and,
- Additional reporting requirements for spills.
- Correspondence from the County regarding the impact of the proximity of Well 3 on any proposed expansion of the Drumbo WWTP is provided in Appendix A.

2.7 Treatment Plant Capacity

The Drumbo WWTP has a rated ADF capacity of 300 m^3/d. The plant was recently re-rated from an original ADF design capacity of 272 m^3/d according to the Amended Environmental Compliance Approval (ECA) Number 8752-9Q4H96 issued in February, 2015.

A recently completed capacity review of the Drumbo WWTP was used to support the re-rating application (XCG, 2014). The capacity review found the ADF capacity of the existing SBR treatment process could be increased to 300 m^3/d through minor modification of existing operational procedures. Further, it identified the existing configuration of the tertiary filters to be a hydraulic bottleneck of the plant.

In part due to these findings, an optimization program is currently being conducted on the SBR and tertiary filtration processes at the Drumbo plant. The objective of the optimization program is to identify operational conditions which will consistently achieve effluent limits for $cBOD_5$, TSS, TAN, and TP.

2.8 Receiving Water Quality and Flow

2.8.1 Monitoring Program

As discussed, treated effluent from the Drumbo WWTP is discharged into the Cowan Drain, which subsequently discharges into the Nith River. A search of available databases revealed that there were no water quality or quantity data available for the Cowan Drain. To address this data gap, the County undertook a monitoring program to collect water quality and stream velocity data. The monitoring program developed was reviewed and approved by the MOECC.

Two water quality sampling locations at accessible culvert crossings were selected for the Cowan Drain and are shown in Figure 2.9. Sample Site 1 is located at the Cowan Drain crossing at Oxford Road 3. Sample Site 2 is located on the Cowan Drain approximately 300 m upstream of the Nith River, at a farmers crossing. Both sample stations are located downstream of the Drumbo WWTP effluent discharge location. During the initial round of sampling, an attempt was made to find an accessible upstream sampling location; however, a suitable location could not found.

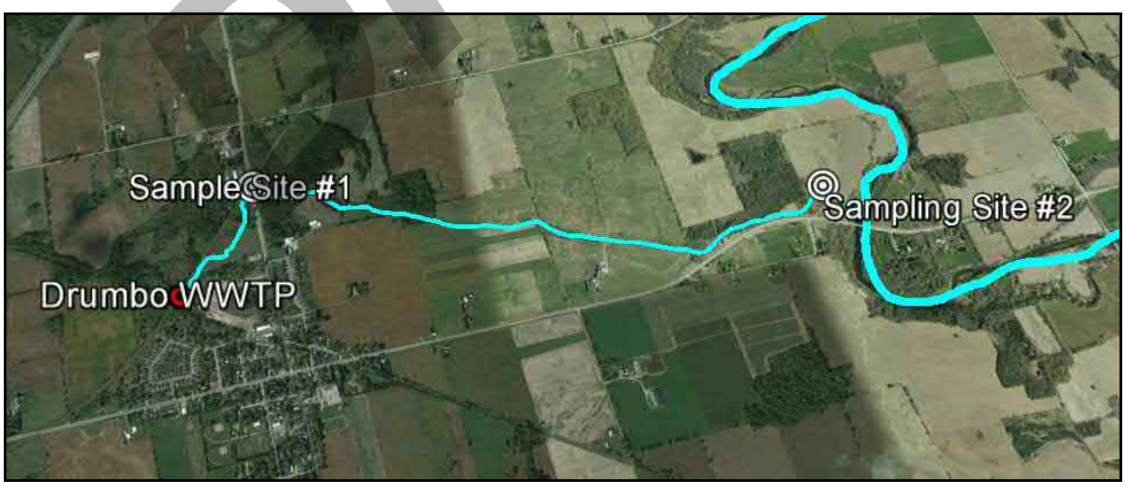

Figure 2.9 Sample Collection Locations

Discharges from the Drumbo WWTP are not continuous due to the batch nature of the sequencing batch reactor (SBR) operation, although an SBR effluent equalization tank upstream of the tertiary filters and UV disinfection process minimizes the intermittent nature of the discharge. Located directly downstream of the WWTP discharge and upstream of Site 1 is a relatively large wetland. This wetland may affect the quality of the discharge into the Cowen Drain and moderates the flow variability associated with the discharge flows generated at the WWTP.

2.8.2 Sampling Methodology

Water quality samples were collected upstream of the culverts at both sampling stations. Collected samples were submitted to the laboratory and analyzed for the following parameters of interest:

- 5-day Biochemical Oxygen Demand (BOD_5)
- Total Suspended Solids (TSS)
- Total Phosphorus (TP)
- Total Ammonia reported as Nitrogen (TAN)
- pH
- *E.coli*

In situ measurements of pH, temperature, and dissolved oxygen were collected at the time of the sampling. Water level measurements were also recorded upstream and downstream of each culvert.

There were a total of twelve sampling/monitoring events at each site. To capture seasonal variation, four samples were collected in each of the following seasons in 2014; spring (March 20 - June 20), summer (June 21 - September 21) and fall (September 22 - December 20).

2.8.3 Sample Results

Water Quality Background

Representative background water quality can be estimated by examining water quality in the vicinity of the wastewater discharge. For analysis purposes, the 75th percentile threshold is applied to characterize ambient conditions, as recommended by the MOECC. The receiving water quality is assigned Policy 1 if the ambient concentration is less than the Provincial Water Quality Objective (PWQO) and Policy 2 if the ambient concentration exceeds the PWQO. The implications of being a Policy 1 or Policy 2 receiver are described briefly below.

- **Policy 1:** *In areas which have water quality better than the Provincial Water Quality Objectives, water quality shall be maintained at or above the Objectives.*
- **Policy 2:** *Water quality which presently does not meet the Provincial Water Quality Objectives shall not be degraded further and all practical measures shall be taken to upgrade the water quality to the Objectives.*

For the purposes of this analysis and based on discussions with the MOECC, the only data source available were the data collected by the County during the monitoring program. Each parameter of interest is discussed in the sections below.

Total Phosphorus

The MOE Provincial Water Quality Objectives (PWQO) state that, as an interim guideline for streams and rivers, total phosphorus (TP) should not exceed 0.03 mg/L to prevent excessive plant growth. The 75th percentile concentrations of the 12 samples collected at Oxford Road 3 (Site 1) and at the farmers crossing (Site 2) were 0.19 mg/L and 0.06 mg/L, respectively; these concentrations exceed the PWQO and therefore the receiver is Policy 2 with respect to TP. A statistical summary of the TP water quality data collected is presented in Table 2.8. The time series plot of ambient TP (upstream of the effluent discharge) over the period of monitoring is illustrated below in Figure 2.10.

The TP concentrations observed at Site 1 are consistently higher than those observed at Site 2.

Table 2.8 Cowan Drain TP Statistics

Statistic	Site 1 Value	Site 2 Value
Minimum (mg/L)	0.04	0.02
Maximum (mg/L)	0.34	0.13
Average (mg/L)	0.13	0.05
75th Percentile (mg/L)	0.19	0.06

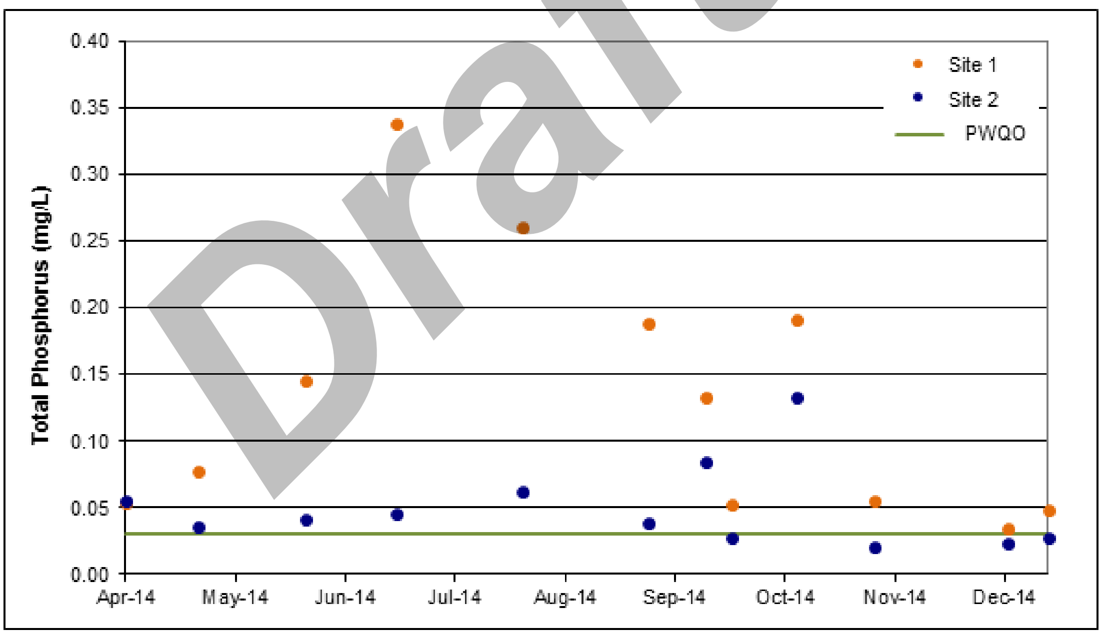

Figure 2.10 Total Phosphorus Time Series

Un-ionized Ammonia (UIA)

The percentage of un-ionized ammonia in aqueous solution varies depending on the temperature and pH of the water. In order to determine the 75th percentile in-stream un-ionized ammonia, it is first necessary to calculate the un-ionized ammonia concentration for days in which synoptic measurements of ammonia, pH, and temperature are available.

The MOECC PWQO for un-ionized ammonia is 0.02 mg/L-NH_3 (20 µg/L). A statistical summary of the Cowan Drain water quality with respect to un-ionized ammonia based on synoptic data for all samples collected is presented in Table 2.9.

The 75th percentile concentrations of the samples collected at Sites No.1 and No.2 were both less than 0.001 mg/L; however, based on the limited number of data points, two exceedances at Site 2 over the monitoring period, relatively high pH, high summer temperatures, and anticipated near zero low flow design conditions, the Cowan Drain is considered to be MOE Policy 2 with respect to un-ionized ammonia. The time series plot of un-ionized ammonia over the monitoring period is illustrated below in Figure 2.11.

The un-ionized ammonia concentrations observed at Site 1 are consistently lower than those observed at Site 2. This may be a consequence of the upstream wetland. It is observed that pH appears to increase from Site 1 to Site 2, as shown in Figure 2.12. This increased pH may be a result of aquatic life activity, primarily plant activity within the upstream wetland. The increased pH results in increased un-ionized ammonia concentrations.

Table 2.9 Cowan Drain Un-ionized Ammonia Statistics

Statistic	Site 1 Value	Site 2 Value
Minimum (mg/L)	< 0.001	< 0.001
Maximum (mg/L)	0.007	0.032
Average (mg/L)	0.003	0.011
75th Percentile (mg/L)	0.004	0.015

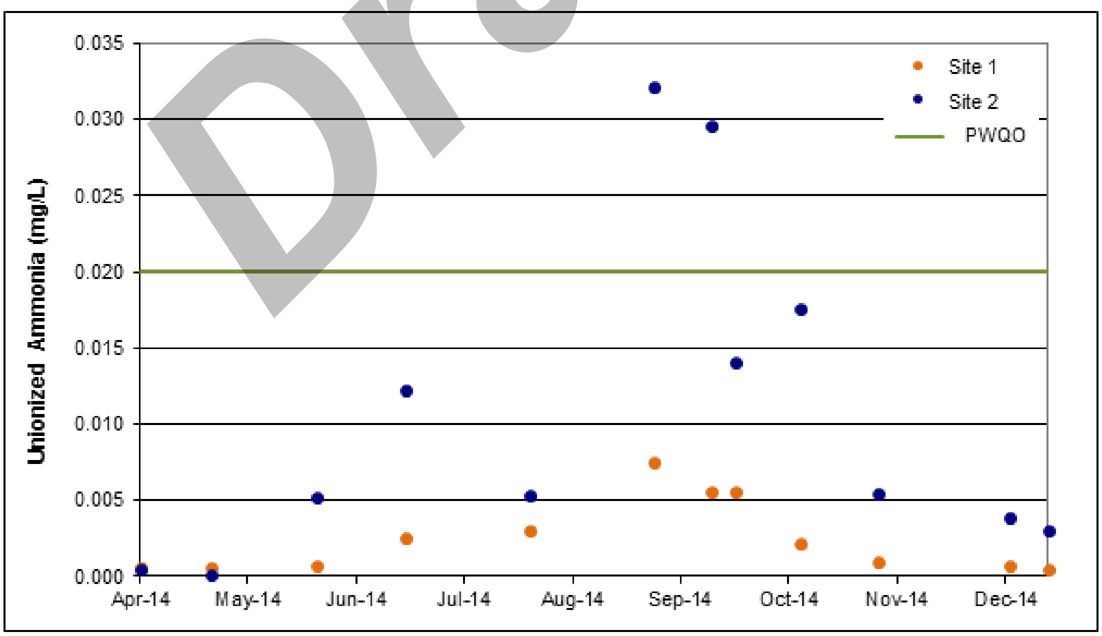

Figure 2.11 Un-ionized Ammonia Time Series

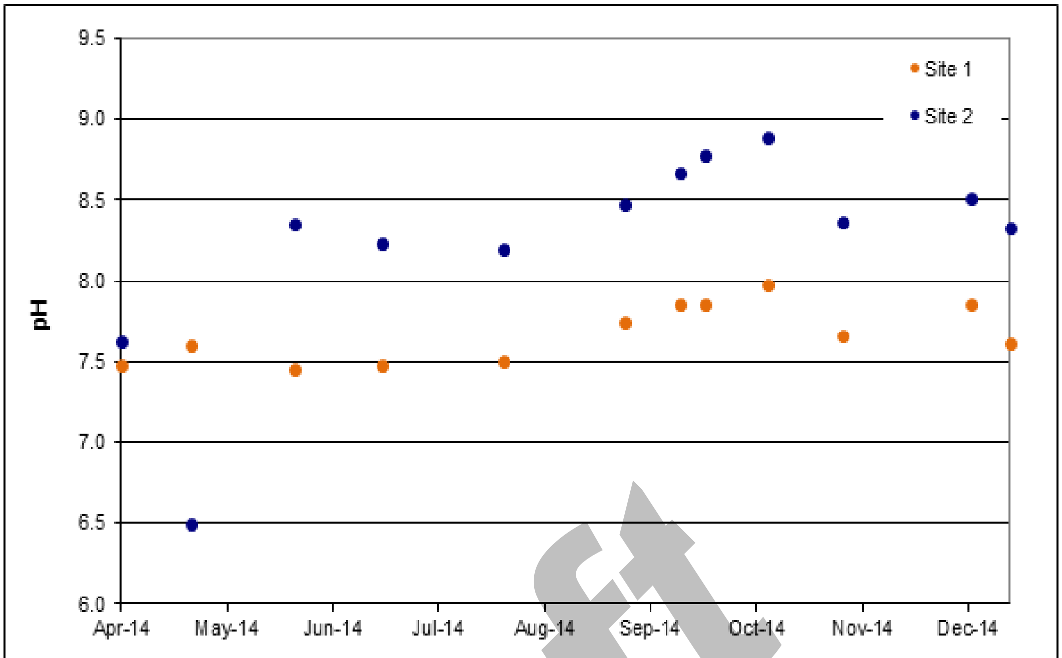

Figure 2.12 pH Time Series

Dissolved Oxygen and BOD_5

For dissolved oxygen (DO), low concentrations are indications of degraded water quality; therefore, 25^{th} percentiles are typically used, rather than 75^{th} percentiles, to characterize ambient conditions. However, given that there are only nine months' of data and significant seasonal variation, DO for the Cowan Drain will be discussed in general only. Figure 2.13 shows the DO time series of the collected monitoring program data as well as the varying PWQO for warm water fisheries based on water temperature. The figure shows that the DO concentrations are consistently lower than the PWQO at Site 1 and consistently higher than the PWQO at Site 2. Therefore, the Cowan Drain is MOE Policy 1 with respect to DO at Site 2 and MOE Policy 2 with respect to DO at Site 1 based on the limited monitoring data.

It should be noted that the dissolved oxygen values are spot measurements taken during the day (typically between 8:15 am and 12:15 pm) and may not be reflective of worst case conditions in the summer (i.e. at dawn when dissolved oxygen is typically lowest).

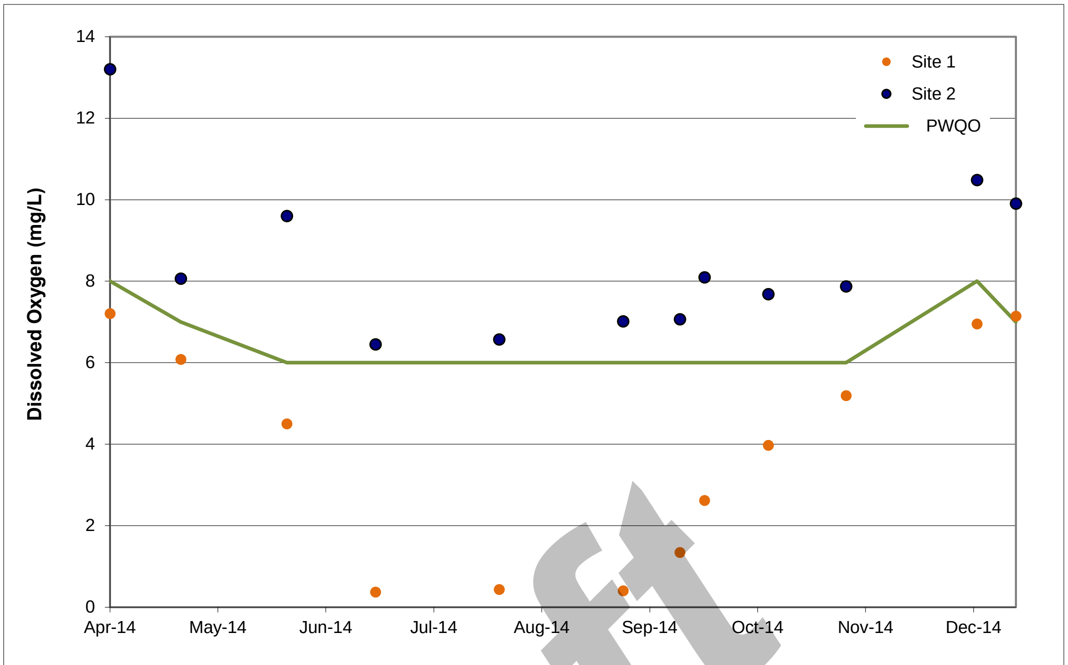

Figure 2.13 Dissolved Oxygen Time Series

Of the samples collected for ambient BOD_5, 50% of the samples collected at Site 1 were reported to be less than the detection limit and 75% of the samples collected at Site 2 were reported to be less than the detection limit, which was 2 mg/L. If the detection limit is substituted for these values than the 75th percentile concentration would be 3.3 mg/L at Site 1 and 2.5 mg/L at Site 2. Figure 2.14 presents a time series of the BOD_5 data collected.

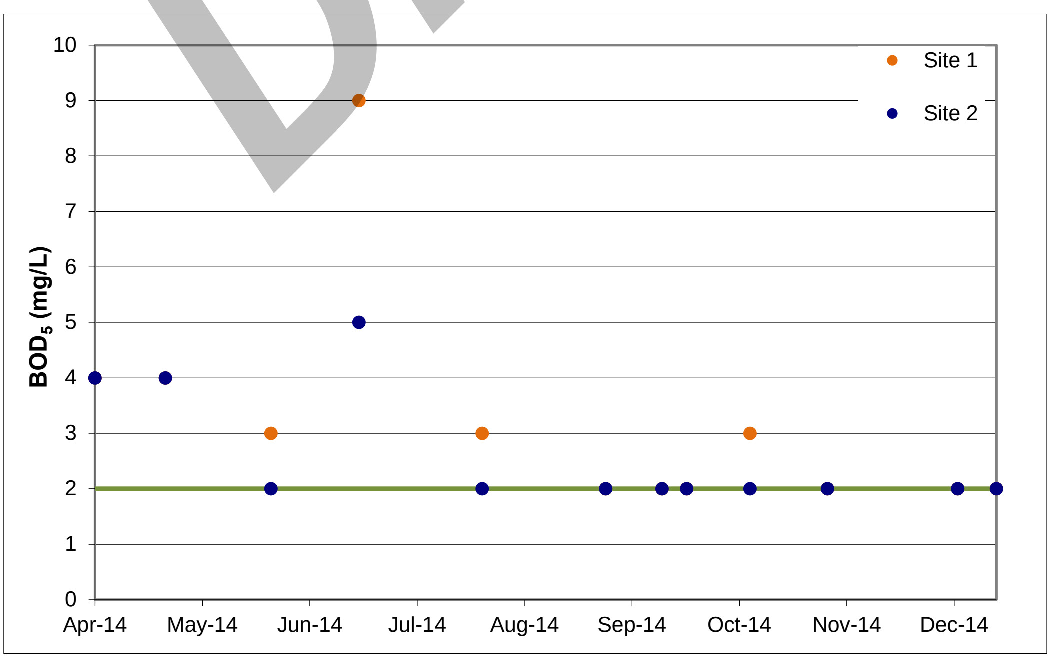

Figure 2.14 BOD_5 Time Series

The analysis of ambient DO and BOD_5 concentrations suggests that there is additional assimilative capacity available for BOD_5. Further, dissolved oxygen at Site 2 appears to be very high, consistently exceeding the PWQO.

E.coli

One third of the *E.coli* samples collected at Site 1 exceeded the PWQO of 100 cfu/100 mL, while two thirds of the samples collected at Site 2 exceeded the PWQO. At Site 1, the 75th percentile concentration was 107 cfu/100 mL and the geometric mean was 61 cfu/100 mL. At Site 2, the 75th percentile concentration was 211 cfu/100 mL and the geometric mean was 150 cfu/100 mL. Accordingly, the Cowan Drain is MOE Policy 1 with respect to *E.coli* at Site 1 and Policy 2 at Site 2. A statistical summary of the Cowan Drain water quality with respect to *E. coli* for all samples collected is presented in Table 2.10. The time series plot of *E. coli* over the monitoring period is illustrated below in Figure 2.15.

Table 2.10 Cowan Drain E. coli Statistics

Statistic	Site 1 Value	Site 2 Value
Minimum (CFU/100 mL)	0	54
Maximum (CFU/100 mL)	1,900	800
Geomean (CFU/100 mL)	61	150
75th Percentile (CFU/100 mL)	107	211

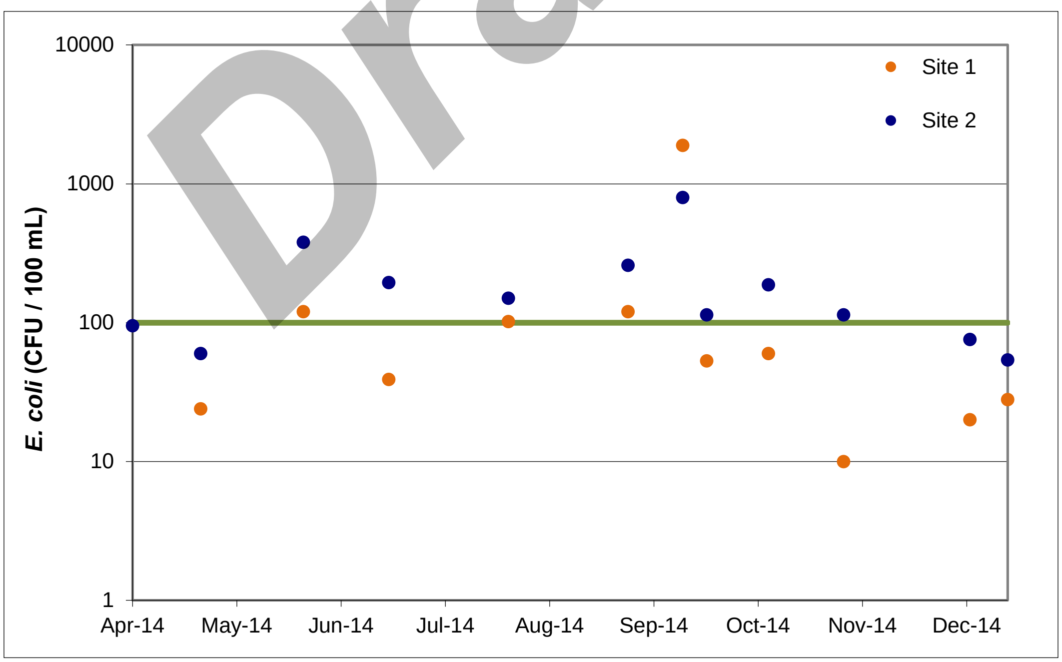

Figure 2.15 E. coli Time Series

Total Suspended Solids

There is no PWQO for total suspended solids (TSS). A time series of the collected TSS samples is illustrated in Figure 2.16. The 75th percentile concentration of the ambient TSS was 16 mg/L at Site 1 and 11 mg/L at Site 2. Calculated statistics on all of the data collected at both sampling locations are shown in Table 2.11.

Table 2.11 Cowan Drain TSS Statistics

Statistic	Site 1 Value	Site 2 Value
Minimum (mg/L)	2	2
Maximum (mg/L)	67	18
Average (mg/L)	14	8
75th Percentile (mg/L)	16	11

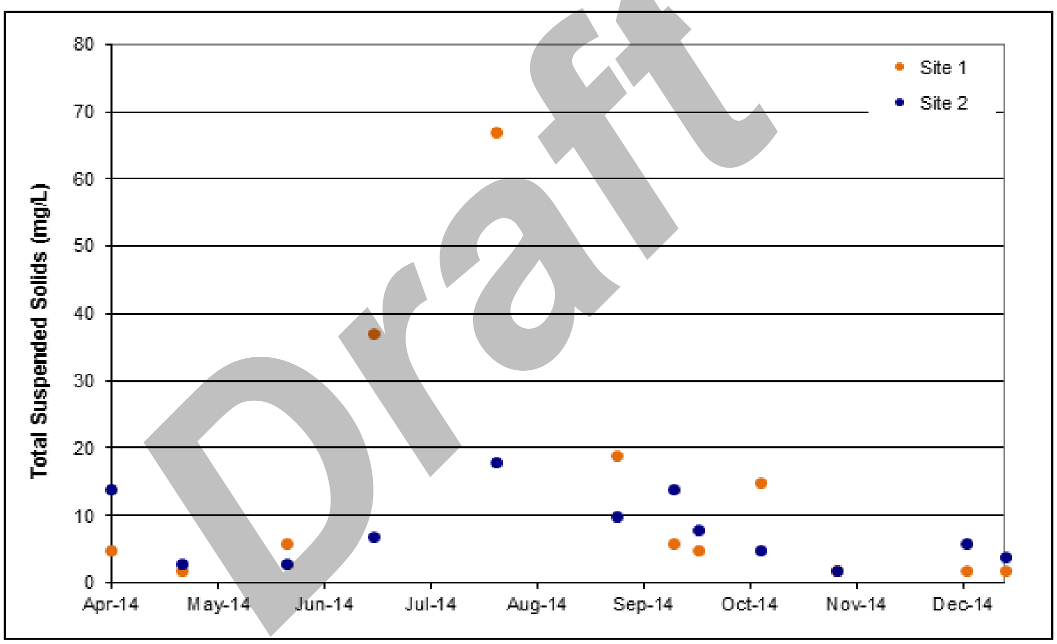

Figure 2.16 TSS Time Series

Low Flows

As discussed, the Drumbo WWTP discharges into the Cowan Drain, which subsequently discharges into the Nith River. Sampling Site 1 was located in a relatively large wetland, located directly downstream of the Drumbo WWTP discharge and upstream of Oxford Road 3. This wetland equalizes the outgoing water quality and moderates the flow variability associated with the flows generated at the plant.

As part of the monitoring program, water level measurements at the culvert inlet and outlet were collected at each site. Velocity measurements were estimated using the culvert length and the travel time of an object from the culvert inlet to the outlet. Several field observations indicated low or near-zero velocity; however, these were deemed unreliable because water level measurements remained above 20 cm and a gradient was observed between the culvert inlet and outlet. Further, it was noted in a field observation from August 2014 that obstructions within the culvert were affecting the time measurements used to determine the velocity of the stream. For the purpose of this work, it is recommended that an initial low flow estimate of 0.005 m^3/s be applied where required. This corresponds to 50% of the lowest flow estimate for Site 1, and a total change in watershed storage of less than 1 mm per day.

3. COMMUNITY OF PRINCETON

The Community of Princeton is located fourteen kilometres east of the City of Woodstock (Woodstock) in the Township of Blandford-Blenheim (Township). Princeton is a relatively small community with 199 residential buildings and a seniors' home (Countryside Manor) containing 23 units. The estimated residential population is 617 persons. In addition, there are approximately 8.17 ha of land within Princeton with industrial, commercial or institutional (I/C/I) land uses.

The purpose of this section is to provide an overview of the existing conditions in the Community of Princeton.

3.1 Existing Wastewater Servicing in Princeton

Wastewater generated by residents of Princeton is currently treated through private on-site wastewater treatment systems. There are 207 private treatment systems in Princeton that service a mixture of residential and non-residential properties, including the 23 unit seniors' home and a number of I/C/I properties. Maintenance and replacement of the private on-site wastewater treatment systems are the responsibility of the individual property owners.

Oxford County Public Health and Emergency Services maintain records of private on-site wastewater treatment system approvals. These records were reviewed to assess the age and design of each private on-site wastewater treatment system. A total of 66 private on-site wastewater treatment systems are on record with Oxford County Public Health and Emergency Services. For the most part, systems approved or installed prior to 1975 predate Oxford County Public Health and Emergency Services' involvement in the approval process and are not shown in the records. Oxford County Public Health and Emergency Services has records for 13 systems approved for installation prior to 1975. For the purpose of this review, it was assumed that all systems not included in Oxford County Public Health and Emergency Services records were constructed before 1975.

Table 3.2 presents a summary of the estimated age of private on-site wastewater treatment systems in Princeton based on Oxford County Public Health and Emergency Service records.

Of the 66 private on-site wastewater treatment systems included in Oxford County Public Health and Emergency Services records, most are conventional on-site wastewater treatment systems, commonly referred to as septic systems approved for construction after 1975. The records show one biofilter system, three sand filter systems, and two holding tanks. Of the 66 systems on record, 37 systems were less than 25 years old (approved in 1987 or later), 16 systems are between 25 and 35 years old (approved between 1977 and 1987) and the remaining 13 systems are now older than 35 years (approved before 1977). There are no records for 141 systems, and these systems were assumed to have been installed prior to 1975.

Table 3.1 Summary of Princeton Private On-Site Wastewater Treatment Systems

	Number of Systems
Number of On-Site Private Wastewater Treatment Systems Newer than 25 Years Old(1)	37
Number of On-Site Private Wastewater Treatment Systems Between 25 and 35 Years Old (2)	16
Number of On-Site Private Wastewater Treatment Systems Assumed to be Older than 35 Years Old (3)	154
Total Number of Systems	**207**
Number of On-Site Private Wastewater Treatment Systems Recorded as Being "Non-Conforming" (4)	16
Total Number of Existing Systems Contained within the Records of Oxford County Public Health and Emergency Services	66

Notes:

1. Systems approved between 1987 and 2011.
2. Systems approved between 1977 and 1987.
3. Includes systems approved before 1977 plus all remaining systems not included in Oxford County Public Health and Emergency Services records. There are 66 records in total with records for 13 systems approved before 1977.
4. Oxford County Public Health and Emergency Services records indicate 16 non-conforming systems. Reasons for non-conformance were not included in private on-site wastewater treatment system records obtained. Majority of the non-conforming systems were constructed prior to Part 8 of the Ontario Building Code being implemented and were constructed to meet different standards.

The typical average life span of a septic system is 20 to 25 years, although some systems have been known to function effectively for as long as 35 years. This suggests that 74 percent of the systems in Princeton have exceeded their expected life span or design life by 10 years or more and will require replacement in the near future.

3.2 Existing Water Servicing in Princeton

Prior to 2013, water supply for the Community of Princeton consisted of individually owned private wells. In 2006, the Princeton Water Servicing Study Class EA was completed. As part of the Class EA, Oxford County Public Health and Emergency Services performed two door-to-door water sampling surveys in spring 2002 and spring 2004. Raw water samples from private wells located in Princeton were collected and analyzed for *E.coli*, total coliform and total nitrates. Both surveys found evidence of aquifer contamination with approximately 20 percent of wells sampled having bacteriological and/or nitrate contamination. The Princeton Water Servicing Study Class EA concluded with a recommendation for a new feedermain and local water distribution system that would provide water to Princeton residents from wells located in Drumbo. Oxford County commissioned the new water supply system for Princeton in 2013.

The Drumbo-Princeton water system currently has reserve capacity for an additional 140 lots in Drumbo and Princeton combined, or approximately 20 years assuming the development of 7 lots/year. A new well would be required to accommodate a proposed new residential development in the Community of Princeton.

4. SUMMARY OF EXISTING CONDITIONS

Based on the available data and information provided, the following summarizes the key findings of this review of the current status of wastewater servicing in the Communities of Drumbo and Princeton.

4.1 Community of Drumbo

- Over the review period, the Drumbo WWTP has operated at an ADF of approximately 253 m^3/d, or about 84% of the plant rated capacity of 300 m^3/d.
- The rated capacity of the Drumbo WWTP was recently re-rated from 272 m^3/d to 300 m^3/d using results from a capacity assessment. Currently, the SBR and tertiary filtration treatment processes are the subject of an optimization program.
- Effluent quality from the Drumbo WWTP consistently met ECA effluent compliance criteria for $cBOD_5$, TSS, TAN, and TP.
- The Drumbo WWTP is located within 100 m of a drinking water production well for the Communities of Drumbo and Princeton. As such, future expansion of the plant may be subject to several additional conditions during both construction and operation of the plant.
- Effluent from the Drumbo WWTP is discharged to the Cowan Drain. Water quality in the Cowan Drain was evaluated based on samples collected at two locations downstream of the treatment plant. Sample results indicate the Cowan Drain is MOECC Policy 2 for total phosphorus and un-ionized ammonia at both sampling locations. In addition, it was found to be Policy 2 with respect to dissolved oxygen (at Site 1 only) and with respect to *E. coli* (at Site 2 only). All other parameters were MOECC Policy 1, or did not have a PWQO.

4.2 Community of Princeton

- Wastewater treatment is currently provided by private onsite treatment systems (i.e. septic systems). There exists 207 private systems in the Community of Princeton.
- An estimated 74 percent of private treatment systems in Princeton have exceeded their expected life span or design life by 10 years or more and will require replacement in the near future.
- The Communities of Princeton and Drumbo are serviced by a communal water system located in Drumbo. The existing water system has capacity for approximately 140 additional units.
- Future wastewater servicing in the Community of Princeton was the subject of two recently completed studies: Princeton Wastewater Servicing Study (XCG, 2015) and Princeton Wastewater Servicing Study: Suggested Alternative Treatment Solution (Dillon, 2015). Examination of the proposed alternative servicing solution will be undertaken in parallel with this Class EA.

5. REFERENCES

1. Dillon Consulting. Princeton Wastewater Servicing Study: Suggested Alternative Servicing Solution. 2015.
2. Metcalf and Eddy. Wastewater Engineering: Treatment and Resource Recovery. Fourth Edition. 2003.
3. Ministry of the Environment. MOE Design Guidelines for Sewage Works. 2008.
4. Ministry of the Environment. Guidelines for the Design of Sanitary Sewage Works. 1985.
5. Ministry of Environment and Energy, *Water Management: Policies, Guidelines, Provincial Water Quality Objectives.* July 1994 (MOE Blue Book).
6. XCG Consultants Ltd. Princeton Wastewater Servicing Study. 2015.
7. XCG Consultants Ltd. Influent Flow Meter Verification – Drumbo WWTP. 2014.

APPENDIX A
IMPACT OF WELL 3 ON EXPANSION OF THE DRUMBO WWTP

Oxford County
growing stronger...together
PUBLIC WORKS
P. O. Box 1614, 21 Reeve Street, Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 • Fax: 519-421-4711
Website: www.oxfordcounty.ca

January 25, 2016

Shahab Shafai, P.Eng.
Manager of Environmental Services
Oxford County
21 Reeve Street, P.O.Box. 1614
Woodstock, ON N4S 7Y3

RE: Drumbo Wastewater Treatment Plant Class EA

The Risk Management Office has conducted a preliminary review of the above noted planned Class EA and has the following comments:

The Drumbo Wastewater Treatment Plant (WWTP) is located within the WHPA-A (100 m zone) for well 3 of the Drumbo Drinking Water System (map attached). The vulnerability score in that area is 10 and as such the WWTP has been identified as a significant drinking water threat under the Clean Water Act, 2006 (the Act).

Under the Act, the establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage is considered a significant drinking water threat activity. Specifically, there are 3 components of the WWTP that have been flagged as significant drinking water threats, under specific circumstances:

1) Collection system piping,
2) Discharge, and
3) Tankage for treatment or storage, whether above or below grade

The detailed significant threat circumstances are included in Appendix A.

The above-noted activities associated with the WWTP will be subject to the policies in the Grand River Source Protection Plan (the Plan), which will come into effect on July 1, 2016. The Plan contains policies for both existing and future activities. Unless otherwise noted in the specific policies, it is intended that replacements, modifications and expansions to existing significant threat activities be considered as part of the existing significant threat activity and, therefore, evaluated in accordance with the policies pertaining to existing threats. Therefore, the WWTP upgrade will be subject to policies OC-MC-3.5 and OC-MC-3.7. Policies OC-MC-3.5 and OC-MC-3.7 direct the MOECC to review and where necessary amend the ECA to incorporate terms and conditions to ensure the activity ceases to be considered a significant drinking water threat. The policy excerpts are included in Appendix B for reference.

Conditions imposed by the MOECC may include requirements such as more frequent cleaning/inspection, more stringent specifications on construction material types, more robust spill response plans and procedures and additional reporting requirements for spills. It is recommended that you consult with the MOECC early in the Class EA process.

For further questions or clarifications please contact the undersigned at 519-539-9800 extension 3116.

Deborah Goudreau, P.Eng.
Manager of Water Services
Oxford County

Copy: Mark Maxwell, P.Eng., Oxford County

Appendix A

Tables of Drinking Water Threats *Clean Water Act, 2006*

Excerpt from Table 2 – Drinking Water Threats – Pathogens:

Drinking Water Threat:	**Reference Number**	**Under the following circumstances**
The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	1958	1. The system is a wastewater collection facility that collects or transmits sewage containing human waste, but does not include any part of the facility that is a sewage storage tank or works used to carry out a designed bypass. 2. The discharge from the system may result in the presence of one or more pathogens in groundwater or surface water.
	1959	1. The system is a wastewater treatment facility that discharges to surface water through a means other than a designed bypass. 2. A discharge may result in the presence of one or more pathogens in groundwater or surface water.
	1960	1. The system is a sewage treatment tank or sewage storage tank in either a wastewater collection facility or wastewater treatment facility, and any part of the tank is at or above grade. 2. A spill from the tank may result in the presence of one or more pathogens in groundwater or surface water.
	1961	1. The system is a sewage treatment tank or sewage storage tank in a wastewater collection facility or a wastewater treatment facility and the tank is below grade. 2. A spill from the tank may result in the presence of one or more pathogens in groundwater or surface water.

Appendix B

Grand River Source Protection Plan Volume II – Approved

Excerpt from Chapter 12:

Policy Number	Source Protection Plan Policies within the County of Oxford
Sewage System or Sewage Works- Storage of Sewage (e.g., treatment plant tanks) Sewage System or Sewage Works- Sewage Treatment Plant Effluent Discharges	
OC-MC-3.5 *Existing* *Prescribed Instr.* *WHPA-A- v.10;* *WHPA-B- v.10 WHPA-B-v.8;* *WHPA-C-v.8*	For any existing sewage treatment plant effluent discharges or storage of sewage, where these activities are significant drinking water threats, the Ministry of the Environment and Climate Change shall review, and where necessary, amend Environmental Compliance Approvals to incorporate terms and conditions that, when implemented, ensure these activities cease to be significant drinking water threats.
OC-MC-3.6 *Future* *Prescribed Instr.* *WHPA-A- v.10;* *WHPA-B- v.10 WHPA-B-v.8;* *WHPA-C-v.8*	For any new sewage treatment plant effluent discharge or storage of sewage, where these activities would be significant drinking water threats, the Ministry of the Environment and Climate Change shall prohibit these activities through the Environmental Compliance Approvals process to ensure these activities never become significant drinking water threats.
Sewage System or Sewage Works – Sanitary Sewers and Related Pipes	
OC-MC-3.7 *Existing/Future* *Prescribed Instr.* *WHPA-A- v.10;* *WHPA-B- v.10*	For any existing or new sanitary sewer and related pipes, where this activity is, or would be a significant drinking water threat, the Ministry of the Environment and Climate Change shall ensure that the Environmental Compliance Approval for this activity is prepared, or, where necessary, amended to incorporate terms and conditions that, when implemented ensure this activity ceases to be or will never become a significant drinking water threat. The terms and conditions may include, but not necessarily be limited to, requirements for regular maintenance and inspections by the holder of the Environmental Compliance Approval.

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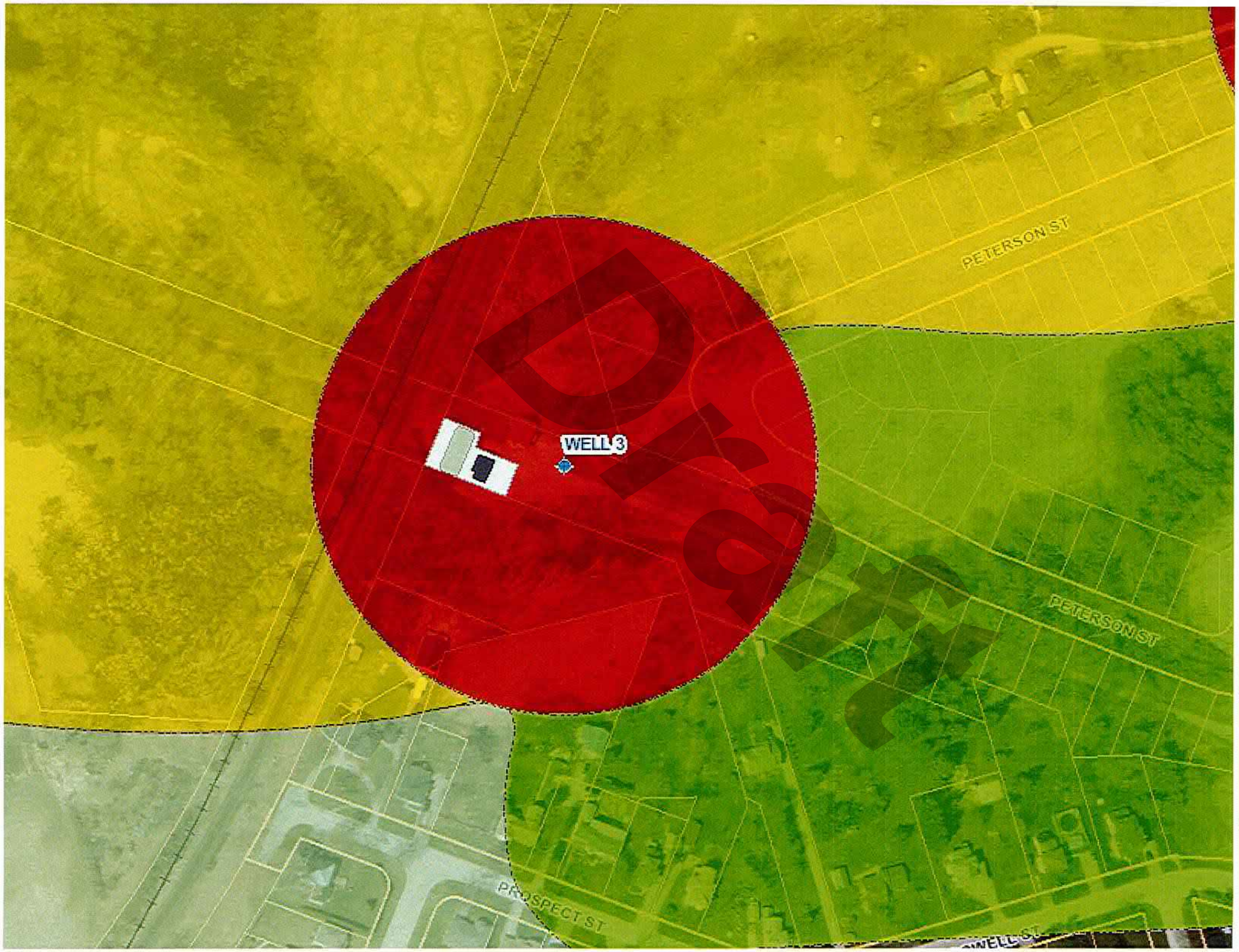
Drumbo WWTP



Legend

- Buildings - Control
- Site (Grounds)
- Site (Works)
- Production Well
- WHPA A-D

AVI:Score (WHPA A)
- 2
- 4
- 6
- 8
- 10

AVI:Score (WHPA B)
- 2
- 4
- 6
- 8
- 10

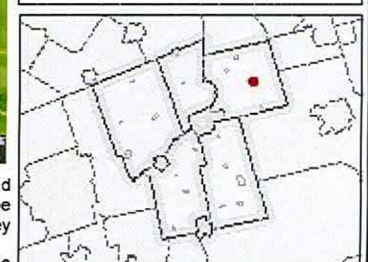
AVI:Score (WHPA C)
- 2
- 4
- 6
- 8
- 10

AVI:Score (WHPA D)
- 2
- 4
- 6
- 8
- 10

SWAT:Score (WHPA A)
- 2
- 4
- 6
- 8
- 10

SWAT:Score (WHPA B)

Notes



map it

0 58 117 Meters

NAD_1983_UTM_Zone_17N

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. This is not a plan of survey

January 25, 2016

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2620 Bristol Circle, Suite 300, Oakville, Ontario, Canada L6H 6Z7

XCG File No.: 3-277-47-02
August 26, 2016
FINAL DRAFT

DRUMBO WASTEWATER TREATMENT PLANT
CLASS ENVIRONMENTAL ASSESSMENT
TECHNICAL MEMORANDUM 2
FUTURE FLOWS AND LOADS

Prepared for:

OXFORD COUNTY
PUBLIC WORKS
P.O. Box 1614, 21 Reeve Street
Woodstock, ON
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Attention: Mark Maxwell

Prepared by:

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Oakville, ON
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TABLE OF CONTENTS

TABLES

1. INTRODUCTION

1.1 Background

Oxford County ("The County")'s Drumbo Wastewater Treatment Plant (WWTP) provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP is a Sequencing Batch Reactor (SBR) facility with tertiary filtration and ultraviolet disinfection and has an approved average day flow (ADF) capacity of 300 m^3/d.

The County is currently undertaking a Class Environment Assessment (Class EA) study to identify the most cost effective and environmentally sustainable approach to providing wastewater treatment to meet the future needs of the Community of Drumbo. Further, the County wishes to evaluate the potential to treat additional flow from the nearby Community of Princeton and from a proposed new residential development within the Community of Princeton.

XCG Consulting Limited (XCG) has been retained by the County to provide engineering support through the Class EA process.

1.2 Objectives

The objective of this Technical Memorandum (TM2) is to develop a range of future wastewater flows and loads to the Drumbo WWTP up to at least 2036 based on population growth projections for the Community of Drumbo and the Community of Princeton, with and without the proposed new residential development in Princeton.

2. DESIGN BASIS

There are three distinct areas which may be serviced by the Drumbo WWTP in the future:

- The Community of Drumbo;
- The Community of Princeton (including limited infill growth of 100 units); and,
- The proposed new development in the Community of Princeton.

Two different types of collection systems have previously been considered for installation in the existing Community of Princeton, namely:

- A septic tank effluent gravity (STEG) or septic tank effluent pumping (STEP) arrangement; or,
- A conventional collection system.

The type of collection system provided will impact the expected flows and loads from the serviced area. The Princeton Wastewater Servicing Study (XCG, May 2015) concluded that a STEP/STEG system was the preferred servicing option for Princeton. For the purposes of developing conceptual level flows and loads from the Princeton service area, it has been assumed that a STEP/STEG system would be installed for the purposes of servicing the Community of Princeton, including the proposed new development.

Overall, five servicing alternatives for the Drumbo WWTP have been identified, with sub-options to consider servicing the Community of Princeton and the proposed new development. The servicing alternatives are described in Table 2.1.

Table 2.1 Summary of Drumbo Class EA Servicing Alternatives

Servicing Alternative	Description
Alternative 1 – ‘Do Nothing’	No additional wastewater treatment capacity for Drumbo and no treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 2	Expand the Drumbo WWTP at the existing site to service Drumbo. No treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 3	Construct a new Drumbo WWTP at a new site to service Drumbo. No treatment of Princeton wastewater at the new Drumbo WWTP.
Alternative 4A	Expand the Drumbo WWTP at the existing site to service Drumbo and Princeton, **excluding** proposed new development units in Princeton.
Alternative 4B	Expand the Drumbo WWTP at the existing site to service Drumbo and Princeton, **including** proposed new development units in Princeton.
Alternative 5A	Construct a new Drumbo WWTP at a new site to service Drumbo and Princeton, **excluding** proposed new development units in Princeton.
Alternative 5B	Construct a new Drumbo WWTP at a new site to service Drumbo and Princeton, **including** proposed new development units in Princeton.

The following sub-sections provide population projections, design flows and loadings associated with each of the above five servicing alternatives.

2.1 Current and Future Service Area Populations, Flows and Loads

2.1.1 Population Projections

Population projections for the Drumbo service area were based on information provided by the County. There are currently 59 lots that are draft approved / registered for development and approximately 27 infill and unconnected lots in Drumbo. A design population density of 2.81 people per unit (ppu), as provided by the County, was applied to the draft approved and potential infill/unconnected lots (units) to estimate a population growth of 242 people from new residential development.

Population projections for the Community of Princeton were based on the Princeton Wastewater Servicing Study and information provided by the Dillon Consulting for the proposed new development. From the recently completed Princeton Wastewater Servicing Study (XCG, 2015), the existing population and future service population within the Community of Princeton were estimated to be 854 and 1,113 persons, respectively. The proposed new development was considered separately from the Community of Princeton. Two phases of development are proposed for this development: Phase 1, consisting of 100 units, and Phase 2, consisting of 224 units. The assumed population density for the entire development (Phase 1 and Phase 2) was 3.25 ppu (Dillon, 2015). Based on the development proposal, the ultimate service population of the proposed new development was estimated to be 1,053 persons. For purposes of this report, all analysis is based on the ultimate service population of the proposed new development.

Current and future population projections for each of the five servicing alternatives are presented in Table 2.2.

Table 2.2 Projected Populations for Servicing Alternatives

	Parameter	Existing	Growth	Projected
A	Drumbo Service Population	877	242	1,119
B	Princeton Service Population (1)	821	292	1,113
C	Proposed New Development Service Population (2)	-	1,053	1,053
	Alternative 1 Population (A) (*Existing only*)			877 (3)
	Alternative 2 / Alternative 3 Population (A) (*Projected*)			1,119
	Alternative 4A / Alternative 5A Population (A+B) (*Projected*)			2,232
	Alternative 4B / Alternative 5B Population (A+B+C) (*Projected*)			3,285

Notes:
1. From the Princeton Wastewater Servicing Study (XCG, 2015).
2. From Dillon, 2015.
3. Alternative 1 services only existing population from Drumbo.

From Table 2.2, the estimated future service population is approximately 877 persons for Alternative 1 (servicing existing Drumbo population), 1,119 persons for Alternative 2 and Alternative 3 (servicing existing and growth Drumbo population), 2,232 persons for Alternative 4A and Alternative 5A (servicing of Drumbo and Princeton, excluding the proposed new development in Princeton), and 3,285 persons for Alternative 4B and Alternative 5B (servicing of Drumbo, Princeton, and the proposed new development in Princeton).

2.1.2 Future Projected Average Day Flows

The future servicing needs for the Community of Drumbo were based on historical flows (2012 - 2015) from the existing service area, plus the projected flows attributed to anticipated growth. Projected residential flows in the Community of Drumbo were based on the historical wastewater generation rate of 288 L/cap/d for future growth. The projected average day residential wastewater flows are considered to be conservative since they are based on the historical average per capita flow which includes contributions from collection system inflow and infiltration (I/I).

For the Community of Princeton, the Wastewater Servicing Study estimated an average wastewater generation rate of 293 L/cap/d (XCG, 2015), while wastewater generation from the proposed new development was assumed to be 350 L/cap/d (Dillon, 2016). For the purposes of this study, a design per capita wastewater generation from the Community of Princeton and the proposed new development was estimated using existing water use records for the Community of Princeton, and including an allocation for I/I flow. By this method, the estimated per capita wastewater flow from the Community of Princeton and the proposed new development is 288 L/cap/d, which is equivalent to the design wastewater generation rate for the Community of Drumbo. For purposes of this report, a per capita average wastewater flow of 288 L/cap/d has also been assumed for both the Community of Princeton and the proposed new development.

The estimated projected residential flows to the Drumbo WWTP for all servicing alternatives presented in Table 2.3.

Table 2.3 Design Average Day Flows for Servicing Alternatives

	Parameter	Existing	Growth	Projected
A	Drumbo ADF	253 m^3/d	69 m^3/d	322 m^3/d
B	Princeton ADF (1)	237 m^3/d	84 m^3/d	321 m^3/d
C	Proposed New Development ADF (2)	-	303 m^3/d	303 m^3/d
	Alternative 1 Design ADF (A) (*Existing flow only*)			253 m^3/d (3)
	Alternative 2 / Alternative 3 Design ADF (A) (*Projected flow*)			322 m^3/d
	Alternative 4A / Alternative 5A Design ADF (A+B) (*Projected flow*)			643 m^3/d
	Alternative 4B / Alternative 5B Design ADF (A+B+C) (*Projected flow*)			946 m^3/d

Notes:
1. Assuming a per capita flow of 288 L/cap/d.
2. From Dillon, 2015.
3. Alternative 1 services only existing population from Drumbo.

From Table 2.3, the estimated future ADF for the Drumbo WWTP is approximately 253 m^3/d for Alternative 1 (servicing existing Drumbo population), 322 m^3/d for Alternative 2 and Alternative 3 (servicing existing and growth Drumbo population), 643 m^3/d for Alternative 4A and Alternative 5A (servicing of Drumbo and Princeton, excluding the proposed new development in Princeton), and 946 m^3/d for Alternative 4B and Alternative 5B (servicing of Drumbo, Princeton, and the proposed new development in Princeton).

2.1.3 Projected Maximum Day Flow

The design future maximum day flow (MDF) for the Drumbo WWTP service area was based on the historical MDF plus an allowance for new growth from the Community of Drumbo. Allowances for maximum day flows from the Community of Princeton and the proposed new development were included, as necessary, for each alternative. As noted previously, it was assumed that the same peaking factors apply to a STEP/STEG system as to a conventional collection system to service the community of Princeton, which will result in a conservative estimate of the peak flows for the STEP/STEG system.

A dry weather flow analysis for the existing Drumbo WWTP service area was completed to determine the historical DWF factor. The analysis of DWF was conducted based on flow data from 2012 to 2015 and meteorological data from Environment Canada. Days were considered to be "dry" when no precipitation occurred for that day and three days prior between the months of May and October, inclusive. Based on the flow analysis, the historical DWF peaking factor for the existing service area was 1.5. This DWF was assumed to apply to new growth and new services in the Community of Drumbo, the Community of Princeton, and the proposed new development.

Assuming a typical I/I flow rate of 90 L/cap/d (MOE, 1985), the design per capita DWF for the residential service area is 198 L/cap/d. These values were applied to determine the design MDF for new growth and new services in the Community of Drumbo, the Community of Princeton, and the proposed new development in Princeton. By applying the historical DWF peaking factor of 1.5 to the dry weather flow portion of the per capita flow (198 L/cap/d), and including an allowance for the peak I/I portion of the per capita flow (227 L/cap/d), the overall MDF peaking factor was determined to be 1.8 for new growth in Drumbo and new service areas.

The conceptual level design MDF values for each design alternative are presented in Table 2.4.

For the purposes of developing the conceptual level design bases for the Drumbo WWTP, the design future MDFs for the Drumbo WWTP are 664 m^3/d for Alternative 1 (servicing existing Drumbo population only), 789 m^3/d for Alternative 2 and Alternative 3 (servicing existing and growth Drumbo population), 1,368 m^3/d for Alternative 4A and Alternative 5A (servicing of Drumbo and Princeton), and 1,913 m^3/d for Alternative 4B and Alternative 5B (servicing of Drumbo, Princeton, and the proposed new development).

Table 2.4 Design Maximum Day Flow to the Drumbo WWTP

	Parameter	Projected ADF	MDF Factor	Projected MDF
A	Existing Service Area	253 m^3/d	2.6	664 m^3/d
B	Drumbo Growth	69 m^3/d	1.8	125 m^3/d
C	Princeton Service Area	321 m^3/d	1.8	579 m^3/d
D	Proposed new development in Princeton	303 m^3/d	1.8	545 m^3/d
	Alternative 1 Design MDF (A)	253 m^3/d	2.6	664 m^3/d
	Alternative 2 / 3 Design MDF (A+B)	322 m^3/d	2.4	789 m^3/d
	Alternative 4A / 5A Design MDF (A+B+C)	643 m^3/d	2.1	1,368 m^3/d
	Alternative 4B / 5B Design MDF (A+B+C+D)	947 m^3/d	2.0	1,913 m^3/d

2.1.4 *Projected Peak Instantaneous Flow*

Historical peak instantaneous flow (PIF) data were not available for the Drumbo WWTP. Therefore, to determine the design PIF factor associated with projected future connections to the sewage collection system, the Harmon Formula was used for DWF, and a peak extraneous flow allowance of 227 L/cap/d (MOE, 1985) was applied to account for I/I. The Harmon Formula predicts the DWF PIF factor, exclusive of extraneous flows, experienced by a sewage system based on the size of the service population. As with the maximum day flow, the same peaking factor was applied to the STEP/STEG system as to the conventional collection system in Princeton.

The Harmon peaking factor was calculated based on the entire service population, and therefore depended on the specific servicing alternative. The Harmon peaking factor was calculated to be to be 3.8 for Alternative 1, Alternative 2, and Alternative 3, 3.5 for Alternative 4A and Alternative 5A, and 3.4 for Alternative 4B and Alternative 5B. By applying the Harmon peaking factor to the dry weather flow portion of the per capita flow (198 L/cap/d), and including an allowance for peak I/I flows of 227 L/cap/d (MOE, 1985), the overall design PIF generation rate was determined for each alternative.

The PIF generation rate and design service population for each service area was applied to determine the conceptual level design PIF for each alternative. The conceptual level design PIF values for each design alternative are presented in Table 2.5.

Table 2.5 Design Peak Instantaneous Flow to the Drumbo WWTP

	Projected ADF	PIF Factor	Projected PIF
Alternative 1 Design PIF	253 m^3/d	3.4	859 m^3/d
Alternative 2 / 3 Design PIF	322 m^3/d	3.4	1,096 m^3/d
Alternative 4A / 5A Design PIF	643 m^3/d	3.2	2,053 m^3/d
Alternative 4B / 5B Design PIF	946 m^3/d	3.1	2,956 m^3/d

The estimated future PIF is 859 m^3/d for Alternative 1 (servicing existing Drumbo population only), 1,096 m^3/d for Alternative 2 and Alternative 3 (servicing of existing and growth Drumbo population), 2,053 m^3/d for Alternative 4A and Alternative 5A (servicing of Drumbo and Princeton), and 2,956 m^3/d for Alternative 4B and Alternative 5B (servicing of Drumbo, Princeton, and the proposed new development in Princeton).

2.2 Design Raw Wastewater Characteristics and Loadings

Raw influent wastewater to the Drumbo WWTP enters into the trash tank where it is combined with tertiary filter backwash flow and waste activated sludge (WAS) from the SBRs. Waste solids which settle in the trash tank are pumped out as required and hauled to the Woodstock WWTP for stabilization. Combined wastewater flows from the trash tank to the SBR transfer tank, where it is pumped to the two reactors during the fill cycle. The raw influent sample for the Drumbo WWTP is collected at the trash tank immediately upstream of the transfer tank. As a result of plant operation, there is some uncertainty related to the existing loadings to the treatment plant.

It is important to note that historical TSS concentrations (91 mg/L) are well below typical TSS concentrations of low strength domestic wastewater (120 mg/L) (M&E, 2003). Relative to typical low strength domestic wastewater, results suggest that TSS removal due to settling in the trash tank and/or transfer tank has been historically observed at the Drumbo WWTP. It is expected that, as a result of settling solids in the raw influent stream and recycle streams, BOD_5 and TKN may also be subject to removal across the trash tank.

In order to develop a conservative design basis, the estimated TSS removal (approximately 24%) was applied to historical measured influent concentrations of BOD_5, TSS, and TKN to estimate the existing base loadings from the Drumbo WWTP service area. Design loadings associated with new growth and new services were determined based on the higher value of historical per capita loadings and typical per capita loadings presented in MOE Design Guidelines (2008) and Metcalf and Eddy (2014).

There is currently no collection system in Princeton or the proposed new development. As previously noted, it was assumed a STEP/STEG collection would be installed in these service areas. This type of collection system involves installation of preliminary treatment (i.e. a septic tank) at each wastewater connection prior to discharge to the collection system. Wastewater is transferred to the collection system using gravity flow (STEG) or by pumping (STEP).

Design loadings associated with future residential growth from the Community of Princeton and the proposed new development were determined based on typical STEP/STEG system effluent BOD_5 and TSS concentrations (Saunders *et al.*, WEFTEC, 2010). Design loadings for TKN and TP were based on typical raw wastewater per capita loadings presented in MOE Design Guidelines (2008) and Metcalf and Eddy (2014).

Table 2.6 present future design loadings in terms of BOD_5, TSS, TKN, and TP for the Drumbo service area. Table 2.7 presents the same information for the Community of Princeton and the proposed new development in Princeton. Table 2.8 summarizes the design loadings and concentrations for all alternatives. Wastewater characteristics for the service areas should be confirmed as part of the preliminary design of a new or expanded WWTP.

Table 2.6 Projected Design Loadings for the Drumbo Service Area

Source	Design Value			
	BOD_5	TSS	TKN	TP
New Growth Design Value	75 g/cap·d (2)	90 g/cap·d (2)	13.2 g/cap·d (3)	2.1 g/cap·d (3)
Alternative 1 (Existing Service Area Loading)	43.4 kg/d (4)	30.6 kg/d (4)	10.7 kg/d (4)	1.0 kg/d
New Growth Loading (1)	18.2 kg/d	21.8 kg/d	3.2 kg/d	0.5 kg/d
Alternative 2 / 3 (Total Design Loading - Drumbo Service Area)	61.6 kg/d	52.4 kg/d	13.9 kg/d	1.5 kg/d

Notes:
1. Based on an estimated service population growth of 242 people.
2. MOE Design Guidelines (2008).
3. Metcalf and Eddy (2014).
4. Adjusted to account for possible settling in the trash tank.

Table 2.7 Projected Design Loadings for the Princeton and Proposed New Development Service Areas

Source	Design Value			
	BOD_5	TSS	TKN	TP
Design Value with Pre-treatment (STEP/STEG)	125 mg/L (1)	30 mg/L (1)	13.2 g/cap·d (2)	2.1 g/cap·d (2)
Alternative 4A / 5A (3) (Princeton – STEP/STEG)	40.3 kg/d	9.7 kg/d	14.7 kg/d	2.3 kg/d
Alternative 4B / 5B 4 (4) (Princeton/New Development – STEP/STEG)	78.1 kg/d	18.7 kg/d	28.6 kg/d	4.5 kg/d

Notes:
1. Based on typical STEG/STEP system effluent concentrations (Saunders et al., 2010).
2. Metcalf and Eddy (2014).
3. Based on a design ADF of 321 m^3/d, a design population of 1,113 persons, and typical STEG/STEP effluent quality.
4. Based on a design ADF of 624 m^3/d, a design population of 2,166 persons, and typical STEG/STEP effluent quality.

Table 2.8 Summary Projected Design Loadings and Concentrations

	Design Value			
	BOD_5	TSS	TKN	TP
Alternative 1 - Drumbo Existing Population Only	43.4 kg/d (171 mg/L)	30.6 kg/d (120 mg/L)	10.7 kg/d (42.3 mg/L)	1.0 kg/d (3.95 mg/L)
Alternative 2 / 3 - Drumbo Existing and Growth Population	61.6 kg/d (191 mg/L)	52.4 kg/d (162 mg/L)	13.9 kg/d (43.0 mg/L)	1.5 kg/d (4.7 mg/L)
Alternative 4A / 5A - Drumbo and Princeton Servicing	101 kg/d (157 mg/L)	62.0 kg/d (96 mg/L)	28.6 kg/d (44.3 mg/L)	3.8 kg/d (6.0 mg/L)
Alternative 4B / 5B - Drumbo, Princeton, and proposed new development Servicing	139 kg/d (147 mg/L)	71.1 kg/d (75.1 mg/L)	42.4 kg/d (44.8 mg/L)	6.1 kg/d (6.4 mg/L)
Notes: Estimated concentrations shown in parentheses.				

2.3 Summary of Design Basis

Table 2.9 summarizes the design raw wastewater flows, based on growth projections, for each servicing scenario. Table 2.10 summarizes the overall design raw wastewater loadings and concentrations projected to the Drumbo WWTP for each servicing scenario.

Table 2.9 Summary of Design Flows

Parameter	Design Value			
	Alternative 1	Alternative 2 / 3	Alternative 4A / 5A	Alternative 4B / 5B
ADF	253 m^3/d	322 m^3/d	643 m^3/d	947 m^3/d
MDF Factor	2.6	2.4	2.1	2.0
MDF	664 m^3/d	789 m^3/d	1,368 m^3/d	1,913 m^3/d
PIF Factor	3.4	3.4	3.2	3.1
PIF	859 m^3/d	1,096 m^3/d	2,053 m^3/d	2,956 m^3/d

Table 2.10 Summary of Design Raw Wastewater Quality

Parameter	Design Value			
	Alternative 1	Alternative 2 / 3	Alternative 4A / 5A	Alternative 4B / 5B
BOD_5	43.4 kg/d (171 mg/L)	61.5 kg/d (191 mg/L)	101 kg/d (157 mg/L)	139 kg/d (147 mg/L)
TSS	30.6 kg/d (120 mg/L)	52.4 kg/d (163 mg/L)	62.0 kg/d (96.4 mg/L)	71.1 kg/d (75.1 mg/L)
TKN	10.7 kg/d (42.3 mg/L)	13.8 kg/d (42.8 mg/L)	28.5 kg/d (44.3 mg/L)	42.4 kg/d (44.8 mg/L)
TP	1.0 kg/d (3.95 mg/L)	1.5 kg/d (4.7 mg/L)	3.8 kg/d (6.0 mg/L)	6.1 kg/d (6.4 mg/L)

2.4 Design Effluent Requirements

Final effluent quality objectives and compliance limits will depend on the characteristics of the effluent receiver. For design alternatives which consider the construction of a new treatment plant at a new site (Alternatives 3, 5A, and 5B), the effluent receiver has not yet been selected, and will depend on the plant site location and available receivers nearby (one possible effluent receiver is the Nith River). Final effluent quality requirements will be determined after an assimilative capacity study conducted on the selected effluent receiver

For design alternatives which maintain the existing treatment plant site (Alternatives 1, 2, 4A, and 4B), it is assumed effluent will continue to be discharged to the Cowan Drain. Projected final effluent quality objectives and compliance limits for these alternatives were developed using an assessment of background water quality and flows in the Cowan Drain. The approach used in this assessment is consistent with the approach typically used to complete assimilative capacity studies to support the development of effluent requirements for WWTP expansions. However, the results of this assessment have not been submitted to the MOECC for review or approval.

Based on the results of the water quality sampling program, the receiver is Policy 2 with respect to TP and un-ionized ammonia. As a result, effluent TP loading cannot exceed the current ECA loading limits. In addition, to address un-ionized ammonia, it was assumed that the existing ECA's seasonal TAN loading limits would apply for all scenarios. In addition, the receiver is Policy 2 for *E. coli* at one of the two monitoring sites. Therefore, to not further degrade receiver quality, effluent *E. coli* must be at or below the Provincial Water Quality Objective (PWQO) of 200 cfu/100 mL.

The receiver is Policy 1 with respect to dissolved oxygen and BOD_5. Since the facility will likely continue to have a dissolved oxygen requirement, and given the low BOD_5 concentrations in the receiver, the existing BOD_5 objective and limit were carried forward for all scenarios. There is no PWQO for TSS. The existing TSS objective and limit are generally lower than concentrations observed in the receiving stream and, therefore, these existing values were carried forward for all scenarios.

A summary of the proposed effluent objectives and limits for each servicing scenario is given in Table 2.11 and Table 2.12, respectively. Conceptual level designs for the expanded Drumbo WWTP were developed to meet the proposed effluent objectives.

Table 2.11 Projected Design Effluent Compliance Objective Concentrations for Discharge to Cowan Drain

Effluent Parameter	Scenario 1	Scenario 2 & 3	Scenario 4 & 5
$cBOD_5$ (mg/L)	4.7		
TSS (mg/L)	4.7		
TP (mg/L)	0.25	0.13	0.09
TAN (May 1 – Oct. 31) (mg/L)	1.7	0.8	0.6
TAN (Nov. 1 – Apr. 30) (mg/L)	3.3	1.7	1.1
E. Coli (CFUs/100 mL)	< 150		
Dissolved Oxygen (mg/L)	> 6		
pH	6.5 – 8.5 (inclusive)		

Table 2.12 Projected Design Effluent Compliance Limits for Discharge to Cowan Drain

Effluent Parameter	Scenario 1	Scenario 2 & 3	Scenario 4 & 5
$cBOD_5$ Concentration (mg/L) Load (kg/d)	9.3 (3.0)	9.3 (6.0)	9.3 (8.0)
TSS Concentration (mg/L) Load (kg/d)	9.3 (3.0)	9.3 (6.0)	9.3 (8.0)
TP Concentration (mg/L) Load (kg/d)	0.43 (0.14)	0.22 (0.14)	0.15 (0.14)
TAN (May 1 – Oct. 31) Concentration (mg/L) Load (kg/d)	2.5 (0.8)	1.2 (0.8)	0.8 (0.8)
TAN (Nov. 1 – Apr. 30) Concentration (mg/L) Load (kg/d)	4.2 (1.36)	2.1 (1.36)	1.4 (1.36)
E. Coli (CFUs/100 mL)	< 200		
Dissolved Oxygen (mg/L)	> 5		
pH	6.0 – 9.5 (inclusive)		

3. REFERENCES

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September 16, 2016
FINAL DRAFT V3

DRUMBO WASTEWATER TREATMENT PLANT CLASS ENVIRONMENTAL ASSESSMENT TECHNICAL MEMORANDUM 3 EVALUATION PROCESS

Prepared for:

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TABLE OF CONTENTS

TABLES

1. INTRODUCTION

1.1 Background

Oxford County's ("the County") Drumbo Wastewater Treatment Plant (WWTP) provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP is a Sequencing Batch Reactor (SBR) facility with tertiary filtration and ultraviolet disinfection and has an approved average day flow (ADF) capacity of 300 m^3/d.

The County is currently undertaking a Class Environment Assessment (Class EA) study to identify the most cost effective and environmentally sustainable approach to providing wastewater treatment to meet the future needs of the Community of Drumbo. Further, the County wishes to evaluate the potential to treat additional flow from the nearby Community of Princeton and from a proposed new residential development within the Community of Princeton at the Drumbo WWTP.

XCG Consulting Limited (XCG) has been retained by the County to provide engineering support through the Class EA process.

1.2 Objective

The objective of this Technical Memorandum (TM) is to present the alternative solutions that will be considered to meet the Opportunity Statement developed for the Drumbo WWTP Class EA, and to summarize the process that will be used and the criteria by which the Drumbo WWTP alternative solutions will be evaluated.

2. EVALUATION PROCESS

2.1 Alternatives Being Considered

Five alternatives, with two sub-alternatives (a total of seven alternative solutions) are being considered to meet the Opportunity Statement that has been developed for the Drumbo WWTP Class EA. These alternatives are presented in Table 2.1.

Table 2.1 Summary of Alternative Solutions

Alternative Number	Description
1. Do Nothing	No additional wastewater treatment capacity would be provided for Drumbo and no treatment of Princeton wastewater at the Drumbo WWTP.
2. Service Drumbo at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service the planned growth in Drumbo. No treatment of Princeton wastewater would be provided at the Drumbo WWTP.
3. Service Drumbo at a new Drumbo WWTP at a new site	A new Drumbo WWTP would be constructed at a new site to service Drumbo. The existing Drumbo WWTP would be decommissioned. No treatment of Princeton wastewater would be provided at the new Drumbo WWTP.
4A/4B. Service Drumbo and Princeton at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service the planned growth in Drumbo and the community of Princeton, excluding (4A) or including (4B) the proposed new development units in Princeton (324 units).
5A/5B. Service Drumbo and Princeton at a new Drumbo WWTP at a new site	A new Drumbo WWTP would be constructed at a new site to service Drumbo and the community of Princeton, excluding (5A) or including (5B) the proposed new development units in Princeton (324 units). The existing Drumbo WWTP would be decommissioned.

Projected flows and loads for each of the alternative solutions were developed and presented in TM2. This TM establishes the evaluation criteria which will be used to form the foundation for evaluating the servicing options.

2.2 Evaluation Criteria

The evaluation criteria that will be used to evaluate the alternative solutions are presented in Table 2.2.

Table 2.2 Evaluation Criteria

EA Categories	Criteria	Description
Technical	Satisfaction of objectives	• Meets the Problem/Opportunity Statement established for the Drumbo WWTP Class EA
	Consistent with the County's policies, guidelines, standards, and Strategic Plan	• Addresses compliance with the County's Strategic Plan, planning policies, guidelines and standards
	Technical feasibility	• Ease of implementation • Constructability • Operational capability • Potential for phased construction • Ability to meet projected future effluent limits
	System complexity	• Operational requirements for existing, new, and retrofitted infrastructure (plant and collection system) • Operator familiarity with collection system/plant treatment technology
	Sustainability	• Energy usage • Impact on investments in infrastructure already made
Environmental	Surface water impacts	• Potential impacts on surface water resources • Assimilative capacity of receiver
	Groundwater impacts	• Potential (positive or negative) impacts on groundwater quality and quantity • Compliant with Grand River Source Water Protection Plan
	Impacts on the natural environment	• Greater potential for impacts on the natural environment if additional lands required for facility construction
Social	Community impacts	• Potential noise, dust, odour, traffic, etc. impacts on adjacent land owners and users during construction • Potential noise, dust, odour, traffic, etc. impacts on adjacent land owners and users during operations • Time required for construction.
	Impact on Archaeological and Heritage Resources	• Greater potential for impacts on archaeological and heritage resources if additional lands required for facility construction
Financial	Capital Cost	• Total capital cost of alternative • Capital cost per existing lot • Impact on Development Charges • Impact on County Servicing Assistance Program (CSAP) • Land acquisition costs
	Operating and Maintenance (O&M) Costs	• Total annual O&M cost • O&M costs per lot
	Life cycle Cost	• Net present value life cycle cost of alternative
	Financial Risk	• Risk to the County to incur debt if new units are not developed and Development Charges are not collected. • Risk of increase in user fees if new units are not developed.

2.3 Evaluation Methodology

Each of the alternative solutions will be evaluated against each criterion using the following general methodology:

1. For each criterion, alternatives will be evaluated as:
   - ○ No impact. Lowest cost.
   - ◔ Negligible impact.
   - ◑ Minor impact.
   - ◕ Moderate impact.
   - ● Major impact. Highest cost.
2. All EA categories will be considered to have equal weight.
3. Based on the results of the evaluation, options will be ranked from most preferred to least preferred.

Table 2.3 presents an evaluation matrix that will be used to evaluate the alternatives and rank each alternative to determine the least and most preferred alternative.

Table 2.3 Evaluation Matrix

Alternative	Criteria													
	Technical					Environmental			Social		Financial			
	Satisfaction of Objectives	Consistent with the County's policies, guidelines, standards, and Strategic Plan	Technical Feasibility	System Complexity	Sustainability	Surface Water Impacts	Groundwater Impacts	Impacts on the Natural Environment	Community Impacts	Impact on Archaeological and Heritage Resources	Capital Cost	O&M Cost	Life Cycle Cost	Financial Risk
1: Do Nothing														
2: Service Drumbo at an expanded Drumbo WWTP														
3: Service Drumbo at a new Drumbo WWTP at a new site														
4A: Service Drumbo and Princeton, excluding the proposed new development in Princeton, at an expanded Drumbo WWTP														
4B: Service Drumbo and Princeton, including the proposed new development in Princeton, at an expanded Drumbo WWTP														
5A: Service Drumbo and Princeton, excluding the proposed new development in Princeton, at a new Drumbo WWTP at a new site														
5B: Service Drumbo and Princeton, including the proposed new development in Princeton, at a new Drumbo WWTP at a new site														

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FINAL DRAFT V03

DRUMBO WASTEWATER TREATMENT PLANT
CLASS ENVIRONMENTAL ASSESSMENT
TECHNICAL MEMORANDUM 4
EVALUATION OF ALTERNATIVE SOLUTIONS

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TABLE OF CONTENTS

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The County is currently undertaking a Schedule C Class Environment Assessment (Class EA) to identify the most cost effective and environmentally sustainable approach to providing wastewater treatment to meet the future needs of the Community of Drumbo. Further, the County wishes to evaluate the potential to treat additional flow from the nearby Community of Princeton and from a proposed new residential development within the Community of Princeton.

XCG Consulting Limited (XCG) has been retained by the County to provide engineering support through the Class EA process.

1.2 Objectives

On September 12 2016, staff from the County and the Consulting Team held a workshop to evaluate the potential alternative solutions which have been developed to meet the Class EA Problem/Opportunity Statement. The objective of this Technical Memorandum (TM4) is to present the results from the workshop and to identify a preliminary preferred alternative solution.

2. ALTERNATIVE SOLUTIONS

Five alternative solutions with two sub-alternatives (a total of seven alternative solutions) are being considered to meet the Problem/Opportunity Statement that has been developed for the Drumbo WWTP Class EA. These alternatives are presented in Table 1 and were discussed in more detail in TM3 (XCG, 2016).

Table 1 Summary of Alternative Solutions

Alternative Number	Description
1. Do Nothing	No additional wastewater treatment capacity would be provided for Drumbo and no treatment of Princeton wastewater at the Drumbo WWTP.
2. Service Drumbo at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service the planned growth in Drumbo. No treatment of Princeton wastewater would be provided at the Drumbo WWTP.
3. Service Drumbo at a new Drumbo WWTP at a new site (1)	A new Drumbo WWTP would be constructed at a new site to service Drumbo. The existing Drumbo WWTP would be decommissioned. No treatment of Princeton wastewater would be provided at the new Drumbo WWTP.
4A/4B. Service Drumbo and Princeton at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service the planned growth in Drumbo and the community of Princeton, excluding (4A) or including (4B) the proposed 324-unit development in Princeton.
5A/5B. Service Drumbo and Princeton at a new Drumbo WWTP at a new site (1)	A new Drumbo WWTP would be constructed at a new site to service Drumbo and the community of Princeton, excluding (5A) or including (5B) the proposed 324-unit development in Princeton. The existing Drumbo WWTP would be decommissioned.

Notes

1. Alternatives which consider the construction of a new WWTP at a new site may require upgrades to the existing Drumbo WWTP in the interim to maintain plant operation and effluent quality.

3. EVALUATION OF ALTERNATIVE SOLUTIONS

Alternative solutions were evaluated based on their impacts in four categories: Technical, Environmental, Social and Financial. Each category consists of several evaluation criteria. A detailed description of the evaluation methodology and criteria is included in TM3 (XCG, 2016).

3.1 General Considerations

Some general discussion has been provided below for several criteria to explain how alternative solutions were evaluated.

3.1.1 Criteria: Satisfaction of Objectives

As presented at Public Consultation Centre (PCC) No.1, the Problem/Opportunity Statement for the Drumbo WWTP Class EA is as follows:

> "Develop a wastewater servicing plan for the Community of Drumbo that is environmentally responsible, socially acceptable, and economically sustainable to accommodate existing and future development in the Community to at least 2036. The Drumbo WWTP Class EA will also consider the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP."

As such, the primary project objective is to provide wastewater servicing for future planned growth in the Community of Drumbo, and the secondary objective is to service the Community of Princeton. Alternative 1 ("Do Nothing") does not satisfy the Problem/Opportunity Statement as it would not accommodate growth in either community. As such, it does not meet the needs of the County, and was eliminated from consideration as an Alternative Solution.

3.1.2 Criteria: Consistent with the County's policies, guidelines, standards, and Strategic Plan

Drumbo is designated as a 'Serviced Village' in the Oxford County Official Plan (OP) Settlement Strategy Plan (Schedule C3). Servicing of Drumbo is consistent with the Oxford County OP and Growth Management Strategy which state that the majority of growth will be directed to settlements with centralized wastewater facilities. The Oxford County Strategic Plan also states that the County must maintain and strengthen the core infrastructure and adapt services and facilities to reflect evolving community needs.

According to the County Planning Office, the existing settlement designation 'Village' and the boundary for Princeton in the Oxford County OP were established on the basis of development on private or partial services. If Princeton were to be fully serviced, the OP policies would need to be amended to change the designation of the settlement from 'Village' to 'Serviced Village.' As part of this process, a secondary plan would be required which would include the establishment of a new settlement boundary that is reflective of the reduced land area that would be required to accommodate the Village's previous planned growth potential on full municipal services.

Attachments to a November 2015 Council Report note that:

> "the request for additional development is premature as Princeton is not recognized as a serviced community in the Oxford County OP. A plan is set out to review this situation as part of the next Official Plan review as it relates to the 'bigger picture' development for the Township" (PW 2015-63).

The OP review is also referenced in a May 2015 Council Report which notes that:

> "the Community and Strategic Planning Office and Public Works will also review and evaluate servicing options for Princeton during future reviews of the Official Plan (OP) in approximately five (5) years to consider where development will occur in the Township of Blandford-Blenheim. This process will then guide future servicing for the growth centres in the Township" (PW 2015-25).

The November 2015 report further notes that:

> "growth is to be directed to designated settlement areas, particularly fully serviced villages such as Drumbo and Plattsville. There is currently an over-supply of residential lands within the Township to accommodate the projected growth over the 20-year planning period" (PW 2015-63).

As such, all alternatives which provide wastewater servicing to Drumbo to accommodate future growth were considered to be consistent with the Oxford County OP and Growth Management Strategy. Conversely, alternatives which provide wastewater servicing to Princeton were considered to be inconsistent with the Oxford County OP and Growth Management Strategy.

3.1.3 Criteria: Financial Risk

As detailed in TM3, the Financial Category evaluates capital and operation and maintenance (O&M) costs for each alternative solution. For purposes of this report, O&M costs for the treatment plant, the collection system, and for conveyance of flows to a new treatment plant were considered, where applicable.

Capital costs for the expansion of the Drumbo WWTP will be funded initially by the County and partially recovered through Development Charges levied on new lots as they are constructed. However, Development Charges can only be collected from lots which are developed and sold. As such, the County assumes financial risk by planning and constructing for treatment plant capacity which may not be realized. The financial risk can be mitigated to some degree by phasing the construction of capital works, but cannot be eliminated. Some components of the works, such as collection systems components, plant control rooms, and plant outfalls, cannot be easily phased.

The level of financial risk to the County for each alternative was evaluated by considering the size of development under consideration, the status of the development, and the consistency of the proposed growth with existing County policies. By these factors, additional development in Drumbo and infill growth in Princeton was determined to have a relatively low financial risk. Conversely, proposed new development in Princeton has not currently been approved, and is inconsistent with existing County planning policies. Therefore, options that provide servicing to the new development in Princeton were deemed to be a significant financial risk to the County.

O&M costs are comprised of several factors including, but not limited to: utility costs, replacement costs, chemical costs, and labour costs. A portion of these costs are directly related to the volume of wastewater treated in the system. As with capital costs, high O&M costs can be partially mitigated by phasing; however, some of the O&M costs will be incurred regardless of the treated volume or service population.

Table 2 presents a summary of annual estimated O&M costs per lot for each alternative. For purposes of comparison, the table presents the annual estimated O&M costs assuming all proposed developments for each alternative are fully completed, and assuming there is no development of any proposed growth for each alternative. The "no development' costs are considered a "worst case" as these assume that the full capital and O&M costs will be incurred even if no development occurs.

Table 2 Summary of Annual O&M Costs per Lot

Alternative Number	SBR		MBR	
	Full Development	No Development	Full Development	No Development
1. Do Nothing	- Does not meet the objectives of the Problem/Opportunity Statement, therefore was not considered further.			
2. Service Drumbo at an expanded Drumbo WWTP	$525	$670	$658	$840
3. Service Drumbo at a new Drumbo WWTP at a new site	$601	$766	$734	$936
4A. Service Drumbo and Princeton at an expanded Drumbo WWTP **excluding** proposed 324-unit development in Princeton	- (1)	- (1)	$986	$1,339
4B: Service Drumbo and Princeton at an expanded Drumbo WWTP **including** proposed 324-unit development in Princeton	- (1)	- (1)	$998	$1,979
5A: Service Drumbo and Princeton at a new Drumbo WWTP at a new site **excluding** proposed 324-unit development in Princeton	$898	$1,220	$986	$1,339
5B: Service Drumbo and Princeton at a new Drumbo WWTP at a new site **including** proposed 324-unit development in Princeton	$929	$1,842	$998	$1,979

Notes:
1. Previously studied for purposes of the Drumbo WWTP Feasibility Study of Alternative Expansion Options (XCG, 2016). Determined to be infeasible due to the space available on the existing site for purposes of plant expansion.

Costs presented in Table 2 suggest that the estimated annual O&M costs per lot may increase between 27% and 98% if the planned development for each alternative is not fully completed. As previously discussed, the County will be responsible for constructing and operating the treatment system to accommodate future development in the Community of Drumbo and the Community of Princeton. Costs incurred by the

County for the operation and maintenance of the treatment system will be covered by users of the system.

3.2 Results of Evaluation of Alternative Solutions

The results of the alternatives evaluation and conceptual level cost information for each alternative solution are summarized in Tables 3, 4, and 5. Table 6 presents the ratings assigned to each alternative based on the evaluation methodology presented in TM3.

Table 3 Technical Evaluation Matrix

Alternative	Technical				
	Satisfaction of objectives (1)	**Consistent with the County's policies, guidelines, standards, and Strategic Plan (2)**	**Technical Feasibility**	**System Complexity**	**Sustainability**
1: Do Nothing	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth. - Does not meet the needs of the County and was, therefore, not considered further.				
2: Service Drumbo at an expanded Drumbo WWTP	- Projected 20 year growth in Drumbo is accommodated. - No servicing provided to Princeton.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - No servicing provided to Princeton.	- Source water protection restrictions and residential buffer requirements may impact onsite expansion of Drumbo WWTP. - Careful planning required to maintain treatment capacity during plant expansion.	- Most comparable to size/operational complexity of existing treatment plant.	- Smallest expansion, best use of existing infrastructure. - Low relative energy consumption at plant in part due to reduced pumping requirements.
3: Service Drumbo at a new Drumbo WWTP at a new site	- Projected 20 year growth in Drumbo is accommodated. - No servicing provided to Princeton.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - No servicing provided to Princeton.	- Construction at new site has no impact on operation of existing Drumbo WWTP.	- New treatment plant requires some additional infrastructure (i.e., forcemain, outfall).	- New plant does not allow for reuse of existing plant infrastructure and increases pumping requirements. - Low relative energy consumption at plant.
4A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at an expanded Drumbo WWTP	- Projected 20 year growth in Drumbo is accommodated. - Existing Princeton population is serviced.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - Existing Princeton population is serviced, although Princeton not identified as a "Serviced Village" in Oxford County OP.	- Source water protection restrictions and residential buffer requirements may impact onsite expansion of Drumbo WWTP. - Potential constructability issues to convert to an MBR treatment process while maintaining existing treatment capacity.	- Requires new collection system in Princeton and new forcemain to the Drumbo WWTP. - MBR treatment process, required for this alternative, is new technology for the County.	- Potential to reuse existing plant infrastructure. - Forcemain to convey Princeton wastewater to Drumbo WWTP increases pumping requirements. - Higher flows, therefore greater relative energy consumption.
4B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at an expanded Drumbo WWTP (3)	- Projected 20 year growth in Drumbo is accommodated. - Existing and future growth in Princeton is serviced.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - Existing and potential future Princeton population is serviced, although Princeton not identified as a "Serviced Village" in Oxford County OP.	- Source water protection restrictions and residential buffer requirements may impact onsite expansion of Drumbo WWTP. - Potential constructability issues to convert to an MBR treatment process while maintaining existing treatment capacity.	- Requires new collection system in Princeton and new forcemain to the Drumbo WWTP. - MBR treatment process, required for this alternative, is new technology for the County.	- Potential to reuse existing plant infrastructure. - Forcemain to convey Princeton wastewater to Drumbo WWTP increases pumping requirements. - Highest flows, therefore greatest relative energy consumption.
5A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at a new Drumbo WWTP at a new site	- Projected 20 year growth in Drumbo is accommodated. - Existing Princeton population is serviced.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - Existing Princeton population is serviced, although Princeton not identified as a "Serviced Village" in Oxford County OP.	- Construction at new site has no impact on operation of existing Drumbo WWTP.	- Requires new collection system in Princeton and new forcemain to a new WWTP. - Assumed new plant (either MBR or SBR) designed to minimize system complexity.	- New plant does not allow for reuse of existing plant infrastructure. - Forcemain to convey Princeton wastewater to Drumbo WWTP increases pumping requirements. - Higher flows, therefore greater relative energy consumption.
5B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at a new Drumbo WWTP at a new site (3)	- Projected 20 year growth in Drumbo is accommodated. - Existing and future growth in Princeton is serviced.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - Existing and potential future Princeton population is serviced, although Princeton not identified as a "Serviced Village" in Oxford County OP.	- Construction at new site has no impact on operation of existing Drumbo WWTP.	- Requires new collection system in Princeton and new forcemain to a new WWTP. - Assumed new plant (either MBR or SBR) designed to minimize system complexity.	- New plant does not allow for reuse existing infrastructure. - Forcemain to convey Princeton wastewater to Drumbo WWTP increases pumping requirements. - Highest flows, therefore greatest relative energy consumption.

Notes:
1. Primary project objective is to provide wastewater servicing for the projected 20 year planned growth in the Community of Drumbo. Secondary objective is to service Community of Princeton.
2. Drumbo is designated as a 'Serviced Village' in the Oxford County Official Plan (OP) Settlement Strategy Plan (Schedule C3). Servicing of Drumbo is consistent with the Oxford County OP and Growth Management Strategy which state that the majority of growth will be directed to settlements with centralized wastewater facilities. The Oxford County Strategic Plan also states that the County must maintain and strengthen the core infrastructure and adapt services and facilities to reflect evolving community needs.
3. Further planning approvals would be required prior to the development of the additional units in Princeton, included in Alternatives 4B and 5B. As part of this process, a secondary plan would have to be prepared to establish a new settlement boundary that is reflective of the reduced land area that would be required to accommodate the Village's planned growth potential on full municipal services.

Table 4 Environmental/Social Evaluation Matrix

Alternative	Environmental			Social	
	Surface Water Impacts	**Groundwater Impacts**	**Impacts on the Natural Environment**	**Community Impacts**	**Impacts on Archaeological and Heritage Resources**
1: Do Nothing	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth. - Does not meet the needs of the County and was, therefore, not considered further.				
2: Service Drumbo at an expanded Drumbo WWTP	- Proposed discharge location (Cowan Drain) assumed to have relatively less assimilative capacity.	- Proposed onsite expansion within the wellhead protection area of a production well servicing the communities of Drumbo and Princeton.	- Proposed expansion within existing site boundary. - No impacts on the natural environment are anticipated at expanded Drumbo WWTP.	- Minor noise and dust impacts on adjacent residents and landowners during construction of expanded Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices. - No change over existing conditions anticipated with operation of expanded Drumbo WWTP.	- Proposed expansion within existing site boundary. - No impacts on archaeological and heritage resources anticipated at expanded Drumbo WWTP.
3: Service Drumbo at a new Drumbo WWTP at a new site	- Proposed discharge location (Nith River) assumed to have relatively greater assimilative capacity.	- Assumed that new WWTP site would not be within a wellhead protection area and that facility construction and operation would minimize impact on groundwater resources.	- Greater potential for impacts on natural environment at a new WWTP site. - Any impacts on natural environment would be minimized through selection of site for new WWTP and implementation of appropriate mitigation measures, although some displacement impacts may remain. - Forcemain to connect to new Drumbo WWTP would be constructed within existing road allowance, minimizing impacts on the natural environment. - Some potential impacts on the natural environment along new outfall to Nith River.	- Assumed that new WWTP site is selected to minimize impacts on adjacent residents and landowners. - Potential for short-term noise and dust impacts on adjacent residents and landowners during construction of new Drumbo WWTP and forcemain to new Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices. - Assumed any potential impacts during WWTP operations (e.g., odour) can be mitigated.	- Greater potential for impacts on archaeological and heritage resources at a new WWTP site. - Any impacts on archaeological and heritage resources would be minimized through implementation of appropriate mitigation measures. - Forcemain to connect to new Drumbo WWTP would be constructed within existing road allowance, minimizing impacts on archaeological and heritage resources. - Some potential impacts on the natural environment along new outfall to Nith River.
4A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at an expanded Drumbo WWTP	- Proposed discharge location (Cowan Drain) assumed to have relatively less assimilative capacity.	- Proposed onsite expansion within the wellhead protection area of a production well servicing the communities of Drumbo and Princeton. - Providing wastewater service to Princeton will eliminate reliance on septic systems, thereby improving groundwater quality.	- Proposed expansion within existing site boundary. - No impacts on the natural environment are anticipated at expanded Drumbo WWTP. - Collection system in Princeton and forcemain to connect to Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on the natural environment.	- Minor noise and dust impacts on adjacent residents and landowners during construction of expanded Drumbo WWTP, collection system in Princeton and forcemain to connect to Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices. - No change over existing conditions anticipated with operation of expanded Drumbo WWTP.	- Proposed expansion within existing site boundary. - No impacts on archaeological and heritage resources anticipated at expanded Drumbo WWTP. - Collection system in Princeton and forcemain to connect to Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on archaeological and heritage resources.
4B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at an expanded Drumbo WWTP (1)	- Proposed discharge location (Cowan Drain) assumed to have relatively less assimilative capacity.	- Proposed onsite expansion within the wellhead protection area of a production well servicing the communities of Drumbo and Princeton. - Providing wastewater service to Princeton will eliminate reliance on septic systems, thereby improving groundwater quality.	- Proposed expansion within existing site boundary. - No impacts on the natural environment are anticipated at expanded Drumbo WWTP. - Collection system in Princeton and forcemain to connect to Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on the natural environment.	- Minor noise and dust impacts on adjacent residents and landowners during construction of expanded Drumbo WWTP, collection system in Princeton and forcemain to connect to Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices. - No change over existing conditions anticipated with operation of expanded Drumbo WWTP.	- Proposed expansion within existing site boundary. - No impacts on archaeological and heritage resources anticipated at expanded Drumbo WWTP. - Collection system in Princeton and forcemain to connect to Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on archaeological and heritage resources.

Table 4 Environmental/Social Evaluation Matrix cont'd

Alternative	Environmental			Social	
	Surface Water Impacts	**Groundwater Impacts**	**Impacts on the Natural Environment**	**Community Impacts**	**Impacts on Archaeological and Heritage Resources**
5A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at a new Drumbo WWTP at a new site	- Proposed discharge location (Nith River) assumed to have relatively greater assimilative capacity.	- Assumed that new WWTP site would not be within a wellhead protection area and that facility construction and operation would minimize impact on groundwater resources. - Providing wastewater service to Princeton will eliminate reliance on septic systems, thereby improving groundwater quality.	- Greater potential for impacts on natural environment at a new WWTP site. - Any impacts on natural environment would be minimized through selection of site for new WWTP and implementation of appropriate mitigation measures, although some displacement impacts may remain. - Collection system in Princeton and forcemain to connect to Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on the natural environment. - Some potential impacts on the natural environment along new outfall to Nith River.	- Assumed that new WWTP site is selected to minimize impacts on adjacent residents and landowners. - Potential for short-term noise and dust impacts on adjacent residents and landowners during construction of new Drumbo WWTP, collection system in Princeton and forcemain to new Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices - Assumed any potential impacts during WWTP operations (e.g., odour) can be mitigated.	- Greater potential for impacts on archaeological and heritage resources at a new WWTP site. - Any impacts on archaeological and heritage resources would be minimized through implementation of appropriate mitigation measures. - Collection system in Princeton and forcemain to connect to new Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on archaeological and heritage resources. - Some potential impacts on the natural environment along new outfall to Nith River.
5B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at a new Drumbo WWTP at a new site (1)	- Proposed discharge location (Nith River) assumed to have relatively greater assimilative capacity.	- Assumed that new WWTP site would not be within a wellhead protection area and that facility construction and operation would minimize impact on groundwater resources. - Providing wastewater service to Princeton will eliminate reliance on septic systems, thereby improving groundwater quality.	- Greater potential for impacts on natural environment at a new WWTP site. - Any impacts on natural environment would be minimized through selection of site for new WWTP and implementation of appropriate mitigation measures, although some displacement impacts may remain. - Collection system in Princeton and forcemain to connect to new Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on the natural environment. - Some potential impacts on the natural environment along new outfall to Nith River.	- Assumed that new WWTP site is selected to minimize impacts on adjacent residents and landowners. - Potential for short-term noise and dust impacts on adjacent residents and landowners during construction of new Drumbo WWTP, collection system in Princeton and forcemain to new Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices. - Assumed any potential impacts during WWTP operations (e.g., odour) can be mitigated.	- Greater potential for impacts on archaeological and heritage resources at a new WWTP site. - Any impacts on archaeological and heritage resources would be minimized through implementation of appropriate mitigation measures. - Collection system in Princeton and forcemain to connect to new Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on archaeological and heritage resources. - Some potential impacts on the natural environment along new outfall to Nith River.

Notes:
1. Further planning approvals would be required prior to the development of the additional units in Princeton, included in Alternatives 4B and 5B. As part of this process, a secondary plan would have to be prepared to establish a new settlement boundary that is reflective of the reduced land area that would be required to accommodate the Village's planned growth potential on full municipal services.

Table 5 Financial Evaluation Matrix

Alternative	Capital Cost (4) SBR	Capital Cost (4) MBR	Yearly O&M Cost SBR	Yearly O&M Cost MBR	Yearly O&M Cost per Lot (3) SBR	Yearly O&M Cost per Lot (3) MBR	Life Cycle Cost SBR	Life Cycle Cost MBR	Financial Risk
1: Do Nothing	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth. - Does not meet the needs of the County and was, therefore, not considered further.								
2: Service Drumbo at an expanded Drumbo WWTP	$3.06 M	$5.94 M	$209,000	$262,000	$525 ($670)	$658 ($840)	$6.73 M	$10.53 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - No barriers were identified which may restrict future development. - Relatively low financial risk.
3: Service Drumbo at a new Drumbo WWTP at a new site	$7.80 M	$9.44 M	$239,000	$292,000	$601 ($766)	$734 ($936)	$11.99 M	$14.56 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - No barriers were identified which may restrict future development. - Relatively low financial risk.
4A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at an expanded Drumbo WWTP	- (1)	$12.45 M	- (1)	$695,000	- (1)	$986 ($1,339)	- (1)	$24.63 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - Infill growth in Princeton is not defined, but represents a modest increase from estimated existing wastewater flows. - Moderate financial risk.
4B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at an expanded Drumbo WWTP (2)	- (1)	$13.93 M	- (1)	$1,027,000	- (1)	$998 ($1,979)	- (1)	$31.93 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - Infill growth in Princeton is not defined, but represents a modest increase from estimated existing wastewater flows. - Additional proposed growth in Princeton represents a significant increase from estimated existing wastewater flows, is not consistent with the current growth strategy for the Community, and has not been approved. - Significant financial risk.
5A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at a new Drumbo WWTP at a new site	$13.86 M	$15.20 M	$633,000	$695,000	$898 ($1,220)	$986 ($1,339)	$24.96 M	$27.38 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - Infill growth in Princeton is not defined, but represents a modest increase from estimated existing wastewater flows. - Moderate financial risk.
5B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at a new Drumbo WWTP at a new site (2)	$14.40 M	$16.52 M	$956,000	$1,027,000	$929 ($1,842)	$998 ($1,979)	$31.16 M	$34.53 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - Infill growth in Princeton is not defined, but represents a modest increase from estimated existing wastewater flows. - Additional proposed growth in Princeton represents a significant increase from estimated existing wastewater flows, is not consistent with the current growth strategy for the Community, and has not been approved. - Significant financial risk.

Notes:
1. Previously studied for purposes of the Drumbo WWTP Feasibility Study of Alternative Expansion Options (XCG, 2016). Determined to be infeasible due to the space available on the existing site for purposes of plant expansion.
2. Further planning approvals would be required prior to the development of the additional units in Princeton, included in Alternatives 4B and 5B. As part of this process, a secondary plan would have to be prepared to establish a new settlement boundary that is reflective of the reduced land area that would be required to accommodate the Village's planned growth potential on full municipal services.
3. Estimated yearly O&M cost per lot assumes all proposed lots have been developed, and future operating costs are divided equally among all existing and newly developed lots. Numbers in parentheses show the estimated yearly O&M cost per lot assuming none of the proposed residential development is completed. The range between these figures quantifies the potential financial risk to existing lots if future proposed residential development is not built.
4. Capital cost estimates do not include interim costs incurred to maintain current infrastructure during construction of a new treatment plant.

Table 6 Summary Evaluation Matrix

Alternative	Technical					Environmental			Social		Financial				Overall	
	Satisfaction of objectives	Consistent with the County's policies	Technical Feasibility	System Complexity	Sustainability	Surface Water Impacts	Groundwater Impacts	Impacts on the Natural Environment	Community Impacts	Impacts on Archaeological and Heritage Resources	Capital Cost	O&M Cost	Life Cycle Cost	Financial Risk	Score (1)	Rank
1: Do Nothing	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth. - Does not meet the needs of the County and was, therefore, not considered further.															
2: Service Drumbo at an expanded Drumbo WWTP	◔	○	◔	○	○	◔	◕	○	◑	○	○	○	○	○	22	**1**
3: Service Drumbo at a new Drumbo WWTP at a new site	◔	○	○	◔	◕	○	◔	◑	◑	◑	◔	○	◔	○	28	**2**
4A: Service Drumbo and Princeton, excluding the proposed new development in Princeton, at an expanded Drumbo WWTP	○	◔	◑	◕	◔	◔	◔	◔	◕	◔	◕	●	◕	◑	40	**3**
4B: Service Drumbo and Princeton, including the proposed new development in Princeton, at an expanded Drumbo WWTP	○	◑	◑	◕	◑	◔	◑	◔	◕	◔	◕	●	●	●	46	**5**
5A: Service Drumbo and Princeton, excluding the proposed new development in Princeton, at a new Drumbo WWTP at a new site	○	◔	○	◑	◕	○	○	◕	◑	◕	●	●	◕	◑	41	**4**
5B: Service Drumbo and Princeton, including the proposed new development in Princeton, at a new Drumbo WWTP at a new site	○	◑	○	◑	●	○	○	◕	◑	◕	●	●	●	●	46	**5**

Notes:
1. Evaluations for each alternative solution were quantified by assigning a number score for each criteria. Scores ranged from one (1) for an evaluation of No Impact/Lowest Cost up to five (5) for an evaluation of Major Impact/Highest Cost. The presented score is a sum of scores for each criteria.

To quantify the results, the ratings were given a numerical value according to Table 7. The total score was calculated for each alternative, and the alternative with the lowest total score was selected as the preliminary preferred alternative.

Table 7 Quantification of Alternative Evaluation

Evaluation	Description	Numerical Value
○	No impact. Lowest cost.	1
◔	Negligible impact.	2
◑	Minor impact.	3
◕	Moderate impact.	4
●	Major impact. Highest cost.	5

A summary of the total score and overall rank for each treatment alternative is given in Table 8.

Table 8 Summary of Alternative Evaluation Scores

Treatment Alternative	Total Score	Ranking
1. Do Nothing	- (1)	- (1)
2. Service Drumbo at an expanded Drumbo WWTP	22	1
3. Service Drumbo at a new Drumbo WWTP at a new site	28	2
4A. Service Drumbo and Princeton at an expanded Drumbo WWTP **excluding** proposed 324-unit development in Princeton	40	3
4B: Service Drumbo and Princeton at an expanded Drumbo WWTP **including** proposed 324-unit development in Princeton	46	5
5A: Service Drumbo and Princeton at a new Drumbo WWTP at a new site **excluding** proposed 324-unit development in Princeton	41	4
5B: Service Drumbo and Princeton at a new Drumbo WWTP at a new site **including** proposed 324-unit development in Princeton	46	5

Notes:

1. Alternative 1 does not meet the objectives of the Problem/Opportunity Statement and will not accommodate planned community growth. Therefore it does not meet the needs of the County was not considered further.

Based on the evaluation of alternative solutions, the preliminary preferred alternative solution is:

- Alternative 2 – Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the Drumbo WWTP.

The rationale for selecting Alternative 2 as the preliminary preferred alternative solution was based on the following:

- Alternative 2 is the most consistent with existing County policies and plans for future growth.
- Alternative 2 is the most comparable in size and operational complexity to the existing WWTP.
- Alternative 2 represents the best use of existing infra/structure and the lowest relative energy usage for wastewater treatment.
- Expansion required for Alternative 2 is proposed to occur within the existing site boundary, thereby reducing risks for impacts on the natural environment or archaeological and heritage resources.
- Relative to the other alternative solutions, Alternative 2 has the lowest estimated capital and operational costs, and the lowest financial risk for the County and local residents (i.e. system users).

To service future development within the Drumbo Village boundary but beyond the 20 year planning horizon considered in this Class EA, consideration of all technically feasible alternatives to provide additional treatment capacity to service all lands within the designated settlement boundary of Drumbo will be required as part of a Class EA initiated at that time. Evaluation criteria that would be considered as part of that Class EA would include, but not be limited to, additional capacity requirements, site constraints, capital costs to upgrade the existing plant vs. building a new plant at a new location, source water protection issues, treatment technology advances, and effluent quality requirements.

Appendix C
TM #1: Drumbo WWTP MCEA Review Summary

TECHNICAL MEMORANDUM

TM #1 – Drumbo WWTP MCEA Review Summary

PREPARED FOR:	Oxford County
PREPARED BY:	CH2M
DATE:	January 19, 2018
PROJECT NUMBER:	700053
REVISION NO.:	0

Introduction

Background

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Village of Drumbo. The Drumbo WWTP, constructed in 1993, is a sequencing batch reactor (SBR) with tertiary filtration and ultraviolet (UV) disinfection with a current rated capacity of 300 cubic metres per day (m^3/d) (re-rated from 270 m^3/d in 2014).

In June 2013, Oxford County initiated a Municipal Class Environmental Assessment (MCEA) to develop a wastewater servicing plan for the Village of Drumbo to service planned growth in the community in a cost-effective, environmentally sound, and sustainable manner. The Drumbo WWTP MCEA also considered the potential to provide servicing for the Village of Princeton at an expanded or new Drumbo WWTP. The Village of Princeton is currently serviced by private sewage systems (i.e. Septic Tanks).

The study was undertaken as a Schedule C project in accordance with the requirements of the MCEA (Municipal Engineers Association, June 2000, as amended in 2007, 2011, and 2015), and included opportunities for public comment. Phases 1 and 2 of the MCEA process were completed.

Public Consultation Centres (PCCs) were held on June 16, 2016 and May 16, 2017 to provide information on the study and to receive comments from the public.

Additionally, an optimization study of the tertiary filters was completed at the Drumbo WWTP.

Figure 1 shows an aerial of the site showing the WWTP and the water treatment plant (WTP) on the existing site.

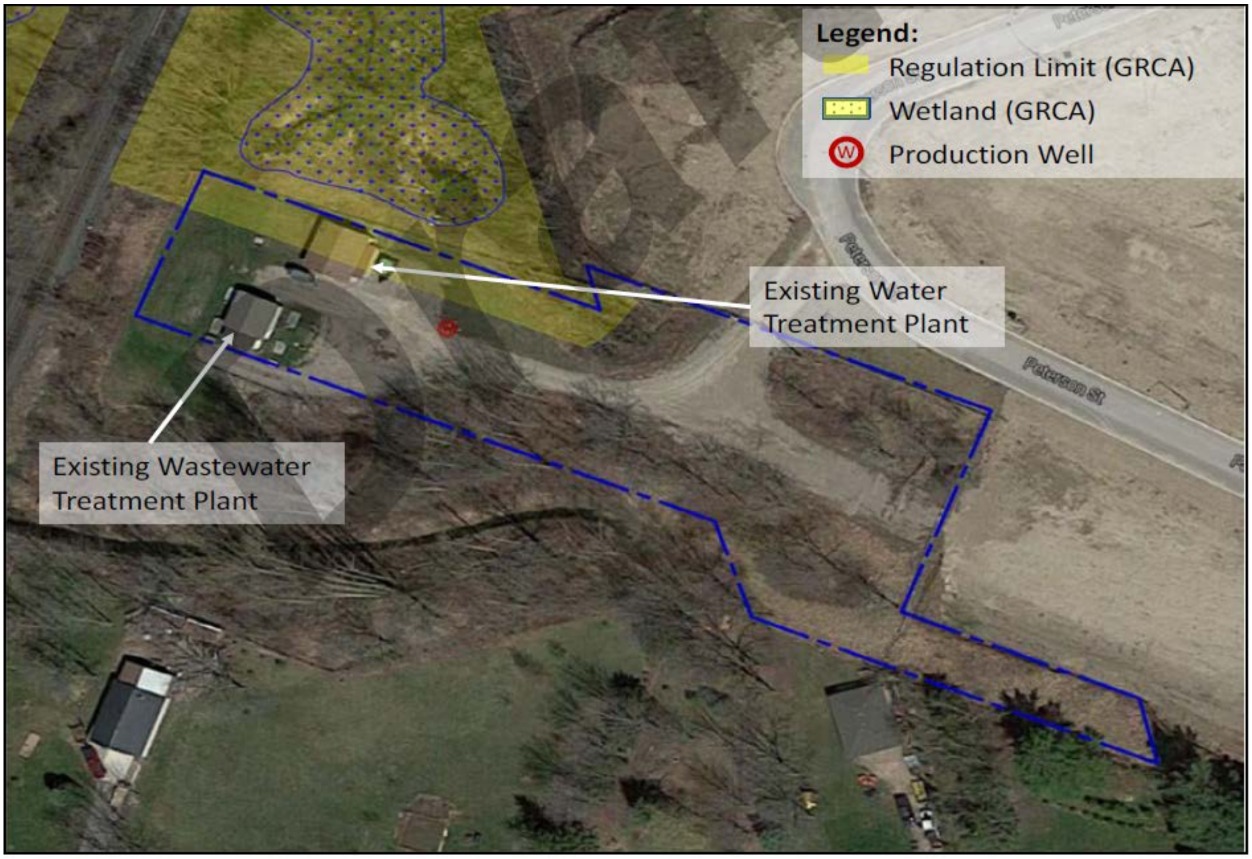

Figure 1. Drumbo WWTP Location and Surrounding Areas

Timeline of Previous Work

The following are milestone dates associated with the Drumbo WWTP MCEA project:

- April 2013: Available Treatment Capacity Review
- June 2013: Class EA Initiated
- June 28, 2013: Notice of Commencement
- January 2014: Cowan Drain Background
- May 2014: Capacity Review
- February 9, 2015: ECA approval for Re-Rating
- October 2015: Drumbo WWTP Alternatives – Design Basis
- June 16, 2016: PCC #1
- June 27, 2016: Steering Committee Meeting #1
- January 26, 2017: Steering Committee Meeting #2
- May 16, 2017: PCC #2
- July 2017: Optimization Progress

Project Scope

Phase 1 and 2 of the MCEA process conducted by XCG Consulting Limited, evaluated five options for the Drumbo WWTP to handle the anticipated growth of the community until 2036. Of the five options, two took into consideration the potential to include servicing the Village of Princeton. The alternatives were assessed and brought forth in PCCs to determine the preferred solution for the Village of Drumbo. Each alternative had a demand scenario (i.e. servicing demand or flow) associated with it. There are four different demand scenarios in total, which were calculated to provide the design basis for upgrade options based on the alternatives.

Review of Drumbo WWTP Performance

Drumbo WWTP Process Overview

Raw sewage is conveyed to the Drumbo WWTP via a sewage forcemain and flow entering the Drumbo WWTP is measured with a magnetic flow meter. Sewage flows enter a 51 cubic metre (m^3) trash tank, which also serves as a holding tank for waste activated sludge (WAS) from the biological reactors. The trash tank overflows to a 51 m^3 transfer tank that feeds the two SBRs, which operate in parallel. In the event of high flow periods that exceed the capacity of the transfer tank and SBRs, wastewater can flow by gravity from the transfer tank to a 91 m^3 emergency overflow containment basin. Wastewater stored in the emergency overflow containment basin is pumped back to the transfer tank manually using a submersible pump when the SBRs have enough capacity to treat the stored wastewater.

Flow from the transfer tank is delivered to the SBRs by four submersible, 0.76 cubic metre per minute (m^3/min) transfer pumps. Two pumps are dedicated to each reactor (one duty and one standby). Each SBR reactor has a total volume of approximately 102.2 m^3. Air supply to the reactors is provided by three Roots-Dresser blowers. Aluminum sulphate (alum) is added for phosphorus removal directly into each of the SBR tanks from the alum storage tanks during the SBR react cycle. Each reactor goes through a sequence of filling, reacting, settling, decanting, and sludge wasting that is controlled by a programmable logic controller (PLC). Filling is initiated by the liquid level in the transfer tank and continues until the reactor is full. Time allocated for each step of the reaction process can be modified as required by plant operators to maintain effluent quality from the plant.

Decanting from each reactor is completed by one of two 0.76 m^3/min decant pumps dedicated to each reactor (four decant pumps total, two for each reactor). Decant water is pumped to two filter equalization tanks with a total volume of approximately 57.6 m^3. A volume of 47.4 m^3 is decanted from each reactor during each cycle. Following the decant stage, sludge is wasted from the reactor to the trash tank for approximately one minute. At the completion of the wasting stage, the reactor is ready to receive feed again from the transfer tank, which initiates a new treatment cycle. A reactor can only receive feed from the transfer tank when it is in the fill portion of the cycle.

Tertiary filtration at the Drumbo WWTP is accomplished using three down-flow multimedia pressure filters. Flow to the tertiary filters is controlled by three filter feed pumps, each with a capacity of approximately 0.284 m^3/min (409 m^3/d). Pumping to the filters is controlled by level sensors in the filter equalization tank. Once the target level is reached, two filter feed pumps start. The third filter feed pump is initiated by the high level alarm in the filter equalization tank, which will also stop operation of the SBR decant pumps. Variable frequency drives (VFDs) are not installed on the filter pumps.

Flow from the filter equalization tank is pumped to a common filter influent pipe that feeds all three tertiary filters. Unless a filter is in backwash, pumped filter influent flow is directed equally between all online filters. Manually operated valves installed on the influent and effluent of each filter allow each filter to be taken offline individually; however, three filters are online during typical operation.

At the beginning of each discharge period, one of the three tertiary filters is backwashed for approximately 30 minutes. During backwashing, flow from the filter equalization tank is directed upwards through the filter media. Only one tertiary filter is backwashed per discharge period. Filter backwashing does not impact filter feed operation previously described. Rather, backwash is controlled by the control valves installed on each tertiary filter. Filter backwash water is discharged to a drain and recycled to the trash tank upstream of the SBRs. As a result of pressure differentials across the filters, pumped filter influent flow preferentially feeds the filter in backwash. The control valve regulates flow for the filter in backwash to the target flow rate (approximately 409 m^3/d). Flow in excess of the target backwash flow is directed to the remaining two filters, which remain online.

Given the capacity of each filter feed pump, typical filter flow is approximately 0.56 m^3/min (818 m^3/d), and peak flow is approximately 0.84 m^3/min (1,226 m^3/d). Filtered effluent is disinfected using UV disinfection and discharged to the Cowan Drain.

A process flow schematic of the treatment train at the Drumbo WWTP is shown in Figure 2.

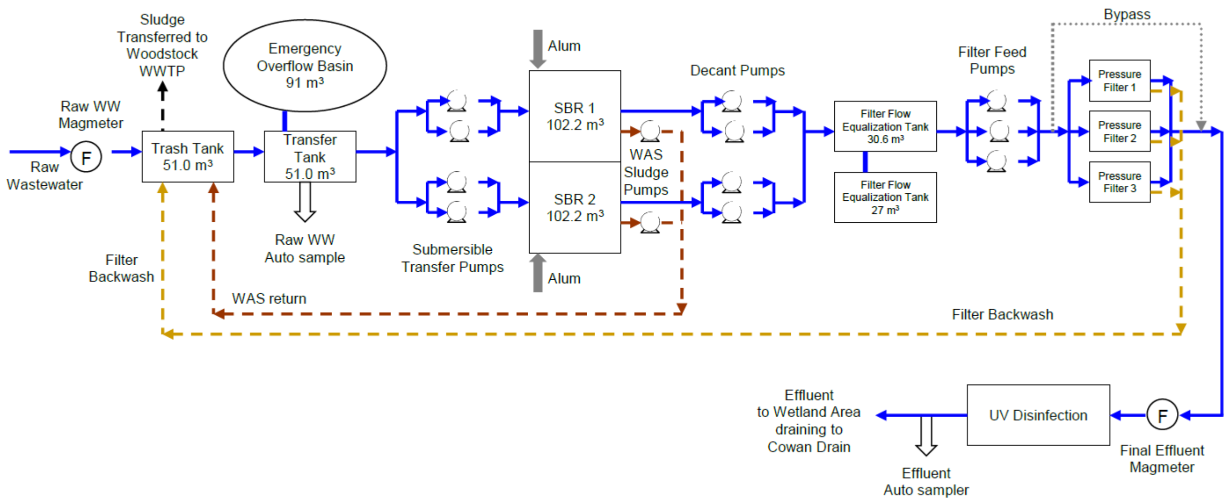

Figure 2 Process Flow Diagram for Drumbo WWTP ((XCG Consulting Limited, 2016)

As noted during the December 21st, 2017 initial kick-off meeting and site visit to the Drumbo WWTP, there is a secondary effluent storage basin located directly beside the water treatment plant (WTP)'s clear well. A berm between the two storage areas is the only known means of separating the secondary effluent and drinking water. The secondary effluent storage area is rarely full and only used in extreme cases. At this point it is not considered to be a concern for contamination.

Current and Future Flows

The future servicing needs for the Village of Drumbo were based on historical flows (2012 - 2015) from the existing service area, plus the projected flows attributed to anticipated growth. Projected residential flows in the Community of Drumbo were based on the historical wastewater generation rate of 288 litres per capita per day (LPCD) for future growth (XCG Consulting Limited, 2016). The projected average day residential wastewater flows are considered to be conservative since they are based on the historical average per capita flow which includes contributions from collection system inflow and infiltration (I/I).

Table 1 – Current and Future Average Daily Flows

Service Area	Existing (m^3/d)	Growth (m^3/d)	Projected (m^3/d)
Drumbo ADF	253	69	322
Princeton ADF	237	84	321
New Development ADF (VanWees)	-	303	303
		Drumbo + Princeton ADF	643
		Drumbo + Princeton + New Development ADF	946

Presently, the Drumbo WWTP has a rated capacity of 300 m^3/d, which is sufficient to handle the current flow rate from the community of Drumbo. Projecting out to 2036, it was shown that the existing system will not be sufficient to handle the increased demand.

Influent Quality

Raw wastewater entering the Drumbo WWTP includes wastewater from domestic and commercial sources in the community. Backwash from the tertiary filters is recycled to the trash tank at the head of the plant upstream of the raw influent sampling point. Raw sewage samples are collected using a 24-hour composite sampler from the SBR transfer tank.

Table 2 - Historical Raw Wastewater Characteristics

Year	Average Concentrations (mg/L)			
	BOD_5	TSS	TP	TKN
2009	121	110	4.0	27.2
2010	126	82	3.8	29.8
2011	101	75	3.3	28.7
2012	146	111	4.6	32.9
2013	112	78	3.1	31.8
2014	126	89	4.0	30.0
2015	124	86	4.0	34.0
2016	121	69	3.0	32.0
Average	**122**	**88**	**3.7**	**30.8**
Max	**146**	**111**	**4.6**	**34.0**

Results shown in Table 2 indicate that BOD_5, TKN, and TP are at levels which are considered medium to low strength for raw wastewater. TSS concentrations are considered below typical concentrations for domestic wastewater (Metcalf and Eddy, 2003). The previous review evaluated raw wastewater concentrations from 2012 to 2015, this review includes 2009 through 2011 and 2016 and indicates raw wastewater concentrations previously used are representative of the influent concentrations and that they have remained relatively unchanged over the long-term.

Effluent Performance

Currently the Drumbo WWTP operates under limits set by Amended Environmental Compliance Approval (ECA) Number 8752-9Q4H96, issued in February 2015. Note that historical data includes years that operated under a different set of limits from an earlier certificate of approval (C of A).

Table 3 - Historical Final Effluent Concentrations

Year	Average Concentrations (mg/L)				
	$cBOD_5$	TSS	TAN (May – Oct)	TAN (Nov – Apr)	TP
2009[1]	4.9	5.3	0.8	0.8	0.19
2010[1]	4.3	4.3	0.6	0.6	0.17
2011[1]	4.3	4.9	0.7	0.7	0.14
2012	2.3 (3.0)[2]	4.6 (7.0)	1.1 (2.2)	1.2 (2.0)	0.20 (0.36)
2013	2.4 (4.2)	5.6 (7.5)	1.4 (2.2)	2.0 (3.3)	0.17 (0.26)
2014	2.3 (3.0)	5.4 (7.5)	1.2 (1.7)	2.5 (4.3)	0.20 (0.32)
2015	2.7 (3.5)	5.2 (7.2)	1.9 (2.6)	1.6 (2.9)	0.23 (0.32)
2016[3]	2.0 – 6.0	2.2 – 11.9	0.5 – 3.2	0.6 – 4.1	0.1 – 0.3
Average	**3.15 (4.2)**	**5.06 (7.5)**	**1.1 (2.6)**	**1.4 (4.5)**	**0.19 (0.36)**
Effluent Non-Compliance Criteria	**9.3 mg/L**	**9.3 mg/L**	**2.7 mg/L**	**4.5 mg/L**	**0.46 mg/L**

[1]Only average data available

[2] Value in brackets is maximum value

[3] 2016 data presented as minimum and maximum concentrations

It is shown that annual effluent and maximum month concentrations of $cBOD_5$ have remained consistently below effluent objectives. Maximum month concentrations of TSS, TAN, and TP have occasionally exceeded effluent objective concentrations, but annual average concentrations remain below effluent limits. In 2016 the effluent TSS and TAN concentrations exceeded the effluent limit in May. The TSS concentration also exceeded the effluent objective during seven months in 2016. Higher TSS concentrations may be indicating treatment limitations in the filtration process. Otherwise, effluent quality remains in compliance on average at current flows. Current flows averaged 260 m^3/d (87% of current rated capacity) from 2009 to 2016 with a maximum year flow of 290 m^3/d in 2013.

Process Loading

Table 4 shows the historical process loading that is discharged to the Cowan Drain and subsequently the Nith River. (XCG Consulting Limited, 2016)

It is shown in Table 4 that the effluent loading of all parameters has remained below the effluent non-compliance limited established by the aforementioned ECA.

Table 4 - Historical Final Effluent Loading

Year	Effluent Loading (kg/d)				
	$cBOD_5$	TSS	TAN (May – Oct)	TAN (Nov – Apr)	TP
2009[1]	1.2	1.3	0.2	0.2	0.05
2010[1]	1.1	1.1	0.1	0.1	0.04
2011[1]	1.1	1.2	0.2	0.2	0.03
2012	0.6 (0.8)	1.1 (1.6)	0.2 (0.5)	0.3 (0.6)	0.05 (0.07)
2013	0.6 (1.2)	1.5 (2.0)	0.3 (0.6)	0.6 (0.9)	0.04 (0.07)
2014	0.6 (1.1)	1.4 (1.7)	0.3 (0.5)	0.7 (1.6)	0.05 (0.07)
2015	0.6 (0.9)	1.2 (2.3)	0.4 (0.5)	0.4 (0.6)	0.05 (0.06)
2016[2]	0.5 – 1.5	0.5 – 2.9	0.1 – 0.8	0.1 – 1.0	0.02 – 0.07
Average	**0.8 (1.2)**	**1.3 (2.3)**	**0.3 (0.5)**	**0.5 (1.6)**	**0.05 (0.07)**
Effluent Non-Compliance Criteria	**2.8 kg/d**	**2.8 kg/d**	**0.8 kg/d**	**1.36 kg/d**	**0.14 kg/d**

[1]Only average data available

[2] Value in brackets is maximum value

[3]2016 data presented as minimum and maximum loadings

Review of MCEA

Future Needs

There are three distinct areas which may be serviced by the Drumbo WWTP in the future:

1. The Village of Drumbo
2. The Village of Princeton (including limited infill growth of 100 units)
3. Proposed new development in the Community of Princeton

Each of these specific population areas are expected to grow in the coming years. Current and future population projections for each of these areas are shown in Table 5.

Table 5 - Projected Populations for Servicing (XCG Consulting Limited, 2016)

Population Area	Existing	Growth	Projected
Drumbo Service	877	242	1,119
Princeton Service	821[1]	292	1,113
Proposed New Development	-	1,053	1,053

[1] Includes existing 211 household units and 8.17 ha of industrial/commercial/institutional land as equivalent population (25 people/ha)

The project average daily flows associated with the growth is shown in Table 6.

Table 6 – Current and Future Average Daily Flows

Service Area	Existing (m^3/d)	Growth (m^3/d)	Projected (m^3/d)
Drumbo ADF	253	69	322
Princeton ADF	237	84	321
New Development ADF	-	303	303
		Drumbo + Princeton ADF	643
		Drumbo + Princeton + New Development ADF	946

Using these projections, the design basis for the future needs of the Drumbo WWTP was estimated. The design basis takes into consideration each potential scenario (i.e. demand scenarios) in increasing demand or capacity needs. These scenarios are:

1. Existing Drumbo population
2. Drumbo existing population and growth
3. Drumbo growth including Princeton servicing
4. Drumbo growth including Princeton servicing and Princeton future development (i.e. VanWees development)

The expected composition of raw wastewater quality for each scenario is presented in Table 7.

Table 7 – Summary of Design Raw Wastewater Quality (XCG Consulting Limited, 2016)

Parameter	Design Value			
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
BOD_5	43.4 kg/d (171 mg/L)	61.5 kg/d (191 mg/L)	101 kg/d (157 mg/L)	139 kg/d (147 mg/L)
TSS	30.6 kg/d (120 mg/L)	52.4 kg/d (163 mg/L)	62.0 kg/d (96.4 mg/L)	71.1 kg/d (75.1 mg/L)
TKN	10.7 kg/d (42.3 mg/L)	13.8 kg/d (42.8 mg/L)	28.5 kg/d (44.3 mg/L)	42.4 kg/d (44.8 mg/L)
TP	1.0 kg/d (3.95 mg/L)	1.5 kg/d (4.7 mg/L)	3.8 kg/d (6.0 mg/L)	6.1 kg/d (6.4 mg/L)

Under Scenario 1, the Drumbo WWTP does not require any modifications. Scenarios 2 through 4 will necessitate an expanded capacity for the plant. Projected final effluent quality compliance limits for discharge to the Cowan Drain for the expanded plant are shown in Table 8. These effluent quality parameters assume that the final loading will remain unchanged.

Table 8 – Projected Design Effluent Compliance Limits for Discharge to Cowan Drain (XCG Consulting Limited, 2016)

Effluent Parameter	Scenario 2	Scenario 3	Scenario 4
$cBOD_5$			
Concentration (mg/L)	9.3	9.3	9.3
Load (kg/d)	(3.0)	(6.0)	(8.0)
TSS			
Concentration (mg/L)	9.3	9.3	9.3
Load (kg/d)	(3.0)	(6.0)	(8.0)
TP			
Concentration (mg/L)	0.43	0.22	0.15
Load (kg/d)	(0.14)	(0.14)	(0.14)
TAN (May 1 – Oct. 31)			
Concentration (mg/L)	2.5	1.2	0.8
Load (kg/d)	(0.8)	(0.8)	(0.8)
TAN (Nov. 1 – Apr. 30)			
Concentration (mg/L)	4.2	2.1	1.4
Load (kg/d)	(1.36)	(1.36)	(1.36)
E. Coli (CFUs/100 mL)	< 200		
Dissolved Oxygen (mg/L)	> 5		
pH	6.0 – 9.5 (inclusive)		

Stream Assimilative Capacity

The Drumbo WWTP discharges into the Cowan Drain, which conveys WWTP effluent flows to the Nith River. The approximate path of the Cowan Drain and its discharge point in the Nith River is shown in Figure 3 (also proposed sampling locations – see below). The previous work evaluated the existing data sources and made enquires with agencies concerning the WWTP receiver and the need for an assimilative capacity study. The following summarizes the main conclusions and recommendation from the previous work.

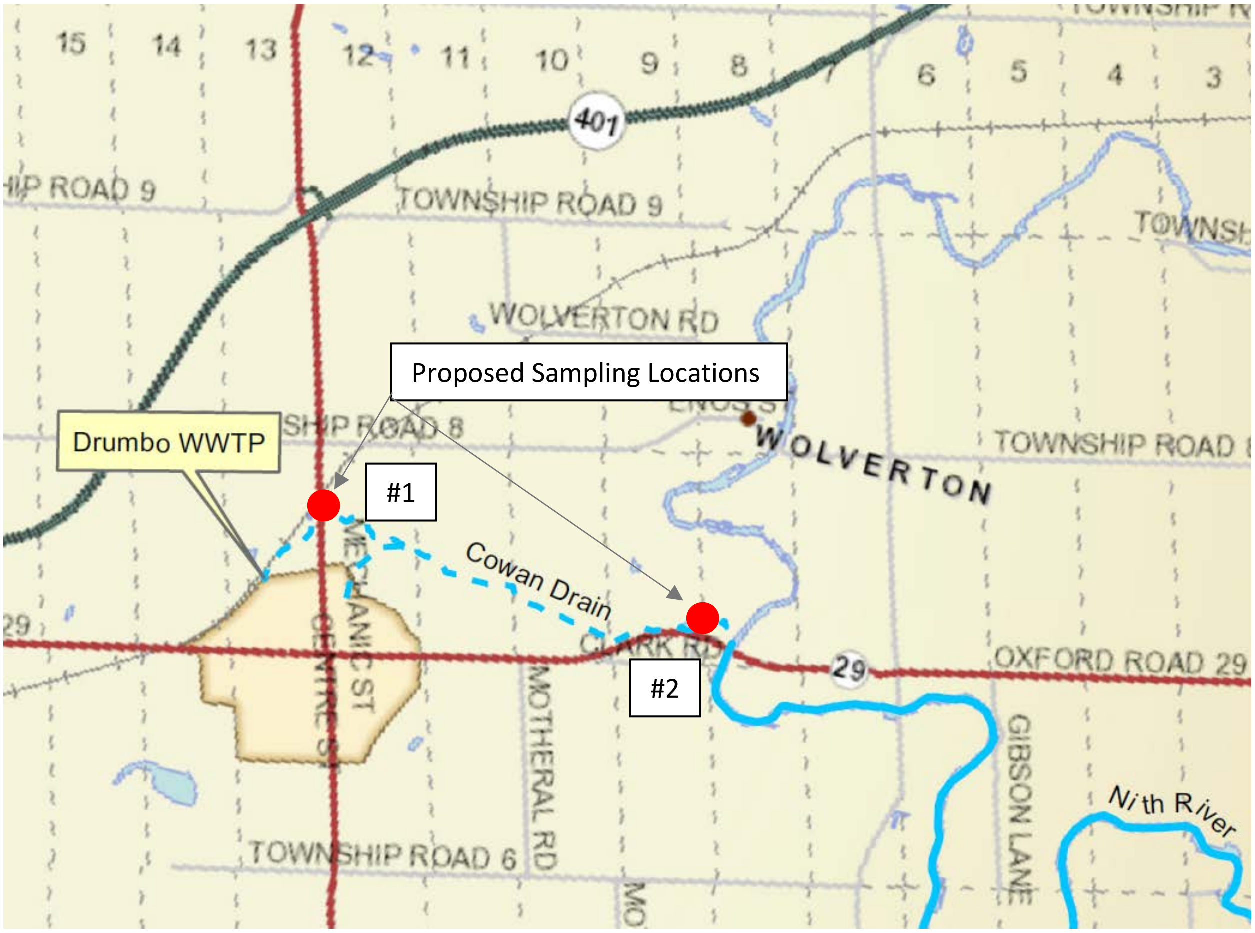

Figure 3 Cowan Drain and Connection with the Nith River

Three reports were reviewed from the previous work (i.e. conducted by XCG):

- Summary of Water Quality/Quantity Data Sources near the Drumbo WWTP (Dec 3, 2013)
- Drumbo WWTP MCEA – Cowan Drain Background Information (Jan 14, 2014)
- Drumbo WWTP Monitoring Program (Feb 28, 2014)

Based on these reports the following conclusions/recommendations are made:

- A review of the topography suggests that the drainage area of the Cowan drain is small at about 4.0 to 4.5 square kilometres (km^2). Given the small drainage area, it was initially concluded that the Cowan drain is dry for most of the year, and hence can be classified as a dry ditch discharge with the ultimate receiver being the Nith River. However, a later memorandum concluded that it appears that flow is continuous throughout the year and may be estimated based on nearby streamflow gauges on other creeks with similar catchment areas.
- There is little to no information or data from the Cowan Drain.
- Monitoring stations (i.e. flows and quality) are located upstream and downstream of the discharge of the Cowan Drain into the Nith River.
- There are two stream flow gauges on the Nith River upstream and downstream of the Cowan Drain discharge into the Nith River. The first is at New Hamburg (# 02GA018), the second downstream at Canning (# 02GA010). Both have daily data from 1950 to 2016.

- There are a number of Provincial and Waterloo Region monitoring stations (i.e. for water quality) upstream of the Cowan Drain, generally located near Ayr and further upstream near New Hamburg. These monitoring stations include New Hamburg (1st bridge downstream from New Hamburg - #16018403200 with data from 1970 to 2016), Plattsville (1st bridge downstream from Plattsville - #16018403102 with data from 1970 to 1979) and Ayr (1st bridge west of Ayr - #16018403302 with data from 1970 to 2016). In additional there are two Waterloo Region monitoring stations at Greenfield/Trussler (upstream of Ayr - #6473003) and Northumberland at Cedar Creek (upstream of Ayr - #6474003).
- There may be species at risk located in the receiver (i.e., Cowan Drain), although this will need to be confirmed by the Ministry of Natural Resources (MNR) and/or Fisheries and Oceans Canada (DFO).
- A sampling plan was developed for sampling two locations in the Cowan Drain, the first proposed sampling location is located at the Cowan Drain crossing at Oxford Road 3, the second is located approximately 300 metres (m) upstream of the Nith River, at a farmer's crossing (see Figure 3). It was proposed that 12 samples be collected from each location in 2014 and analyzed for conventional parameters, including BOD_5, TSS, TP, TAN, and E. coli and monitored for temperature, pH, and dissolved oxygen.
- The approximate location of the flow and quality monitoring stations is shown on Figure 4.

The following recommendations were made:

- County monitoring of pH and temperature was recommended to assist with evaluating the ammonia-nitrogen effluent needs from the WWTP.
- Sampling at two locations in Cowan Drain was recommended.
- The status of these two recommendations is required.

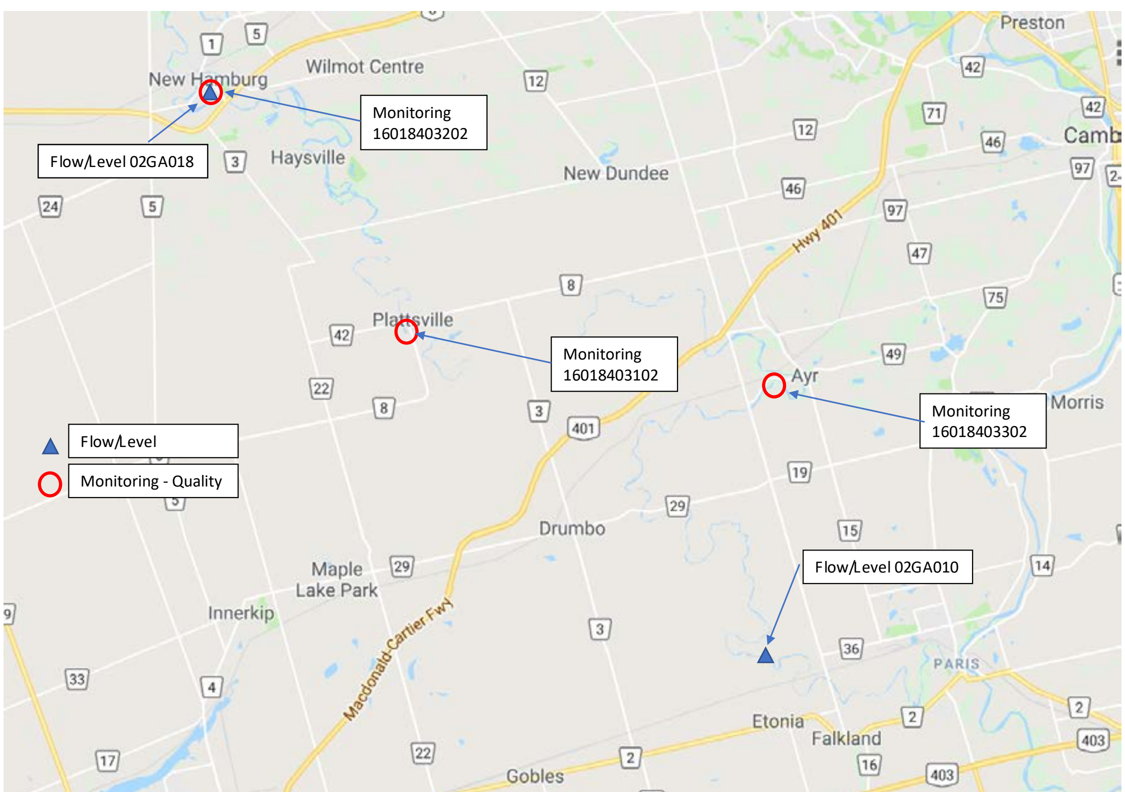

Figure 4. Flow and Quality Monitoring Station on Nith River Near Discharge of the Cowan Drain

Alternative Solutions

XCG Consulting Limited provided 5 potential alternatives for the Drumbo WWTP during Phase 1 of the MCEA. Each of these alternatives are consistent with one of the demand scenarios listed above. These alternatives are summarized in Table 9

Table 9 - Summary of Alternative Solutions (XCG Consulting Limited, 2017)

Alternative Number	Description	Demand Scenario
1. Do Nothing	No additional wastewater treatment capacity would be provided for Drumbo and no treatment of Princeton wastewater at the Drumbo WWTP.	1
2. Service Drumbo at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service the planned growth in Drumbo. No treatment of Princeton wastewater would be provided at the Drumbo WWTP.	2
3. Service Drumbo at a new Drumbo WWTP at a new site (1)	A new Drumbo WWTP would be constructed at a new site to service Drumbo. The existing Drumbo WWTP would be decommissioned. No treatment of Princeton wastewater would be provided at the new Drumbo WWTP.	2
4A/4B. Service Drumbo and Princeton at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service the planned growth in Drumbo and the community of Princeton, excluding (4A) or including (4B) the proposed 324-unit development in Princeton.	A – 3 B – 4
5A/5B. Service Drumbo and Princeton at a new Drumbo WWTP at a new site (1)	A new Drumbo WWTP would be constructed at a new site to service Drumbo and the community of Princeton, excluding (5A) or including (5B) the proposed 324-unit development in Princeton. The existing Drumbo WWTP would be decommissioned.	A – 3 B – 4

Notes

1. Alternatives which consider the construction of a new WWTP at a new site may require upgrades to the existing Drumbo WWTP in the interim to maintain plant operation and effluent quality.

During Phase 2 of the MCEA, these 5 alternatives were evaluated against four main criteria: technical, environmental, social, and financial. A score was given to each alternative using this basis, and the results showed that Alternative #2 was the preferred option for the County (expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo). No treatment of wastewater generated in the Community of Princeton would be provided at the Drumbo WWTP. The complete evaluation matrix and scoring method is shown in Attachment A. The reasoning is summarized below (XCG Consulting Limited, 2017):

- Alternative #2 is the most consistent with existing County policies and plans for future growth.
- Alternative #2 is the most comparable in size and operational complexity to the existing WWTP.
- Alternative #2 represents the best use of existing infrastructure and the lowest relative energy usage for wastewater treatment.
- Expansion required for Alternative #2 is proposed to occur within the existing site boundary, thereby reducing risks for impacts on the natural environment or archaeological and heritage resources.
- Relative to the other alternative solutions, Alternative #2 has the lowest estimated capital and operational costs, and the lowest financial risk for the County and local residents (i.e., system users).

Drumbo WWTP Expansion Options

XCG Consulting Limited conducted a feasibility study regarding alternative approaches for expanding the Drumbo WWTP. Options evaluated were: increasing the capacity of the existing SBR (Sequence Batch Reactor) treatment process or by converting to a new MBR (Membrane BioReactor) treatment process.

The following conclusions were made regarding the expansion of the Drumbo WWTP (XCG Consulting Limited, 2016):

- Relative to MBRs, SBRs represent a less complex and less expensive treatment technology. County operating staff are experienced working with the current SBR treatment process;
- Relative to MBRs, SBR treatment technology occupies a larger footprint, cannot produce an effluent quality meeting all of the proposed effluent limits, and cannot easily be expanded.
- Installation of preliminary treatment creates the potential for additional odours and increased truck traffic;
- Sludge production will increase with increasing flows. Relative to current operation, future sludge production (per treated m^3) is expected to be comparable; and,
- Due to receiver constraints, plant expansion beyond an ADF of about 950 m^3/d is limited, due to effluent TAN and TP quality that would be required at higher flows.

Public Consultation Summary

Two PCCs were held over the course of Phase 1 and 2 of the MCEA. The PCCs were held in Drumbo to discuss future plans for the Drumbo WWTP. Residents of Princeton made up the majority of the attendance to voice their concerns about the prospect of connecting Princeton to Drumbo for servicing. The finding of the PCCs are summarized below (D.C. Damman and Associates, 2017).

PCC #1 was held during Phase 1 with the purpose of providing the public with background information about the study, present the problem statement, and outline the alternatives that would be evaluated in Phase 2.

Public Consultation Centre #1 Comments

54 people signed the attendance for PCC #1. 15 completed comment sheets and two submitted emails to the County. A summary of the major points is provided below:

- Certain Princeton residents want to be included in the future wastewater plan
- Certain Princeton residents feel left out of growth plans for the County
- Concern that many of the septic systems (i.e., in Village of Princeton) have reached their expiry dates and are in favour of a new solution
- Other Princeton residents do not want to see any change to the town, not in favour of sewer
- Princeton residents do not want to pay for sewer, believe landowner should pay themselves

PCC #2 was held during Phase 2 of the MCEA. This consultation presented the alternatives that were evaluated in Phase 2 and delineated the methodology by which the recommended alternative was selected. The recommended alternative was presented and the next steps of the MCEA process were outlined. The recommended alternative was Alternative #2: service Drumbo only with an expanded WWTP.

Public Consultation Centre #2 Comments

38 people signed the attendance for PCC #2. Eight completed comment sheets and two submitted emails to the County. A summary of the major points is provided below:

- Many in favour of Alternative #2: not servicing the Village of Princeton
- Concerns that no sewer system will stunt future growth in Princeton

Notice of Public Consultation Centres were sent to the following Aboriginal contacts:

- Six Nations of the Grand River
- Six Nations Haudenosaunee Confederacy Council
- Mississaugas of the New Credit
- Munsee-Delaware Nation

- Chippewas of the Thames River First Nation
- Delaware Nation
- Oneida Nation of the Thames
- Walpole Island First Nation
- Métis Nation of Ontario

Only one response was received, coming from Chippewas of the Thames First Nation stating that they no longer feel they require regular project updates or notices.

Additional Aspects

Optimization of the WWTP

XCG Consulting Limited conducted an optimization study to review current operation of tertiary filters at the Drumbo WWTP and to identify strategies to optimize performance of the tertiary filters. A review of historical filter operation and performance identified the following key items:

- Under current operation, filtration rates at the Drumbo WWTP exceed both the supplier recommended filtration rates and typical maximum design filtration rates for pressure filters. As per supplier recommendations, the peak capacity of the existing tertiary filters is approximately 409 m^3/d.
- Plant operators have noted filters are currently operated with significantly less media than the original design. Previous attempts to refurbish the filters results in the accumulation of filter media in downstream processes.
- Over the historical review period, effluent concentrations of TSS and TP have remained consistently below the ECA effluent limits. ECA effluent objectives for both parameters have been exceeded on occasion.

To improve overall operation of the tertiary filters and the filter effluent quality, several operational strategies were reviewed. To immediately improve the quality and consistency of tertiary effluent, the following short-term strategies are recommended:

- Refurbish the existing filters to the original design specifications, and modify operation of the filter feed pumps to maintain the supplier recommended filtration rate.
- Adjust control of the filter feed pump and filter bypass operation such that operation of the SBR tanks is not impacted.

It is recommended that operation of the filter feed pumps and filter bypass is modified prior to refurbishing the tertiary filters. Short-term strategies identified above are expected to have a minimal impact on current plant operation and be relatively inexpensive to implement.

It is acknowledged that the total estimated capacity of the tertiary filters (i.e. max of 409 m^3/d) is less than the current and projected maximum day flow to the Drumbo WWTP. As such, three additional long-term strategies were identified that could reduce the filter bypass frequency, bypass volume, or increase the overall effluent quality during a bypass event. However, a MCEA is currently being completed to analyze future wastewater treatment for the Community of Drumbo. Two of the three long-term strategies involve capital construction at the Drumbo site (equalization tankage and filter expansion).

Conclusions and Recommendations

Phase 1 and Phase 2 of the Municipal Class EA process were completed by XCG Consulting Limited for the Drumbo WWTP. Five alternatives were brought forward to the public, which considered the growth of the Drumbo community as well as the potential to provide the community of Princeton with servicing. The five alternatives were evaluated on the basis of technical, environmental, social, and financial feasibility. This evaluation led to the recommendation to expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the Drumbo WWTP.

Further to the MCEA, an optimization study was conducted on the Drumbo WWTP's tertiary filter operation. This study concluded that the current operation of the tertiary filters does not meet their objectives and replacement or refurbishment of the filters will be required in the future. It is recommended that Oxford County move ahead with the alternative put forth in Phase 2 by considering the findings of the optimization study.

Lastly, an update on the status of the monitoring and sampling recommended for the Cowan Drain is required.

References

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Metcalf and Eddy. (2003). *Wastewater Engineering: Treatment and Resource Recovery. Fourth Edition.*

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XCG Consulting Limited. (2016). *Drumbo WWTP Class EA Technical Memorandum 2: Future Flows and Loads.*

XCG Consulting Limited. (2016). *Tertiary Filter Operation Review and Optimization Plan.*

XCG Consulting Limited. (2017). *Drumbo WWTP Class EA Technical Memorandum 4: Evaluation of Alternative Solutions.*

Abbreviations/Nomenclature

The following abbreviation/nomenclature are used in this TM:

1. ADF – Average Daily Flow
2. $cBOD_5$ – 5-day Carbonaceous Biological Oxygen Demand
3. BOD_5 – 5-day Biological Oxygen Demand
4. cfu/100mL – colony forming units per 100 mL
5. d – days
6. hr – hours
7. kg/d – kilograms per day
8. LPCD – litre per capita day
9. mg/L – milligrams per litre
10. TAN – total ammonia nitrogen
11. TKN – Total Kejdhal Nitrogen
12. TP – Total Phosphorus

13. TSS – Total Suspended Solids

Attachment A
Evaluation of Alternative Solutions by XCG Consulting Limited

Table 3 Technical Evaluation Matrix

Alternative	Technical				
	Satisfaction of objectives (1)	Consistent with the County's policies, guidelines, standards, and Strategic Plan (2)	Technical Feasibility	System Complexity	Sustainability
1: Do Nothing	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth. - Does not meet the needs of the County and was, therefore, not considered further.				
2: Service Drumbo at an expanded Drumbo WWTP	- Projected 20 year growth in Drumbo is accommodated. - No servicing provided to Princeton.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - No servicing provided to Princeton.	- Source water protection restrictions and residential buffer requirements may impact onsite expansion of Drumbo WWTP. - Careful planning required to maintain treatment capacity during plant expansion.	- Most comparable to size/operational complexity of existing treatment plant.	- Smallest expansion, best use of existing infrastructure. - Low relative energy consumption at plant in part due to reduced pumping requirements.
3: Service Drumbo at a new Drumbo WWTP at a new site	- Projected 20 year growth in Drumbo is accommodated. - No servicing provided to Princeton.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - No servicing provided to Princeton.	- Construction at new site has no impact on operation of existing Drumbo WWTP.	- New treatment plant requires some additional infrastructure (i.e., forcemain, outfall).	- New plant does not allow for reuse of existing plant infrastructure and increases pumping requirements. - Low relative energy consumption at plant.
4A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at an expanded Drumbo WWTP	- Projected 20 year growth in Drumbo is accommodated. - Existing Princeton population is serviced.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - Existing Princeton population is serviced, although Princeton not identified as a "Serviced Village" in Oxford County OP.	- Source water protection restrictions and residential buffer requirements may impact onsite expansion of Drumbo WWTP. - Potential constructability issues to convert to an MBR treatment process while maintaining existing treatment capacity.	- Requires new collection system in Princeton and new forcemain to the Drumbo WWTP. - MBR treatment process, required for this alternative, is new technology for the County.	- Potential to reuse existing plant infrastructure. - Forcemain to convey Princeton wastewater to Drumbo WWTP increases pumping requirements. - Higher flows, therefore greater relative energy consumption.
4B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at an expanded Drumbo WWTP (3)	- Projected 20 year growth in Drumbo is accommodated. - Existing and future growth in Princeton is serviced.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - Existing and potential future Princeton population is serviced, although Princeton not identified as a "Serviced Village" in Oxford County OP.	- Source water protection restrictions and residential buffer requirements may impact onsite expansion of Drumbo WWTP. - Potential constructability issues to convert to an MBR treatment process while maintaining existing treatment capacity.	- Requires new collection system in Princeton and new forcemain to the Drumbo WWTP. - MBR treatment process, required for this alternative, is new technology for the County.	- Potential to reuse existing plant infrastructure. - Forcemain to convey Princeton wastewater to Drumbo WWTP increases pumping requirements. - Highest flows, therefore greatest relative energy consumption.
5A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at a new Drumbo WWTP at a new site	- Projected 20 year growth in Drumbo is accommodated. - Existing Princeton population is serviced.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - Existing Princeton population is serviced, although Princeton not identified as a "Serviced Village" in Oxford County OP.	- Construction at new site has no impact on operation of existing Drumbo WWTP.	- Requires new collection system in Princeton and new forcemain to a new WWTP. - Assumed new plant (either MBR or SBR) designed to minimize system complexity.	- New plant does not allow for reuse of existing plant infrastructure. - Forcemain to convey Princeton wastewater to Drumbo WWTP increases pumping requirements. - Higher flows, therefore greater relative energy consumption.
5B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at a new Drumbo WWTP at a new site (3)	- Projected 20 year growth in Drumbo is accommodated. - Existing and future growth in Princeton is serviced.	- Projected 20 year growth in Drumbo is accommodated. Consistent with County planning policies and approach to growth management. - Existing and potential future Princeton population is serviced, although Princeton not identified as a "Serviced Village" in Oxford County OP.	- Construction at new site has no impact on operation of existing Drumbo WWTP.	- Requires new collection system in Princeton and new forcemain to a new WWTP. - Assumed new plant (either MBR or SBR) designed to minimize system complexity.	- New plant does not allow for reuse existing infrastructure. - Forcemain to convey Princeton wastewater to Drumbo WWTP increases pumping requirements. - Highest flows, therefore greatest relative energy consumption.

Notes:
1. Primary project objective is to provide wastewater servicing for the projected 20 year planned growth in the Community of Drumbo. Secondary objective is to service Community of Princeton.
2. Drumbo is designated as a 'Serviced Village' in the Oxford County Official Plan (OP) Settlement Strategy Plan (Schedule C3). Servicing of Drumbo is consistent with the Oxford County OP and Growth Management Strategy which state that the majority of growth will be directed to settlements with centralized wastewater facilities. The Oxford County Strategic Plan also states that the County must maintain and strengthen the core infrastructure and adapt services and facilities to reflect evolving community needs.
3. Further planning approvals would be required prior to the development of the additional units in Princeton, included in Alternatives 4B and 5B. As part of this process, a secondary plan would have to be prepared to establish a new settlement boundary that is reflective of the reduced land area that would be required to accommodate the Village's planned growth potential on full municipal services.

Table 4 Environmental/Social Evaluation Matrix

Alternative	Environmental			Social	
	Surface Water Impacts	**Groundwater Impacts**	**Impacts on the Natural Environment**	**Community Impacts**	**Impacts on Archaeological and Heritage Resources**
1: Do Nothing	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth. - Does not meet the needs of the County and was, therefore, not considered further.				
2: Service Drumbo at an expanded Drumbo WWTP	- Proposed discharge location (Cowan Drain) assumed to have relatively less assimilative capacity.	- Proposed onsite expansion within the wellhead protection area of a production well servicing the communities of Drumbo and Princeton.	- Proposed expansion within existing site boundary. - No impacts on the natural environment are anticipated at expanded Drumbo WWTP.	- Minor noise and dust impacts on adjacent residents and landowners during construction of expanded Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices. - No change over existing conditions anticipated with operation of expanded Drumbo WWTP.	- Proposed expansion within existing site boundary. - No impacts on archaeological and heritage resources anticipated at expanded Drumbo WWTP.
3: Service Drumbo at a new Drumbo WWTP at a new site	- Proposed discharge location (Nith River) assumed to have relatively greater assimilative capacity.	- Assumed that new WWTP site would not be within a wellhead protection area and that facility construction and operation would minimize impact on groundwater resources.	- Greater potential for impacts on natural environment at a new WWTP site. - Any impacts on natural environment would be minimized through selection of site for new WWTP and implementation of appropriate mitigation measures, although some displacement impacts may remain. - Forcemain to connect to new Drumbo WWTP would be constructed within existing road allowance, minimizing impacts on the natural environment. - Some potential impacts on the natural environment along new outfall to Nith River.	- Assumed that new WWTP site is selected to minimize impacts on adjacent residents and landowners. - Potential for short-term noise and dust impacts on adjacent residents and landowners during construction of new Drumbo WWTP and forcemain to new Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices. - Assumed any potential impacts during WWTP operations (e.g., odour) can be mitigated.	- Greater potential for impacts on archaeological and heritage resources at a new WWTP site. - Any impacts on archaeological and heritage resources would be minimized through implementation of appropriate mitigation measures. - Forcemain to connect to new Drumbo WWTP would be constructed within existing road allowance, minimizing impacts on archaeological and heritage resources. - Some potential impacts on the natural environment along new outfall to Nith River.
4A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at an expanded Drumbo WWTP	- Proposed discharge location (Cowan Drain) assumed to have relatively less assimilative capacity.	- Proposed onsite expansion within the wellhead protection area of a production well servicing the communities of Drumbo and Princeton. - Providing wastewater service to Princeton will eliminate reliance on septic systems, thereby improving groundwater quality.	- Proposed expansion within existing site boundary. - No impacts on the natural environment are anticipated at expanded Drumbo WWTP. - Collection system in Princeton and forcemain to connect to Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on the natural environment.	- Minor noise and dust impacts on adjacent residents and landowners during construction of expanded Drumbo WWTP, collection system in Princeton and forcemain to connect to Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices. - No change over existing conditions anticipated with operation of expanded Drumbo WWTP.	- Proposed expansion within existing site boundary. - No impacts on archaeological and heritage resources anticipated at expanded Drumbo WWTP. - Collection system in Princeton and forcemain to connect to Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on archaeological and heritage resources.
4B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at an expanded Drumbo WWTP [(1)]	- Proposed discharge location (Cowan Drain) assumed to have relatively less assimilative capacity.	- Proposed onsite expansion within the wellhead protection area of a production well servicing the communities of Drumbo and Princeton. - Providing wastewater service to Princeton will eliminate reliance on septic systems, thereby improving groundwater quality.	- Proposed expansion within existing site boundary. - No impacts on the natural environment are anticipated at expanded Drumbo WWTP. - Collection system in Princeton and forcemain to connect to Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on the natural environment.	- Minor noise and dust impacts on adjacent residents and landowners during construction of expanded Drumbo WWTP, collection system in Princeton and forcemain to connect to Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices. - No change over existing conditions anticipated with operation of expanded Drumbo WWTP.	- Proposed expansion within existing site boundary. - No impacts on archaeological and heritage resources anticipated at expanded Drumbo WWTP. - Collection system in Princeton and forcemain to connect to Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on archaeological and heritage resources.

Table 4 Environmental/Social Evaluation Matrix cont'd

Alternative	Environmental			Social	
	Surface Water Impacts	Groundwater Impacts	Impacts on the Natural Environment	Community Impacts	Impacts on Archaeological and Heritage Resources
5A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at a new Drumbo WWTP at a new site	- Proposed discharge location (Nith River) assumed to have relatively greater assimilative capacity.	- Assumed that new WWTP site would not be within a wellhead protection area and that facility construction and operation would minimize impact on groundwater resources. - Providing wastewater service to Princeton will eliminate reliance on septic systems, thereby improving groundwater quality.	- Greater potential for impacts on natural environment at a new WWTP site. - Any impacts on natural environment would be minimized through selection of site for new WWTP and implementation of appropriate mitigation measures, although some displacement impacts may remain. - Collection system in Princeton and forcemain to connect to Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on the natural environment. - Some potential impacts on the natural environment along new outfall to Nith River.	- Assumed that new WWTP site is selected to minimize impacts on adjacent residents and landowners. - Potential for short-term noise and dust impacts on adjacent residents and landowners during construction of new Drumbo WWTP, collection system in Princeton and forcemain to new Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices - Assumed any potential impacts during WWTP operations (e.g., odour) can be mitigated.	- Greater potential for impacts on archaeological and heritage resources at a new WWTP site. - Any impacts on archaeological and heritage resources would be minimized through implementation of appropriate mitigation measures. - Collection system in Princeton and forcemain to connect to new Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on archaeological and heritage resources. - Some potential impacts on the natural environment along new outfall to Nith River.
5B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at a new Drumbo WWTP at a new site (1)	- Proposed discharge location (Nith River) assumed to have relatively greater assimilative capacity.	- Assumed that new WWTP site would not be within a wellhead protection area and that facility construction and operation would minimize impact on groundwater resources. - Providing wastewater service to Princeton will eliminate reliance on septic systems, thereby improving groundwater quality.	- Greater potential for impacts on natural environment at a new WWTP site. - Any impacts on natural environment would be minimized through selection of site for new WWTP and implementation of appropriate mitigation measures, although some displacement impacts may remain. - Collection system in Princeton and forcemain to connect to new Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on the natural environment. - Some potential impacts on the natural environment along new outfall to Nith River.	- Assumed that new WWTP site is selected to minimize impacts on adjacent residents and landowners. - Potential for short-term noise and dust impacts on adjacent residents and landowners during construction of new Drumbo WWTP, collection system in Princeton and forcemain to new Drumbo WWTP. - Construction impacts can be mitigated through implementation of best management practices. - Assumed any potential impacts during WWTP operations (e.g., odour) can be mitigated.	- Greater potential for impacts on archaeological and heritage resources at a new WWTP site. - Any impacts on archaeological and heritage resources would be minimized through implementation of appropriate mitigation measures. - Collection system in Princeton and forcemain to connect to new Drumbo WWTP would be constructed within existing road allowances, minimizing impacts on archaeological and heritage resources. - Some potential impacts on the natural environment along new outfall to Nith River.

Notes:
1. Further planning approvals would be required prior to the development of the additional units in Princeton, included in Alternatives 4B and 5B. As part of this process, a secondary plan would have to be prepared to establish a new settlement boundary that is reflective of the reduced land area that would be required to accommodate the Village's planned growth potential on full municipal services.

Table 5 Financial Evaluation Matrix

Alternative	Financial								
	Capital Cost (4)		Yearly O&M Cost		Yearly O&M Cost per Lot (3)		Life Cycle Cost		Financial Risk
	SBR	MBR	SBR	MBR	SBR	MBR	SBR	MBR	
1: Do Nothing	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth. - Does not meet the needs of the County and was, therefore, not considered further.								
2: Service Drumbo at an expanded Drumbo WWTP	$3.06 M	$5.94 M	$209,000	$262,000	$525 ($670)	$658 ($840)	$6.73 M	$10.53 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - No barriers were identified which may restrict future development. - Relatively low financial risk.
3: Service Drumbo at a new Drumbo WWTP at a new site	$7.80 M	$9.44 M	$239,000	$292,000	$601 ($766)	$734 ($936)	$11.99 M	$14.56 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - No barriers were identified which may restrict future development. - Relatively low financial risk.
4A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at an expanded Drumbo WWTP	- (1)	$12.45 M	- (1)	$695,000	- (1)	$986 ($1,339)	- (1)	$24.63 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - Infill growth in Princeton is not defined, but represents a modest increase from estimated existing wastewater flows. - Moderate financial risk.
4B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at an expanded Drumbo WWTP (2)	- (1)	$13.93 M	- (1)	$1,027,000	- (1)	$998 ($1,979)	- (1)	$31.93 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - Infill growth in Princeton is not defined, but represents a modest increase from estimated existing wastewater flows. - Additional proposed growth in Princeton represents a significant increase from estimated existing wastewater flows, is not consistent with the current growth strategy for the Community, and has not been approved. - Significant financial risk.
5A: Service Drumbo and Princeton, **excluding** the proposed new development in Princeton, at a new Drumbo WWTP at a new site	$13.86 M	$15.20 M	$633,000	$695,000	$898 ($1,220)	$986 ($1,339)	$24.96 M	$27.38 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - Infill growth in Princeton is not defined, but represents a modest increase from estimated existing wastewater flows. - Moderate financial risk.
5B: Service Drumbo and Princeton, **including** the proposed new development in Princeton, at a new Drumbo WWTP at a new site (2)	$14.40 M	$16.52 M	$956,000	$1,027,000	$929 ($1,842)	$998 ($1,979)	$31.16 M	$34.53 M	- Proposed growth in Drumbo is modest, and development plans have been approved. - Infill growth in Princeton is not defined, but represents a modest increase from estimated existing wastewater flows. - Additional proposed growth in Princeton represents a significant increase from estimated existing wastewater flows, is not consistent with the current growth strategy for the Community, and has not been approved. - Significant financial risk.

Notes:
1. Previously studied for purposes of the Drumbo WWTP Feasibility Study of Alternative Expansion Options (XCG, 2016). Determined to be infeasible due to the space available on the existing site for purposes of plant expansion.
2. Further planning approvals would be required prior to the development of the additional units in Princeton, included in Alternatives 4B and 5B. As part of this process, a secondary plan would have to be prepared to establish a new settlement boundary that is reflective of the reduced land area that would be required to accommodate the Village's planned growth potential on full municipal services.
3. Estimated yearly O&M cost per lot assumes all proposed lots have been developed, and future operating costs are divided equally among all existing and newly developed lots. Numbers in parentheses show the estimated yearly O&M cost per lot assuming none of the proposed residential development is completed. The range between these figures quantifies the potential financial risk to existing lots if future proposed residential development is not built.
4. Capital cost estimates do not include interim costs incurred to maintain current infrastructure during construction of a new treatment plant.

Table 6 Summary Evaluation Matrix

Alternative	Technical					Environmental			Social		Financial				Overall	
	Satisfaction of objectives	Consistent with the County's policies	Technical Feasibility	System Complexity	Sustainability	Surface Water Impacts	Groundwater Impacts	Impacts on the Natural Environment	Community Impacts	Impacts on Archaeological and Heritage Resources	Capital Cost	O&M Cost	Life Cycle Cost	Financial Risk	Score (1)	Rank
1: Do Nothing	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth. - Does not meet the needs of the County and was, therefore, not considered further.															
2: Service Drumbo at an expanded Drumbo WWTP	◔	○	◔	○	○	◔	◕	○	◑	○	○	○	○	○	22	**1**
3: Service Drumbo at a new Drumbo WWTP at a new site	◔	○	○	◔	◕	○	◔	◑	◑	◑	◔	○	◔	○	28	**2**
4A: Service Drumbo and Princeton, excluding the proposed new development in Princeton, at an expanded Drumbo WWTP	○	◔	◑	◕	◔	◔	◔	◔	◕	◔	◕	●	◕	◑	40	**3**
4B: Service Drumbo and Princeton, including the proposed new development in Princeton, at an expanded Drumbo WWTP	○	◑	◑	◕	◑	◔	◑	◔	◕	◔	◕	●	●	●	46	**5**
5A: Service Drumbo and Princeton, excluding the proposed new development in Princeton, at a new Drumbo WWTP at a new site	○	◔	○	◑	◕	○	○	◕	◑	◕	●	●	◕	◑	41	**4**
5B: Service Drumbo and Princeton, including the proposed new development in Princeton, at a new Drumbo WWTP at a new site	○	◑	○	◑	●	○	○	◕	◑	◕	●	●	●	●	46	**5**

Notes:
1. Evaluations for each alternative solution were quantified by assigning a number score for each criteria. Scores ranged from one (1) for an evaluation of No Impact/Lowest Cost up to five (5) for an evaluation of Major Impact/Highest Cost. The presented score is a sum of scores for each criteria.

To quantify the results, the ratings were given a numerical value according to Table 7. The total score was calculated for each alternative, and the alternative with the lowest total score was selected as the preliminary preferred alternative.

Table 7 Quantification of Alternative Evaluation

Evaluation	Description	Numerical Value
	No impact. Lowest cost.	1
	Negligible impact.	2
	Minor impact.	3
	Moderate impact.	4
	Major impact. Highest cost.	5

A summary of the total score and overall rank for each treatment alternative is given in Table 8.

Table 8 Summary of Alternative Evaluation Scores

Treatment Alternative	Total Score	Ranking
1. Do Nothing	- [1]	- [1]
2. Service Drumbo at an expanded Drumbo WWTP	22	1
3. Service Drumbo at a new Drumbo WWTP at a new site	28	2
4A. Service Drumbo and Princeton at an expanded Drumbo WWTP **excluding** proposed 324-unit development in Princeton	40	3
4B: Service Drumbo and Princeton at an expanded Drumbo WWTP **including** proposed 324-unit development in Princeton	46	5
5A: Service Drumbo and Princeton at a new Drumbo WWTP at a new site **excluding** proposed 324-unit development in Princeton	41	4
5B: Service Drumbo and Princeton at a new Drumbo WWTP at a new site **including** proposed 324-unit development in Princeton	46	5

Notes:

1. Alternative 1 does not meet the objectives of the Problem/Opportunity Statement and will not accommodate planned community growth. Therefore it does not meet the needs of the County was not considered further.

Appendix D
TM #2: Cowan Drain Assessment

TECHNICAL MEMORANDUM

TM #2 – Cowan Drain Assessment

PREPARED FOR:	Oxford County
PREPARED BY:	CH2M
DATE:	May 1, 2018
PROJECT NUMBER:	700053
REVISION NO.:	0

Introduction

Background

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Village of Drumbo. The Drumbo WWTP, constructed in 1993, is a sequencing batch reactor (SBR) with tertiary filtration and ultraviolet (UV) disinfection with a current rated capacity of 300 cubic metres per day (m^3/d) (re-rated from 270 m^3/d in 2014).

In June 2013, Oxford County initiated a Municipal Class Environmental Assessment (MCEA) to develop a wastewater servicing plan for the Village of Drumbo to service planned growth in the community in a cost-effective, environmentally sound, and sustainable manner. The Drumbo WWTP MCEA also considered the potential to provide servicing for the Village of Princeton at an expanded or new Drumbo WWTP. The Village of Princeton is currently serviced by private sewage systems (i.e. Septic Tanks).

Effluent from the WWTP discharges to the Cowan Drain which runs north of the plant (i.e. approximately 500 m) before crossing Oxford Road 3 and running generally east toward the Nith River. The approximate length from the Drumbo WWTP effluent to the Nith River is 3.55 km. Figure 1 shows the approximate route of the Cowan Drain from the WWTP to the Nith River. The figure also shows the approximate location of two sampling points used in 2014 to characterize conditions in the receiver. This technical memorandum (TM) summarize the flows and quality in the Cowan Drain and Nith River.

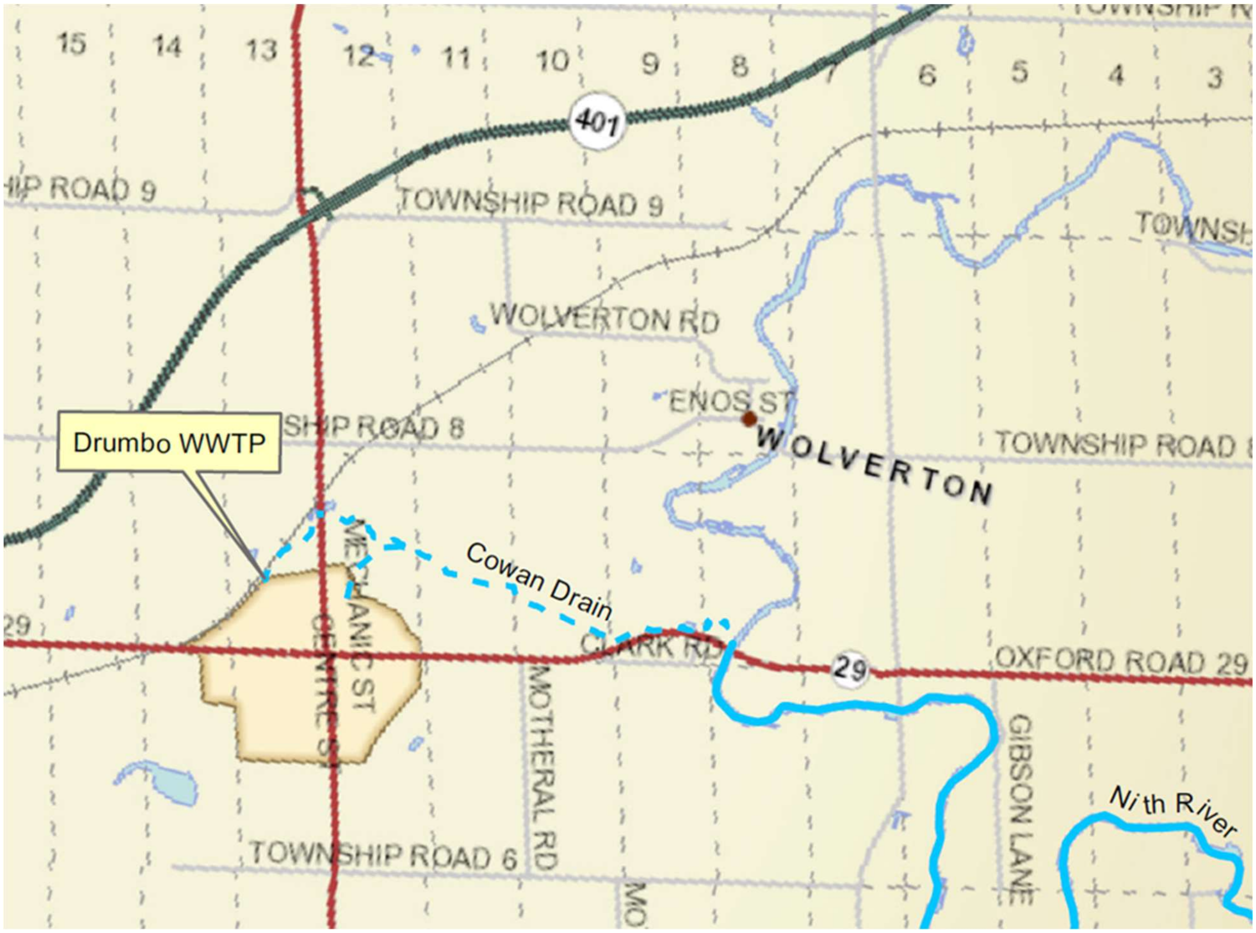

Figure 1. Drumbo WWTP and Effluent Receiver

Project Scope

The project scope was to review flow and quality information for the Cowan Drain and for the Nith River. Figure 2 shows flow monitoring and quality locations along the Nith River, upstream and downstream of the Cowan Drain discharge into the Nith River. The Cowan Drain discharges into the Nith River near Oxford Road 29 (on north side of bridge). Figure 3 shows an aerial of the location where the Cowan Drain discharges into the Nith River.

To evaluate upgrade options at the Drumdo WWTP, this TM summarizes the conditions in the Nith River and the Cowan Drain. Flows upstream of the Cowan Drain at New Hamburg and downstream at Canning and water quality sampled at Ayr (upstream) and Paris (downstream) are the main locations for characterizing the Nith River in the vicinity of the Cowan Drain discharge. Flows for the Cowan Drain are not measured and are estimated based on similar streams with similar catchment areas in the vicinity of the Cowan Drain. Cowan Drain water quality is based on twelve samples taken during 2014.

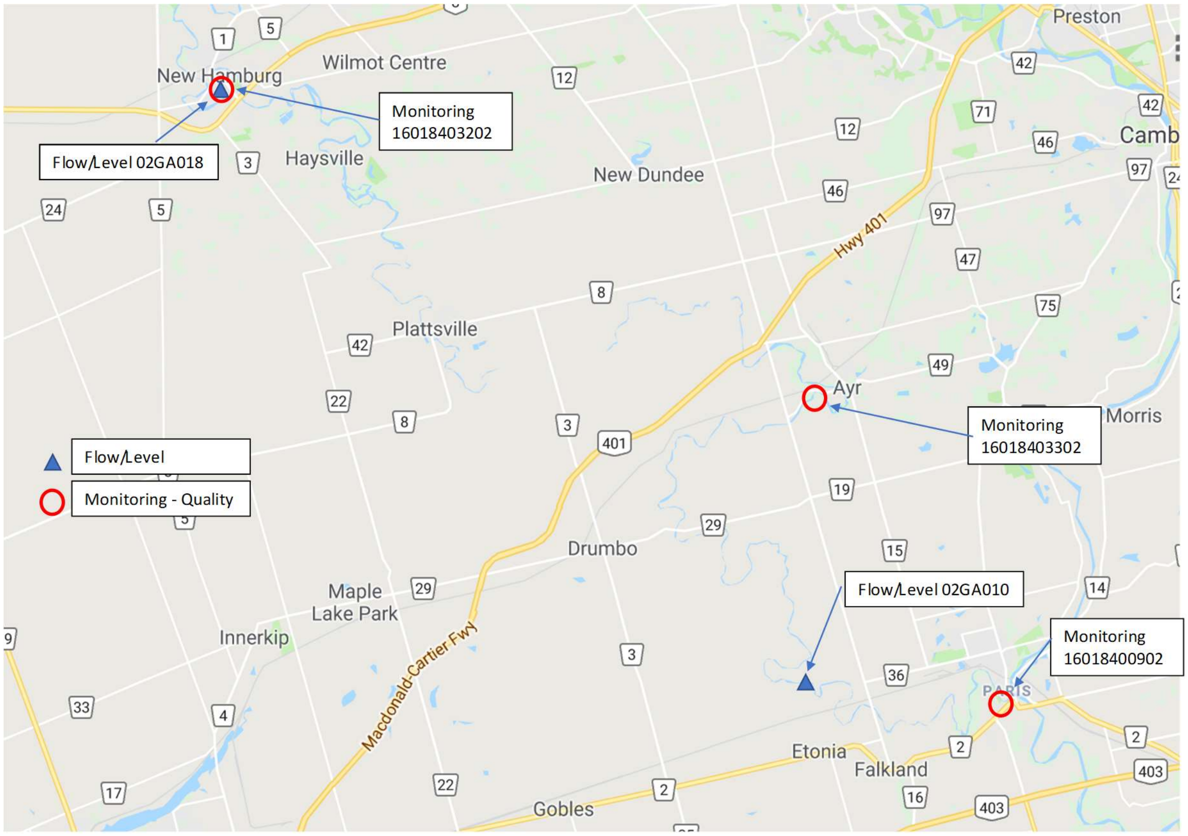

Figure 2. Flow and Quality Monitoring Station on Nith River Near Discharge of the Cowan Drain

Figure 3. Flow and Quality Monitoring Station on Nith River Near Discharge of the Cowan Drain

Nith River and Cowan Drain Flows

The Nith River flows reviewed for this assessment are located upstream at New Hamburg (Stn# 02GA018) and downstream at Canning (Stn# 02GA010). These two stations have flow and level monitoring starting in 1950. To estimate flows in the Cowan Drain, similar streams with flow monitoring were used. As indicated in XCG's previous report there are nearby flow gauges in the vicinity of the Cowan Drain that can be used to estimate the flow in the Cowan Drain. The Cowan Drain catchment area was previously indicated at between 4 and 4.5 km^2, an average value of 4.25 km^2 has been used for this evaluation. Nearby streams with streamflow gauges near the Cowan Drain were within 46 km, and had catchment areas from 2.19 to 27.7 km^2. Three streams within 20 km of the Cowan Drain and with similar catchment areas (i.e. less than 10 km^2) were chosen for this assessment. Table 1 provides the details on the three streams used to characterize flows for the Cowan Drain.

Table 1 – Streams Used to Estimated Flow in Cowan Drain

Streamflow Gauge Name	Stn#	Drainage Area (km^2)	Distance to Drumbo (km)
Hunsburger near Haysville	02GA045	7.34	15
Hunsburger near Schindelsteddle	02GA046	3.46	17
Silver Spring Creek neat Wilmot Centre	02GA044	2.19	17

A summary of the average, minimum and maximum flows for the periods monitored for the Nith River and representative streams is provided in Table 2 (based on monthly data from 1950). The flows are increasing in the Nith River as it passes the Cowan Drain point. But the amount contributed from the Cowan Drain will be small, based on the representative streams. Based on a ratio of the catchment areas of the representative streams to the Cowan Drain the expected average flow for the Cowan Drain would be 0.027, 0.044 and 0.046 m^3/s, respectively for the three streams or an overall average of 0.039 m^3/s. The Drumbo WWTP current and design average day flows are 0.0029 m^3/s (253 m^3/d) and 0.0035 m^3/s (300 m^3/d), resepectively. Therefore, the Drumbo WWTP is about 7.5% of the flow in of the Cowan Drain on an average basis but only 0.025% on average of the flow in the Nith River downstream of the Cowan drain discharge.

Figure 4 shows a comparison of the Nith River average flows in the vicinity of the Cowan Drain with the estimated flows for Cowan Drain based on representative streams and catchments areas. The vertical axis is a logarithmic scale since the flows are significantly different and the estimated Cowan Drain flow is expected to be less than 0.5% of the flow in the Nith River on an average basis.

Figure 5 shows a similar comparison for minimum flows, which indicates the estimate for the Cowan Drain flows would be about 3% of the minimum flow in the Nith River. The minimum Nith River flows are 1.52 m^3/s downstream of the Cowan Drain and the Drumbo WWTP average design flow is 300 m^3/d of 0.0035 m^3/s.

Low flow conditions in the Nith and the Cowan Drain were estimated from daily data from the upstream and downstream locations on the Nith River, and from representative streams for the Cowan Drain. Estimates of the winter and summer low flows (i.e. approximate 7Q20) was determined for each location based on the minimum 7-d moving average flow for each month. The average summer period was taken from April to September and winter from October to March. For the representative smaller stream used to estimate flow in the Cowan Drain, winter monitoring was limited to October and November (i.e. not monitored in other winter months). The average yearly minimum 7-d flow for the Nith River at Canning is shown in Figure 6. The 99.5% percentile minimum flow for this location (i.e.

approximate 7Q20) was determined to be 2.4 and 4.1 m^3/s, respectively for the summer and winter period.

Table 2 – Summary of Flows in Nith River and Representative Streams

Stream and Location	Flow (m^3/s)		
	Average	**Minimum**	**Maximum**
Nith River at New Hamburg (Upstream)	6.26	0.20	44.1
Nith River at Canning (Downstream)	11.65	1.52	67.3
Hunsburger near Haysville	0.076	0.034	0.17
Hunsburger near Schindelsteddle	0.022	0.011	0.047
Silver Spring Creek near Wilmot Centre	0.024	0.008	0.17

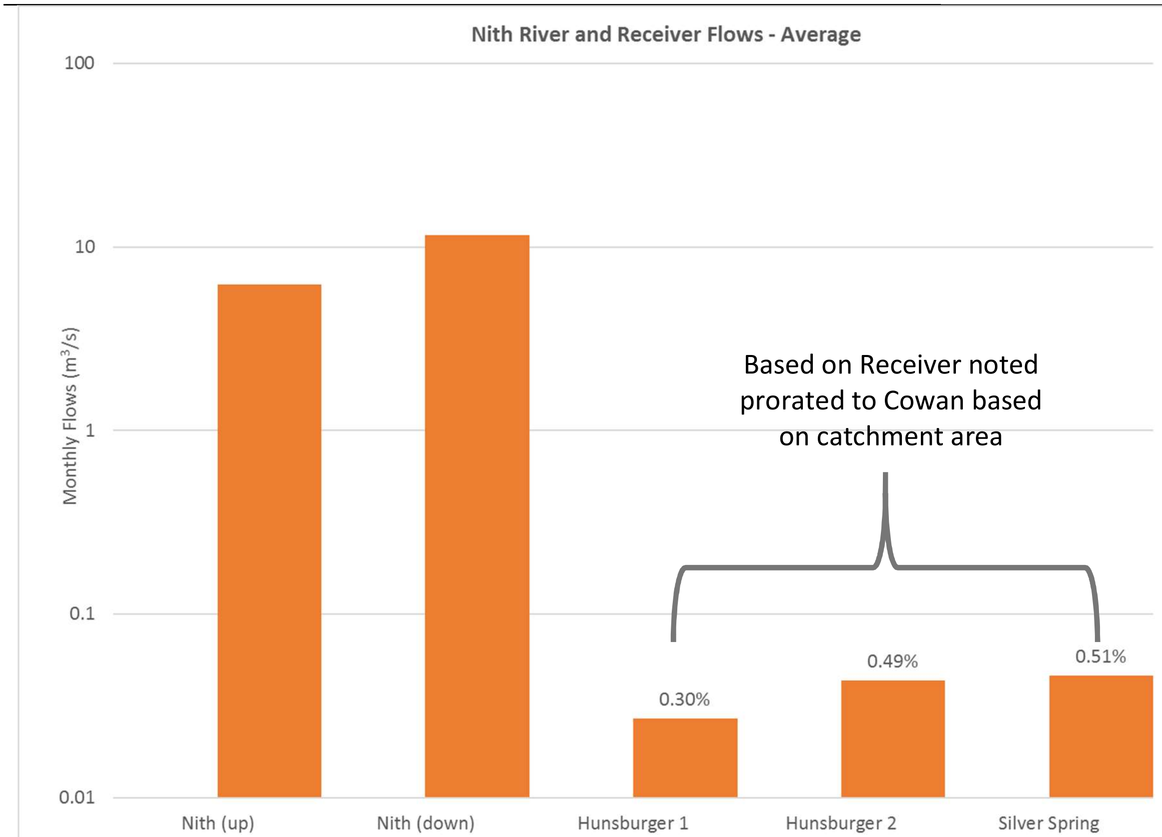

Figure 4. Comparison of Average Flows in Nith River and Estimated Flow for Cowan Drain based on Representative Streams

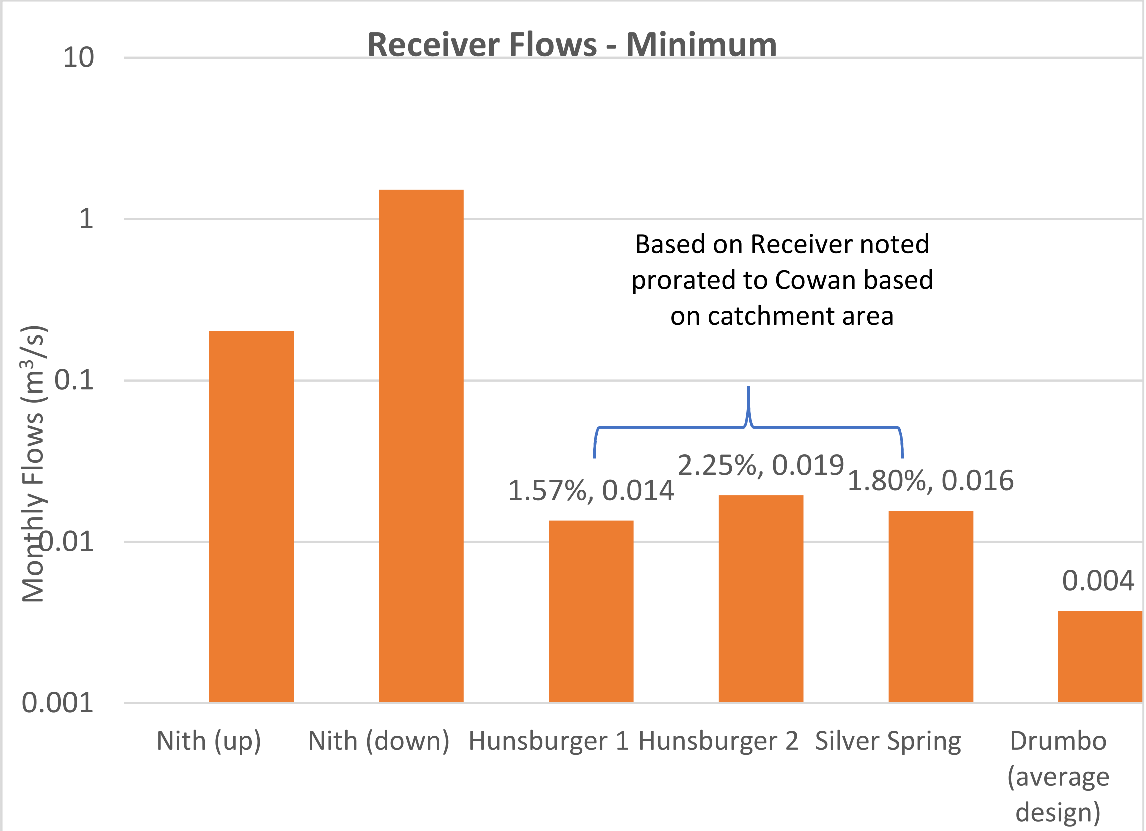

Figure 5. Comparison of Minimum Flows in Nith River and Estimated Flow for Cowan Drain based on Representative Streams

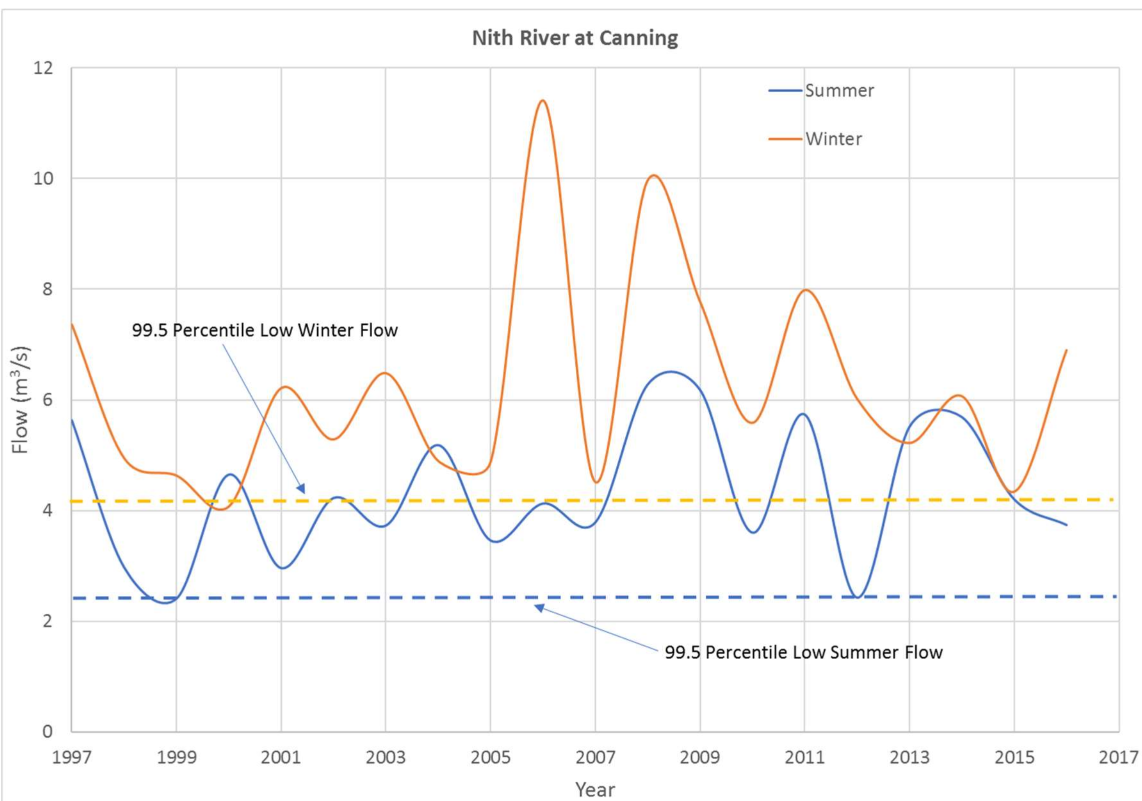

Figure 6. Minimum Monthly Flows for Nith River at Canning Based on Minimum 7-d Averages

A summary of the average, minimum, and 95th season flows is provided in Table 3. The Cowan Drain flows are based on the average of the values from the three representative streams based on the catchments areas of each compared to the catchment area for the Cowan Drain.

Table 3 – Summary of Flows in Nith River and Cowan Drain

Stream and Location	**Flow (m^3/s)**			
	Average	**Minimum**	**95th Quartile**	
			Summer	**Winter**
Nith River at New Hamburg (Upstream)	6.256	0.202	0.446	1.158
Nith River at Canning (Downstream)	11.646	1.520	2.409	4.106
Cowan Drain	0.039	0.016	0.017	0.020

Nith River and Cowan Drain Quality

Water quality is monitored in the Nith River at multiple locations in the vicinity of the Cowan Drain. Table 4 summaries the water quality for the two upstream monitoring stations (i.e. New Hamburg and Ayr) and the downstream monitoring station (i.e. Paris).

Table 4 – Water Quality for Monitoring Stations on the Nith River

Station/Statistic	**Parameter Concentration (mg/L) or Other**						
	DO	TP	NH_3-N	Un-Ionized NH_3-N (µg/L)	Nitrates	pH	Temp (°C)
New Hamburg							
• Average	11.2	0.114	0.074	3.84	3.18	8.20	14.9
• Minimum	6.2	0.027	0.002	0.10	0.01	7.36	0.0
• Maximum	21.4	0.581	0.425	66.87	9.86	8.97	28.6
• 3rd Quartile	12.3	0.116	0.083	3.85	4.56	8.32	22.1
• 1st Quartile	9.2	0.051	0.032	1.02	1.17	8.08	9.0
Ayr							
• Average	11.7	0.079	0.062	2.09	3.67	8.20	14.4
• Minimum	7.8	0.008	0.002	0.05	0.98	7.58	0.0
• Maximum	22.0	0.493	0.406	8.62	9.72	8.94	26.4
• 3rd Quartile	12.6	0.072	0.053	2.82	4.35	8.31	21.2
• 1st Quartile	10.1	0.018	0.021	0.73	2.61	8.11	8.1
Paris							
• Average	11.5	0.076	0.055	1.89	3.08	8.21	14.6
• Minimum	8.3	0.005	0.002	0.08	1.29	7.67	0.1
• Maximum	22.4	0.613	0.372	7.82	8.53	8.87	26.7
• 3rd Quartile	12.5	0.080	0.048	2.43	3.86	8.33	22.0
• 1st Quartile	9.6	0.015	0.019	0.76	2.03	8.10	8.2

Sampling was conducted on the Cowan Drain near the WWTP effluent (Site #1) and near the discharge into the Nith River (Site #2) in 2014 (i.e. 12 samples from April to December). A number of the BOD_5 analysis and the NH_3-N are indicated at less than the stated value, to be conservative the value indicated has been used. The results for similar parameters (no nitrate) are provided in Table 5.

Table 5 – Water Quality for Monitoring Sites on Cowan Drain

Station/Statistic	Parameter Concentration (mg/L) or Other						
	DO	TP	NH_3-N	Un-Ionized NH_3-N (µg/L)	Nitrates	pH	Temp (^oC)
Cowan Drain at WWTP (Site#1)							
• Average	3.8	0.132	0.167	2.09	NA	7.7	10.5
• Minimum	0.4	0.035	0.100	0.37	NA	7.5	0.5
• Maximum	7.2	0.338	0.300	6.13	NA	8.0	19.8
• 3rd Quartile	6.3	0.189	0.200	2.98	NA	7.9	17.8
• 1st Quartile	1.1	0.054	0.100	0.57	NA	7.5	4.5
Cowan Drain at Nith River (Site#2)							
• Average	8.5	0.05	0.13	8.81	NA	8.24	10.5
• Minimum	6.45	0.02	0.10	0.04	NA	6.5	1.0
• Maximum	13.2	0.13	0.30	26.4	NA	8.89	17.4
• 3rd Quartile	9.7	0.06	0.125	12.3	NA	8.55	16.0
• 1st Quartile	7.1	0.03	0.10	3.0	NA	8.22	5,1

Drumbo WWTP Performance

Currently the Drumbo WWTP operates under limits set by Amended Environmental Compliance Approval (ECA) Number 8752-9Q4H96, issued in February 2015. Table 6 summarizes the historical effluent concentrations and limits. Note that historical data includes years that operated under a different set of limits from an earlier certificate of approval (C of A).

It is shown that annual effluent and maximum month concentrations of $cBOD_5$ have remained consistently below effluent objectives. Maximum month concentrations of TSS, TAN, and TP have occasionally exceeded effluent objective concentrations, but annual average concentrations remain below effluent limits. In 2016 the effluent TSS and TAN concentrations exceeded the effluent limit in May. The TSS concentration also exceeded the effluent objective during seven months in 2016. Higher TSS concentrations may be indicating treatment limitations in the filtration process. Otherwise, effluent quality remains in compliance on average at current flows. Current flows averaged 260 m^3/d (87% of current rated capacity) from 2009 to 2016 with a maximum year flow of 290 m^3/d in 2013.

Table 6 - Historical Final Effluent Concentrations

Year	Average Concentrations (mg/L)				
	$cBOD_5$	TSS	TAN (May – Oct)	TAN (Nov – Apr)	TP
2009[1]	4.9	5.3	0.8	0.8	0.19
2010[1]	4.3	4.3	0.6	0.6	0.17
2011[1]	4.3	4.9	**0.7**	**0.7**	0.14
2012	2.3 (3.0)[2]	4.6 (7.0)	1.1 (2.2)	1.2 (2.0)	0.20 (0.36)
2013	2.4 (4.2)	5.6 (7.5)	1.4 (2.2)	2.0 (3.3)	0.17 (0.26)
2014	2.3 (3.0)	5.4 (7.5)	1.2 (1.7)	2.5 (4.3)	0.20 (0.32)
2015	2.7 (3.5)	5.2 (7.2)	1.9 (2.6)	1.6 (2.9)	0.23 (0.32)
2016[3]	2.0 – 6.0	2.2 – 11.9	0.5 – 3.2	0.6 – 4.1	0.1 – 0.3
Average	**3.15 (4.2)**	**5.06 (7.5)**	**1.1 (2.6)**	**1.4 (4.5)**	**0.19 (0.36)**
Effluent Objective	**4.7**	**4.7**	**1.8**	**3.6**	**0.27**
Effluent Non-Compliance	**9.3**	**9.3**	**2.7**	**4.5**	**0.46**

[1]Only average data available

[2] Value in brackets is maximum value

[3] 2016 data presented as minimum and maximum concentrations

Overall Flow, Concentrations and Process Loading

Table 7 shows the historical concentrations from the WWTP, Cowan Drain and the Nith River. The results indicate that the concentration in the Cowan Drain are similar to the effluent from the Drumbo WWTP for BOD_5, TSS and TP. Total ammonia-N concentration in the Cowan Drain are generally significantly less that the effluent from the plant and hence the un-Ionized ammonia is also less in the receiver. The total ammonia-N concentration in the Cowan Drain is higher than that in the Nith River, both upstream and downstream of the discharge of the Cowan Drain. Based on loadings using the average design flow for the WWTP and the 95% percentile low summer flows for Cowan Drain and the Nith River, the WWTP is a significant loading to the Cowan Drain (TAN and TP), but reasonable small for the Nith River. The calculated loadings are provided in Table 8. The WWTP TP loading is about 30% of the TP loading downstream of the plant. The ammonia loading is potentially the majority of the ammonia loading downstream of the plant.

Therefore, to minimize impacts to the Cowan Drain it would appear the design loading should remain unchanged for ammonia-N and TP at increasing capacity. The impact of BOD_5 and TSS is limited and should be able to remain at current limits.

Table 7 - Historical Concentrations in Nith River, Cowan Drain and Drumbo WWTP

Location	**Concentration (mg/L)**				
	$cBOD_5$	TSS	TAN	Un-Ionized NH_3-N	TP
Drumbo WWTP	3.15	5.06	1.25	0.012[1]	0.19
Cowan Drain Upstream	3.17	14.00	0.17	0.0021	0.13
Cowan Drain Downstream	2.58	7.83	0.13	0.0088	0.05
Nith River at New Hamburg	NA	NA	0.074	0.0038	0.11
Nith River at Ayr	NA	NA	0.062	0.0021	0.079
Nith River at Paris	NA	NA	0.055	0.0019	0.076

Table 8 - Historical Loadings in Nith River, Cowan Drain and Drumbo WWTP

Location	**Loading (kg/d)**				
	$cBOD_5$	TSS	TAN	Un-Ionized NH_3-N	TP
Drumbo WWTP	0.945	1.518	0.375	0.0036	0.057
Cowan Drain Upstream	4.782	21.118	0.256	0.0032	0.196
Cowan Drain Downstream	3.892	11.811	0.196	0.0133	0.075
Nith River at New Hamburg	NA	NA	2.854	0.1465	4.242
Nith River at Ayr	NA	NA	7.648	0.2590	9.745
Nith River at Paris	NA	NA	11.448	0.3955	15.819

[1]Upstream Cowan pH and Temperature

Conclusions and Recommendations

The Drumbo WWTP discharges to the Cowan Drain, a small receiver, that flows 3.55 km from the WWTP effluent to the Nith River. The Cowan Drain roughly follows Oxford County Rd 29 (although first north of the County road) and discharges into the Nith River at the Oxford County Road 29 bridge over the Nith River, about half way between Ayr and Paris.

Flows in the Cowan Drain were estimated from similar small receivers in the area with similar catchment areas. Flows in the Nith River are measured upstream and downstream of the point the Cowan Drain discharges into the Nith, upstream at New Hamburg and downstream at Canning. Water quality monitoring was undertaken in the Cowan Drain in 2014, in total twelve samples were taken. Monitoring in the Nith River occurs a New Hamburg and Ayr (upstream of Cowan Drain discharge) and at Paris (downstream of Cowan Drain discharge).

The Drumbo WWTP is about 7.5% of the flow in of the Cowan Drain on an average basis but only 0.025% of the flow in the Nith River downstream of the Cowan Drain discharge. However, the concentrations in the WWTP effluent for ammonia-N and TP in particular are greater than the Cowan Drain and the Nith River. The Drumbo WWTP is however a small loading to the Nith River. For continued discharge to the Cowan Drain it is expected that limits for ammonia and TP would be maintained at a constant loading to the current limiting loadings.

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Abbreviations/Nomenclature

The following abbreviation/nomenclature are used in this TM:

1. ADF – Average Daily Flow
2. $cBOD_5$ – 5-day Carbonaceous Biological Oxygen Demand
3. BOD_5 – 5-day Biological Oxygen Demand
4. cfu/100mL – colony forming units per 100 mL
5. d – days
6. hr – hours
7. kg/d – kilograms per day
8. mg/L – milligrams per litre
9. TAN – total ammonia nitrogen
10. TKN – Total Kejdhal Nitrogen
11. TM – Technical Memorandum
12. TP – Total Phosphorus
13. TSS – Total Suspended Solids
14. WWTP – Wastewater treatment plant
15. UV - Ultraviole

Appendix E
Cost Summary

Drumbo WWTP
Life Cycle Costing of SBR and MBR Option

Conceptual Cost Estimates

Capital Costs

Items	Option		
		MBR	
	SBR/Filters	Vendor #1	Vendor #2
General/Misc.	$286,450	$286,450	$286,450
Headworks	$317,800		
Disinfection	$76,500		
Tertiary Filtration	$345,750		
Secondary Treatment (SBR or MBR)	$634,250	$2,289,421	$1,480,000
Other Plant Improvements	$202,800	$97,500	$97,500
Sub Total	$1,863,550	$2,673,371	$1,863,950
General Requirements (15%)	$279,533		
Contingency (20%)	$372,710	$534,674	$372,790
Engineering (15%)	$377,369	$481,207	$335,511
Total	$2,893,161	$3,689,252	$2,572,251
Roundup	$2,893,000	$3,689,000	$2,572,000

O&M Costs

Items	Option		
		MBR	
	SBR/Filters	Vendor #1	Vendor #2
Labour	$23,750	$23,750	$23,750
Energy	$63,072	$102,492	$102,492
Chemicals	$43,800	$44,800	$44,800
Equipment Maintenance	$27,953	$40,101	$40,101
Equipment Replacement	$26,636	$69,601	$69,601
Sludge Haulage	$46,800	$46,800	$46,800
Total	$232,011	$327,544	$327,544
Roundup	$232,000	$328,000	$328,000

Life Cycle

Items	Option		
		MBR	
	SBR/Filters	Vendor #1	Vendor #2
Capital	$2,893,000	$3,689,000	$2,572,000
25 Year NPV O&M	$4,067,000	$5,750,000	$5,750,000
25 Year Lifecycle	$6,960,000	$9,439,000	$8,322,000

Appendix F
County Council Report (June 13, 2018)

Oxford County
growing stronger...together

Report No: PW 2018-27
PUBLIC WORKS
Council Date: June 13, 2018

To: Warden and Members of County Council

From: Director of Public Works

Drumbo Wastewater Treatment Plant Expansion Class Environmental Assessment Study

RECOMMENDATIONS

1. **That County Council receive the information contained in Report No. PW 2018-27 as an update on the recommended design alternative for the Drumbo Wastewater Treatment Plant Expansion Class Environmental Assessment Study;**

2. **And further, that Council direct staff to present the recommendation of expanding the Wastewater Treatment Plant at the existing site to service Drumbo at a Public Information Centre and, subject to comments received, finalize the Environmental Study Report and issue a Notice of Completion for the Class EA Study.**

REPORT HIGHLIGHTS

- This Report provides an update on the recent work completed for the Drumbo Wastewater Treatment Plant (WWTP) Expansion Class Environmental Assessment (Class EA) Study including the recommended design alternative.
- The recommended works include replacing the existing Sequencing Batch Reactor (SBR) plant with a Membrane Bioreactor (MBR) plant rated at 450 m^3/d, capable of servicing a population of approximately 1,800.

Implementation Points

Following Council approval, staff will proceed with holding a final Public Information Centre in Drumbo to advise residents of the preferred solution and, subject to comments received, will finalize the required Environmental Study Report (ESR) and issue a Notice of Completion for the Class EA Study.

Class EA Studies are subject to a mandatory 30-day public review period during which time any member of the Public or a review Agency may apply to the Ministry of the Environment and Climate Change for a Part II Order requiring the County to undertake additional work or measures. Should no Part II Order be received, staff will proceed with the detailed design of the preferred alternative with construction anticipated to begin in 2019/2020.

Financial Impact

The cost of the detailed design for the preferred alternative has been included in the approved 2018 Capital Plan.

Previous cost estimates for the engineering and construction of the works was $3.06M to $5.94M. Current cost estimates based on the preferred alternative and the increased growth allotment is $3.7M. The updated cost estimate will be included in the 2019 capital budget. It is estimated that the technology change from SBR to MBR will increase operation and maintenance costs for the system by $100,000 largely due to increased electricity costs and periodic membrane replacement. These costs will be incorporated into the next rate study for the Drumbo wastewater system in 2020. The existing rates can accommodate the increased operational costs until that time.

The Treasurer has reviewed this report and agrees with the financial impact information.

Risks/Implications

The completion of the ESR at this time is necessary to allow the expansion of the Drumbo WWTP to proceed without delay. The Plant is currently nearing capacity under its Environmental Compliance Approval (ECA) and during wet weather events has difficulty maintaining compliance. Failure to address these non-compliance situations in a timely manner could result in orders and/or charges by the Ministry of the Environment and Climate Change.

Strategic Plan (2015-2018)

County Council adopted the County of Oxford Strategic Plan (2015-2018) at its regular meeting held May 27, 2015. The initiative contained within this report supports the Values and Strategic Directions as set out in the Strategic Plan as it pertains to the following Strategic Directions:

1. ii. ***A County that Works Together*** – Enhance the quality of life for all of our citizens by:

- *Maintaining and strengthening core infrastructure*

3. iii. ***A County that Thinks Ahead and Wisely Shapes the Future*** - Demonstrated commitment to sustainability by:

- *Ensuring that all significant decisions are informed by assessing all options with regard to the community, economic and environmental implications*

4. i. ***A County that Informs and Engages*** - Harness the power of the community through conversation and dialogue by:

- *Providing multiple opportunities for public participation and a meaningful voice in civic affairs*
- *Fostering greater involvement in County and community events and/or program/project implementation*

DISCUSSION

Background

The County began the Drumbo WWTP Expansion Class EA Study in 2012 with Council approval of Report No. PW 2012-59. Over the past six years, staff and two engineering consulting firms have reviewed numerous alternatives and design concepts. In March of 2017, through Report No. PW 2017-17, Council approved proceeding with the alternative to expand the WWTP at the existing site in Drumbo.

Since March of 2017, Public Works and Community Planning staff and the consultant have reviewed and clarified the growth projections, which includes an evaluation of the existing approved development for Drumbo and the Township of Blandford Blenheim as a whole, and evaluated different technologies to determine the preferred design concept.

Comments

The work originally completed on the Drumbo WWTP Class EA Study had settled on a design flow rate of 322 m^3/day which provided for additional capacity for the approved development and potential infill lots, but not for other growth lands within the village boundary. During consultation, residents and representatives of the Township expressed concern that the proposed capacity may limit future development in the village (beyond approved development and potential infilling).

The project team undertook a detailed review of population and growth projections at the Township level and an assessment of land availability within the Township's serviced villages (Drumbo and Plattsville), and confirmed that based on the availability of residential growth lands in the Village, the capacity of the WWTP should be increased to a design flow rate of 450 m^3/day.

This increase in capacity in turn narrowed the technology options due to the treatment requirements to meet the expected effluent criteria. As an SBR plant would not likely be capable of meeting effluent requirements, primarily for phosphorus, of the MOECC at the 450 m^3/day rated capacity, the recommended design alternative is to expand the Drumbo WWTP at the existing location utilizing MBR technology.

The project team reached out to three suppliers of modular MBR treatment systems for cost estimates. Two estimates were received and ranged from $2.6M to $3.7M which is in line with previous capital cost estimates. The modular MBR option also has the added flexibility of being able to add additional membrane units as development occurs, thereby deferring capital costs.

The MBR option does have higher operational costs in comparison with the SBR option largely due to higher electricity costs and the need to replace membranes on a periodic (10-year) basis. It is estimated that Operation and Maintenance costs for the expanded system will be approximately $350,000 per year which represents a $15 - $20 per customer increase over the SBR option. The increased costs will be built into the next rate study for the Drumbo

Wastewater system which is planned to be undertaken in 2020. The existing rates can accommodate the increased operational costs until that time.

Conclusions

Staff recommend proceeding with presenting the recommended design alternative at a final Public Information Centre and, subject to comments received, issuing a Notice of Completion for the Class EA Study.

Following a 30-day comment period and subject to no Part II Orders being received, staff will proceed with the design and construction of the proposed works.

SIGNATURES

Report Author:

Original signed by:

Deborah Goudreau, P.Eng.
Manager of Water and Wastewater Services

Departmental Approval:

Original signed by:

David Simpson, P.Eng., PMP
Director of Public Works

Approved for submission:

Original signed by:

Peter M. Crockett, P.Eng.
Chief Administrative Officer

Appendix G
Consultation

Drumbo Wastewater Treatment Plant Class Environmental Assessment

Summary of Public and Agency Consultation Program

Submitted to: Mr. Mark Maxwell
Project Engineer
Oxford County

Submitted by: Dianne C. Damman, Principal
D.C. Damman and Associates

June 1, 2017

Table of Contents

List of Appendices

Drumbo Wastewater Treatment Plant Class EA
Summary of Public and Agency Consultation Program

1.0 INTRODUCTION AND PURPOSE

1.1 Background

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP) which provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a current rated capacity of 300 m^3/day.

In June 2013, Oxford County initiated a Class Environmental Assessment (EA) to develop a wastewater servicing plan for the Community of Drumbo to service planned growth in the community in a cost-effective, environmentally sound and sustainable manner. The Drumbo WWTP Class EA also considered the potential to provide servicing for the Community of Princeton at an expanded or a new Drumbo WWTP. The Community of Princeton is currently serviced by private sewage systems.

The study was undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, June 2000, as amended in 2007, 2011 and 2015), and included opportunities for public comment. Phases 1 and 2 of the Municipal Class EA process were completed.

Public Consultation Centres (PCCs) were held on June 16, 2016 and May 16, 2017 to provide information on the study and to receive comments from the public.

1.2 Purpose

Public and agency consultation was an important component of Phases 1 and 2 of the Class EA process, including consultation with regulatory and review agencies, interested stakeholders, the public and Aboriginal peoples. The purpose of this report is to document the consultation that was undertaken during Phases 1 and 2 of the Class EA process.

2.0 NOTIFICATIONS

Members of the public and those on the project mailing list (see Section 6.0), which included agencies, stakeholders, adjacent residents/property owners and Aboriginal peoples, were provided with project notifications through direct mail outs at key points in Phases 1 and 2 the Class EA process. These notifications were also published in local newspapers. In addition, all Drumbo and Princeton residents received notification of the Public Consultation Centres (PCCs) through Canada Post mailbox delivery.

The following provides details on the Notice of Commencement and the Notice of PCCs.

2.1 Notice of Commencement

A Notice of Commencement for the Drumbo Class EA was published in the Oxford Review on July 4 and 11, 2013. It was also posted on the Oxford County web site on June 28, 2013.

Information on the County's Drumbo Wastewater Treatment Plant (WWTP) was provided in the notice, along with information on the Class EA process and opportunities for public input. Questions or comments on the study were invited and contact information for the Oxford County project manager was provided. The Notice of Commencement newspaper advertisement is provided in Appendix A-2.

In addition, a Notice of Commencement letter was mailed to those on the project contact list on July 11, 2013. This mailing included letters to federal, provincial and municipal agencies, utilities, Aboriginals, special interest groups and stakeholders. Residents/Property Owners located adjacent to the Drumbo and WWTP were also mailed notices. Examples of these letters are provided in Appendix A-2.

The Notice of Commencement was also posted on the Oxford County web site on June 28, 2013.

2.2 Notice of Public Consultation Centres (PCCs)

Two (2) Public Consultation Centres (PCCs) were held to provide an opportunity for members of the public to obtain information on Phases 1 and 2 of the Class EA process, the alternative solutions, the evaluation of these alternatives and the recommended preferred alternative. It was also an opportunity for members of the public to obtain responses to questions and provide comment and input to the study.

Public Consultation Centre No. 1

The first PCC was held on June 16, 2016 at Princeton Centennial Hall in Princeton, Ontario. The Notice of PCC No. 1 was published in the Oxford Review on June 2 and 9, 2016 and in the Ayr News on June 8 and 15, 2016.

A copy of this notification is included in Appendix A-4. A Notice of PCC No. 1 was also posted on the County's web site on May 31, 2016. The PCC was also advertised on signage at the Drumbo and Princeton Fire Stations.

In addition, a letter of notification for PCC No. 1 was sent to those on the project contact list on June 6, 2016, as well as to all residents/property owners located adjacent to the Drumbo WWTP. Examples of these letters are provided in Appendix A-4.

Public Consultation Centre No. 2

The second PCC was held on May 16, 2017 at the Drumbo Agricultural Hall in Drumbo. The Notice of PCC No. 2 was published in the Oxford Review on May 4 and 11, 2017 and in the Ayr News on May 3 and 10, 2017.

A copy of this notification is included in Appendix A-5. A Notice of PCC No, 2 was also posted on the County's web site on April 27, 2017.

In addition, a letter of notification for PCC No. 2 was sent to those on the project contact list on May 1, 2017, as well as to all residents/property owners located adjacent to the Drumbo WWTP. In addition, Canada Post inserted the notice in all mail boxes in Drumbo and Princeton. Examples of these letters are provided in Appendix A-5.

3.0 STEERING COMMITTEE

A Steering Committee was formed to provide advice to the project team and to participate in the Class EA process. Membership was by invitation, with the Steering Committee consisting of representatives from the following:

- Warden, Oxford County;

- Public Works, Oxford County;
- Community and Strategic Planning, Oxford County;
- Public Health and Emergency Services, Oxford County;
- Township of Blandford-Blenheim Planner, Oxford County;
- Township of Blandford-Blenheim, Mayor;
- Township of Blandford-Blenheim, CAO;
- Township of Blandford-Blenheim, Councillor;
- Ministry of the Environment and Climate Change (MOECC); and
- Grand River Conservation Authority.

A list of Steering Committee members is provided in Appendix A-3. Two meetings of the Steering Committee were held on June 27, 2016 and January 26, 2017, respectively. The following items were discussed at the June 27, 2016 Steering Committee meeting:

- Background – Drumbo WWTP Class EA and Princeton Servicing Study;
- Class EA Process – Role of the Steering Committee and Approach to Public Consultation;
- Problem / Opportunity Statement;
- Alternatives Being Considered;
- Public Consultation Centre No. 1;
- Next Steps and Schedule; and
- Questions and Discussion.

The following items were discussed at the January 26, 2017 Steering Committee meeting:

- Review and Approval of Steering Committee No. 1 Meeting Notes;
- Comments on Technical Memoranda 1 and 2;
- Evaluation Process;
- Evaluation of Alternative Solutions;
- Recommended Preferred Alternative Solution;
- Next Steps and Schedule – County Council; Public Consultation Centre No. 2; Next Steering Committee Meeting; Phases 3 and 4 of Class EA; Phase 5 – Design and Construction;
- Other Business – Results of Princeton Surface Water Sampling Program; Outreach and Education Program on the Operation and Maintenance of Your Septic System; and

- Questions and Discussion.

Appendix A-3 contains the agendas, presentations and meeting notes for the Steering Committee meetings.

4.0 PUBLIC CONSULTATION CENTRE NO. 1

The first PCC was held from 6:30 p.m. to 8:30 p.m. on June 16, 2016 at the Princeton Centennial Hall in Princeton, Ontario. The PCC was a drop-in format with display boards available for viewing and an opportunity for one-on-one discussions with project team members. Members of the project team, including Oxford County and consultant representatives, were available to provide and discuss information on the study, and to receive comments and input.

A Comment Sheet and Handout were available for attendees. The display boards provided information on:

- Welcome;
- Purpose of PCC No. 1;
- Background – Drumbo WWTP Class EA;
- Location of Drumbo WWTP;
- Background – Princeton Wastewater Servicing Study;
- Municipal Class Environmental Assessment Process;
- Problem / Opportunity Statement;
- Alternatives Being Considered;
- Evaluation Methodology;
- Proposed Next Steps and Schedule; and
- Contact Information and Request for Comments.

The PCC materials were also posted on the Oxford County web site.

Table 1 summarizes the comments received. Fifty-four (54) people signed the Attendance Record for the PCC. Fifteen (15) completed Comment Sheets and two (2) e-mails were submitted to the County (see Appendix A-4).

Table 1: Summary of Public Information Centre Comments

Comment Sheet Question	Responses Provided on Completed Comment Sheets	Responses to Comments Received
Please provide any comments on the Problem/Opportunity Statement.	• we would like to see this system started asap • meetings for meeting for meeting are a waste of time and money	• comments noted; no response required
	• now is the time for a sewage system – not 8 – 10 years from now • Princeton seems to be the forgotten village in Oxford County	• comments noted; no response required
	• to see growth in Princeton, we need to be included in the wastewater plan	• comments noted; no response required
	• why will we have to pay for sanitary when we are and shouldn't have had to pay for watermain that also didn't include hydrants • we paid $9500 for water • the developer should have to pay for this	• comments noted; no response required
	• we don't believe we need this in Princeton • there is nothing here to attract anyone – no school, no bank, a park that never gets used, churches that are ready to close • if Van Wees wants this – let him pay for it! • why should we pay for something we don't want or need to benefit one person	• comments noted; no response required
	• an aerial shot of both Drumbo and Princeton would be helpful • something needs to be done as size of lots in drastic changes	• comments noted; aerial plan to be provided at PCC No. 2
	• not pleased with your options that omit Princeton • Princeton needs to be included • we are an important village in this Township but are slowly dying • we are close to 403 and 401 so growth would happen here if we had wastewater treatment (sewer systems) • why are we being left out of the growth plans for the Township?!	• comments noted; no response required

Comment Sheet Question	Responses Provided on Completed Comment Sheets	Responses to Comments Received
	• Drumbo is growing, Princeton is not • it is a community that has literally built maybe five homes in the last 40 years • a town keeps its charm by being what it is – a small community, a farming community • adding the sewer to accommodate a 324 house subdivision would rape Princeton of its charm and appeal, not to mention the fact that no one wants this sewer • as a resident of Princeton for at least 29 years, I can honestly say that I have not come across one person who is in favour of this sewer … other than two individuals who stand to profit from it	• comments noted; no response required
	• the economic stability of this project relies solely on the concept of selling 324 development lots • the fact is Princeton is not a booming suburbia and there is a great likelihood that the economic side of things will not pan out for these developers • this would only create higher taxes because someone would eventually have to pay for these sewage systems to be implemented into a vacant and useless development area • not to mention that we enjoy our town being a small tight knit community • socially this implementation only helps two main people and out of town developers	• comments noted; no response required
	• I have but one comment regarding Princeton • if the "local landowner" wants this project to go forward in Princeton so that said "local landowner" wants to make their millions of dollars then may I propose that the above mentioned "local landowner" pay for this project • I do not in any way feel like paying another astronomical amount of money to stuff said "local landowner's" pockets	• comments noted; no response required

Comment Sheet Question	Responses Provided on Completed Comment Sheets	Responses to Comments Received
	• my initial response is that this will be a very expensive project undertaken because certain people, namely those trying to develop lots in Princeton and advocates of same project will benefit financially and the villages will grow disproportionately • take a good look at Ayr which used to be a nice village and is now very busy and more citified • let Princeton people who need new septic systems upgrade them themselves, if necessary, the same as all rural road residents	• comments noted; no response required
	• concerns – solution 5A/5B – best for future growth for both communities • type of treatment facility • location – i.e., odours, noise (equipment and traffic) • receiving stream – Cowan Drain – already lots of algae • discharge limits would be tight due to limited dilution of Cowan Drain • operational cost increase • housing increase / population increase for both communities - good	• comments noted; no response required
	• we would be interested in Alternatives 4 or 5, considering economic and other impacts related to these options	• comments noted; no response required
Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.	• the comment was made by one of the County representatives that there is no growth in Princeton; which leads us to believe the County wants it that way	• comments noted; no response required
	• do Drumbo only – leave Princeton as is	• comments noted; no response required
	• I do not support a WWTP for Princeton • the landowner supporting this study stands to profit substantially from the sale of lots for future development • therefore, allow him to pay for the upgrades necessary to allow the sale of his lots	• comments noted; no response required

Comment Sheet Question	Responses Provided on Completed Comment Sheets	Responses to Comments Received
	• possible notice of dates in tax bill/posters of notice in due time of meeting • cost of any expense to Princeton residents and what possible grants are allotted for such a major future plan should it need to be expanded in another 20 years due to growth	• comments noted; no response required
	• one WWTP would suit both communities from a growth and environmental standpoint • few different WWTPs to choose from to keep capital and operational costs lower depending on discharge requirements	• comments noted; no response required
	• Princeton requires a sewer system to address the aging septic systems; I hope a cost effective solution is found	• comments noted; no response required
	• expanding the Drumbo WWTP (Alternative 2) makes the most sense • it helps Drumbo and doesn't require Princeton to get caught up in in for no reason other than people trying to make a profit at the cost of a community	• comments noted; no response required
	• Alternative 2 – service Drumbo at an expanded Drumbo WWTP makes the most sense • this plan helps Drumbo expand without disrupting the community of Princeton	• comments noted; no response required
Please provide any other comments.	• there would be growth here if Princeton was brought up to date with the infrastructure that Drumbo, Plattsville and other villages have	• comments noted; no response required
	• over 75% of septics in Princeton have reached their expiry dates • we need the County to see the vision of growth in Princeton, not just Drumbo and Plattsville; we cannot grow without sewers	• comments noted; no response required
	• thankful of information right here for Princeton people • should be in Drumbo as well for them if time and facility allows	• comments noted; no response required

Comment Sheet Question	Responses Provided on Completed Comment Sheets	Responses to Comments Received
	• I moved to a small town and I would like to continue to live in a small town • I came from a city to retire here and I would like to keep it the way it is • the landowner in question would bankrupt all residents for his own purposes – to make a buck at others expense • I strongly disagree with this procedure • Princeton is a beautiful and friendly community – let's keep it that way • P.S. – if the landowner wants to develop Drumbo it's easier 401 access	• comments noted; no response required
	• if this sewer goes in, who will pay for it – I don't have the money – where is the money coming from for me to pay for my sewer • this whole sewer debate is basically two people saying that everyone in Princeton wants a sewer – that's a lie • when someone tells you that they want a sewer and the whole town agrees, remember that this person forgot to check with the rest of us	• comments noted; no response required
	• this plan of implementing a sewer system would not benefit me • I have spoken with many in the town of Princeton and most simply cannot foot the bill (even at a discounted cost) • if the two main people pushing for this sewer system would like to foot the bill for everyone in this town, then I'd be all for it • as that is not likely to happen, I ask that you please consider us "less than rich" folks as we make up the majority of this town	• comments noted; no response required
	• comment on idea of a treatment plant located between Drumbo and Princeton with it possibly discharging into the creek that runs through our farm	• comments noted; County provided a response on July 13, 2016 noting that no decision has been made

Comment Sheet Question	Responses Provided on Completed Comment Sheets	Responses to Comments Received
	• I am opposed to this idea because I do not want our creek ruined by the runoff • can you guarantee that the runoff is always properly treated? • my father-in-law believes his creek was ruined by the runoff from the existing treatment plant and I do not want that to happen here • I think the best solution is to enlarge the plant in Drumbo • why do you need a subdivision in Princeton when there are a lot of empty lots in the "Mud Hole" subdivision in Drumbo	regarding the need for and location of a possible WWTP to service Drumbo and Princeton; consequently, no decision regarding a possible discharge for a new WWTP has been made
	• there is no need for our lot to connect to municipal sanitary servicing at this time, as our current septic system is operating as intended • our lot is large enough to support a replacement which would have sufficient longevity for use while we live here • we are still paying off fees associated with the water service connection • additional costs over and above the connection fee and monthly bill include but may not be limited to external and internal plumbing, yard restoration, removal of exiting septic tile / tank, etc. • the drive for providing wastewater servicing to Princeton is to support local development and to serve existing users on holding tanks is assumed • do not support the need for municipal wastewater in Princeton as we have no present requirement for it and certainly no desire for the additional financial burden that accompanies it	• comments noted; no response required

5.0 PUBLIC CONSULTATION CENTRE NO. 2

The second PCC was held from 6:00 p.m. to 8:00 p.m. on May 16, 2017 at the Drumbo Agricultural Hall in Drumbo, Ontario. The PCC was a drop-in format with display boards available for viewing and an opportunity for one-on-one discussions with project team members. Members of the project team, including Oxford County and consultant representatives, were available to provide and discuss information on the study, and to receive comments and input.

A Comment Sheet and Handout were available for attendees. The display boards provided information on:

- Welcome;
- Problem / Opportunity Statement;
- Municipal Class Environmental Assessment Process;
- Background – Drumbo WWTP Class EA;
- Location of WWTP;
- Community of Drumbo – Draft Approved Subdivisions and Potential Infill Development;
- Alternative Solutions Considered;
- Alternatives Evaluation Process;
- Evaluation Methodology;
- Evaluation of Alternatives;
- Summary of Alternative Evaluation;
- Recommended Preferred Alternative;
- Rationale for Selection of Preferred Alternative;
- Servicing Beyond 20-Year Horizon;
- Proposed Next Steps and Schedule; and
- Contact Information and Request for Comments.

The PCC materials were also posted on the Oxford County web site.

Table 2 summarizes the comments received. Thirty-eight (38) people signed the Attendance Record for the PCC. Eight (8) completed Comment Sheets and three (3) e-mails were submitted to the County (see Appendix A-5).

Table 2: Summary of Public Information Centre Comments

Comment Sheet Question	Responses Provided on Completed Comment Sheets	Responses to Comments Received
Please provide any comments on the recommended preferred alternative – i.e., Alternative 2.	• I do not want sewers put in Princeton	• comments noted; no response required
	• no wastewater treatment in Princeton	• comments noted; no response required
	• I would like to know when the Princeton WTP issue will be addressed	• comments noted; no response required
	• Princeton needs sewers; the pollution must be there or why did we need water; before we have another Walkerton, do something	• comments noted; no response required
	• this would be the high end of what I would want to see • more growth only increases costs of infrastructure, taxes, eats up farmland and brings the city to the villages and erodes the charm of living in a low density environment • Princeton can do what they want to promote growth but leave Drumbo out of it and the associated crowds and costs	• comments noted; no response required
	• Alternative 5 or 6 – 6 would be Princeton generate / expand its own wastewater system	• comments noted; no response required
	• in favour of Drumbo servicing Princeton or Princeton having own system	• comments noted; no response required
	• totally opposed to sewers coming into Princeton as I will still be paying off my water debenture plus I cannot afford the cost of getting sewer hooked up to my house or monthly charge • I also know that a lot of other residents in the village are in the same boat that my wife and I are, and are not interested in having sewers • I really feel it is a small group that are pushing this again and again and they are only pushing it to increase the chance of selling lots on the property they own	• comments noted; no response required

Comment Sheet Question	Responses Provided on Completed Comment Sheets	Responses to Comments Received
	• I for one live in Princeton because it is a small village and do not want to see it's number increase	• comments noted; no response required
	• in favour of a Princeton sewer solution • the Dillon cost of approximately $6 million to service Princeton is the same as the Drumbo expansion cost per connection – Princeton $29,000 for 207 connections; Drumbo approximately $3 million divided by 90 = $33,000 – for 90 connections • Embro sewer $8,357,458 divided by 300 connections = $27,858 / connection • Princeton costs are in line (Talbotville) • Sothwold Township is currently installing a new terra system; CAO is pleased so far, costing is coming in as quoted; same receiver as Nith type • may be a good idea to investigate Sothwold?	• comments noted; no response required
	• to put waste management in Princeton supports the issues some homeowners are having • it is also required for expansion, for 100 to 300 new homes to be developed • it is trying to draw new families into the village • my main issue with this apart from cost, is without a public school, why would families come into the village • they have better options with Drumbo, Tavistock and Plattsville • we currently don't have any issues, however, expansion should not be the only consideration to put sewer in • don't agree with joining the Drumbo process – that is providing too many opportunities for failure, and will limit any expansion possibilities	• comments noted; no response required
	• we currently live in an 800 square foot home which we will grow out of very quickly • an option we've been looking into is building an addition but our current septic prevents that	• comments noted; no response required

Comment Sheet Question	Responses Provided on Completed Comment Sheets	Responses to Comments Received
	• our septic is on its last legs (like most are in Princeton) so we will either need to repair / upgrade or get sewer lines installed • also, considering the roads are being done in ~ 2020, it is very counterproductive and a waste of tax payers money to not add sewers at the same time rather than tearing them up 10+ years down the road • a very big concern to us is the contamination discussed • in our opinion, if there was any contamination found, why is it even a question to put sewers in • most septic systems will need to be replaced in the very near future • we don't want to have to pay to have ours done then 5 to 10 years down the road have to pay for the sewers	
Please provide any other comments.	• people in Princeton are not managing their systems or no systems would be over 30/35 years • but instead people tell us their system is 60 years • big brother system of your neighbour (who you live beside daily) complaining about your waste issues also isn't happening to the degree of stories people have shared • just ask people of Princeton of what they see – otherwise, straw on yard, extra dirt added to yard, etc.	• comments noted; no response required
	• we strongly feel the need for sewers in Princeton • some opinions expressed were solely based on Princeton not wanting to grow but in our opinion, without growth we're moving backwards • growth is inevitable	• comments noted; no response required

6.0 PROJECT CONTACT LIST AND WEB-SITE POSTINGS

A project contact list was maintained throughout Phases 1 and 2 of the Class EA process. The contact list was developed at the Notice of Commencement stage and contacts were added to the contact list in response to requests from agencies, stakeholders and members of the public. A copy of the project contact list is provided in Appendix A-1. This list was used for the mailing of all study notifications.

In addition, key project information such as notifications, PCC materials (i.e., display boards, comment sheet, handout) were posted on the Oxford County web site.

7.0 AGENCY AND STAKEHOLDER CONSULTATION

In addition to the agencies represented on the Steering Committee, other federal, provincial and municipal agencies, as well as utilities and special interest groups, were consulted during Phases 1 and 2 of the Class EA process. The following are agencies, utilities, special interest groups and stakeholders that were included on the project contact list, provided with project notifications and asked to provide comments regarding the study:

Federal

- Aboriginal Affairs and Northern Development Canada (AANDC) (now Indigenous and Northern Affairs Canada (INAC));

Provincial

- Ministry of Aboriginal Affairs (MAA) (now Ministry of Indigenous Relations and Reconciliation (MIRR));
- Ministry of the Environment and Climate Change, Southwestern Region;
- Ministry of Agriculture, Food and Rural Affairs;
- Ministry of Tourism, Culture and Sport;
- Ministry of Municipal Affairs and Housing;
- Ministry of Natural Resources and Forestry;
- Ministry of Transportation;
- Infrastructure Ontario;
- Grand River Conservation Authority;
- Upper Thames Conservation Authority;

County and Municipal

- Oxford County Public Health and Emergency Services;
- Oxford County Medical Officer of Health;
- Oxford County Risk Management Official;
- Township of Blandford-Blenheim, Mayor;
- Township of Blandford-Blenheim, CAO/Clerk;
- Township of Blandford-Blenheim, Director of Public Works;
- Township of Blandford-Blenheim, Manager of Building Services / Chief Building Official;
- Township of Blandford-Blenheim, Director of Public Works;

Utilities

- Hydro One Networks Inc.;
- Union Gas Limited;
- Canadian National Railway Company;
- Enbridge Gas Distribution Inc.;
- Rogers Cable;
- Bell Canada;

Special Interest Groups and Stakeholders

- Frank Cowan Company;
- Princeton Centennial Hall.

Additions were made to the project contact list upon request. The project contact list (see Appendix A-1) contains complete information on agencies, utilities, special interest groups and stakeholders contacted during Phases 1 and 2 of the Class EA process. Table 3 provides a summary of comments received from agencies, utilities and stakeholders, along with the response to these comments. Appendix A-6 contains correspondence received during Phases 1 and 2 of the Class EA process, as well as responses to this correspondence.

Table 3: Summary of Agency, Stakeholder and Aboriginal Comments

Date	Contact	Comment	Action Taken
Federal			
August 27, 2013	Guylaine Gaudreau A/Research Manager Specific Claims Branch Aboriginal Affairs and Northern Development Canada	• provided resource information pertaining to identifying First Nations within the vicinity of the project	• no response required
July 29, 2013	Allison Berman Regional Subject Expert for Ontario Consultation and Accommodation Unit Policy and Strategic Direction Aboriginal Affairs and Northern Development Canada	• provided information on proximity of First Nation Communities and related information	• no response required
July 22, 2013	Allison Berman Regional Subject Expert for Ontario Consultation and Accommodation Unit Policy and Strategic Direction Aboriginal Affairs and Northern Development Canada	• noted that she will be providing a response in request to Oxford County's request for information	• response received July 29, 2013
Provincial			
June 29, 2016	Tammie Ryall Regional Environmental Planner / Regional EA Coordinator Ministry of the Environment and Climate Change	• response to PCC # 1 notification • provided information on Consultation with First Nations and Métis Communities, including attached Aboriginal Consultation Information • noted that proponent has a responsibility to conduct adequate consultation with First Nation and Métis communities as part of the EA process • Crown is delegating procedural aspects of consultation to the proponent	• Oxford County provided a response on July 6, 2016; response noted that the County has contacted all First Nations suggested in a response received from MAA; response further indicated that the County recognizes that any changes to the Drumbo WWTP will be subject to the policies of the Grand River Source Protection Program;

Date	Contact	Comment	Action Taken
		• proponents should contact the Ministry of Aboriginal Affairs (MAA) to help identify First Nations and Métis communities to be contacted • proponents undertaking a Municipal Class EA project must identify whether a project is occurring within a source water protection vulnerable area and should contact and consult with the appropriate Conservation Authority/Source Protection Authority to discuss potential considerations and policies in the Source Protection Plan that apply to the project • please include a section in the report on Source Water protection	County has engaged the Grand River Conservation Authority and will have on-going discussions with them on this matter
June 21, 2016	Patrick Grace Director Land Transactions, Hydro Corridors and Public Works Infrastructure Ontario (IO)	• if the project requires IO lands, Oxford County would be required to work with IO to fulfill the Ministry of IO's obligations • Oxford County should confirm in writing if any IO lands are proposed to be used for the proposed project • if IO lands are not impacted by the proposed project, provide a written confirmation to IO	• Oxford County provided a response on June 15, 2016 indicating that the County will contact IO if IO lands would be required • alternative solutions will be evaluated during the next steps of the study process
March 12, 2014	Penny Young Heritage Planner Ministry of Tourism, Culture and Sport (MTCS)	• Ministry has an interest in the conservation of cultural heritage resources including archaeological resources, built heritage resources and cultural heritage landscapes • please advise MTCS as to whether any technical heritage studies will be completed for your EA project, and	• comments noted • Oxford County will provide the relevant technical studies, if required

Date	Contact	Comment	Action Taken
		provide them to MTCS before issuing a Notice of Completion • provided a form for Screening Impacts to Built Heritage and Cultural Heritage Landscapes	
October 10, 2013	Heather Levecque Manager, Consultation Unit Aboriginal Relations and Ministry Partnerships Division Ministry of Aboriginal Affairs	• suggested that Oxford County contact the Six Nations of the Grand River Territory, Haudenosaunee Confederacy Chiefs Council and Mississaugas of the New Credit First Nation	• no response required • Oxford County has contacted the First Nations noted
August 21, 2013	John Brum Resource Planner Grand River Conservation Authority	• noted that location of Drumbo WWTP is located within 120 m of adjacent wetland areas • note that effluent from the plant outlets to Cowan Drain • these are areas that are regulated by the GRCA under Ontario Regulation 150/06 (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation) • recommend that the wetlands be confirmed in the field; suggest contacting MNRF Aylmer District Office with regards to confirming the presence of endangered/rare species data within the study are and for any available fish data • any future development within the regulated areas will require the prior issuance of a Permit pursuant to Ontario Regulation 150/06	• no response required • MNRF have been contacted with regard to endangered/rare species; further discussions will be undertaken • Oxford County are aware of requirement for a permit under Ontario Regulation 150/06
July 22, 2013	Bob Aggerholm Regional EA Coordinator Ministry of the Environment Southwestern Region	• provided comments on the project problem or opportunity, associated or related amendments to the Official Plan,	• Oxford County provided a response on October 8, 2013

Date	Contact	Comment	Action Taken
		PIC materials (requested a copy), effluent quality and consultation with First Nations and Métis communities • also noted that the Ministry wishes to review a draft of the ESR, with a 30 to 45 day review period requested	
Stakeholders			
August 9, 2013	Murray Lipton Owner's Representative Taylor Development – 32T-92006	• M. Lipton had called the Director of Public Works, County of Oxford regarding the process and timing of the study to upgrade the Drumbo WWTP	• Oxford County provided e-mail response on August 9, 2013; provided M. Lipton with a copy of the Notice of Commencement; provided information on the schedule, as it was known at that time, and the approximate budget for the upgrades
Aboriginal Peoples			
May 9, 2017	Fallon Burch Chippewas of the Thames Consultation Coordinator	• in our screening of your correspondence, we identified no concerns with your project • based on the proximity of the project, we feel we no longer require regular project updates or notices	• comments noted • Chippewas of the Thames will not be provided with any future project notifications

8.0 ABORIGINAL CONSULTATION

8.1 Identification of Aboriginal Communities

A number of sources were used to identify Aboriginal communities. The MOECC web site was consulted for information on identifying Aboriginal communities and agency contact information. The Indian and Northern Affairs Canada (now Indigenous and Northern Affairs Canada (INAC)) web site was also reviewed for information on land claims. The Métis Nation of Ontario web site was also reviewed.

The Ministry of Aboriginal Affairs (MAA) (now Ministry of Indigenous Relations and Reconciliation (MIRR)) and INAC were contacted for information on Aboriginal communities, and specific and comprehensive land claims. The Chiefs of Ontario directory and map of existing Aboriginal communities was reviewed. The Natural Resources Canada Ontario First Nations Lands and National Parks map was also consulted, as was the INAC map of First Nation communities. The MAA First Nation map and posted information on Aboriginal organizations was also used.

In addition, experience from previous Class EAs in the general area of the project provided insight regarding Aboriginal community contacts.

8.2 Agency Contacts

The information for the agencies contacted regarding Aboriginal consultation is provided on the project contact list included in Appendix A-1. In addition, all correspondence from these agencies is documented in Table 3 and included in Appendix A-6.

Notice of Commencement

Notice of Commencement letters were to INAC and MIRR on July 11, 2013.

Notices of Public Consultation Centres

A Notice of PCC No. 1 was sent to INAC and MIRR on June 6, 2013. A Notice of PCC No. 2 was sent to INAC and MIRR on May 1, 2017.

8.3 Responses to Agency Contacts

The responses to contact with INAC and MIRR are outlined in Table 3.

In July 29, 2013 and August 27, 2013 responses to the Notice of Commencement, INAC provided information on proximity of First Nation communities and related information. Both of these responses are provided in Appendix A-6 and summarized in Table 3.

An October 10, 2013 response to the Notice of Commencement from MIRR suggested that the Six Nations of the Grand River, the Haudenosaunee Confederacy and the Mississaugas of the New Credit First Nation be contacted regarding the project. These First Nations were subsequently added to the project mailing list and received PCC notifications.

8.4 Aboriginal Contacts

Notice of Commencement

Notice of Commencement letters (see Appendix A-7) were sent to the following Aboriginal contacts on July 11, 2013:

- Munsee-Delaware Nation;
- Chippewas of the Thames River First Nation;
- Delaware Nation;
- Oneida Nation of the Thames;
- Walpole Island First Nation; and
- Métis Nation of Ontario.

Notice of Public Consultation Centre No. 1

Notice of Public Consultation Centre No. 1 letters (see Appendix A-7) were sent to the following Aboriginal contacts on June 16, 2016:

- Six Nations of the Grand River;
- Six Nations Haudenosaunee Confederacy Council;
- Mississaugas of the New Credit;
- Munsee-Delaware Nation;
- Chippewas of the Thames River First Nation;
- Delaware Nation;

- Oneida Nation of the Thames;
- Walpole Island First Nation; and
- Métis Nation of Ontario.

Notice of Public Consultation Centre No. 2

Notice of Public Consultation Centre No. 2 letters (see Appendix A-7) were sent to the above noted Aboriginal contacts on May 1, 2017.

8.5 Responses to Aboriginal Contacts

One response was received from Aboriginal contacts during the Class EA process. In response to the PCC No. 2 notification, a May 9, 2017 letter was received from the Chippewas of the Thames First Nation (see Appendix A-7). This response noted that "based on the proximity of the project, we feel we no longer require regular project updates or notices".

APPENDIX A
PUBLIC, AGENCY, STAKEHOLDER AND ABORIGINAL CONSULTATION

A-1. AGENCY AND STAKEHOLDER CONTACT LIST

A-2. NOTICE OF COMMENCEMENT
- NEWSPAPER AD
- EXAMPLE LETTERS

A-3. STEERING COMMITTEE MEETINGS
- STEERING COMMITTEE MEMBERSHIP LIST
- STEERING COMMITTEE MEETING NO. 1
- STEERING COMMITTEE MEETING NO. 2

A-4. PUBLIC CONSULTATION CENTRE NO. 1
- NEWSPAPER AD
- EXAMPLE LETTERS
- ATTENDANCE RECORD
- COMMENT SHEET
- DISPLAY BOARDS
- HANDOUT
- COMMENTS RECEIVED

A-5. PUBLIC CONSULTATION CENTRE NO. 2
- NEWSPAPER AD
- EXAMPLE LETTERS
- ATTENDANCE RECORD
- COMMENT SHEET
- DISPLAY BOARDS
- HANDOUT
- COMMENTS RECEIVED

A-6. AGENCY AND STAKEHOLDER CONSULTATION
- CORRESPONDENCE

A-7. ABORIGINAL CONSULTATION
- NOTICE OF COMMENCEMENT
- NOTICE OF PUBLIC CONSULTATION CENTRE NO. 1
- NOTICE OF PUBLIC CONSULTATION CENTRE NO. 2

A-1

AGENCY AND STAKEHOLDER CONTACT LIST

Oxford County
Drumbo WWTP Class Environmental Assessment
Agency and Stakeholder Contact List

Agency/Organization	Contact	Contact Information	Phone/Fax/E-Mail
County of Oxford			
County of Oxford	Mr. David Mayberry Warden	P.O. Box 1614 Woodstock, ON N4S 7Y3	
County of Oxford	Ms. Lynn Beath Director, Public Health and Emergency Services	P.O. Box 1614 Woodstock, ON N4S 7Y3	Phone: 519-539-9800, ext. 3400
County of Oxford	Dr. Douglas Neal Acting Medical Officer of Health	P.O. Box 1614 Woodstock, ON N4S 7Y3	
County of Oxford	Mr. Gord Hough Director, Community and Strategic Planning	P.O. Box 1614 Woodstock, ON N4S 7Y3	Phone: 519-539-9800, ext. 3207
County of Oxford	Mr. Peter Heywood Manager of Health Protection Oxford County Public Health and Emergency Services	410 Buller Street Woodstock, ON N4S 4N2	Phone: 519-539-9800, ext. 3602
County of Oxford	Mr. Don Ford Wastewater Supervisor	410 Buller Street Woodstock, ON N4S 4N2	
County of Oxford	Ms. Rebecca Smith Development Planner, Blandford-Blenheim	P.O. Box 1614 Woodstock, ON N4S 7Y3	
County of Oxford	Ms. Deborah Goudreau Risk Management Official	P.O. Box 1614 Woodstock, ON N4S 7Y3	Phone: 519-539-9800, ext. 3116 E-mail: dgoudreau@oxfordcounty.ca
Municipal			
Township of Blandford-Blenheim	Mayor Marion Wearn	47 Wilmot Street P.O. Box 100	Phone: 519-463-5333 E-mail: mwearn@sympatico.ca

Agency/Organization	Contact	Contact Information	Phone/Fax/E-Mail
		Drumbo, ON N0J 1G0	
Township of Blandford-Blenheim	Mr. Rodger Mordue CAO/Clerk	47 Wilmot Street P.O. Box 100 Drumbo, ON N0J 1G0	Phone: 519-463-5347, ext. 227 E-mail: rmordue@blandfordblenheim.ca
Township of Blandford-Blenheim	Councillor Mark Peterson	47 Wilmot Street P.O. Box 100 Drumbo, ON N0J 1G0	Phone: 519-463-5478 E-mail: mpeterson@blandfordblenheim.ca
Township of Blandford-Blenheim	Mr. Gary Crandall Director of Public Works	47 Wilmot Street P.O. Box 100 Drumbo, ON N0J 1G0	Phone: 519-463-5347, ext. 230 E-mail: gcrandall@blandfordblenheim.ca
Township of Blandford-Blenheim	Mr. John Scherer Chief Building Official	47 Wilmot Street P.O. Box 100 Drumbo, ON N0J 1G0	Phone: 519-463-5347, ext. 230
County of Brant Public Works Department	Mr. Michael Bradley Director of Public Works	26 Park Avenue P.O. Box 160 Burford, ON N0E 1A0	Phone: 519-449-2451, ext. 2245 E-mail: Michael.Bradley@brant.ca
Conservation Authority			
Grand River Conservation Authority	Mr. John Brum Resource Planner	400 Clyde Road Cambridge, ON L1R 5W6	Phone: 519-621-2763, ext. 2233 E-mail: jbrum@grandriver.ca
Grand River Conservation Authority	Ms. Sandra Cooke Senior Water Quality Supervisor	400 Clyde Road, PO Box 729 Cambridge, Ontario N1R 5W6	Phone: 519-621-2761 Fax: 519-621-4945 E-mail: scooke@grandriver.ca
Grand River Conservation Authority	Mr. Mark Anderson Water Quality Engineer	400 Clyde Road, PO Box 729 Cambridge, Ontario N1R 5W6	Phone: 519-621-2763, ext. 2226 Fax: 519-621-4945 E-mail: manderson@grandriver.ca
Grand River Conservation Authority	Mr. Gus Rungis Senior Water Resources Engineer	400 Clyde Road, PO Box 729 Cambridge, Ontario N1R 5W6	Phone: 519-621-2763 ext. 2222 E-mail: grungis@grandriver.ca
Grand River Conservation Authority	Mr. Martin Keller Source Protection Project Manager	400 Clyde Road, PO Box 729 Cambridge, Ontario N1R 5W6	Phone: 519-621-2763, ext. 2303 E-mail: mkeller@grandriver.ca
Grand River Conservation Authority	Mr. Joe Farwell Chief Administrative Officer	400 Clyde Road, PO Box 729 Cambridge, Ontario N1R 5W6	Phone: 519-621-2761 ext. 2221 E-mail: jfarwell@grandriver.ca
Upper Thames River Conservation Authority	Mr. Mark Snowsell Land Use Regulations Officer Hydrology and Regulatory	1424 Clarke Road London, ON N5V 5B9	Phone: 519-451-2800 Fax: 519-451-1188 E-mail: snowsellm@thamesriver.on.ca

Agency/Organization	Contact	Contact Information	Phone/Fax/E-Mail
	Services		
Federal			
Aboriginal Affairs and Northern Development Canada	Ms. Allison Berman Regional Subject Expert for Ontario Consultation and Accommodation Unit **Do Not Send Notice of PCCs or Notice of Completion**	300 Sparks Street, Room 205 Ottawa, ON K1A 0H4	Phone: 613-943-5488 E-mail: Allison.Berman@aandc.gc.ca
Provincial			
Ministry of Indigenous Relations and Reconciliation (as of June 2016, formerly Ministry of Aboriginal Affairs)	Mr. François Lachance Senior Policy Advisor Aboriginal and Ministry Relationships Branch	160 Bloor St. E., 9th Floor Toronto, ON M7A 2E6	Phone: 416-326-4754 Fax: 416-325-1066 E-mail: Francois.Lachance@ontario.ca
Ministry of Indigenous Relations and Reconciliation (as of June 2016, formerly Ministry of Aboriginal Affairs)	Ms. Lorena Weesit Correspondence Unit, Aboriginal and Ministry Relationships Branch	160 Bloor St. E., 4th Floor Toronto, ON M7A 2E6	Phone: 416-314-9341 E-mail: lorena.weesit@ontario.ca
Ministry of Indigenous Relations and Reconciliation (as of June 2016, formerly Ministry of Aboriginal Affairs)	Ms. Heather Levecque Manager, Consultation Unit Aboriginal Relations and Ministry Partnerships Division	160 Bloor St. E., 9th Floor Toronto, ON M7A 2E6	Phone: 416-326-4740 E-mail: heather.levecque@ontario.ca
Ministry of the Environment and Climate Change Southwestern Region	Mr. Craig Newton Environmental Planner	733 Exeter Road London, ON N6E 1L3	Phone: 519-873-5014 E-mail: craig.newton@ontario.ca
Ministry of Agriculture, Food and Rural Affairs	Mr. Drew Crinklaw Rural Planner	667 Exeter Road London, ON N6E 1L3	Phone: 519-873-4085 E-mail: drew.crinklaw@ontario.ca
Ministry of Tourism, Culture and Sport	Ms. Penny Young Heritage Planner Programs and Services Branch	401 Bay Street, Suite 1700 Toronto, ON M7A 0A7	Phone: 416-212-4019 E-mail: penny.young@ontario.ca

Agency/Organization	Contact	Contact Information	Phone/Fax/E-Mail
	Culture Services Unit		
Ministry of Municipal Affairs and Housing Municipal Services Office - Western	Mr. Dwayne Evans Planner	659 Exeter Road, 2nd Floor London, ON N6E 1L3	Phone: 519-873-4695 E-mail: Dwayne.Evans@ontario.ca
Ministry of Municipal Affairs and Housing Municipal Services Office - Western	Mr. Craig Cooper Planner	659 Exeter Road, 2nd Floor London, ON N6E 1L3	Phone: 519-873-4020 E-mail: Craig.Cooper@ontario.ca
Ministry of Natural Resources and Forestry	Ms. Andrea Fleischhauer District Planner, Aylmer District	615 John Street North Aylmer, ON N5H 2S8	E-mail: andrea.fleischhauer@ontario.ca
Ministry of Natural Resources and Forestry	Ms. Elizabeth Reimer SAR Biologist	615 John Street North Aylmer, ON N5H 2S8	Phone: 519-773-4727 E-mail: Elizabeth.Reimer@ontario.ca
Ministry of Natural Resources and Forestry	Mr. David Marriott District Planner	Guelph District Office 1 Stone Road West Guelph, ON N1G 4Y2	Phone: 519-826-4926 E-mail: david.marriott@ontario.ca
Ministry of Natural Resources and Forestry	Mr. Mike Stone District Planner	Guelph District Office 1 Stone Road West Guelph, ON N1G 4Y2	Phone: 519-826-4912 E-mail: mike.stone@ontario.ca
Infrastructure Ontario	Ms. Lisa Myslicki Environmental Coordinator	1 Dundas Street West, Suite 2000 Toronto, ON M5G 2L5	Phone: 416-212-3768 E-mail: lisa.myslicki@infrastructureontario.ca
Infrastructure Ontario	Mr. Patrick Grace Director Land Transactions, Hydro Corridors and Public Works	1 Dundas Street West, Suite 2000 Toronto, ON M5G 2L5	E-mail: patrick.grace@infrastuctureontario.ca
Utilities			
Hydro One Networks Inc.	Mr. Brian McCormick Manager Environmental Services & Approvals	483 Bay Street North Tower, 13th Floor Toronto, ON M5G 2P5	Phone: 416-345-6597 Fax: 416-345-6919
Union Gas Limited	Mr. Taylor Jones Construction Project Manager	109 Commissioners Road West London, ON N6A 4P1	Phone: 519-667-4212 E-mail: tljones3@uniongas.com
Union Gas Limited	Mr. Paul Rietdyk Director of Operations	50 Keil Drive North Chatham, ON N7M 5M1	
Canadian National Railway	Attention: Contracts Supervisor	1 Administration Road	

Agency/Organization	Contact	Contact Information	Phone/Fax/E-Mail
Company		P.O. Box 1000 Concord, ON L4K 1B9	
Canadian National Railway Company	Mr. Stefan Linder Manager, Public Works	1 Administration Road P.O. Box 1000 Concord, ON L4K 1B9	Phone: 905-669-3155
Canadian National Railway Company	Ms. Marissa Crawford Engineering Division	1 Administration Road P.O. Box 1000 Concord, ON L4K 1B9	
Enbridge Gas Distribution Inc.	Mr. Vince Cina Supervisor of Planning and Design	3157 Kennedy Road Scarborough, ON N1V 4Y1	
Rogers Cable	Mr. Darryl Dimitroff Planner	3573 Wolfdale Road Mississauga, ON L5C 3T6	
Bell Canada	Mr. Chris Seasons	5115 Creek Bank Road Floor 3 West Mississauga, ON L4W 5R1	Phone: 905-219-4882
Bell Canada	Mr. Silvio Korasantucci	5115 Creek Bank Road Floor 3 West Mississauga, ON L4W 5R1	
Aboriginal			
Six Nations of the Grand River	Mr. Lonny Bomberry, Director	Land and Resources Department P.O. Box 5000 2498 Chiefswood Road Ohsweken, ON N0A 1M0	E-mail: lonnybomberry@sixnations.ca
Six Nations of the Grand River	Mr. Paul General, Eco-Centre Manager	Lands and Resources Department Six Nations Council 2676 Fourth Line Road P.O. Box 5000 Ohsweken, ON N0A 1M0	Phone: 519-445-0330 Fax: 519-445-0242 E-mail: pgeneral@sixnations.ca
Six Nations of the Grand River	Chief G. Ava Hill	1695 Chiefswood Road P.O. Box 5000 Ohsweken, ON N0A 1M0	Phone: 519-445-2201
Six Nations Haudenosaunee Confederacy Council	Mr. Leroy Hill Secretary	Haudenosaunee Resource Centre 2634 6th Line RR # 2	Phone: 905-765-1749 Fax: 905-765-9193

Agency/Organization	Contact	Contact Information	Phone/Fax/E-Mail
		Ohsweken, ON N0A 1M0	
Munsee-Delaware Nation	Chief Roger Thomas	R.R. # 1 Muncey, ON N0L 1Y0	Phone: 519-289-5396 Fax: 519-289-5156 E-mail: pwaddilove@munsee.on.ca
Chippewas of the Thames River First Nation	Chief Leslee White-Eye **Do Not Send Notice of PCC No. 3 or Notice of Completion**	320 Chippewa Road R.R. # 1 Muncey, ON N0L 1Y0	Phone: 519-289-5555 Fax: 519-289-2230 E-mail: chief@cottfn.ca
Delaware Nation	Chief Greg Peters	14760 School House Line R.R. # 3 Thamesville, ON N0P 2K0	Phone: 519-692-3936 Fax: 519-692-5522 E-mail: gcpeters@mnsi.net
Oneida Nation of the Thames	Chief Sheri Doxtator	2212 Elm Avenue R.R. # 2 Southwold, ON N0L 2G0	Phone: 519-652-3244 Fax: 519-652-9287 E-mail: joel.abram@oneida.on.ca
Walpole Island First Nation	Dr. Dean M. Jacobs cc. Chief Dan Miskokomon	Heritage Centre R.R. # 3 Wallaceburg, ON N8A 4K9	Phone: 519-627-1475 Fax: 519-627-1530 E-mail: dean.jacobs@wifn.org E-mail: joseph.gilbert@wifn.org
Mississaugas of the New Credit New Credit	Chief R. Stacey LaForme	2789 Mississauga Road R.R. # 6 Hagersville, ON N0A 1H0	Phone: 905-768-1133, ext. 240 Fax: 905-768-1225 E-mail: staceylaforme@newcreditfirstnation.com
Métis Nation of Ontario	Ms. Margaret Froh President	500 Old St. Patrick St., Unit D Ottawa, ON K1N 9G4	Phone: 613-798-1488 Fax: 613-722-4225 E-mail: garyl@metisnation.org
Stakeholders			
Frank Cowan Company	Ms. Margaret Fisher		
Princeton Centennial Hall	Ms. Deb MacDonald		
	Ms. Deb MacDonald		
GB Architects Inc.	Mr. Guy Bellehumeur		
	Russ and Judy King		
	Alex Donn		
	Ms. Debbie Randall		
Taylor Development, 32T-92006	Owner's Representative: Murray Lipton		

Agency/Organization	Contact	Contact Information	Phone/Fax/E-Mail
	Mr. Craig Van Wees		
	Mr. Bev Beaton		
Sheryl (did not want to provide last name)			
	Kim Fountain		
	Mr. Ernie Keys		
	Keith and Pat Cadwell		
	Betty and Rob Cowan		
	Ron and Judie Gillespie		
	Lois Case		
	Flint and Elain Barnes		
	John Jansen		
	Darren Mahlman		
	M. Kirby		
	Mark Kirby		
	Roger Kockel		
	Joanne Forrest		
	Rob Van De Cappelle		
	Truus Van Wees		
	Tyler Little		
	Kristen Little		
Stantec	Mr. Matt Ninomiya Project Manager, Community Development	100-300 Hagey Boulevard Waterloo, ON N2L 0A4	
GSP Group Inc.	Mr. Brandon Flewwelling Associate – Senior Planner	72 Victoria Street South Suite 201 Kitchener, ON N2G 4Y9	
Dryden, Smith & Head Planning Consultants Ltd.	Mr. Sam Head, President	54 Cedar Street N. Kitchener, ON N2H 2X1	
	Deb Beemer		
	Jeff Raun		
	Dyce and Edna Williamson		
	Gwen Van Wees		
	Jaben and Megan Wassink		
Adjacent Residents / Property Owners			
	Mr. John Ilett		

Agency/Organization	Contact	Contact Information	Phone/Fax/E-Mail
	Ms. Anna Leach		
	Mr. Jason Parke		
	Ms. Annie Dupuis		
	Mr. Joseph Singer		
	Mr. Garnet Harris		
	Ms. Kimberley Dedman		
	Mr. Larry Etherington		

For Notice of Completion Only:

Ministry of the Environment and Climate Change, Environmental Assessment and Approvals Branch	MEA.NOTICES.EAAB@Ontario.ca Copy to Mr. Craig Newton, Southwestern Region Office

A-2

NOTICE OF COMMENCEMENT

– *NEWSPAPER AD*

– *EXAMPLE LETTERS*

NOTICE OF COMMENCEMENT

CLASS ENVIRONMENTAL ASSESSMENT
OXFORD COUNTY DRUMBO WASTEWATER TREATMENT PLANT

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Oxford County Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a rated capacity of 272 m^3/d.

A preliminary review of available treatment capacity for the Oxford County Drumbo WWTP was completed in 2012, and included a review of current flow data to determine the available capacity of the Plant. Oxford County has initiated the current Class Environmental Assessment (Class EA) to examine upgrade options in detail and to determine the most cost-effective, environmentally sound, and sustainable approach to increase the treatment capacity of the Oxford County Drumbo WWTP. The study will include a door-to-door survey of all properties to ensure that sump pumps and foundation drains are not connected to the sanitary sewers.

The study will be undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, 2011), and will include opportunities for public comment.

Public input and comments will be an important component of the Class EA process. Two Public Information Centres (PICs) will be held during the course of the study to present and receive comments on the preferred alternative for upgrading the WWTP. Notice of the PICs will be advertised in advance of each public meeting.

Please contact Mark Maxwell at the address below if you have any questions or comments about the study, or if you would like to be added to the mailing list to receive future notifications for the study.

Mark Maxwell, P.Eng.
Oxford County, Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800, ext. 3195
Fax: 519-421-4711
E-mail: mmaxwell@oxfordcounty.ca

This Notice issued on June 28, 2013

Robert Walton, P.Eng.
Director of Public Works

Published in: Oxford Review – July 4 and 11, 2013

Oxford County
growing stronger...together
Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 ♦ Fax: 519-421-4711
Web site: www.oxfordcounty.ca

July 11, 2013

Mr. Bob Aggerholm
Environmental Planner / EA Coordinator
Ministry of the Environment
London Regional Office
733 Exeter Road
London, ON N6E 1L3

RE: Class Environmental Assessment
Oxford County Drumbo Wastewater Treatment Plant
Notice of Commencement

Dear Mr. Aggerholm:

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Oxford County Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a rated capacity of 272 m^3/d.

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The study will be undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, 2011), and will include opportunities for public comment.

The purpose of this letter is to advise you of the commencement of this study. We have attached a Notice of Commencement that will be published in local newspapers to advise the general public of the study.

If you have any initial concerns or comments regarding this project, we would appreciate receiving your comments in writing. It is recognized that you may not want to receive further notifications regarding the study. If this is the case, please respond in writing.

Please note that two Public Information Centres (PICs) will be held during the course of the study to present and receive comments on the preferred alternative for upgrading the WWTP. Notice of the PICs will be advertised in advance of each public meeting.

..... Page 2

If you have any questions or would like further information about the project, please contact Mark Maxwell, P.Eng. by telephone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca.

Thank you for your interest in the project.

Sincerely,

Shahab Shafai

Shahab Shafai, M.Sc., P.Eng.
Manager of Wastewater Services

Encl.

Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 • Fax: 519-421-4711
Web site: www.oxfordcounty.ca

July 11, 2013

Mr. Drew Crinklaw
Rural Planner
Ministry of Agriculture, Food and Rural Affairs
667 Exeter Road
London, ON N6E 1L3

RE: Class Environmental Assessment
Oxford County Drumbo Wastewater Treatment Plant
Notice of Commencement

Dear Mr. Crinklaw:

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Oxford County Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a rated capacity of 272 m^3/d.

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..... Page 2

If you have any questions or would like further information about the project, please contact Mark Maxwell, P.Eng. by telephone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca.

Thank you for your interest in the project.

Sincerely,

Shahab Shafai

Shahab Shafai, M.Sc., P.Eng.
Manager of Wastewater Services

Encl.

A-3

STEERING COMMITTEE MEETINGS

- *STEERING COMMITTEE MEMBERSHIP LIST*
  - *STEERING COMMITTEE MEETING NO. 1*
  - *STEERING COMMITTEE MEETING NO. 2*

Drumbo WWTP Class Environmental Assessment
Steering Committee Members

Name	Organization	Contact Information
David Mayberry	Warden County of Oxford	21 Reeve St., Woodstock, ON, N4S 3G1 Ph: 519.539.9800 ext. 3003 warden@oxfordcounty.ca
Marion Wearn	Mayor, Township of Blandford-Blenheim	Township of Blandford-Blenheim 47 Wilmot Street Drumbo, Ontario N0J 1G0 mwearn@blandfordblenheim.ca
Roger Mordue	CAO, Township of Blandford-Blenheim	Township of Blandford-Blenheim 47 Wilmot Street Drumbo, Ontario N0J 1G0 rmordue@blandfordblenheim.ca
Mark Peterson	Councillor, Township of Blandford-Blenheim	Township of Blandford-Blenheim 47 Wilmot Street Drumbo, Ontario N0J 1G0 mpeterson@blandfordblenheim.ca
	Director of Public Works Oxford County	21 Reeve St., Woodstock, ON, N4S 3G1 Phone: 519-539-9800 Fax: 519-421-4711
	Manager of Environmental Services Oxford County	21 Reeve St., Woodstock, ON, N4S 3G1 Phone: 519-539-9800 Fax: 519-421-4711
Don Ford	Wastewater Supervisor	21 Reeve St., Woodstock, ON, N4S 3G1 Phone: 519-539-9800 ext. 3191 Fax: 519-421-4711 dford@oxfordcounty.ca
Mark Maxwell	Construction Coordinator & Project Engineer Oxford County	21 Reeve St., Woodstock, ON, N4S 3G1 Phone: 519-539-9800 ext. 3195 Fax: 519-421-4711 mmaxwell@oxfordcounty.ca
Peter Heywood	Public Health & Emergency Services County of Oxford	410 Buller Street, Woodstock, ON, N4S 4N2 Phone: 519.539.9800 Ext. 3502 Fax: 519.539.6206 pheywood@oxfordcounty.ca
Rebecca Smith	Oxford County/Blandford-Blenheim Township Planner	21 Reeve St., Woodstock, ON, N4S 3G1 Phone: 519-539-9800 ext. 3205 Fax: 519-421-4713 rsmith@oxfordcounty.ca
Tammie Ryall	Ministry of the Environment and Climate Change Southwestern Region	733 Exeter Road London, ON N6E 1L3 Tel: 519-873-5115 Email: tammie.ryall@ontario.ca
John Brum	Grand River Conservation Authority	Grand River Conservation Authority 400 Clyde Road Cambridge, ON N1R 5W6 jbrum@grandriver.ca
Mark Anderson	Grand River Conservation Authority	Grand River Conservation Authority 400 Clyde Road Cambridge, ON N1R 5W6 manderson@grandriver.ca
Steve Nutt	XCG Consulting Limited	
Graham Seggewiss	XCG Consulting Limited	
Dianne Damman	D.C. Damman and Associates	

Steering Committee Meeting # 1

June 27, 2016

– ***Agenda***

– ***Presentation Material***

– ***Meeting Notes***

OXFORD COUNTY
DRUMBO WASTEWATER TREATMENT PLANT CLASS EA

STEERING COMMITTEE MEETING NO. 1
JUNE 27, 2016

Room 129, 21 Reeve St., Woodstock
2:00 p.m.

AGENDA

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1. Introductions
2. Background
    - Drumbo Wastewater Treatment Plant Class EA
    - Princeton Servicing Study
3. Class EA Process
    - Role of the Steering Committee
    - Approach to Public Consultation
4. Problem/Opportunity Statement
5. Alternatives being Considered
6. Public Consultation Centre No. 1
7. Next Steps and Schedule
    - Next Steering Committee Meeting
8. Questions and Discussion

OxfordCounty
growing stronger...together

Drumbo Wastewater Treatment Plant Class Environmental Assessment

Steering Committee Meeting #1
June 27, 2016

XCG
Environmental Engineers & Scientists

Meeting Agenda

- **Introductions**
- **Background**
  - Drumbo WWTP Class EA
  - Princeton Servicing Study
- **Class EA Process**
  - Role of the Steering Committee
  - Approach to Public Consultation
- **Problem/Opportunity Statement**
- **Alternatives Being Considered**
- **Public Consultation Centre No. 1**
- **Next Steps and Schedule**
  - Next Steering Committee Meeting
- **Questions and Discussion**

Drumbo WWTP Class EA – Steering Committee Members

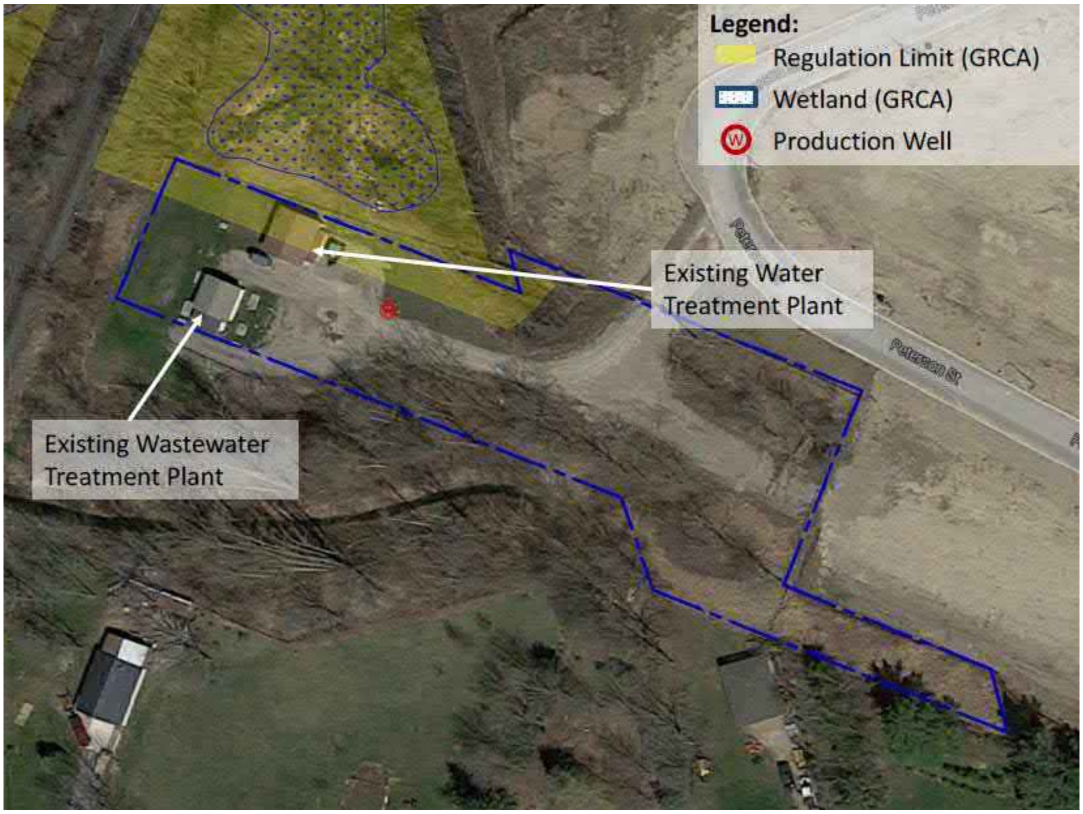
Name	Organization
David Mayberry	Warden, County of Oxford
Roger Mordue	CAO, Township of Blandford-Blenheim
Mark Peterson	Councillor, Township of Blandford-Blenheim
Robert Walton	Director of Public Works, Oxford County
Shahab Shafai	Manager of Environmental Services, Oxford County
Don Ford	Wastewater Supervisor, Oxford County
Mark Maxwell	Construction Coordinator and Project Engineer, Oxford County
Peter Heywood	Public Health and Emergency Services, Oxford County
Rebecca Smith	Oxford County/Blandford-Blenheim Township Planner
John Brum	Grand River Conservation Authority
Mark Anderson	Grand River Conservation Authority
Tammie Ryall	MOECC

XCG

Background – Drumbo WWTP Class EA

- Notice of Commencement issued June 2013
- Existing WWTP is a Sequencing Batch Reactor (SBR) with tertiary filtration and ultraviolet disinfection, and a discharge to the Cowan Drain
- Original design capacity was 272 m^3/d. In February 2015, the plant was re-rated to a design capacity of 300 m^3/d
- In 2015, the annual average day flow was 228 m^3/d, or 76% of the re-rated design capacity

XCG



Background – Princeton WW Servicing Study

- Initiated in February 2011 as a Schedule C Class EA
- After consideration of alternatives to provide wastewater servicing, it was concluded that MOECC would not approve a sub-surface discharge system or a direct discharge to Horner Creek
- A collection system and treatment plant with direct discharge to Nith River was deemed to be economically unsustainable
- A Wastewater Servicing Study Report was prepared recommending continued reliance on private systems with a supporting Outreach/Education program to be delivered by Oxford County Public Health

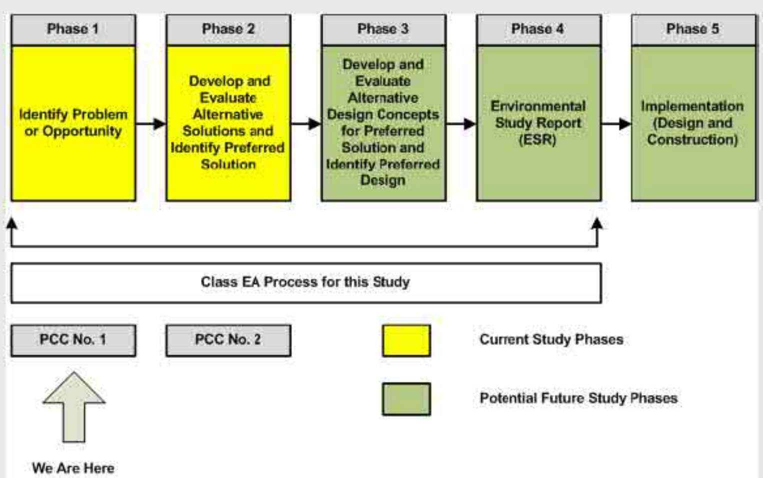
Background – Princeton WW Servicing Study

- A local landowner proposed an alternative servicing solution to the County that would service the existing community plus a residential development of 324 units
- The alternative servicing solution also involved a collection system and treatment plant with discharge to the Nith River, but with costs distributed over more lots
- County Council directed staff to further examine this proposed alternative servicing solution
- Examination of the alternative servicing solution will be undertaken in parallel with the Drumbo WWTP Class EA

Municipal Class Environmental Assessment Process

Phases of the Study:

Public Consultation Centres (PCCs):



Role and Responsibilities of the Steering Committee in the Class EA

- **Role:**
  - To provide advice and feedback to the County's Project Team at key milestones during the project
- **Responsibilities:**
  - Provide direction to the Project Team on balancing the differing project objectives of various stakeholders
  - Review Public Consultation Centre materials produced during the project
  - Attend two meetings of the Steering Committee during Phases 1 and 2 of the study process

Approach to Public Consultation

- Steering Committee Meetings (2)
- Meetings with Review Agencies (MOECC, GRCA)
- Agency and Stakeholder Contact List
- Project Notices – Commencement, Public Consultation Centres

Approach to Public Consultation

- Public Consultation Centres (minimum of 2)
- Oxford County Website
- Comment Tracking Table
- Summary of Comments Received from the Public

XCG

Agency and Stakeholder Contact List

- Provincial Agencies (MOECC, MNRF, OMAFRA, MAA, MTCS, MMAH, IO)
- Federal Agencies (AANDC)
- Oxford County and Township of Blandford-Blenheim
- Grand River Conservation Authority
- Utilities
- Aboriginal Groups
- Adjacent Property Owners and Stakeholders

XCG

Drumbo WWTP Class EA – Problem/Opportunity Statement

Develop a wastewater treatment plan for the Community of Drumbo that is environmentally responsible, socially acceptable and economically sustainable to accommodate existing and future development within the community to at least 2036. The Drumbo WWTP Class EA will also consider the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP.

XCG

Alternatives Being Considered

Alternative Solution	Description
Alternative 1 – "Do Nothing"	No additional wastewater treatment capacity for Drumbo and no treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 2 – Service Drumbo at an expanded Drumbo WWTP	Expand the Drumbo WWTP to service growth in Drumbo. No treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 3 – Service Drumbo at a new Drumbo WWTP at a new site	Construct a new Drumbo WWTP at a new site to service Drumbo. No treatment of Princeton wastewater at the new Drumbo WWTP.

XCG

Servicing Alternatives Considered

Alternative Solution	Description
Alternative 4A/4B – Service Drumbo and Princeton at an expanded Drumbo WWTP	Expand the Drumbo WWTP to service Drumbo and Princeton, excluding (4A) or including (4B) proposed new development units in Princeton.
Alternative 5A/5B – Service Drumbo and Princeton at a new Drumbo WWTP at a new site	Construct a new Drumbo WWTP at a new site to service Drumbo and Princeton, excluding (5A) or including (5B) proposed new development units in Princeton.

XCG

Servicing Needs for Alternatives Considered

Alternative Solution	Existing (1)		Growth		Total Average Day Flow
	Units	Population	Units	Population (2)	
Alternative 1	312	877	-	-	253 m^3/d
Alternative 2	312	877	86	242	322 m^3/d
Alternative 3	312	877	86	242	322 m^3/d
Alternative 4A	519	1,698	186	534	643 m^3/d
Alternative 4B	519	1,698	510	1,587	946 m^3/d
Alternative 5A	519	1,698	186	534	643 m^3/d
Alternative 5B	519	1,698	510	1,587	946 m^3/d

Notes:
1. Includes existing but unserviced population of Princeton where applicable.
2. Estimated population density of 2.81 people/unit (Drumbo), 2.92 people/unit (Princeton, excluding new development), 3.25 people/unit (Princeton new development).

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Evaluation Methodology

- Evaluation criteria will consider natural, social, technical, and economic impacts
- Evaluation criteria and weighting will be presented to the Steering Committee for discussion at the next Steering Committee meeting
- Evaluation will consider public input received at two to three scheduled Public Consultation Centres (PCCs)

Public Consultation Centre #1

- June 16, 2016 from 6:30 to 8:30 - Princeton Centennial Hall
- A total of 54 residents signed in at the PCC
- Comment sheets were received from 11 attendees + additional e-mail comments received by County

Proposed Next Steps and Schedule

- Steering Committee Meeting No. 1 – **June 27, 2016**
- Complete evaluation of alternatives and recommend Preferred Servicing Alternative – **August 2016**
- Present recommended Preferred Servicing Alternative at Steering Committee Meeting No. 2 – **September 2016**
- Hold Public Consultation Centre No. 2 to present the recommended Preferred Servicing Alternative – **Fall/Winter 2016**
- Initiate Phase 3 of the Drumbo WWTP Class EA – **Fall/Winter 2016** (depending on outcome of Phase 2 of the Class EA process)

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Questions and Discussion

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XCG File No.: 3-277-47-02

Meeting Date:	June 27, 2016; 2:00 PM
Location:	Room 129, 21 Reeve St., Woodstock
Attendees:	Tammie Ryall (TR), MOECC Sandra Cooke (SC), GRCA John Brum (JB), GRCA Roger Mordue (RM), Township of Blandford-Blenheim Mark Peterson (MP), Township of Blandford-Blenheim David Mayberry (DM), Oxford County Rob Walton (RW), Oxford County Shahab Shafai (SS), Oxford County Mark Maxwell (MM), Oxford County Peter Heywood (PH), Oxford County Don Ford (DF), Oxford County Rebecca Smith (RS), Oxford County Minoo Yazdanpanah (MY), Oxford County Stephen Nutt (SN), XCG Consulting Limited Dianne Damman (DD), D.C. Damman and Associates

Re: **Drumbo Wastewater Treatment Plant (WWTP) Class EA**

Item	Action

1. Introductions

- SS welcomed the Steering Committee members and provided some brief introductory comments. All in attendance introduced themselves and noted their affiliation.
- It was noted that Mark Anderson, GRCA will attend some meetings in place of Sandra Cooke, GRCA. SC membership listing will identify that both are members.

2. Background

- SN provided some background information on the Drumbo WWTP Class EA, including the 2015 re-rating of the plant to a design capacity of 300 m^3/day (a Schedule A activity under the Municipal Class EA). He also noted that the Notice of Commencement for the project had been issued in June 2013.
- SN outlined site constraints at the existing Drumbo WWTP, including the GRCA regulated wetland area and the existing Oxford County water supply well and water treatment plant. He also noted potential constraints with the receiving water body, and indicated that an assimilative capacity study would be undertaken in a subsequent phase of the Class EA process (i.e. Phase 3) when the location of the new or expanded WWTP is confirmed.

Item	Action

- SN provided background information on the Princeton Servicing Study, which was initiated as a Schedule C Class EA in 2011. After considering alternatives to provide wastewater servicing, it was concluded that MOECC would not approve a sub-surface discharge system or a direct discharge to Horner Creek. In addition, a collection system and treatment plant with direct discharge to the Nith River was deemed to be economically unsustainable. Consequently, a Wastewater Servicing Study Report was prepared recommending continued reliance on private systems with a supporting Outreach/Education program to be delivered by Oxford County Public Health.
- SN noted that a local landowner has proposed an alternative servicing solution for Princeton that would service the existing community plus a residential development of 324 units. County Council have directed staff to examine this proposed alternative servicing solution in parallel with the Drumbo WWTP Class EA.

3. Class EA Process

- SN provided an overview of the Municipal Class EA process, noting that Phases 1 and 2 would be completed for this study. Once a conclusion is reached at the end of Phase 2, the County will then have to make a decision regarding next steps.
- DD noted the roles and responsibilities of the Steering Committee, including: attending at least two meetings; providing direction to the Project Team on balancing the differing project objectives of various stakeholders; and reviewing Public Consultation Centre materials produced during the project.
- DD provided an overview of the public and agency consultation program which will include: Steering Committee meetings (at least two); meetings with review agencies (MOECC, GRCA) as needed; agency and stakeholder contact list; project notices; public consultation centres (PCC) (minimum of two); Oxford County and Township web site postings; a comment tracking table; and a summary of comments received from the public.

4. Problem / Opportunity Statement

- SN reviewed the Problem / Opportunity Statement, which was presented at PCC No. 1, as follows:

  "*Develop a wastewater servicing plan for the Community of Drumbo that is environmentally responsible, socially acceptable and economically sustainable to accommodate existing and future development within the community to at least 2036. The Drumbo*

Item	Action

WWTP Class EA will also consider the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP".

5. **Alternatives Being Considered**

- SN outlined seven alternatives that are being considered, including:

  Alternative 1 – "Do Nothing"

  No additional wastewater treatment capacity for Drumbo and no treatment of Princeton wastewater at the Drumbo WWTP.

  Alternative 2 – Service Drumbo at an Expanded Drumbo WWTP

  Expand the Drumbo WWTP to service growth in Drumbo. No treatment of Princeton wastewater at the Drumbo WWTP.

  Alternative 3 – Service Drumbo at a New Drumbo WWTP at a New Site

  Construct a new Drumbo WWTP at a new site to service Drumbo. No treatment of Princeton wastewater at the new Drumbo WWTP.

  Alternative 4A/4B - Service Drumbo and Princeton at an Expanded Drumbo WWTP

  Expand the Drumbo WWTP to service Drumbo and Princeton, excluding (4A) or including (4B) proposed new development units in Princeton (324 units).

  Alternative 5A/5B – Service Drumbo and Princeton at a New Drumbo WWTP at a New Site

  Construct a new Drumbo WWTP at a new site to service Drumbo and Princeton, excluding (5A) or including (5B) proposed new development units in Princeton (324 units).

- It was noted that the location of the County's water treatment plant and well will have to be taken into consideration in the evaluation of alternatives.
- There was a question as to whether there would be any consideration to providing less than the 324 lots as part of Alternatives 4 and 5. RW noted that at this time the intent is to let the study process unfold and see what conclusions are reached.
- TR questioned whether there were any draft approved subdivisions in either community that would use some of the

Item	Action
current capacity. RS noted that there is a 66-lot registered plan of subdivision in Drumbo. The developer has been advised that there is no current treatment capacity for 33 of these lots.	
• SC asked whether effluent criteria for discharge to the Nith River have been established. SN noted that some preliminary effluent criteria have been developed for the Drumbo WWTP. However, criteria cannot be developed for a new WWTP at this time since the location of a new WWTP is uncertain. He noted that once a preferred alternative solution is determined, an assimilative capacity study would be undertaken.	
• SC asked whether there are public health concerns related to the private systems in Princeton. PH replied that Public Health is not aware of any concerns and is in the process of preparing an Outreach/Education program to be delivered to private system owners. A program of mandatory inspections may be considered at a later date if necessary.	
• SC noted that the GRCA would be interested in reviewing the preliminary effluent criteria. SN noted that this information would be shared with the GRCA. He noted that there is a fair amount of available background data on the Nith River.	
• SC noted that the water quality of the Nith River is affected by non-point sources and that point sources are limited relative to the total load. She noted that the GRCA may have some information that can be used to assist in characterizing the Nith River. She also noted that the potential for phosphorus offsetting through non-point source control should be considered if TP concentration or loading limits are too restrictive.	**MM, XCG**
• SN noted that further discussions with the GRCA and MOECC would need to be held in Phase 3 of the Class EA process when assimilative capacity will be addressed for the preferred alternative solution.	
• There was a question regarding whether the existing plant would be decommissioned if the preferred alternative solution involves constructing a new WWTP. RW confirmed that the existing plant would be decommissioned if a new WWTP is selected as the preferred solution.	
• SN noted that the next step will involve developing criteria for the evaluation of the alternatives. These criteria will be presented at the next Steering Committee meeting.	

Item		Action
6.	**Public Consultation Centre No. 1**	
	• PCC No. 1 was held on June 16, 2016 at the Princeton Centennial Hall. A total of 54 residents signed in at the PCC. Comment sheets were received from 11 attendees. Additional comment sheets are expected to be submitted to the County over the next several weeks.	
7.	**Next Steps and Schedule**	
	• SN outlined the next steps in the study, noting that Phase 2 of the Class EA process is to be completed before the end of 2016. The next Steering Committee meeting will be held in September and a second PCC will be held this fall or early winter 2017.	
	• TR requested that copies of draft materials be provided two weeks in advance of the next Steering Committee meeting to allow time for review in advance of the meeting. It was agreed that Technical Memos describing existing conditions, population projections and evaluation criteria would be provided to Steering Committee members once they are finalized. In addition, a draft alternatives evaluation can possibly be provided in advance of the next meeting.	**MM, XCG**

These meeting notes were prepared by Dianne Damman, D.C. Damman and Associates.

Any errors, omissions, or discrepancies should be reported to the author.

STEERING COMMITTEE MEETING #2

JANUARY 26, 2017

– AGENDA

– PRESENTATION MATERIAL

– MEETING NOTES

AGENDA

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XCG FILE NO.: 3-277-47-02

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OXFORD COUNTY
DRUMBO WASTEWATER TREATMENT PLANT CLASS EA
STEERING COMMITTEE MEETING NO. 2
JANUARY 26, 2017
Room 129, 21 Reeve St., Woodstock
2:00 p.m.

Item

Agenda

1. Welcome and Introductions
2. Review and Approval of Steering Committee No. 1 Meeting Notes (June 27, 2016)
3. Comments on Technical Memoranda 1 and 2
   - TM1 – Existing Conditions
   - TM2 - Future Flows and Loads
4. Evaluation Process (TM3)
5. Evaluation of Alternative Solutions (TM4)
6. Recommended Preferred Alternative Solution
7. Next Steps and Schedule
   - County Council (re: Princeton WW Servicing follow up)
   - Public Consultation Centre No. 2
   - Next Steering Committee Meeting
   - Phases 3 and 4 of Class EA
   - Phase 5 – Design and Construction
8. Other Business
   - Results of Princeton Surface Water Sampling Program
   - Outreach and Education Program on the Operation and Maintenance of Your Septic System
9. Questions and Discussion

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Drumbo Wastewater Treatment Plant Class Environmental Assessment

Steering Committee Meeting #2
January 26, 2017

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Meeting Agenda

- **Introductions**
- **Review and Approval of SC Meeting No. 1 Notes**
- **Comments on TMs 1 and 2**
    - TM1 – Existing Conditions
    - TM2 – Future Flows and Loads
- **Evaluation Process (TM3)**
- **Evaluation of Alternative Solutions (TM4)**
- **Recommended Preferred Alternative Solution**
- **Next Steps and Schedule**
    - Public Consultation Centre No. 2
    - Next Steering Committee Meeting
    - Phases 3 and 4 of Class EA
    - Phase 5 – Design and Construction
- **Other Business**
- **Questions and Discussion**

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Evaluation Process

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Alternative Solutions Considered

Alternative Solution	Description
Alternative 1 – "Do Nothing"	No additional wastewater treatment capacity for Drumbo and no treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 2 – Service Drumbo growth at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service 20 years of projected growth in Drumbo. No treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 3 – Service Drumbo growth at a new Drumbo WWTP at a new site	A new Drumbo WWTP would be constructed at a new site to service growth in Drumbo. The existing Drumbo WWTP would be decommissioned. No treatment of Princeton wastewater at the new Drumbo WWTP.

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Alternative Solutions Considered

Alternative Solution	Description
Alternative 4A/4B – Service Drumbo growth and Princeton at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service planned growth in Drumbo and wastewater from Princeton, excluding (4A) or including (4B) proposed 324 unit development in Princeton.
Alternative 5A/5B – Service Drumbo growth and Princeton at a new Drumbo WWTP at a new site	A new Drumbo WWTP would be constructed at a new site to service planned growth in Drumbo and wastewater from Princeton, excluding (5A) or including (5B) proposed 324 unit development in Princeton. The existing Drumbo WWTP would be decommissioned.

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Servicing Needs for Alternatives Considered

Alternative Solution	Existing [1]		Growth		Total Average Day Flow
	Units	Population	Units	Population [2]	
Alternative 1	312	877	-	-	253 m^3/d
Alternative 2	312	877	86	242	322 m^3/d
Alternative 3	312	877	86	242	322 m^3/d
Alternative 4A	519	1,698	186	534	643 m^3/d
Alternative 4B	519	1,698	510	1,587	946 m^3/d
Alternative 5A	519	1,698	186	534	643 m^3/d
Alternative 5B	519	1,698	510	1,587	946 m^3/d

Notes:
1. Includes existing but unserviced population of Princeton where applicable.
2. Estimated population density of 2.81 people/unit (Drumbo), 2.92 people/unit (Princeton, excluding new development), 3.25 people/unit (Princeton new development).

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Alternatives Evaluation Process

- Alternative solutions were evaluated based on four categories:
  - Technical
  - Environmental
  - Social
  - Financial
- Each category had several evaluation criteria, as detailed in subsequent slides.

Evaluation Criteria - Technical

Criteria	Description
Satisfaction of objectives	• Meets the Problem/Opportunity Statement established for the Drumbo WWTP Class EA
Consistent with the County's policies, guidelines, standards, and Strategic Plan	• Addresses compliance with the County's Strategic Plan, planning policies, guidelines and standards
Technical feasibility	• Ease of implementation • Constructability • Operational capability • Potential for phased construction • Ability to meet projected future effluent limits
System complexity	• Operational requirements for existing, new, and retrofitted infrastructure (plant and collection system) • Operator familiarity with collection system/plant treatment technology
Sustainability	• Energy usage • Impact on investments in infrastructure already made

Evaluation Criteria - Environmental

Criteria	Description
Surface water impacts	• Potential impacts on surface water resources • Assimilative capacity of receiver
Groundwater impacts	• Potential (positive or negative) impacts on groundwater quality and quantity • Compliant with Grand River Source Water Protection Plan
Impacts on the natural environment	• Greater potential for impacts on the natural environment if additional lands required for facility construction

Evaluation Criteria - Social

Criteria	Description
Community impacts	• Potential noise, dust, odour, traffic, etc. impacts on adjacent land owners and users during construction • Potential noise, dust, odour, traffic, etc. impacts on adjacent land owners and users during operations • Time required for construction.
Impact on Archaeological and Heritage Resources	• Greater potential for impacts on archaeological and heritage resources if additional lands required for facility construction

Evaluation Criteria - Financial

Criteria	Description
Capital Cost	• Total capital cost of alternative • Capital cost per existing lot • Impact on Development Charges • Impact on County Servicing Assistance Program (CSAP) • Land acquisition costs
Operating and Maintenance (O&M) Costs	• Total annual O&M cost • O&M costs per lot
Life cycle Cost	• Net present value life cycle cost of alternative
Financial Risk	• Risk to the County to incur debt if new units are not developed and Development Charges are not collected • Risk of increase in user fees if new units are not developed

Evaluation Methodology

- Each alternative was evaluated for each criterion using the following ranking system:

○	No Impact. Lowest Cost.
◔	Negligible Impact.
◑	Minor Impact.
◕	Moderate Impact.
●	Major Impact. Highest Cost.

Evaluation Methodology

- All criteria and all categories have equal weight.
- Each alternative was ranked relative to the other alternatives from most preferred to least preferred.
- Evaluation was undertaken by members of the Consulting Team and Oxford County staff representing Public Works, Planning and Public Health at a Workshop held on September 12, 2016
- Outcomes are based on a consensus of input from Workshop participants

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Evaluation of Alternative Solutions

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Results of Technical Evaluation

Alternative	Satisfaction of Objectives	Consistent with County's Policies	Technical Feasibility	System Complexity	Sustainability
Alt. No. 1	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth - Does not meet the needs of the County and was, therefore, not considered further.				
Alt. No. 2	◔	○	◔	○	○
Alt. No. 3	◔	○	○	◔	◕
Alt. No. 4A	○	◔	◑	◕	◔
Alt. No. 4B	○	◑	◑	◕	◑
Alt. No. 5A	○	◔	○	◑	◕
Alt. No. 5B	○	◑	○	◑	●

Results of Environmental Evaluation

Alternative	Surface Water Impacts	Groundwater Impacts	Impacts on the Natural Environment
Alt. No. 1	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth - Does not meet the needs of the County and was, therefore, not considered further.		
Alt. No. 2	◔	◕	○
Alt. No. 3	○	◔	◑
Alt. No. 4A	◔	◔	◔
Alt. No. 4B	◔	◑	◔
Alt. No. 5A	○	○	◕
Alt. No. 5B	○	○	◕

Results of Social Evaluation

Alternative	Community Impacts	Impacts on Archaeological and Heritage Resources
Alt. No. 1	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth - Does not meet the needs of the County and was, therefore, not considered further.	
Alt. No. 2	◑	○
Alt. No. 3	◑	◑
Alt. No. 4A	◕	◔
Alt. No. 4B	◕	◔
Alt. No. 5A	◑	◕
Alt. No. 5B	◑	◕

Results of Financial Evaluation

Alternative	Capital Cost	O&M Cost	Life Cycle Cost	Financial Risk Sustainability
Alt. No. 1	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth - Does not meet the needs of the County and was, therefore, not considered further.			
Alt. No. 2	○	○	○	○
Alt. No. 3	◔	○	◔	○
Alt. No. 4A	◕	●	◕	◑
Alt. No. 4B	◕	●	●	●
Alt. No. 5A	●	●	◕	◑
Alt. No. 5B	●	●	●	●

Quantification of Alternative Evaluation

Evaluation	Description	Numerical Value
○	No impact. Lowest cost.	1
◔	Negligible impact.	2
◑	Minor impact.	3
◕	Moderate impact.	4
●	Major impact. Highest cost.	5

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Summary of Alternative Evaluation

Alternative	Total Score	Ranking
1. Do Nothing	- (1)	- (1)
2. Service Drumbo at an expanded Drumbo WWTP	21	1
3. Service Drumbo at a new Drumbo WWTP at a new site	27	2
4A. Service Drumbo and Princeton at an expanded Drumbo WWTP **excluding** proposed 324-unit development in Princeton	37	3
4B: Service Drumbo and Princeton at an expanded Drumbo WWTP **including** proposed 324-unit development in Princeton	41	5
5A: Service Drumbo and Princeton at a new Drumbo WWTP at a new site **excluding** proposed 324-unit development in Princeton	38	4
5B: Service Drumbo and Princeton at a new Drumbo WWTP at a new site **including** proposed 324-unit development in Princeton	41	5

Notes:

1. Alternative 1 does not meet the objectives of the Problem/Opportunity Statement and will not accommodate planned community growth. Therefore it does not meet the needs of the County and was not considered further.

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Recommended Preferred Alternative

Based on the evaluation of alternative solutions, the recommended preferred alternative solution is:

- Alternative 2 – Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the Drumbo WWTP.

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Rationale for Selection of Preferred Alternative

- Most consistent with County policies and plans for future growth.
- Most comparable in size and operational complexity to existing WWTP.
- Represents best use of existing infrastructure and lowest relative energy use.
- Reduced risk of impacts on natural environment or archeological/heritage resources.
- Lowest estimated capital and operational cost.
- Lowest financial risk to County and residents (system users).

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Servicing beyond 20-year Horizon

- To service future development within the Drumbo Village boundary but beyond the 20 year planning horizon considered in this Class EA, consideration of all technically feasible alternatives to provide additional treatment capacity to service all lands within the designated settlement boundary of Drumbo will be required as part of a Class EA initiated at that time.
- Evaluation criteria that would be considered as part of that Class EA would include, but not be limited to, additional capacity requirements, site constraints, capital costs to upgrade the existing plant vs. building a new plant at a new location, source water protection issues, treatment technology advances and effluent quality requirements.

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Next Steps and Schedule

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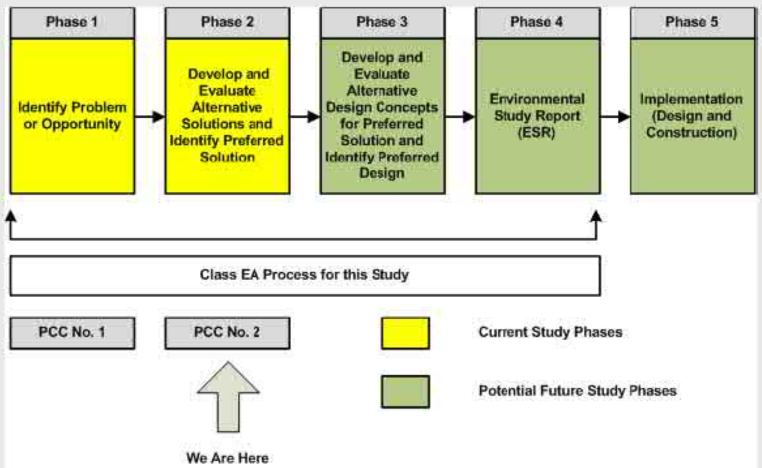
Municipal Class Environmental Assessment Process

Phases of the Study:

Public Consultation Centres (PCCs):



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Proposed Next Steps and Schedule

- Hold Public Consultation Centre No. 2 to present the Recommended Preferred Servicing Alternative – April or May 2017.
- Initiate Phase 3 of the Drumbo WWTP Class EA – Summer 2017.
- Next Steering Committee Meeting (Meeting No. 3) would be held when Phase 3 of the EA is completed and preferred design approach has been determined.

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Other Business

1. Surface Water Sampling Program in Princeton
2. Outreach and Education Campaign on the Operation and Maintenance of Your Septic System

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Princeton: Surface Water Sampling

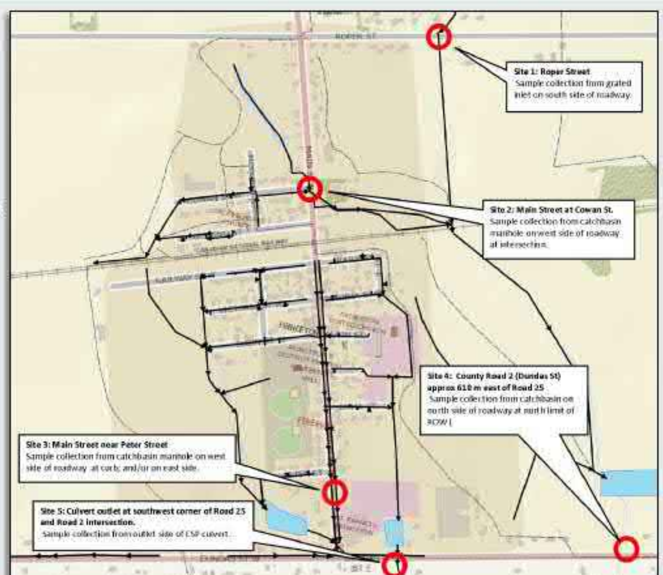
Program Design:

E.Coli as direct indicator of fecal contamination (human or other)

Artificial sweeteners (sucralose and acesulfame potassium) as indication of human wastewater, believed to be unaffected by septic systems

- *E.coli* at Sites 1 to 5
- Sweeteners at Sites 1, 2 and 3

Sampled on Oct. 3, 19, 24 and 31; and Nov. 7, 10 and 14, 2016



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Princeton: Surface Water Sampling

Results:

- High ***E.coli*** found only at Site #1 (Roper Street, upstream of village):
  - As high as 4,000,000 CFU/100mL, with 7 of 8 samples > 1,000,000
  - Also high **Acesulfame-K** at Site #1 at same time high ***E.coli*** found
- ***E. Coli*** relatively low in and below Village:
  - Site #2 (Main/Cowan): 6 of 7 samples at or below 1,000, one sample at 7,500 CFU/100mL
  - Site #3 (Peter/Main): 6 of 7 samples below 1,000, one sample at 3,000 CFU/100mL
  - Sites #4 and #5: 12 of 14 samples at or below 1,000; two samples at 6,000 CFU/100mL
- **Sucralose** present, and higher below village than above
- **Acesulfame-K** present, sometimes high at Site #1, lower in and below village

Conclusions:

- Possible sewage contamination at Site #1 – needs follow-up investigation
- Private septic systems within the village are not causing significant bacterial contamination of surface drainage, and appear to be performing as intended.

PH's Outreach and Education Campaign

- Soft launch of SepticSmart Oxford
- Information Package
  - Understanding Your Home's Septic System
  - Maintaining a Septic System
  - Get a Permit
  - Record of Maintenance
- Offer free on-site assessments
- Held workshop in Princeton

Questions and Discussion

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XCG File No.: 3-277-47-02

Meeting Date:	January 26, 2017
Location:	Room 129, 21 Reeve St., Woodstock
Attendees:	Tammie Ryall (TR), MOECC Mark Anderson (MA), GRCA Rodger Mordue (RM), Township of Blandford-Blenheim Mark Peterson (MP), Township of Blandford-Blenheim Marion Wearn (MW), Township of Blandford-Blenheim David Mayberry (DM), Oxford County Shahab Shafai (SS), Oxford County Mark Maxwell (MM), Oxford County Peter Heywood (PH), Oxford County Ainsley Pemberton (AP), Oxford County Don Ford (DF), Oxford County Gord Hough (GH), Oxford County Rebecca Smith (RS), Oxford County Stephen Nutt (SN), XCG Consulting Limited Graham Seggewiss (GS), XCG Consulting Limited Dianne Damman (DD), D.C. Damman and Associates
Regrets:	Sandra Cooke, GRCA John Brum, GRCA
Re:	**Drumbo Wastewater Treatment Plant (WWTP) Class EA Steering Committee Meeting No. 2**

Item | **Action**

1. **Introductions**

   - SS welcomed the Steering Committee members and provided some brief introductory remarks. All in attendance introduced themselves and their affiliation.

2. **Review and Approval of Steering Committee No. 1 Meeting Notes (June 27, 2016)**

   - There were no comments on the meeting notes for Steering Committee Meeting No. 1. The notes are, therefore, final.

Item		Action
3.	**Comments on Technical Memoranda 1 and 2** • **TM 1 – Existing Conditions** • **TM 2 – Future Flows and Loads** • SN provided an overview of TMs 1 and 2. There were no questions or comments on these TMs. It was noted that the TMs are considered to be final drafts and not for circulation outside of the Steering Committee. These TMs will be finalized as part of the Environmental Study Report (ESR) prepared for the project.	
4.	**Evaluation Process (TM 3)** • SN provided an overview of the evaluation process documented in TM 3. He outlined the alternative solutions considered, including two sub-alternatives which include a potential 324 unit development in Princeton (Alternatives 4B and 5B). He referred to the Problem/Opportunity Statement which notes that the goal of the study is to develop a wastewater treatment plan for the Community of Drumbo to accommodate existing and future development, while also considering the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP. • SN noted that for those alternatives that involve a new Drumbo WWTP, the existing plant would be decommissioned and a pump station would possibly be built at that location. • Technical, environmental, social, and financial criteria were used to evaluate the alternative solutions. Sub-criteria were developed under each of these categories. All criteria and categories have equal weight. Each alternative was ranked relative to the other alternatives from most preferred to least preferred. The initial evaluation was undertaken by members of the consulting team and Oxford County staff representing Public Works, Planning and Public Health at a September 12, 2016 workshop. • MP asked why representatives from the Township were not involved in the evaluation workshop. SN noted that as the proponent, Oxford County has the lead role in the Class EA. The role of the Steering Committee and the objective of this meeting is to provide further input to the evaluation process as presented in TM4.	

Item		Action

5. Evaluation of Alternative Solutions (TM 4)

- SN provided an overview of the evaluation of the alternative solutions by outlining the results of the evaluation of technical, environmental, social and financial criteria. He noted that the "do nothing" alternative (Alternative 1): does not meet the objectives of the Problem/Opportunity Statement; will not accommodate planned community growth; and does not meet the needs of the County. Therefore, this alternative was not considered further.
- TR asked whether there was room on-site for the expansion of the existing plant. SN noted that it is technically feasible to expand the WWTP on the existing site using the exiting SBR (sequencing batch reactor) technology (if only servicing Drumbo) or by converting to an MBR (membrane reactor) technology (to service Drumbo and Princeton).
- There was a question as to whether there was a concern with an on-site expansion, and potential spills, given the location of the municipal well on-site. SN noted that discussions have been held with Source Water Protection staff and that measures will need to be taken to protect the well. He noted that the costs to cover the Source Water Protection measures that may be required are included in the cost estimates as contingency allowances. He also noted that the expansion of the existing WWTP is not that substantial compared to the capacity of the existing plant.
- SN noted that, from a social environment perspective, the expansion of the existing plant does not represent a substantive change over existing conditions. There would be some short term construction impacts but the plant operation would not result in a substantive change in terms of potential community impacts.
- It was noted that there has been no planning application submitted to Oxford County for the potential 324 lots in Princeton at this time.

6. Recommended Preferred Alternative Solution

- SN noted that the recommended preferred alternative solution is Alternative 2 – Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the Drumbo WWTP.
- The rationale for the recommended preferred alternative solution includes:

Item	Action

- it is the most consistent with County policies and plans for future growth;
- it is the most comparable in size and complexity to the existing WWTP;
- it represents the best use of existing infrastructure and the lowest relative energy use;
- reduced risk of impacts on the natural environment or archaeological/heritage resources;
- lowest capital and operational cost; and
- lowest financial risk to the County and residents (system users).

- The servicing of future development within the Drumbo Village boundary beyond the 20 year planning horizon for this Class EA would require the consideration of all technically feasible alternatives to provide additional treatment capacity as part of a separate Class EA initiated at that time.
- SN noted that the results of the evaluation indicate that servicing of Princeton as part of the plan to service Drumbo, with or without the proposed 324 lot development, have a worse score than that any of the alternatives that do not include Princeton.
- It was noted that the costs for those alternatives that include servicing Princeton include costs for the construction of a collection system within the community, as well as for the construction of a trunk sewer line and pumping station to transport the wastewater to the Drumbo WWTP.
- There was a question as to whether the results of the evaluation of alternatives would change if a 30-year planning horizon was used instead of 20 years. SN noted that it would likely not make a difference. At this time, there is nothing to indicate that the County would have to build a new plant at the 30 year mark, rather than expand the existing plant. There is the potential to use MBR technology at the existing plant beyond the 20-year planning horizon.
- It was also noted that perhaps the County could consider moving the municipal well at some future point in time.
- MA questioned whether the evaluation would yield a different result if some of the criteria were ranked higher than others (e.g. cost ranked higher). Is there a need to do any sensitivity

Item		Action
	analyses? SN noted that it would likely not make a difference since the differences among the alternatives are quite apparent.	
	• SN noted that there is an immediate need to expand/upgrade the Drumbo WWTP in order to maintain compliance and to service planned growth in the community.	
7.	**Next Steps and Timing** • **County Council (re. Princeton WW Servicing follow up)** • **Public Consultation Centre No. 2** • **Next Steering Committee Meeting** • **Phases 3 and 4 of Class EA** • **Phase 5 – Design and Construction**	
	• There was some discussion regarding next steps and timing. SS noted that a report outlining the findings of the Drumbo Class EA to date, as well as a recommendation for Princeton, will be going to County Council in March.	
	• It was noted that Public Consultation Centre (PCC) No. 2 would be held in April or May 2017, pending the outcome of discussions with Council in March. The purpose of this PCC will be to present the recommended preferred servicing alternative and receive feedback from the community.	
	• Phase 4 of the Class EA process involves the development and public review of the ESR, while Phase 5 is the implementation (construction) of the project.	
	• SS noted that the next steps regarding recommendations for Princeton include: meet with the land owner that suggested an alternative servicing scenario for Princeton; meet with Township Council; and then report to County Council.	Oxford County
8.	**Other Business** • **Results of Princeton Surface Water Sampling Program** • **Outreach and Education Program on the Operation and Maintenance of Your Septic System**	
	• It was noted that a land owner in Princeton had retained a consultant to undertake surface water monitoring in 2014. According to the consultant that undertook the monitoring, the monitoring results indicated that the town's storm water management system was likely being impacted as a result of the septic systems of local residences. The consultant alleged that there was a potential concern associated with *E. coli* bacteria.	

Item		Action
	• In response to this work, Oxford County engaged Public Health Ontario (PHO) to review the 2014 monitoring results. Public Health Ontario concluded that the levels of *E. coli* bacteria were not unusual and did not present a concern.	
	• Oxford County initiated a surface water sampling program in Princeton in October and November of 2016. Five sample sites were monitored, including one site located upstream of the community. This surface water sampling program concluded that the private septic systems within Princeton are not causing significant bacterial contamination of surface drainage, and appear to be performing well. There was some potential sewage contamination at the sampling site located upstream of the community (Site #1). The County will undertake further investigation relative to this site.	Oxford County
	• PH noted that additional surface water sampling will be undertaken this spring, including an additional sampling site at Princeton Hall.	Oxford County
	• PH outlined the Outreach and Education Campaign that is being implemented by Oxford Public Health in Princeton. This campaign includes an Information Package with fact sheets, free on-site assessments, a town hall meeting, and a workshop.	
9.	**Questions and Discussion**	
	• MP noted that he doesn't see any development occurring in Princeton unless both services (water and wastewater) are in place. He expressed his view that Princeton should be provided with wastewater servicing. He also acknowledged that future growth of about 100 lots in Princeton was likely more realistic than 324 lots.	
	• MP noted that his preference would be to include servicing Princeton at a new WWTP at a new site.	
	• MP expressed his view that there should be a vision to establish a new site which would include servicing Princeton and that this site could be expanded in 20 years to accommodate additional growth, if required.	

These meeting notes were prepared by Dianne Damman, D.C. Damman and Associates.

Any errors, omissions, or discrepancies should be reported to the author.

A-4

PUBLIC CONSULTATION CENTRE NO. 1

– NEWSPAPER AD

– EXAMPLE LETTERS

– ATTENDANCE RECORDS

– COMMENT SHEET

– DISPLAY BOARDS

– HANDOUT

– COMMENTS RECEIVED

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Public Notice

NOTICE OF PUBLIC CONSULTATION CENTRE NO. 1
CLASS ENVIRONMENTAL ASSESSMENT
DRUMBO WASTEWATER TREATMENT PLANT WITH CONSIDERATION FOR SERVICING PRINCETON

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a current rated capacity of 300 m3/d. The Community of Princeton is currently serviced by private sewage systems.

Oxford County is currently undertaking a Class Environmental Assessment (Class EA) to develop a wastewater servicing plan for the Community of Drumbo, to service planned growth in the community in a cost-effective, environmentally sound and sustainable manner. The Drumbo WWTP Class EA will also consider the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP.

The study is being undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, June 2000, as amended in 2007, 2011 and 2015).

Public input and comments are an important component of the Class EA process. The first of two Public Consultation Centres (PCCs) has been scheduled to receive input and comments on the project from interested members of the public. The PCC will provide background information on the study, as well as information on the Class EA process, the Problem/Opportunity Statement, alternatives identified to date, and next steps and timing. The PCC will be held as follows:

Date: Thursday, June 16, 2016
Time: 6:30 p.m. to 8:30 p.m.

Location: Princeton Centennial Hall
35 Main Street South
Princeton, Ontario

The PCC will be a drop-in open house format, with project information posted on display boards, and County staff and their consultants in attendance to provide further explanation, and to receive your comments and answer any questions. There will be no formal presentation at the PCC.

Information on the Drumbo WWTP Class EA is posted on the Oxford County website at www.oxfordcounty.ca.

Please contact either of the following project team members if you have any questions or comments about the study, or if you would like to be added to the mailing list to receive future notifications for this study.

Mark Maxwell, P.Eng.
Oxford County Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800, ext. 3195
Fax: 519-421-4711
E-mail: mmaxwell@oxfordcounty.ca

Mr. Stephen Nutt, M.Eng., P.Eng.
Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4
Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Shahab Shafai, M.Sc.,P.Eng.
Acting Director of Public Works

This Notice issued on May 31, 2016

oxfordcounty.ca

Published in: Oxford Review – June 2 and 9, 2016
Ayr News – June 8 and 15, 2016


Princeton
FIRE STATION
PRINCETON : DRUMBO
WASTEWATER STUDY
JUNE 16 6-30 8-30
PRINCETON HALL


Drumbo
FIRE STATION
DRUMBO:PRINCETON
WASTEWATER STUDY
JUNE 16 630-830
PRINCETON HALL

Public Works
P. O. Box 1614, 21 Reeve Street
Woodstock, Ontario N4S 7Y3
Tel: 519-539-9800 ♦ 800-755-0394
Fax: 519-421-4711
Website: www.oxfordcounty.ca

June 6, 2016

Mr. John Brum
Resource Planner, Grand River Conservation Authority
400 Clyde Road
Cambridge, ON
L1R 5W6

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre 1

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a current rated capacity of 300 m^3/d. The Community of Princeton is currently serviced by private sewage systems.

Oxford County is now undertaking a Class Environmental Assessment (Class EA) to develop a wastewater servicing plan for the Community of Drumbo, to service planned growth in the Community in a cost-effective, environmentally sound and sustainable manner. The Drumbo WWTP Class EA will also consider the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP.

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Time: 6:30 p.m. to 8:30 p.m.	**35 Main Street South**
	Princeton, Ontario

The PCC will be a drop-in open house format, with project information posted on display boards, and County staff and their consultants in attendance to provide further explanation, and to receive your comments and answer any questions. There will be no formal presentation at the PCC.

Information on the Drumbo WWTP Class EA is posted on the Oxford County website at: www.oxfordcounty.ca.

If you have any questions or would like further information about the study, please contact Mark Maxwell by phone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca. Thank you for your interest in this study.

Sincerely,

Shahab Shafai

Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services

cc. Robert Walton, P.Eng., Director of Public Works
Stephen Nutt, XCG Consulting Limited

Public Works
P. O. Box 1614, 21 Reeve Street
Woodstock, Ontario N4S 7Y3
Tel: 519-539-9800 ♦ 800-755-0394
Fax: 519-421-4711
Website: www.oxfordcounty.ca

June 6, 2016

Mr. Drew Crinklaw
Rural Planner, Ministry of Agriculture, Food and Rural Affairs
667 Exeter Road
London, ON
N6E 1L3

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre 1

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a current rated capacity of 300 m^3/d. The Community of Princeton is currently serviced by private sewage systems.

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Sincerely,

Shahab Shafai

Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services

cc. Robert Walton, P.Eng., Director of Public Works
Stephen Nutt, XCG Consulting Limited

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Drumbo Wastewater Treatment Plant
Class Environmental Assessment

PUBLIC CONSULTATION CENTRE
Princeton Centennial Hall
35 Main Street South
Princeton, Ontario
June 16, 2016
6:30 p.m. to 8:30 p.m.

ATTENDANCE SHEET

Thank you for your interest in this project. Please print legibly.

NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
Maryann Green E Ann Jacobson			
KATHY + ERNIE KEYS			
DAVID MECKE			
ROGER KOCKEL			
Peter Heywood	OCPH.	x 3502	pheywood@oxfordcounty.ca
JOHN & HILARY LIBBRECHT			
Don Duncan			
Sheryl Jones			

Drumbo Wastewater Treatment Plant
Class Environmental Assessment

PUBLIC CONSULTATION CENTRE
Princeton Centennial Hall
35 Main Street South
Princeton, Ontario
June 16, 2016
6:30 p.m. to 8:30 p.m.

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ATTENDANCE SHEET

Thank you for your interest in this project. Please print legibly.

NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
Laura Surich			
Norm Laurie			
Lois Caso			
Arnold + Ann Janssen			
Chris Rook			
Elaine Barnes			
Flint Barnes			
Mark Kirby			

The collection of personal information on this form is necessary for the proper administration of a lawfully authorized activity under the Environmental Assessment Act and will be used for the purposes of proving compliance with the consultation and public notice requirements under the Act. For more information about this collection, please contact Shahab Shafai, M.Sc., P. Eng., Manager of Environmental Services, County of Oxford, 21 Reeve Street, P.O. Box 1614, Woodstock, ON, N4S 7Y3 or (519) 539-9800 (ext. 3127).

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Drumbo Wastewater Treatment Plant
Class Environmental Assessment

PUBLIC CONSULTATION CENTRE
Princeton Centennial Hall
35 Main Street South
Princeton, Ontario
June 16, 2016
6:30 p.m. to 8:30 p.m.

ATTENDANCE SHEET

Thank you for your interest in this project. Please print legibly.

NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
Truus VanNees.			
Darren Mahlman			
MARION WEARN			
KEITH & PAT CADWELL			
ROB TEET			
Pat & Kait Toohey			
TILER & KRISTEN LITTLE			
John Janson			

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Drumbo Wastewater Treatment Plant
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ATTENDANCE SHEET

Thank you for your interest in this project. Please print legibly.

NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
David Morgan			
Mark Maxwell	Oxford County		
Rob Walton	Oxford County		
Shahab Shafai	oxford county		
Minoo Yazdanpanah	oxford county		
Robert Randall			
Craig Van Wees			
Bob + Ann Stevenson			

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Drumbo Wastewater Treatment Plant
Class Environmental Assessment

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Princeton Centennial Hall
35 Main Street South
Princeton, Ontario
June 16, 2016
6:30 p.m. to 8:30 p.m.

ATTENDANCE SHEET

Thank you for your interest in this project. Please print legibly.

NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
Pat VanDeCappelle			
CHRIS McDOUGALL			
Kevin Perry			
Peggy Crosby			
ALEX DONN			
SCOTT POLISAK			
JOANNE FORREST			
John Anderson			

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Drumbo Wastewater Treatment Plant
Class Environmental Assessment

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Princeton Centennial Hall
35 Main Street South
Princeton, Ontario
June 16, 2016
6:30 p.m. to 8:30 p.m.

ATTENDANCE SHEET

Thank you for your interest in this project. Please print legibly.

NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
Doris + Mike Ilnycky			
Deb MacDonald			
Larry Etherington			

The collection of personal information on this form is necessary for the proper administration of a lawfully authorized activity under the Environmental Assessment Act and will be used for the purposes of proving compliance with the consultation and public notice requirements under the Act. For more information about this collection, please contact Shahab Shafai, M.Sc., P. Eng., Manager of Environmental Services, County of Oxford, 21 Reeve Street, P.O. Box 1614, Woodstock, ON, N4S 7Y3 or (519) 539-9800 (ext. 3127).

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Drumbo Wastewater Treatment Plant
Class Environmental Assessment

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June 16, 2016
6:30 p.m. to 8:30 p.m.

ATTENDANCE SHEET

Thank you for your interest in this project. Please print legibly.

NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
ALLEN YEANDLE			
Judie Demarest			
Ron Gillespie			
SHAWN BRENNEMAN			
Betty & Rob Cowan			
John Langlois			
Bev Baxter			
Harpreet Rai			

The collection of personal information on this form is necessary for the proper administration of a lawfully authorized activity under the Environmental Assessment Act and will be used for the purposes of proving compliance with the consultation and public notice requirements under the Act. For more information about this collection, please contact Shahab Shafai, M.Sc., P. Eng., Manager of Environmental Services, County of Oxford, 21 Reeve Street, P.O. Box 1614, Woodstock, ON, N4S 7Y3 or (519) 539-9800 (ext. 3127).

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 1
Thursday, June 16, 2016

Thank you for your interest in the **Drumbo Wastewater Treatment Plant Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: ____________________

Address: ____________________ ________
Street / Apt. No.

____________ ____________ ____________
City / Province / Postal Code

Phone: ____________ **E-mail:** ____________

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. ☐ Yes ☐ No

Please feel free to add additional comments on a separate sheet.
Leave your comments on your departure or mail, fax, or e-mail them to:

Mark Maxwell, P. Eng.
Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3

Phone: 519-539-9800, ext. 3195
E-mail: mmaxwell@oxfordcounty.ca

or

Mr. Stephen Nutt, M. Eng., P. Eng.
Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

____
____
____
____
____
____
____
____
____

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Please provide any other comments.

The collection of personal information on this form is necessary for the proper administration of a lawfully authorized activity under the Environmental Assessment Act and will be used for the purposes of proving compliance with the consultation and public notice requirements under the Act. For more information about this collection, please contact Shahab Shafai, M.Sc., P. Eng., Manager of Environmental Services at the County of Oxford, 21 Reeve Street, P.O. Box 1614, Woodstock, ON, N4S 7Y3 or (519) 539-9800 (ext. 3127).

Oxford County
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Drumbo Wastewater Treatment Plant Class Environmental Assessment

Public Consultation Centre #1
June 16, 2016

XCG
Environmental Engineers & Scientists

Welcome to Public Consultation Centre No. 1

Oxford County is undertaking a Schedule C Class Environmental Assessment to develop a wastewater treatment plan for the Community of Drumbo to service existing and planned growth in the community.

The Drumbo Wastewater Treatment Plant (WWTP) Class EA will also consider the potential to provide wastewater treatment for the Community of Princeton at an expanded or new Drumbo WWTP.

Welcome to Public Consultation Centre No. 1

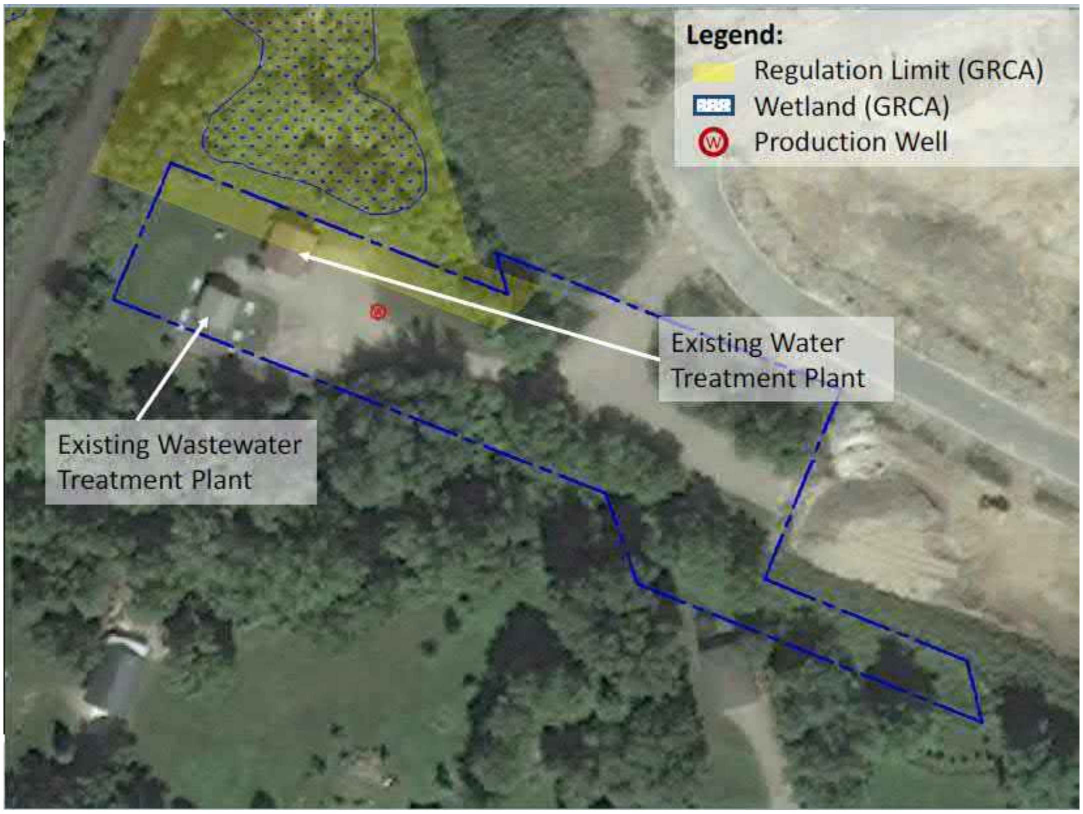
The purpose of PCC#1 is to:

- Provide background information about the study
- Present the problem/opportunity statement that will guide the study
- Present the alternatives that will be evaluated in Phase 2 of the Class EA process
- Outline next steps and schedule

At least one more PCC will be held to present the preferred WWTP upgrade alternative.

Background – Drumbo WWTP Class EA

- Existing WWTP is a Sequencing Batch Reactor (SBR) with tertiary filtration and ultraviolet disinfection, and a discharge to the Cowan Drain
- Original design capacity was 272 m^3/d. In February 2015, the plant was re-rated to a design capacity of 300 m^3/d
- In 2015, the annual average day flow was 228 m^3/d, or 76% of the re-rated design capacity



Background – Princeton WW Servicing Study

- Initiated in February 2011 as a Schedule C Class EA
- After consideration of alternatives to provide wastewater servicing, it was concluded that the Ministry of the Environment and Climate Change (MOECC) would not approve a sub-surface discharge system or a direct discharge to Horner Creek
- A collection system and treatment plant with direct discharge to Nith River was deemed to be economically unsustainable
- A Wastewater Servicing Study Report was prepared recommending continued reliance on private systems with a supporting Outreach/Education program to be delivered by Oxford County Public Health

XCG

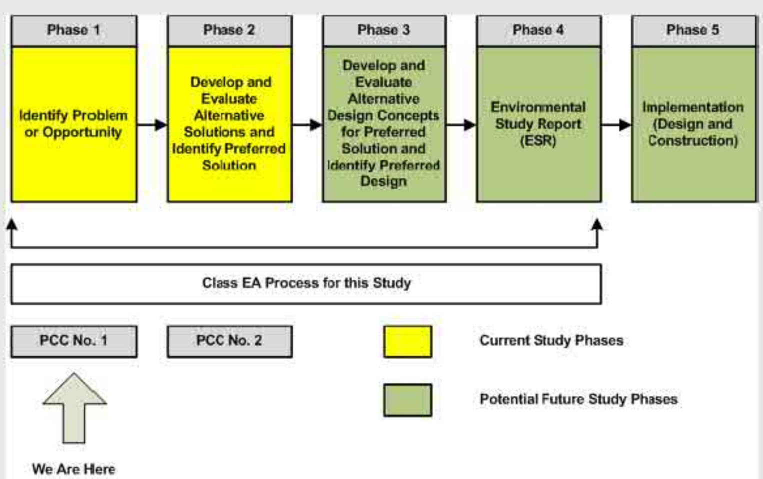
Background – Princeton WW Servicing Study

- A local landowner proposed an alternative servicing solution to the County that would service the existing community plus a residential development of 324 units
- The alternative servicing solution also involved a collection system and treatment plant with discharge to the Nith River, but with costs distributed over more lots
- County Council directed staff to further examine this proposed alternative servicing solution
- Examination of the alternative servicing solution will be undertaken in parallel with the Drumbo WWTP Class EA

Municipal Class Environmental Assessment Process

Phases of the Study:

Public Consultation Centres (PCCs):



Drumbo WWTP Class EA – Problem/Opportunity Statement

Develop a wastewater treatment plan for the Community of Drumbo that is environmentally responsible, socially acceptable and economically sustainable to accommodate existing and future development within the community to at least 2036. The Drumbo WWTP Class EA will also consider the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP.

XCG

Alternatives Being Considered

Alternative Solution	Description
Alternative 1 – "Do Nothing"	No additional wastewater treatment capacity for Drumbo and no treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 2 – Service Drumbo growth at an expanded Drumbo WWTP	Expand the Drumbo WWTP to service growth in Drumbo. No treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 3 – Service Drumbo growth at a new Drumbo WWTP at a new site	Construct a new Drumbo WWTP at a new site to service growth in Drumbo. No treatment of Princeton wastewater at the new Drumbo WWTP.

XCG

Alternatives Being Considered

Alternative Solution	Description
Alternative 4A/4B – Service Drumbo growth and Princeton at an expanded Drumbo WWTP	Expand the Drumbo WWTP to service growth in Drumbo and wastewater from Princeton, excluding (4A) or including (4B) proposed new development units in Princeton.
Alternative 5A/5B – Service Drumbo growth and Princeton at a new Drumbo WWTP at a new site	Construct a new Drumbo WWTP at a new site to service growth in Drumbo and wastewater from Princeton, excluding (5A) or including (5B) proposed new development units in Princeton.

XCG

Evaluation Methodology

- Evaluation criteria will consider natural, social, technical, and economic impacts
- Evaluation criteria and weighting will be presented to the Steering Committee that has been formed to guide the project
- Evaluation will consider public input received at two to three scheduled Public Consultation Centres (PCCs)

XCG

Proposed Next Steps and Schedule

- Steering Committee Meeting No. 1 – June 2016
- Complete evaluation of alternatives and recommend Preferred Servicing Alternative – August 2016
- Present recommended Preferred Servicing Alternative at Steering Committee Meeting No. 2 – September 2016
- Hold Public Consultation Centre No. 2 to present the recommended Preferred Servicing Alternative – Fall/Winter 2016
- Initiate Phase 3 of the Drumbo WWTP Class EA – Fall/Winter 2016 (depending on outcome of Phase 2 of the Class EA process)

We'd Like to Hear From You

Please deposit your comment sheet in the box provided or forward to the County.

Contact information:

Mark Maxwell
Oxford County
Department of Public Works
21 Reeve St., PO Box 1614
Woodstock ON N4S 7Y3

519-539-9800, ext. 3195
mmaxwell@oxfordcounty.ca

Stephen Nutt
Project Manager
XCG Consultants Ltd.
820 Trillium Drive
Kitchener ON N2R 1K4

519-741-5774
stephen.nutt@xcg.com

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Drumbo Wastewater Treatment Plant Class Environmental Assessment

Public Consultation Centre #1
June 16, 2016

XCG Environmental Engineers & Scientists

Slide 1

Welcome to Public Consultation Centre No. 1

Oxford County is undertaking a Schedule C Class Environmental Assessment to develop a wastewater treatment plan for the Community of Drumbo to service existing and planned growth in the community.

The Drumbo Wastewater Treatment Plant (WWTP) Class EA will also consider the potential to provide wastewater treatment for the Community of Princeton at an expanded or new Drumbo WWTP.

2 XCG

Welcome to Public Consultation Centre No. 1

The purpose of PCC#1 is to:

- Provide background information about the study
- Present the problem/opportunity statement that will guide the study
- Present the alternatives that will be evaluated in Phase 2 of the Class EA process
- Outline next steps and schedule

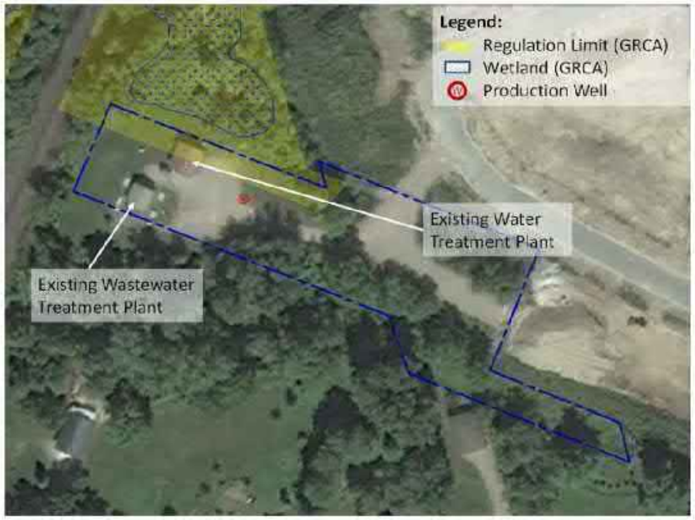
At least one more PCC will be held to present the preferred WWTP upgrade alternative.

3 XCG

Background – Drumbo WWTP Class EA

- Existing WWTP is a Sequencing Batch Reactor (SBR) with tertiary filtration and ultraviolet disinfection, and a discharge to the Cowan Drain
- Original design capacity was 272 m^3/d. In February 2015, the plant was re-rated to a design capacity of 300 m^3/d
- In 2015, the annual average day flow was 228 m^3/d, or 76% of the re-rated design capacity

4 XCG



Background – Princeton WW Servicing Study

- A local landowner proposed an alternative servicing solution to the County that would service the existing community plus a residential development of 324 units
- The alternative servicing solution also involved a collection system and treatment plant with discharge to the Nith River, but with costs distributed over more lots
- County Council directed staff to further examine this proposed alternative servicing solution
- Examination of the alternative servicing solution will be undertaken in parallel with the Drumbo WWTP Class EA

7 XCG

Background – Princeton WW Servicing Study

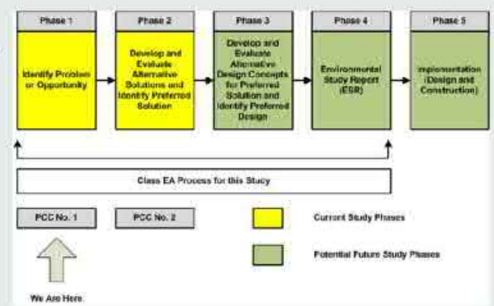
- Initiated in February 2011 as a Schedule C Class EA
- After consideration of alternatives to provide wastewater servicing, it was concluded that the Ministry of the Environment and Climate Change (MOECC) would not approve a sub-surface discharge system or a direct discharge to Horner Creek
- A collection system and treatment plant with direct discharge to Nith River was deemed to be economically unsustainable
- A Wastewater Servicing Study Report was prepared recommending continued reliance on private systems with a supporting Outreach/Education program to be delivered by Oxford County Public Health

5 XCG

Municipal Class Environmental Assessment Process

Phases of the Study:

Public Consultation Centres (PCCs):



8 XCG

Drumbo WWTP Class EA – Problem/Opportunity Statement

Develop a wastewater treatment plan for the Community of Drumbo that is environmentally responsible, socially acceptable and economically sustainable to accomodate existing and future development within the community to at least 2036. The Drumbo WWTP Class EA will also consider the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP.

9 XCG

Alternatives Being Considered

Alternative Solution	Description
Alternative 1 – "Do Nothing"	No additional wastewater treatment capacity for Drumbo and no treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 2 – Service Drumbo growth at an expanded Drumbo WWTP	Expand the Drumbo WWTP to service growth in Drumbo. No treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 3 – Service Drumbo growth at a new Drumbo WWTP at a new site	Construct a new Drumbo WWTP at a new site to service growth in Drumbo. No treatment of Princeton wastewater at the new Drumbo WWTP.

10 XCG

Alternatives Being Considered

Alternative Solution	Description
Alternative 4A/4B – Service Drumbo growth and Princeton at an expanded Drumbo WWTP	Expand the Drumbo WWTP to service growth in Drumbo and wastewater from Princeton, excluding (4A) or including (4B) proposed new development units in Princeton.
Alternative 5A/5B – Service Drumbo growth and Princeton at a new Drumbo WWTP at a new site	Construct a new Drumbo WWTP at a new site to service growth in Drumbo and wastewater from Princeton, excluding (5A) or including (5B) proposed new development units in Princeton.

11 XCG

Evaluation Methodology

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12 XCG

Proposed Next Steps and Schedule

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13 XCG

We'd Like to Hear From You

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 1
Thursday, June 16, 2016

Thank you for your interest in the **Drumbo Wastewater Treatment Plant Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: Deb MACDONALD

Address: ____________ Street ____ Apt. No.

____ City ____ Province ____ Postal Code

Phone: ____ **E-mail:** ____

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. ☒ Yes ☐ No

Please feel free to add additional comments on a separate sheet.
Leave your comments on your departure or mail, fax, or e-mail them to:

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Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

An Aerial Shot of Both DRUMBO + PRINCETON would be helpful.

- Something needs to be done as size of lots in drastic changes

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Possible Notice of Date in TAX Bill / Poster of notice in due time of meeting.

- Cost if any expense to Princeton Residents and what possible grants are allotted for such a major future plan, should it need to be expanded in another 20 yrs due to growth

Please provide any other comments.

Thankful of info right here for residence of Princeton people.

Should as well be in Drumbo for them as well if time and facility allows.

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Thank you for your interest in the **Drumbo Wastewater Treatment Plant Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: ERNIE KEYS.

Address: ______________ Street ______________ Apt. No.

______________ City ______________ Province ______________ Postal Code

Phone: ______________ **E-mail:** ______________

I would like to be placed on a mailing list to receive future notifications regarding this project.

Please indicate Yes or No. ☑ Yes ☐ No

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Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

WE WOULD LIKE TO SEE THIS SYSTEM STARTED ASAP

MEETINGS FOR MEETING FOR MEETING ARE A WASTE OF

TIME & MONEY.

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Please provide any other comments.

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Name: KEITH + PAT CADWELL

Address: Street, Apt. No.

City, Province, Postal Code

Phone: **E-mail:**

I would like to be placed on a mailing list to receive future notifications regarding this project.

Please indicate Yes or No. [X] Yes [ ] No

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Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

Now is the time FOR a Sewage System - NOT 8-10 YRS FROM NOW

PRINCETON SEEMS to be the FORGOTTEN VILLAGE IN OXFORD County.

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

THE COMMENT WAS MADE BY ONE OF THE COUNTY REPRESENTATIVES THAT THERE IS NO GROWTH IN PRINCETON, WHICH LEADS US TO BELIEVE THE COUNTY WANTS IT THAT WAY.

Please provide any other comments.

THERE WOULD BE GROWTH HERE IF PRINCETON WAS BROUGHT UP TO DATE WITH THE INFRASTRATURE THAT DRUMBO - PLATTSVILLE AND OTHER VILLAGES HAVE.

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Name: Betty + Rob Cowan

Address: ______________________ (Street) ______ (Apt. No.)

______ (City) ______ (Province) ______ (Postal Code)

Phone: ______ **E-mail:** ______

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Please indicate Yes or No. [X] Yes [ ] No

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Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

To see growth in Princeton, we need to be included in the WW plan.

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Please provide any other comments.

Over 75% of septics in Princeton have reached their expiry dates -
We need the County to see the vision of growth in Princeton, not just Drumbo & Plattsville.
We can not grow without sewers

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Name: Ron & Judie Gillespie

Address: ______ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.

Please indicate Yes or No. ☑ Yes ☐ No

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Please provide any comments on the Problem/Opportunity Statement.

Not pleased with your options that omit Princeton. Princeton needs to be included. We are an important village in this township but are slowly dieing. We are close to 403 & 401 so growth would happen here if we had waste water treatment (sewer systems) Why are we being left out of the growth plans for the township?!

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Please provide any other comments.

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Name: Lori's Case

Address: ______________________ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.

Please indicate Yes or No. [X] Yes [ ] No

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Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

I do not support a WWTP for Princeton, Ont. The landowner supporting this study stands to profit substantially from the sale of lots for future development; therefore allow him to pay for the upgrades necessary to allow the sale of his lots.

Please provide any other comments.

I moved to a small town and I would like to continue to live in a small town. I came from a city to retire here and I would like to keep it the way it is. The land owner in question would bankrupt all residents for his own purposes → to make a buck at others expense. I strongly disagree with this proceedure! Princeton is a beautiful and friendly community. Let's keep it that way.

Lois Case.

P.S. If the landowner wants to develop Drumbo it's easier 401 access.

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Name: Chris Kook

Address: ______ Street ______ Apt. No. ______

City ______ Province ______ Postal Code ______

Phone: ______ **E-mail:** ______

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Please indicate Yes or No. ☐ Yes ☑ No

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Please provide any comments on the Problem/Opportunity Statement.

- Why will we have to pay for sanitary when we are and shouldn't have had to pay for watermain that also didn't include hydrants
- We paid $9500 for water the developer should have to pay for this.
-

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Please provide any other comments.

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Name: Flint and Elaine Barnes

Address: Street / Apt. No.

City / Province / Postal Code

Phone: **E-mail:**

I would like to be placed on a mailing list to receive future notifications regarding this project.

Please indicate Yes or No. [X] Yes [ ] No

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Please provide any comments on the Problem/Opportunity Statement.

We don't believe we need this in Princeton
There is Nothing here to attract anyone
No School, NO Bank, A Park that never
gets used, Churches that are ready to Close.
If Van Wees wants this → Let him Pay
for it! Why should we pay for something we
don't want or need to benefit one Person.

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Do Drumbo Only
Leave Princeton As IS.

Please provide any other comments.

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Name: John Jansen

Address: ______________ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.

Please indicate Yes or No. ☑ Yes ☐ No

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Please provide any comments on the Problem/Opportunity Statement.

I have but 1 comment regarding Princeton, If the "Local landowner" wants this project to go forward in PRINCETON so that said "Local landowner" wants to make their millions of dollars then may I propose that the above mentioned "Local landowner" pay for this project. I do not in any way feel like paying another astronomical amount of money to stuff said "Local landowners" pockets.

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Please provide any other comments.

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Name: Darren Mahlman

Address:
Street | Apt. No.
City | Province | Postal Code

Phone: **E-mail:**

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Please indicate Yes or No. [X] Yes [ ] No

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Please provide any comments on the Problem/Opportunity Statement.

Concerns - Solution 5A/5A - Best for future Growth for both Communitys
- Type of treatment Facility
- Location: ie odours, Noise ie equipment and traffic
- Receiving Stream - Cowan Drain - already lots of algea
- Discharge limits would be tight due to limited dilution at Cowan Drain
- operational cost increase
- Housing increase / population increase for both communitys - good

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

- One WWTP would suit both communitys from a growth and environmental stand point
- Few different WWTP's to choose from to keep capital and operational costs lower depending on discharge requirements.

Please provide any other comments.

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Oxford County *growing stronger...together*

COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 1
Thursday, June 16, 2016

Thank you for your interest in the **Drumbo Wastewater Treatment Plant Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: M Kirby

Address: Box 244 (Street) ~~Apt. No.~~

Drumbo (City) ON (Province) N0J1G0 (Postal Code)

Phone: 519 463 5417 **E-mail:**

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. ☑ Yes ☐ No

Please feel free to add additional comments on a separate sheet.
Leave your comments on your departure or mail, fax, or e-mail them to:

Mark Maxwell, P. Eng.
Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3

Phone: 519-539-9800, ext. 3195
E-mail: mmaxwell@oxfordcounty.ca

or

Mr. Stephen Nutt, M. Eng., P. Eng.
Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

My initial response is that this will be a very expensive project undertaken because certain people, namely Those trying to develop lots in Princeton and advocates of same project will benefit finacially and the villages will grow disproportionately. Take a good look at Ayr. which used to be a nice village and is now very busy and more citified. Let Princeton people who need new septic systems ~~replace~~ upgrade them themselves if necessary the same as all the rural road residents

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Please provide any other comments.

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 1
Thursday, June 16, 2016

Thank you for your interest in the **Drumbo Wastewater Treatment Plant Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: Truus Van Weer.

Address: ______________________ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. ☑ Yes ☐ No

Please feel free to add additional comments on a separate sheet.
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Woodstock, Ontario N4S 7Y3

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Mr. Stephen Nutt, M. Eng., P. Eng.
Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Princeton requires a sewer system to address the aging septic systems. I hope a cost effective solution is found.

Please provide any other comments.

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 1
Thursday, June 16, 2016

Thank you for your interest in the **Drumbo Wastewater Treatment Plant Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: TYLER LITTLE

Address: ______ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. ☑ Yes ☐ No

Please feel free to add additional comments on a separate sheet.
Leave your comments on your departure or mail, fax, or e-mail them to:

Mark Maxwell, P. Eng.
Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3

Phone: 519-539-9800, ext. 3195
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or

Mr. Stephen Nutt, M. Eng., P. Eng.
Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

Drumbo is growing, Princeton is not. It's a community that has LITERALLY built maybe 5 homes in the last 40 years. A town that keeps its charm by being what it is, a small community. A farming community. Adding the sewer to accomodate a 324 house subdivision would reap Princeton of it's charm and appeal.
Not to mention the fact that NO ONE wants this sewer. As a resident of Princeton for the last 29 years, I can honestly say that I have not come across one person who is in favour of this sewer... other than the 2 individuals who stand to profit from it.

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Expanding the Drumbo WWTP (Alternative 2) makes the most sense. It helps Drumbo and doesn't require Princeton to get caught up in it for no reason other than people trying to make a profit at the cost of a community.

Please provide any other comments.

If this sewer goes in, who will be paying for it? Me? Because I don't have the money! It's as simple as that!
I'm already paying for the $10,000 water install, as well as my taxes going up 5% each year, so where is the money coming from for me to pay for my sewer?
What you're basically saying is that the only way for me to afford my house, is to sell my house. I'm no economic genius, but even I know that's a bad idea.
This whole sewer debate is basically 2 people saying that everyone in Princeton wants a sewer, here's the thing... that's a lie! When someone tells you that they want a sewer and the whole town agree, remember that that person forgot to check with the rest of us!

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 1
Thursday, June 16, 2016

Thank you for your interest in the **Drumbo Wastewater Treatment Plant Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: Kristen Little

Address:
Street — Apt. No.
City — Province — Postal Code

Phone: **E-mail:**

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. ☑ Yes ☐ No

Please feel free to add additional comments on a separate sheet.
Leave your comments on your departure or mail, fax, or e-mail them to:

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Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3

Phone: 519-539-9800, ext. 3195
E-mail: mmaxwell@oxfordcounty.ca

or

Mr. Stephen Nutt, M. Eng., P. Eng.
Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

The economic stability of this project relies solely on the concept of selling 324 development lots. The fact is Princeton is not a booming suburbia and there is a great likelihood that the economic side of things will not pan out for these developers. This would only create higher taxes because someone would eventually have to pay for these sewage systems to be implemented into a vacant and useless development area. Not to mention that we enjoy our town being a small tight knit community. Socially this implementation only helps 2 main people and out of town developers.

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Alternative two - service drumbo at an expanded Drumbo WWTP makes the most sense. This plan helps Drumbo expand without disrupting the community of Princeton.

Please provide any other comments.

I have recently been laid off and my job was outsourced to India. Unfortunately money does not grow on trees; so this plan ~~of~~ of implementing a sewer system would not benefit me. I have spoken with many in the town of Princeton and most simply can not foot the bill (even at a discounted cost). If the two main people pushing for this sewer system would like to foot the bill for everyone in this town then I'd be all for it. As that is not likely to happen, I ask that you please consider us "less than rich" folks as we make up the majority of this town.

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 1
Thursday, June 16, 2016

Thank you for your interest in the **Drumbo Wastewater Treatment Plant Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: D. + M. Ilnycky

Address: ______ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. ☑ Yes ☐ No

Please feel free to add additional comments on a separate sheet.
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21 Reeve Street, P.O. Box 1614
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or

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Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

Being residents of Princeton we are interested in the outcome of this Study. We would be interested in Alternatives 4 or 5 considering economic and other Impacts related to these options

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

as stated earlier

Please provide any other comments.

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 1
Thursday, June 16, 2016

Thank you for your interest in the **Drumbo Wastewater Treatment Plant Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: Laureen Duncan

Address: ______ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. [X] Yes [ ] No

Please feel free to add additional comments on a separate sheet.
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Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
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XCG Consulting Limited
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Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the Problem/Opportunity Statement.

______

over >

Please provide any comments on the alternative solutions being considered for providing wastewater treatment for the Community of Drumbo and potentially the Community of Princeton.

Please provide any other comments.

I was not able to attend the meeting but I would like to comment on one solution that was being considered. My father-in-law was at the meeting and told me about the idea of a treatment plant located between Drumbo & Princeton with it possibly discharging into the creek that runs through our farm. I am opposed to this idea because I do not want our creek ruined by the run-off. Can you guarantee that the run-off is always properly treated? My father-in-law believes his creek was ruined by the run-off from the existing treatment plant and I do not want that to happen here.

I think the best solution is to enlarge the plant in Drumbo. Why do you need a

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subdivision in Princeton when ~~they~~ there are a lot of empty lots in the 'Mud Hole' subdivision in Drumbo?

Thank you

Dianne Damman

From:	Mark Maxwell <mmaxwell@oxfordcounty.ca>
Sent:	June-17-16 9:14 AM
To:	Rob Walton; Shahab Shafai; Stephen Nutt (stephen.nutt@xcg.com); Dianne Damman (ddamman@kw.igs.net); Graham Seggewiss (graham.seggewiss@xcg.com)
Subject:	FW: Sewers in Princeton

Hi Everyone,

I just received the comments below from a Princeton resident.

-Mark

From:
Sent: June-17-16 8:55 AM
To: Mark Maxwell
Subject: Sewers in Princeton

Good Morning Mark,

I couldn't make the meeting last night but my wife was there and gave me a Cole notes version. I wanted to provide some feedback and was hoping you are the person to send it to.

- My wife told me of the different options being looked at for the waste eater for both Princeton and Drumbo. I would like to let you know that I would be in strong support of nothing changing in Princeton and I have some (at least of mine) supporting reasons below.
    - My septic is working fine
    - With city water now we no longer have to worry about our water supply and bacteria
    - The cost that we (and I assume many households) would have to absorb would be difficult if not impossible to handle. I realize we can debenture the cost from the township/county it is more of the hook up cost, I would have to get a loan or mortgage to have this work completed. When we hooked up water it caused "extra" expenses as when they came into my wall the disturbed the dirt etc and now I have to dig the entire wall up and have the wall fixed as my basement now leaks....always extra cost when renovating.
    - I have a cedar hedge around my property that I am sure I would lose (the portion where they have to dig) when they hook up the sewer to my house. This again will cause extra cost and increase the burden.
    - There are still people who are not hooked up to the water so I don't see how you can bill fairly when I'm sure the sewer charges will be based on water charges and with no water consumption (after the meters are installed) they will have minimal sewer charges to go with the minimal water charges.
    - Will you "force" people to hook up to the sewer? Or the water?
    - I am under the impression (perceived or real) that the drive to add sewers to Princeton is coming from a couple individuals who own property and want to build over 300 new homes in Princeton. They seem to be making the most noise as I have not spoke with one other person who is interested in having sewers come in....it seems to be the squeaky wheel is getting the grease again?

I realize a lot of my opposition is personal, but I do feel that a lot of other households are in the same boat and are too proud or scared to say that having to find this type of outlay of cash may be beyond their reach. There is no need to add 300 new homes in Princeton when you may have that many end up empty when people start to sell and move to different locations because they can't afford to stay in Princeton.

Thanks for your time and if you can offer any help, suggestions etc for us in regards to these issues I would appreciate the input. I would also like to ask to be added to the mailing list to receive future notifications regarding this project.

Thanks
Rob Van De Cappelle

Dianne Damman

From:	Mark Maxwell <mmaxwell@oxfordcounty.ca>
Sent:	July-13-16 4:26 PM
To:	
Cc:	Shahab Shafai; Stephen Nutt (stephen.nutt@xcg.com); Dianne Damman
Subject:	Drumbo WWTP Class EA and Princeton WW Servicing

Hi Laureen,

Thanks for submitting your comments following the public consultation centre regarding the Drumbo wastewater treatment (WWTP) plant Class Environmental Assessment and Princeton wastewater servicing.

I just wanted to follow up on a few of your comments and provide some clarification.

No decision has been made regarding the need for and location of a possible new WWTP to service Drumbo and Princeton. Consequently, no decision regarding a possible discharge for a new WWTP has been made. In your comments you note a possible discharge into the creek that runs through your family farm. If a new WWTP is recommended as the preferred alternative solution, detailed studies would be undertaken regarding a possible discharge location. At this point, it would be premature to make any assumptions.

Please feel free to contact me with any follow up questions or comments.

Thanks,

Mark Maxwell
Project Engineer & Construction Coordinator
County of Oxford
21 Reeve Street, Woodstock, ON N4S 3G1
Office: 519-539-9800 x3195
Mobile: 519-532-3974
Fax: 519-421-4711

Dianne Damman

From: Mark Maxwell <mmaxwell@oxfordcounty.ca>
Sent: August-18-16 8:47 AM
To: Alex D.; Jennifer Donn
Cc: Shahab Shafai; Dianne Damman (ddamman@kw.igs.net); stephen.nutt@xcg.com
Subject: RE: A. Donn Comments - Drumbo Wastewater Class EA - PIC 1

Thanks for your comments, Alex and Jennifer.

-Mark Maxwell

From: Alex D.
Sent: August-17-16 10:03 PM
To: Mark Maxwell; stephen.nutt@xcg.com; Jennifer Donn
Subject: A. Donn Comments - Drumbo Wastewater Class EA - PIC 1

Mark / Stephen,

Apologizes for the late reply. Further to PIC #1 held on June 16, 2016, I am forwarding our previously provided correspondence to the older EA for Princeton Wastewater Servicing (2012) and provide the following comments per our discussion at the PIC. As noted our concerns are as follows:

- There is no need for our lot to connect to municipal sanitary servicing at this time, as our current septic system is operating as intended.
- If our septic were to fail, this lot is large enough to support a replacement which would have sufficient longevity for us while we live here.
- We are still paying off fees associated with the water service connection ($10,000.00 / ten years).
    - Municipal sanitary would result in a higher monthly municipal servicing bill.
- Additional costs over and above the connection fee and monthly bill include but may not be limited to external and internal plumbing, yard restoration, removal of existing septic tile / tank, etc.
- The drive for providing wastewater servicing to Princeton is to support local development (i.e. full municipal servicing = smaller lots & more lots) and to serve existing users on holding tanks.
    - It is assumed that the Developer or Municipality (whoever pays for the installation) would want to recover their costs for an oversized wastewater collection / treatment system (existing residents and lands within the settlement boundary + their develop-able lands) and would seek to recover them as local residents connect. Our understanding of process is that this is typical practice unless the municipality foots the bill or another funding source (Provincial?) is used.
    - We would have different thoughts on this matter if there was no "frontage fee" associated with a new connection.

Having stated the above, we do not support the need for municipal wastewater in Princeton as we have no present requirement for it and certainly no desire for the additional financial burden that accompanies it

Respectfully Submitted,

Alexander & Jennifer Donn

From: Alex D.
To: "mabercrombie@oxfordcounty.ca" <mabercrombie@oxfordcounty.ca>
Sent: Wednesday, April 25, 2012 7:33 PM
Subject: Princeton Wastewater Servicing Study - PIC 2 Comments

Mr. Abercrombie,

I am providing my comments to the above indicated Study per the comments sheets distributed at the PIC.

Alexander & Jennifer Donn

Alternative Solution No. 2 is preferred at this time based on the following considerations:

- Existing private septic is functioning with no issues over the last (nearly) three (3) years I have resided here.
    - As the septic is functioning correctly at this time, no additional expenditure is required outside of regular maintenance.
- The existing lot (I believe) is sufficiently sized (0.25 acres approx.) to accommodate any upgrades/future replacement of the tile bed; however I cannot verify this as I am not familiar with the T time, County standards, OBC requirements, etc.).
- Additional financial burden in the form of a minimal $12,500.00 expense, plus monthly rate (assuming that the existing onsite private septic does not fail while my family resides here.
- As municipal watermain has been installed and commissioning anticipated later this year there is already an additional cost to own this home over and above the already established costs for the last three (3) years.
    - The risk of contamination of domestic wells has been by-passed as the drinking water supply has been secured via the installation of municipal water services (though this does not address the environmental impacts the current private septic systems are producing).

I am fully aware that Alternative Solution No. 3 is the ideal long term solution based on sustainability, lifetime cost and environmental impacts but cannot support this approach at this time due to the my private sanitary septic functioning as intended and our current financial situation. Having stated the above I am also fully aware that my situation may not be shared by others in Community and that our existing private system *could* fail in the future while we reside in Princeton.

If communal sanitary was slated for installation ***after*** full payment of the municipal watermain I would be of a different opinion due to the reduced financial burden.

respectfully submitted,

Alexander J. Donn

A-5

Public Consultation Centre No. 2

– Newspaper Ad

– Example Letters

– Attendance Record

– Comment Sheet

– Display Boards

– Handout

– Comments Received

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Public Notice

NOTICE OF PUBLIC CONSULTATION CENTRE NO. 2
CLASS ENVIRONMENTAL ASSESSMENT
DRUMBO WASTEWATER TREATMENT PLANT WITH CONSIDERATION FOR SERVICING PRINCETON

Oxford County is currently undertaking a Class Environmental Assessment (Class EA) to develop a wastewater servicing plan for the Community of Drumbo, to service planned growth in the community in a cost-effective, environmentally sound and sustainable manner. The Drumbo WWTP Class EA has also considered the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP. The study is being undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, June 2000, as amended in 2007, 2011 and 2015).

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a current rated capacity of 300 m^3/d. The community of Princeton is currently serviced by private sewage systems.

The Drumbo Class EA has considered seven (7) alternative solutions, including the "Do Nothing" alternative. The recommended preferred solution is to service growth in the Community of Drumbo at an expanded Drumbo WWTP. The recommended preferred alternative would provide additional capacity for about 20 years of projected growth in Drumbo. The treatment of Princeton wastewater at an expanded Drumbo WWTP is not part of the recommended preferred solution.

Public input and comments are an important component of the Class EA process. The second of three Public Consultation Centres (PCCs) has been scheduled to receive input and comments on the project from interested members of the public. The PCC will provide information on the alternative solutions considered, the evaluation criteria and methodology, the evaluation of the alternative solutions, the recommended preferred solution, and next steps and timing. The PCC will be held as follows:

Date: Tuesday, May 16, 2017
Time: 6:00 p.m. to 8:00 p.m.

Location: Drumbo Agricultural Hall
42 Centre Street, Drumbo, Ontario

The PCC will be a drop-in open house format, with project information posted on display boards, and County staff and their consultants in attendance to provide further explanation, and to receive your comments and questions. Oxford County Public Health will be available to provide information to Princeton residents on septic system care and replacement.

Following this public meeting and confirmation of the preferred alternative solution, the study will proceed to Phase 3 of the Municipal Class EA process to develop and evaluate alternative design concepts for the preferred solution, and identify the preferred design. A third PCC will be held during Phase 3. Information on the Drumbo WWTP Class EA is posted on the Oxford County website at: http://www.oxfordcounty.ca.

Please contact either of the following project team members if you have any questions or comments about the study, or if you would like to be added to the mailing list to receive future notifications for the study.

This notice issued on April 27, 2017

Mr. Mark Maxwell, P.Eng.
Project Engineer
Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800, ext. 3195
Fax: 519-421-4711
E-mail: mmaxwell@oxfordcounty.ca

Mr. Stephen Nutt, M.Eng., P.Eng.
Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4
Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

oxfordcounty.ca

Published in: Ayr News – May 3 and 10, 2017
Oxford Review – May 4 and 11, 2017

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Public Works
21 Reeve Street
PO Box 1614
Woodstock ON N4S 7Y3
Tel 519-539-9800 | Fax 519-421-4711

May 1, 2017

Ministry of the Environment and Climate Change
Southwestern Region
Mr. Craig Newton, Environmental Planner
733 Exeter Road
London, ON N6E 1L3

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre No. 2

Oxford County is currently undertaking a Class Environmental Assessment (Class EA) to develop a wastewater servicing plan for the Community of Drumbo, to service planned growth in the community in a cost-effective, environmentally sound and sustainable manner. The Drumbo WWTP Class EA has also considered the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP. The study is being undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, June 2000, as amended in 2007, 2011 and 2015).

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The Drumbo Class EA has considered seven (7) alternative solutions, including the "Do Nothing" alternative. The recommended preferred solution is to service growth in the Community of Drumbo at an expanded Drumbo WWTP. The recommended preferred alternative would provide additional capacity for 20 years of projected growth in Drumbo. The treatment of Princeton wastewater at an expanded Drumbo WWTP is not part of the recommended preferred solution.

Public input and comments are an important component of the Class EA process. The second of three Public Consultation Centres (PCCs) has been scheduled to receive input and comments on the project from interested members of the public. The PCC will provide information on the alternative solutions considered, the evaluation criteria and methodology, the evaluation of the alternative solutions, the recommended preferred solution, and next steps and timing. The PCC will be held as follows:

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Location: Drumbo Agricultural Hall
42 Centre Street
Drumbo, Ontario

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Following this public meeting and confirmation of the preferred alternative solution, the study will proceed to Phase 3 of the Municipal Class EA process to develop and evaluate alternative design concepts for the preferred solution, and identify the preferred design. A third PCC will be held during Phase 3.

Information on the Drumbo WWTP Class EA is posted on the Oxford County website at: www.oxfordcounty.ca.

If you have any questions or would like further information about the study, please contact Mark Maxwell by phone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca. Thank you very much for your interest in the study.

Sincerely,

Deborah Goudreau, P.Eng.
Manager of Water and Wastewater Services

cc: Mr. Stephen Nutt, XCG Consulting Limited

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Public Works
21 Reeve Street
PO Box 1614
Woodstock ON N4S 7Y3
Tel 519-539-9800 | Fax 519-421-4711

May 1, 2017

Ministry of Agriculture, Food and Rural Affairs
Mr. Drew Crinklaw, Rural Planner
667 Exeter Road
London, ON N6E 1L3

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre No. 2

Oxford County is currently undertaking a Class Environmental Assessment (Class EA) to develop a wastewater servicing plan for the Community of Drumbo, to service planned growth in the community in a cost-effective, environmentally sound and sustainable manner. The Drumbo WWTP Class EA has also considered the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP. The study is being undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, June 2000, as amended in 2007, 2011 and 2015).

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a current rated capacity of 300 m^3/d. The community of Princeton is currently serviced by private sewage systems.

The Drumbo Class EA has considered seven (7) alternative solutions, including the "Do Nothing" alternative. The recommended preferred solution is to service growth in the Community of Drumbo at an expanded Drumbo WWTP. The recommended preferred alternative would provide additional capacity for 20 years of projected growth in Drumbo. The treatment of Princeton wastewater at an expanded Drumbo WWTP is not part of the recommended preferred solution.

Public input and comments are an important component of the Class EA process. The second of three Public Consultation Centres (PCCs) has been scheduled to receive input and comments on the project from interested members of the public. The PCC will provide information on the alternative solutions considered, the evaluation criteria and methodology, the evaluation of the alternative solutions, the recommended preferred solution, and next steps and timing. The PCC will be held as follows:

Date: Tuesday, May 16, 2017
Time: 6:00 p.m. to 8:00 p.m.

Location: Drumbo Agricultural Hall
42 Centre Street
Drumbo, Ontario

The PCC will be a drop-in open house format, with project information posted on display boards, and County staff and their consultants in attendance to provide further explanation, and to receive your comments and questions. Oxford County Public Health will be available to provide information to Princeton residents on septic system care and replacement.

Following this public meeting and confirmation of the preferred alternative solution, the study will proceed to Phase 3 of the Municipal Class EA process to develop and evaluate alternative design concepts for the preferred solution, and identify the preferred design. A third PCC will be held during Phase 3.

Information on the Drumbo WWTP Class EA is posted on the Oxford County website at: www.oxfordcounty.ca.

If you have any questions or would like further information about the study, please contact Mark Maxwell by phone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca. Thank you very much for your interest in the study.

Sincerely,

Deborah Goudreau, P.Eng.
Manager of Water and Wastewater Services

cc: Mr. Stephen Nutt, XCG Consulting Limited

Oxford County
growing stronger...together

Drumbo Wastewater Treatment Plant
Class Environmental Assessment

PUBLIC CONSULTATION CENTRE NO. 2
Drumbo Agricultural Hall
42 Centre Street
Drumbo, Ontario
Tuesday, May 16, 2017
6:00 p.m. to 8:00 p.m.

ATTENDANCE SHEET

Thank you for your interest in this project. Please print legibly.

NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
JEFF RAWN			
[illegible]			
Gwen VanWoes			
John Langlois			
EDNA WILLIAMSON			
DYCE WILLIAMSON			
Donald Duncan			
Mark Kirby			

The collection of personal information on this form is necessary for the proper administration of a lawfully authorized activity under the Environmental Assessment Act and will be used for the purposes of proving compliance with the consultation and public notice requirements under the Act. For more information about this collection, please contact Mark Maxwell, P. Eng. at the County of Oxford, 21 Reeve Street, P.O. Box 1614, Woodstock, ON, N4S 7Y3 or (519) 539-9800 (ext. 3195).

Drumbo Wastewater Treatment Plant
Class Environmental Assessment

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PUBLIC CONSULTATION CENTRE NO. 2
Drumbo Agricultural Hall
42 Centre Street
Drumbo, Ontario
Tuesday, May 16, 2017
6:00 p.m. to 8:00 p.m.

ATTENDANCE SHEET

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NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
Robert Kolesar			
David Kennedy			
Craig VanWees			
Robert Stevenson			
JR Taylor			
Carl + Lorraine McLean			
Bill & Laureen Duncan			
Pat + Kait Toohey			

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Drumbo Wastewater Treatment Plant
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NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
JOHN ZIMMER			
JUDY & BLAKE MULLIN			
MARION WEARN			
Steve Peterson			
MEGAN WASSINK			
JABEN WASSINK			
MARK PETERSON			
Fred Shoemaker			

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Class Environmental Assessment

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NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
RON GILLESPIE			
KEITH CADWELL			
Larry [illegible]			
[illegible]ggy Crosby			
Ernie [illegible]			

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Class Environmental Assessment

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ATTENDANCE SHEET

Thank you for your interest in this project. Please print legibly.

NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
ROBBIE SAVAGE			
DEBRA BEENER			
PAT CADWELL			
Bev Beaton			
Truus VanWees			

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 2
Tuesday, May 16, 2017

Thank you for your interest in the **Drumbo Wastewater Treatment Plant (WWTP) Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: ______________________________

Address: ______________________________ ____________
Street Apt. No.

____________ ____________ ____________
City Province Postal Code

Phone: ______________ **E-mail:** ______________

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. ☐ Yes ☐ No

Please feel free to provide additional comments on a separate sheet. Leave your comments on your departure or mail, fax or e-mail them to either of the following by May 30, 2017:

Mr. Mark Maxwell, P. Eng.
Project Engineer
Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3

Phone: 519-539-9800, ext. 3195
E-mail: mmaxwell@oxfordcounty.ca

or

Mr. Stephen Nutt, M. Eng., P. Eng.
Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the recommended preferred alternative – i.e., Alternative 2: Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the expanded Drumbo WWTP.

____
____
____
____
____
____

Please provide any other comments.

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Drumbo Wastewater Treatment Plant Class Environmental Assessment

Public Consultation Centre No. 2
May 16, 2017

XCG
Environmental Engineers & Scientists

Welcome to Public Consultation Centre No. 2

Oxford County is undertaking a Schedule C Class Environmental Assessment to develop a wastewater treatment plan for the Community of Drumbo to service existing and planned growth in the community.

The Drumbo Wastewater Treatment Plant (WWTP) Class EA has also considered the potential to provide wastewater treatment for the Community of Princeton at an expanded or new Drumbo WWTP.

Welcome to Public Consultation Centre No. 2

The purpose of PCC No. 2 is to:

- Provide background information about the study
- Present the alternatives that were evaluated in Phase 2 of the Class EA process
- Present the methodology that was used to evaluate and compare the alternatives
- Present the outcome of the evaluation and the recommended preferred alternative
- Outline next steps and schedule

A third PCC will be held to present the recommended design that will be used to implement the preferred alternative.

XCG

Drumbo WWTP Class EA – Problem/Opportunity Statement

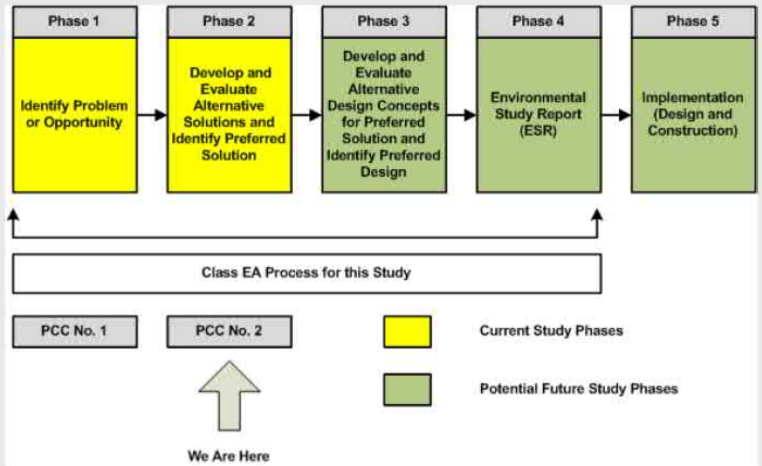
Develop a wastewater treatment plan for the Community of Drumbo that is environmentally responsible, socially acceptable and economically sustainable to accommodate existing and future development within the community to at least 2036. The Drumbo WWTP Class EA will also consider the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP.

XCG

Municipal Class Environmental Assessment Process

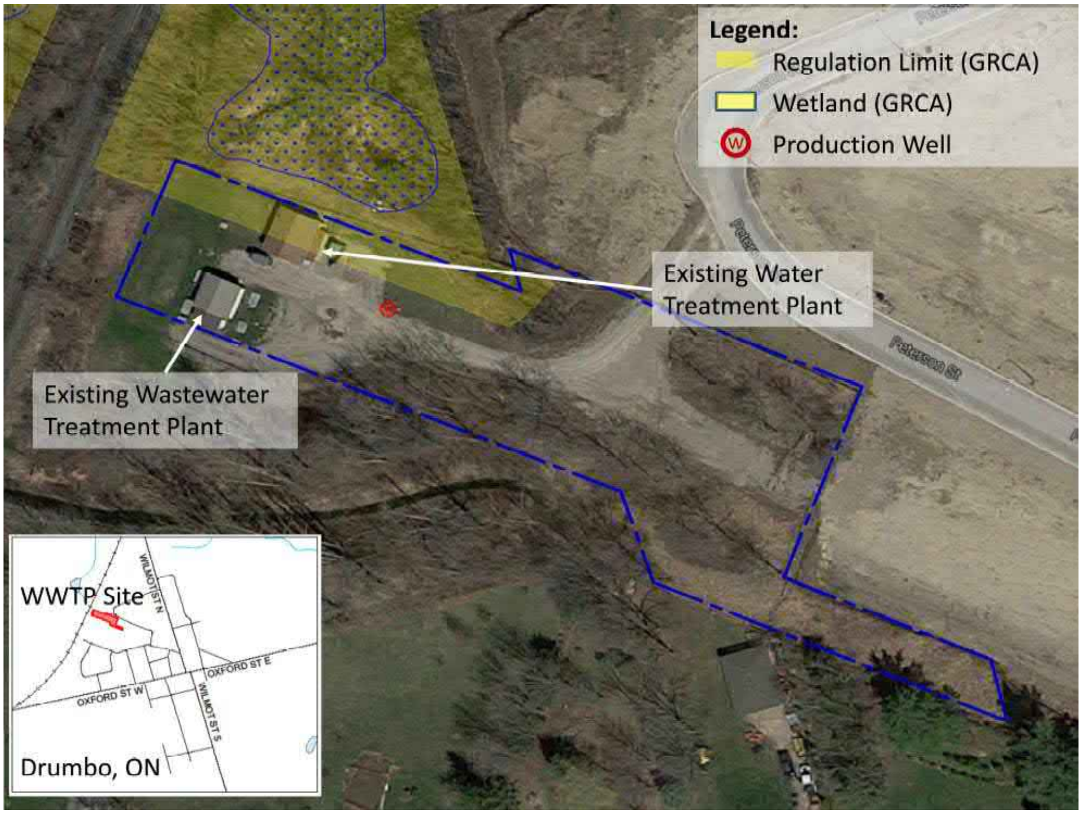
Phases of the Study:

Public Consultation Centres (PCCs):



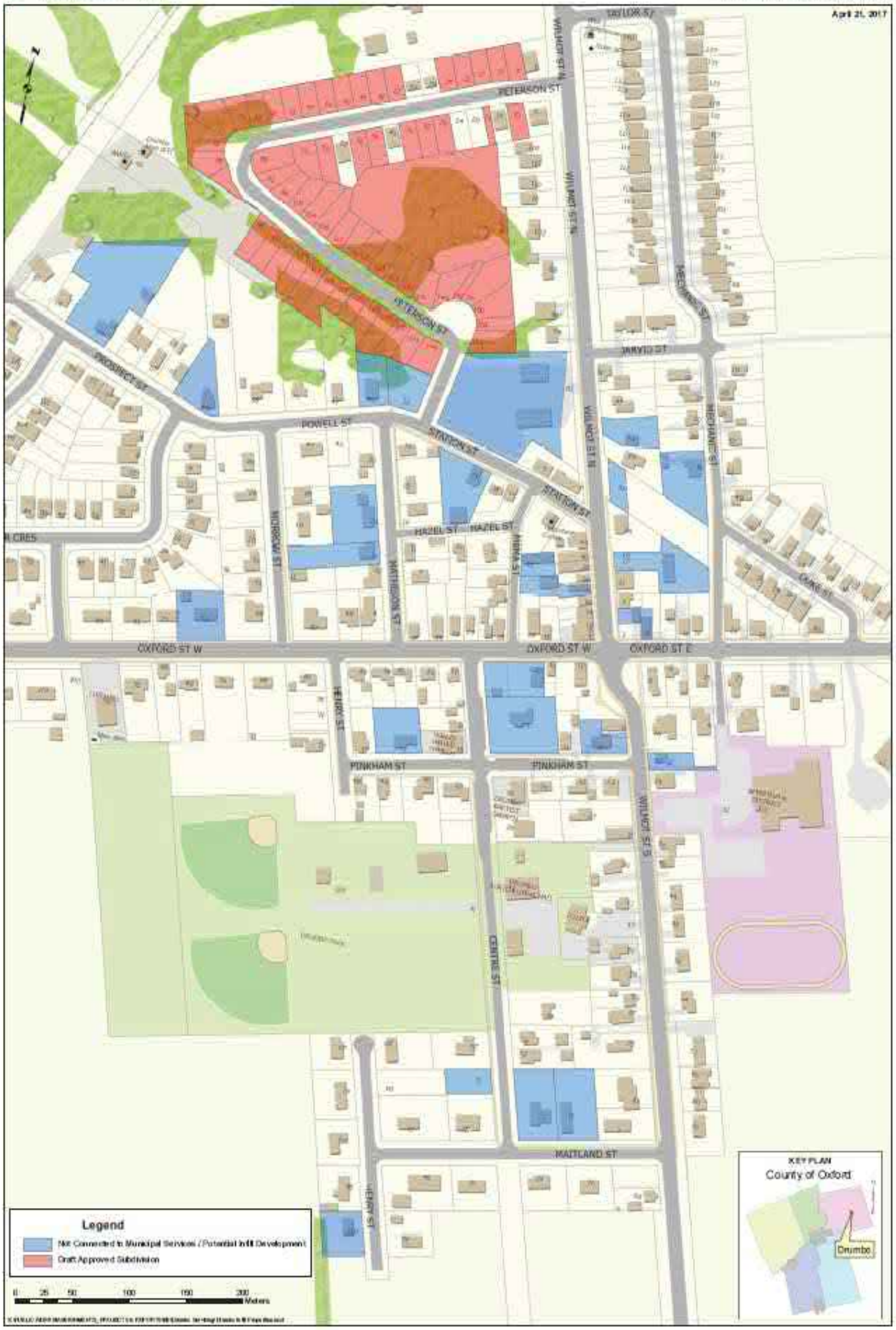
Background – Drumbo WWTP Class EA

- Existing WWTP is a Sequencing Batch Reactor (SBR) with tertiary filtration and ultraviolet disinfection, and a discharge to the Cowan Drain
- Original design capacity was 272 m^3/d. In February 2015, the plant was re-rated to a design capacity of 300 m^3/d
- In 2015, the annual average day flow was 228 m^3/d, or 76% of the re-rated design capacity


Legend:
Regulation Limit (GRCA)
Wetland (GRCA)
Production Well
Existing Water Treatment Plant
Existing Wastewater Treatment Plant
Peterson St
WWTP Site
WILMOT ST N
OXFORD ST E
OXFORD ST W
WILMOT ST S
Drumbo, ON

OxfordCounty growing stronger...together

Community of Drumbo



Alternative Solutions Considered

Alternative Solution	Description
Alternative 1 – "Do Nothing"	No additional wastewater treatment capacity for Drumbo and no treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 2 – Service Drumbo growth at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service 20 years of projected growth in Drumbo. No treatment of Princeton wastewater at the Drumbo WWTP.
Alternative 3 – Service Drumbo growth at a new Drumbo WWTP at a new site	A new Drumbo WWTP would be constructed at a new site to service growth in Drumbo. The existing Drumbo WWTP would be decommissioned. No treatment of Princeton wastewater at the new Drumbo WWTP.

Alternative Solutions Considered

Alternative Solution	Description
Alternative 4A/4B – Service Drumbo growth and Princeton at an expanded Drumbo WWTP	The existing Drumbo WWTP would be expanded to service planned growth in Drumbo and wastewater from Princeton, excluding (4A) or including (4B) proposed 324 unit development in Princeton.
Alternative 5A/5B – Service Drumbo growth and Princeton at a new Drumbo WWTP at a new site	A new Drumbo WWTP would be constructed at a new site to service planned growth in Drumbo and wastewater from Princeton, excluding (5A) or including (5B) proposed 324 unit development in Princeton. The existing Drumbo WWTP would be decommissioned.

Alternatives Evaluation Process

- Alternative solutions were evaluated based on four categories: Technical, Environmental, Social and Financial
- Each category had several evaluation criteria
- All criteria and all categories had equal weight
- Each alternative was ranked relative to the other alternatives from most preferred to least preferred
- A numerical score was assigned to each ranking and the rankings summed to establish an overall score

Evaluation Methodology

Ranking	Description	Numerical Value
○	No impact. Lowest cost.	1
◔	Negligible impact.	2
◑	Minor impact.	3
◕	Moderate impact.	4
●	Major impact. Highest cost.	5

Evaluation of Alternatives

Alternative	Technical					Environmental			Social		Financial			
	Satisfaction of objectives	Consistent with County Policies	Technical feasibility	System complexity	Sustainability	Surface water impacts	Ground-water impacts	Impacts on the Natural Environment	Community Impacts	Impacts on Archaeological and Heritage Resources	Capital Cost	O&M Cost	Life Cycle Cost	Financial Risk
Alt.1	- Does not meet the objectives of the Problem/Opportunity Statement. - Will not accommodate planned community growth - Does not meet the needs of the County and was, therefore, not considered further.													
Alt.2	◔	○	◔	○	○	◔	◕	○	◑	○	○	○	○	○
Alt.3	◔	○	○	◔	◕	○	◔	◑	◑	◑	◔	○	◔	○
Alt.4A	○	◔	◑	◕	◔	◔	◔	◔	◕	◔	◕	●	◕	◑
Alt.4B	○	◑	◑	◕	◑	◔	◑	◔	◕	◔	◕	●	●	●
Alt.5A	○	◔	○	◑	◕	○	○	◕	◑	◕	●	●	◕	◑
Alt.5B	○	◑	○	◑	●	○	○	◕	◑	◕	●	●	●	●

● ◕ ◑ ◔ ○

Least Preferred → Most Preferred

Summary of Alternative Evaluation

Alternative	Total Score	Ranking
1. Do Nothing	- (1)	- (1)
2. Service Drumbo at an expanded Drumbo WWTP	22	1
3. Service Drumbo at a new Drumbo WWTP at a new site	28	2
4A. Service Drumbo and Princeton at an expanded Drumbo WWTP **excluding** proposed 324-unit development in Princeton	40	3
4B: Service Drumbo and Princeton at an expanded Drumbo WWTP **including** proposed 324-unit development in Princeton	46	5
5A: Service Drumbo and Princeton at a new Drumbo WWTP at a new site **excluding** proposed 324-unit development in Princeton	41	4
5B: Service Drumbo and Princeton at a new Drumbo WWTP at a new site **including** proposed 324-unit development in Princeton	46	5

Notes:

1. Alternative 1 does not meet the objectives of the Problem/Opportunity Statement and will not accommodate planned community growth. Therefore it does not meet the needs of the County and was not considered further.

Recommended Preferred Alternative

Based on the evaluation of alternative solutions, the recommended preferred alternative solution is:

- Alternative 2 – Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the Drumbo WWTP.

XCG

Rationale for Selection of Preferred Alternative

- Most consistent with County policies and plans for future growth.
- Most comparable in size and operational complexity to existing WWTP.
- Represents best use of existing infrastructure and lowest relative energy use.
- Reduced risk of impacts on natural environment or archeological/heritage resources.
- Lowest estimated capital and operational cost.
- Lowest financial risk to County and residents (system users).

XCG

Servicing beyond 20-year Horizon

- To service future development within the Drumbo Village boundary but beyond the 20 year planning horizon considered in this Class EA, consideration of all technically feasible alternatives to provide additional treatment capacity to service all lands within the designated settlement boundary of Drumbo will be required as part of a Class EA initiated at that time.
- Evaluation criteria that would be considered as part of that Class EA would include, but not be limited to, additional capacity requirements, site constraints, capital costs to upgrade the existing plant vs. building a new plant at a new location, source water protection issues, treatment technology advances and effluent quality requirements.

Proposed Next Steps and Schedule

- Initiate Phase 3 of the Drumbo WWTP Class EA – Summer 2017
- Hold Public Consultation Centre No. 3 to present the Recommended Preferred Design Approach – Fall 2017
- File the Environmental Study Report for public and agency comment – Winter 2017

We'd Like to Hear From You

Please deposit your comment sheet in the box provided or forward to the County.

Contact information:

Mark Maxwell
Oxford County
Department of Public Works
21 Reeve St., PO Box 1614
Woodstock ON N4S 7Y3

519-539-9800, ext. 3195
mmaxwell@oxfordcounty.ca

Stephen Nutt
Project Manager
XCG Consultants Ltd.
820 Trillium Drive
Kitchener ON N2R 1K4

519-741-5774
stephen.nutt@xcg.com

Drumbo Wastewater Treatment Plant Class Environmental Assessment

Public Consultation Centre No. 2
May 16, 2017

XCG Environmental Engineers & Scientists

Welcome to Public Consultation Centre No. 2

Oxford County is undertaking a Schedule C Class Environmental Assessment to develop a wastewater treatment plan for the Community of Drumbo to service existing and planned growth in the community.

The Drumbo Wastewater Treatment Plant (WWTP) Class EA has also considered the potential to provide wastewater treatment for the Community of Princeton at an expanded or new Drumbo WWTP.

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The purpose of PCC No. 2 is to:

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- Present the alternatives that were evaluated in Phase 2 of the Class EA process
- Present the methodology that was used to evaluate and compare the alternatives
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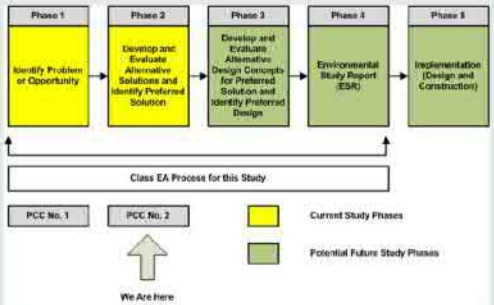
Drumbo WWTP Class EA – Problem/Opportunity Statement

Develop a wastewater treatment plan for the Community of Drumbo that is environmentally responsible, socially acceptable and economically sustainable to accommodate existing and future development within the community to at least 2036. The Drumbo WWTP Class EA will also consider the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP.

Municipal Class Environmental Assessment Process

Phases of the Study:

Public Consultation Centres (PCCs):



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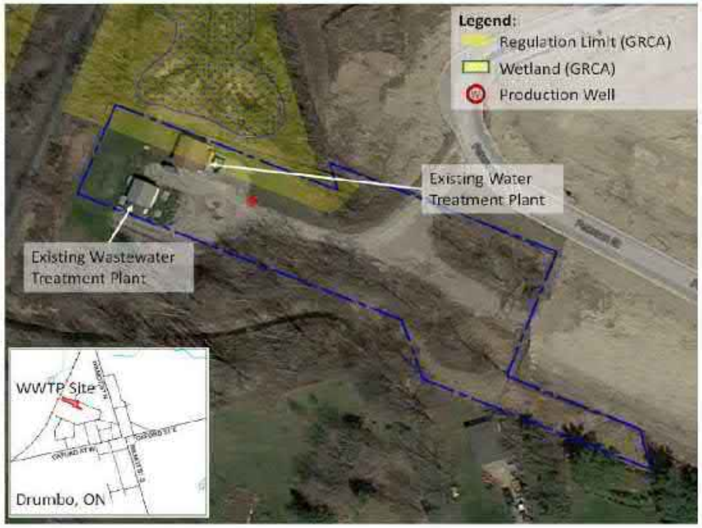

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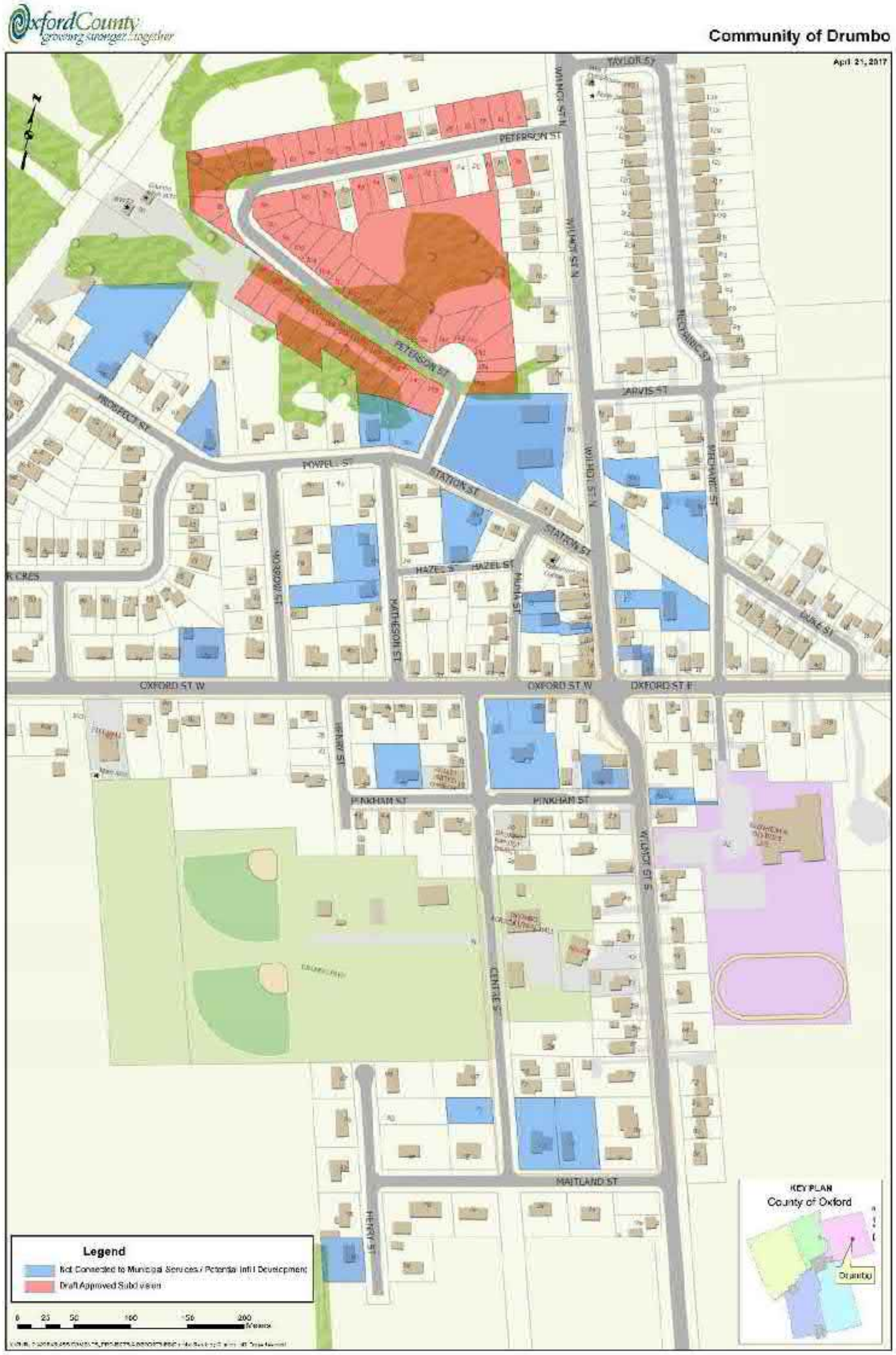
6 XCG


Community of Drumbo
April 21, 2017
TAYLOR ST
PETERSON ST
WILMOT ST N
MECHANIC ST
JARVIS ST
PROSPECT ST
POWELL ST
STATION ST
HAZEL ST
MATHESON ST
OXFORD ST W
OXFORD ST E
PINKHAM ST
WILMOT ST S
CENTRE ST
MAITLAND ST
HENRY ST
DUKE ST
Legend
Not Connected to Municipal Services / Potential Infill Development
Draft Approved Subdivision
KEY PLAN
County of Oxford
Drumbo

Alternative Solutions Considered

Alternative Solution	Description
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Alternative Solution	Description
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10 XCG

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11 XCG

Evaluation Methodology

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●	Major impact. Highest cost.	5

12 XCG

Evaluation of Alternatives

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Alt.4A	○	◔	◑	◕	◔	◔	◔	◔	◕	◔	◕	●	◕	◑
Alt.4B	○	◑	◑	◕	◑	◔	◑	◔	◕	◔	◕	●	●	●
Alt.5A	○	◔	○	◑	◕	○	○	◕	◑	◕	●	●	◕	◑
Alt.5B	○	◑	○	◑	●	○	○	◕	◑	◕	●	●	●	●

● ◕ ◑ ◔ ○

Least Preferred → Most Preferred

13

Summary of Alternative Evaluation

Alternative	Total Score	Ranking
1. Do Nothing	- (1)	- (1)
2. Service Drumbo at an expanded Drumbo WWTP	22	1
3. Service Drumbo at a new Drumbo WWTP at a new site	28	2
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Notes:

1. Alternative 1 does not meet the objectives of the Problem/Opportunity Statement and will not accommodate planned community growth. Therefore it does not meet the needs of the County and was not considered further.

14

Recommended Preferred Alternative

Based on the evaluation of alternative solutions, the recommended preferred alternative solution is:

- Alternative 2 – Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the Drumbo WWTP.

15

Rationale for Selection of Preferred Alternative

- Most consistent with County policies and plans for future growth.
- Most comparable in size and operational complexity to existing WWTP.
- Represents best use of existing infrastructure and lowest relative energy use.
- Reduced risk of impacts on natural environment or archeological/heritage resources.
- Lowest estimated capital and operational cost.
- Lowest financial risk to County and residents (system users).

16

Servicing beyond 20-year Horizon

- To service future development within the Drumbo Village boundary but beyond the 20 year planning horizon considered in this Class EA, consideration of all technically feasible alternatives to provide additional treatment capacity to service all lands within the designated settlement boundary of Drumbo will be required as part of a Class EA initiated at that time.
- Evaluation criteria that would be considered as part of that Class EA would include, but not be limited to, additional capacity requirements, site constraints, capital costs to upgrade the existing plant vs. building a new plant at a new location, source water protection issues, treatment technology advances and effluent quality requirements.

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Proposed Next Steps and Schedule

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- Hold Public Consultation Centre No. 3 to present the Recommended Preferred Design Approach – Fall 2017
- File the Environmental Study Report for public and agency comment – Winter 2017

18 XCG

We'd Like to Hear From You

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Contact information:

Mark Maxwell
Oxford County
Department of Public Works
21 Reeve St., PO Box 1614
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519-539-9800, ext. 3195
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Stephen Nutt
Project Manager
XCG Consultants Ltd.
820 Trillium Drive
Kitchener ON N2R 1K4

519-741-5774
stephen.nutt@xcg.com

19 XCG

OxfordCounty
growing stronger...together

COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 2
Tuesday, May 16, 2017

Thank you for your interest in the **Drumbo Wastewater Treatment Plant (WWTP) Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: Deb Beemer

Address: ______________________ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.

Please indicate Yes or No. [✓] Yes [ ] No

Please feel free to provide additional comments on a separate sheet. Leave your comments on your departure or mail, fax or e-mail them to either of the following by May 30, 2017:

Mr. Mark Maxwell, P. Eng.
Project Engineer
Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3

Phone: 519-539-9800, ext. 3195
E-mail: mmaxwell@oxfordcounty.ca

or

Mr. Stephen Nutt, M. Eng., P. Eng.
Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the recommended preferred alternative – i.e. Alternative 2: Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the expanded Drumbo WWTP.

No wastewater treatment in Princeton

Please provide any other comments.

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OxfordCounty
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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 2
Tuesday, May 16, 2017

Thank you for your interest in the **Drumbo Wastewater Treatment Plant (WWTP) Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: Jeff Rawn

Address: ______ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. [X] Yes [ ] No

Please feel free to provide additional comments on a separate sheet. Leave your comments on your departure or mail, fax or e-mail them to either of the following by May 30, 2017:

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Woodstock, Ontario N4S 7Y3

Phone: 519-539-9800, ext. 3195
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or

Mr. Stephen Nutt, M. Eng., P. Eng.
Consultant Project Manager
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820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the recommended preferred alternative – i.e. Alternative 2: Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the expanded Drumbo WWTP.

I WOULD LIKE TO KNOW WHEN THE PRINCETON WTP ISSUE WILL BE ADDRESSED.

Please provide any other comments.

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
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Public Consultation Centre No. 2
Tuesday, May 16, 2017

Thank you for your interest in the **Drumbo Wastewater Treatment Plant (WWTP) Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: Truus Van Wees

Address: ________ Street ________ Apt. No.

________ City ________ Province ________ Postal Code

Phone: ________ **E-mail:** ________

I would like to be placed on a mailing list to receive future notifications regarding this project.

Please indicate Yes or No. [✓] Yes [ ] No

Please feel free to provide additional comments on a separate sheet. Leave your comments on your departure or mail, fax or e-mail them to either of the following by May 30, 2017:

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Project Engineer
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820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the recommended preferred alternative – i.e. Alternative 2: Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the expanded Drumbo WWTP.

In Favour of Drumbo Servicing Princeton or Princeton having own system.

Please provide any other comments.

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 2
Tuesday, May 16, 2017

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Name: RYCE & EDNA WILLIAMSON

Address: ______ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. [X] Yes [ ] No

Please feel free to provide additional comments on a separate sheet. Leave your comments on your departure or mail, fax or e-mail them to either of the following by May 30, 2017:

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Project Engineer
Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3

Phone: 519-539-9800, ext. 3195
E-mail: mmaxwell@oxfordcounty.ca

or

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Consultant Project Manager
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Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the recommended preferred alternative – i.e. Alternative 2: Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the expanded Drumbo WWTP.

Princeton needs sewers the pollution must be there or why did we need water ? Before we have another Walkerton do something

Please provide any other comments.

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7

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 2
Tuesday, May 16, 2017

Thank you for your interest in the **Drumbo Wastewater Treatment Plant (WWTP) Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: Gwen Van Wees

Address: ______________________ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.

Please indicate Yes or No. ☑ Yes ☐ No

Please feel free to provide additional comments on a separate sheet. Leave your comments on your departure or mail, fax or e-mail them to either of the following by May 30, 2017:

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Project Engineer
Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
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Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the recommended preferred alternative – i.e. Alternative 2: Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the expanded Drumbo WWTP.

Alternative 5 or 6 – 6 would be Princeton generate/expand ~~so~~ it's own waste water System.

-

Please provide any other comments.

People in Princeton are not managing their systems or no systems would be over 30/35 yrs. But instead People tell us their system is 60yrs.

Big brother system of your neighbour (who you live beside daily) complaining about your waiste issues also isn't happen to the degree of stories people have shared. Just ask People of Princeton of what they see - outhouse, straw on yard, extra dirt added to yard etc...

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 2
Tuesday, May 16, 2017

Thank you for your interest in the **Drumbo Wastewater Treatment Plant (WWTP) Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: JABEN + MEGAN WASSINK

Address: ______________________ Street ______ Apt. No.

______ City ______ Province ______ Postal Code

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. [X] Yes [ ] No

Please feel free to provide additional comments on a separate sheet. Leave your comments on your departure or mail, fax or e-mail them to either of the following by May 30, 2017:

Mr. Mark Maxwell, P. Eng.
Project Engineer
Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3

Phone: 519-539-9800, ext. 3195
E-mail: mmaxwell@oxfordcounty.ca

or

Mr. Stephen Nutt, M. Eng., P. Eng.
Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the recommended preferred alternative – i.e. Alternative 2: Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the expanded Drumbo WWTP.

we currently live in an 800 sq/ft home which we & will grow out of very quickly. An option we've been looking into is building an addition but our current septic prevents that. Our septic is on its last legs (like most are in Princeton) so we will either need to repair/upgrade or get sewer lines installed.

Also, considering the roads are being done in ~2020, it is very counterproductive and a waste of tax payers money to not add sewers at the same time rather than tearing them up 10+ yrs down the road.

A very big concern to us is the contamination discussed. In our opinion, if there was any contamination found, why is it even a question to put sewers in.

Lastly, ~~I~~ most septic ~~tanks~~ systems will need to be replaced, in the very near future. We don't want to have to pay to have ours done then 5-10 yrs down the road have to ~~have~~ pay for the sewers.

Please provide any other comments.

We strongly feel the need for sewers in Princeton. Some opinions expressed were solely based on Princeton not wanting to grow, but in our opinion, without growth we're moving backwards. Growth is inevitable.

Thank you.

OxfordCounty
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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 2
Tuesday, May 16, 2017

Thank you for your interest in the **Drumbo Wastewater Treatment Plant (WWTP) Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: Mark Kirby

Address: ______ Street ______ Apt. No. ______

City ______ Province ______ Postal Code ______

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.

Please indicate Yes or No. ☑ Yes ☐ No

Please feel free to provide additional comments on a separate sheet. Leave your comments on your departure or mail, fax or e-mail them to either of the following by May 30, 2017:

Mr. Mark Maxwell, P. Eng.
Project Engineer
Oxford County Department of Public Works
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Woodstock, Ontario N4S 7Y3

Phone: 519-539-9800, ext. 3195
E-mail: mmaxwell@oxfordcounty.ca

or

Mr. Stephen Nutt, M. Eng., P. Eng.
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XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the recommended preferred alternative – i.e. Alternative 2: Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the expanded Drumbo WWTP.

This would be the high end of what I would want to see. More growth only increases costs of infrastructure, taxes, eats up farmland and brings the city to the villages and erodes the charm of living in a low density environment

Princeton can do what they want to promote growth but leave Drumbo out of it and the associated crowds and costs!

Please provide any other comments.

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COMMENT SHEET

Drumbo Wastewater Treatment Plant
Class Environmental Assessment
Public Consultation Centre No. 2
Tuesday, May 16, 2017

Thank you for your interest in the **Drumbo Wastewater Treatment Plant (WWTP) Class Environmental Assessment**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: Craig Van Wees

Address: ______ Street ______ Apt. No. ______

City ______ Province ______ Postal Code ______

Phone: ______ **E-mail:** ______

I would like to be placed on a mailing list to receive future notifications regarding this project.

Please indicate Yes or No. [X] Yes [ ] No

Please feel free to provide additional comments on a separate sheet. Leave your comments on your departure or mail, fax or e-mail them to either of the following by May 30, 2017:

Mr. Mark Maxwell, P. Eng.
Project Engineer
Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3

Phone: 519-539-9800, ext. 3195
E-mail: mmaxwell@oxfordcounty.ca

or

Mr. Stephen Nutt, M. Eng., P. Eng.
Consultant Project Manager
XCG Consulting Limited
820 Trillium Drive
Kitchener, Ontario N2R 1K4

Phone: 519-741-5774
Fax: 519-741-5627
Email: stephen.nutt@xcg.com

Please provide any comments on the recommended preferred alternative – i.e. Alternative 2: Expand the existing Drumbo WWTP on the existing site to service 20 years of projected growth within the Community of Drumbo. No treatment of wastewater generated in the Community of Princeton would be provided at the expanded Drumbo WWTP.

- I am in favour of a Princeton Sewer Solution -
The Dillon costing of approx 6 million to service Princeton is the same as the Drumbo expansion cost per connection - Princeton \$29,000 for 207 connection
Drumbo approx. \$3,000,000 ÷ 90 = \$33,000 - for 90 connection

Embro Sewer $8,357,458 Divided by 300 Connections
= $ 27,858 / connection

Princeton costs are in line.
(Talbotville)
Mark - Sothwold Township is currently installing a New Terra System.
CAO Ken Loveland is pleased so far,
costing is coming in as quoted -
- same receiver as Nith type.

- Maybe a good idea to investigate Sothwold.?

Please provide any other comments.

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Dianne Damman

From: Mark Maxwell <mmaxwell@oxfordcounty.ca>
Sent: May-23-17 9:37 AM
To: Dianne Damman
Subject: FW: Sewers in Princeton

Hi Dianne,

I've added this comment to the collection for the Drumbo WWT Class EA PIC#2.

-Mark

-----Original Message-----
From: noreply@oxfordcounty.ca [mailto:noreply@oxfordcounty.ca]
Sent: May-20-17 4:47 PM
To: Public Works
Subject: Sewers in Princeton

Category:: Water & Wastewater

I do not want sewers put into Princeton.

Submitted By:
Name::
Email::

Submitted From:
http://oxfordcounty.ca/Contact-Us

Dianne Damman

From: Mark Maxwell <mmaxwell@oxfordcounty.ca>
Sent: May-16-17 3:36 PM
To: Dianne Damman
Subject: FW: Results from Speak Up Oxford - Princeton

Dianne,

See comments below for our Consultation section of the EA.

-Mark

From: Deborah Goudreau
Sent: May-16-17 2:52 PM
To: Mark Maxwell
Subject: FW: Results from Speak Up Oxford - Princeton

Hi Mark,

Please file.
Deb

Deborah Goudreau, P.Eng.
Manager of Water and Wastewater Services

From: Tommasina Conte
Sent: May-16-17 2:40 PM
To: 'Sddl86@brant.net'
Cc: Peter Crockett; Deborah Goudreau
Subject: RE: Results from Speak Up Oxford - Princeton

Thank you for passing along your feedback, Steve. By way of this email, I am sharing your message directly with our CAO, Peter Crockett, and our manager of Water and Wastewater Services, Deborah Goudreau.

Many thanks,
Tommasina

TOMMASINA CONTE | Manager, Strategic Communication & Engagement
519.539.9800, ext 3503 |1.800.755.0394

From: Communications Group [mailto:communications@oxfordcounty.ca]
Sent: May-16-17 1:15 PM
To: Oxford County Communications
Subject: Results from Speak Up Oxford comment form

Name:

Email:

$(Municipality_FullResults)

Subject: Water/Wastewater Rates

Comment: To put waste management in Princeton, supports the issues some homeowners are having. It is also required for expansion, for 100 to 300 new homes to be developed. It is trying to draw new families into the village. My main issue with this apart from the cost, is without a public school, why would families come into the village. They have better options with Drumbo, Tavistock and Plattsville. We currently don'the have any issues, however expansion should not be the only consideration to put sewer in. And one last thought is I don't agree with joining the Drumbo process. That is providing too many opportunities for failure, and will limit any expansion possibilities. It is a significant investment for any homeowner to undertake, especially for recent buyers. Thank you. Steve

Dianne Damman

From: Mark Maxwell <mmaxwell@oxfordcounty.ca>
Sent: May-05-17 5:41 PM
To: Rob Van De Cappelle
Cc: Stephen Nutt (stephen.nutt@xcg.com); Deborah Goudreau; Graham Seggewiss (graham.seggewiss@xcg.com); Michael Newbigging; Dianne Damman
Subject: RE: Sewers in Princeton

Hi Rob,

Thanks for your comments below regarding the Drumbo WWTP Class EA. Even though you aren't able to make it to the public meeting, we'll add your comments to the file.

If you're interested, following the public meeting, I'll be able to send you a copy of the presentation material. Please note that the recommended preferred alternative does not include the treatment of Princeton wastewater at the Drumbo Wastewater Treatment Plant (in line with your preference).

Thanks,

Mark Maxwell
Project Engineer & Construction Coordinator
County of Oxford
21 Reeve Street, Woodstock, ON N4S 3G1
Office: 519-539-9800 x3195
Mobile: 519-532-3974
Fax: 519-421-4711

From: Rob Van De Cappelle
Sent: May-05-17 4:01 PM
To: Mark Maxwell
Cc:
Subject: Sewers in Princeton

Mark,

My wife and I live in Princeton and I received the letter in the mail about the upcoming waste water meeting on May 16. I unfortunately cannot make the meeting but I wanted to express my opinion to you regarding the idea. I am totally opposed to sewers coming into Princeton as I will still be paying off my water debenture plus I really cannot afford the cost of getting the sewer hooked up to my house or another monthly charge. I also know that a lot of other residents in the village are in the same boat that my wife and I are and are not interested in having sewers. I really feel it a small group that are pushing this again and again and they are only pushing it to increase the chance of selling lots on the property that they own, I for one live in Princeton because it is a small village and do not want to see it's number increase. If you have any questions or would like to discuss my opposition please feel free to call me at work 519-537-2216 or my cell 519-532-1932. Thank you and I appreciate the chance to voice my opinion. Have a great weekend, try and stay dry! ☺

A-6

AGENCY AND STAKEHOLDER CONSULTATION

– CORRESPONDENCE

AGENCIES AND UTILITIES

Public Works
P. O. Box 1614, 21 Reeve Street
Woodstock, Ontario N4S 7Y3
Tel: 519-539-9800 ♦ 800-755-0394
Fax: 519-421-4711
Website: www.oxfordcounty.ca

July 6, 2016

Ms. Tammie Ryall
Regional Environmental Planner / Regional EA Coordinator
Ministry of the Environment and Climate Change
733 Exeter Road
London, ON N6E 1L3

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment - MOECC Response to Notice of Public Consultation Centre No. 1

Dear Tammie:

Thank you for your June 29, 2016 response to Oxford County's Notice of Public Consultation Centre No. 1 for the Drumbo Wastewater Treatment Plant (WWTP) Class Environmental Assessment (Class EA).

In reference to your suggestion to contact the Ministry of Aboriginal Affairs (MAA), please note that Oxford County has contacted MAA and received a response from this Ministry on October 10, 2013. The 2013 MAA letter was in response to Oxford County's Notice of Commencement for this project. Oxford County has contacted the First Nations suggested by MAA (as well as a number of other First Nation communities) and will continue to advise these First Nations of the project.

We also note your comments in reference to the Municipal Class EA requirement to identify whether a project occurs within a source water protection vulnerable area, and to clearly document this in a Project File report or Environmental Study Report. We recognize that any changes to the Drumbo WWTP will be subject to the policies in the Grand River Source Protection Plan. We will ensure that this matter is addressed in our evaluation process and project reporting. We have engaged the Grand River Conservation Authority and will have on-going discussions with them on this matter.

Thank you for your interest and input to this study. If you have any questions or would like further information about the study, please contact Mark Maxwell by phone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca.

Sincerely,

Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services

cc. Robert Walton, Oxford County
Stephen Nutt, XCG Consulting Ltd.

Ministry of the Environment
and Climate Change

733 Exeter Road
London ON N6E 1L3
Tel': 519 873-5000
Fax: 519 873-5020

Ministèrede l'Environnement
et de l'Action en matière de
changement climatique

733, rue Exeter
London ON N6E 1L3
Tél.: 519 873-5000
Fax: 519 873-5020

Ontario

June 29, 2016

Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services
Department of Public Works
Oxford County
P.O. Box 1614
Woodstock, Ontario
N4S 7Y3

**Re: Notice of Public Consultation Centre 1
Drumbo Wastewater Treatment Plant
Class Environmental Assessment with
Consideration for Servicing Princeton**

Dear Mr. Shafai:

This letter is the Ministry of the Environment and Climate Change's (MOECC) response to the Notice of Public Consultation Centre 1 for the above noted project. It is understood that the Oxford County is undertaking a Class Environmental Assessment (Class EA) to develop a wastewater servicing plan for the Community of Drumbo. The Drumbo WWTP Class EA will also consider the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP. The following comments are submitted for your consideration.

As you know, the Class EA planning process includes consultation with interested stakeholders, evaluation of alternatives, assessment of the effects of the proposed works and identification of measures to mitigate any adverse impacts. In addition to public agencies and the general public, consultation with First Nations and Metis is required.

Consultation with First Nation and Métis Communities

The Crown has a duty to consult First Nation and Métis communities if there is a potential impact to Aboriginal or treaty rights. The proponent of this project, the County of Oxford, has a responsibility to conduct adequate consultation with First Nation and Métis communities as part of the environmental assessment process. The Crown is therefore, delegating the procedural aspects of consultation to the proponent, as outlined in the attached document. As a note, the attached document refers the proponent to contact the Ministry of Aboriginal Affairs (MAA) to help identify First Nations and Metis communities to be contacted. The MOECC advises that the proponent may need to follow up with MAA after its initial request for assistance.

The proponent must contact the Director of the MOECC's Environmental Approvals Branch if this project may adversely affect an Aboriginal or treaty right. The MOECC will then determine whether the Crown has a duty to consult. Information and resources to assist the County of Oxford in fulfilling this requirement are provided as an attachment.

Source Water Protection

As per the recent amendments to the Municipal Engineers Association (MEA) Class EA parent document approved October 2015, proponents undertaking a Municipal Class EA project must identify early in the process whether a project is occurring within a source water protection vulnerable area. This must be clearly documented in a Project File report or ESR. If the project is occurring in a vulnerable area, then there may be policies in the local Source Protection Plan (SPP) that need to be adhered to (requirements under the *Clean Water Act*). The proponent should contact and consult with the appropriate Conservation Authority/Source Protection Authority (CA/SPA) to discuss potential considerations and policies in the SPP that apply to the project.

Please include a section in the Report on Source Water Protection. Specifically, it should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area. If located in a vulnerable area, proponents should document whether any project activities are a prescribed drinking water threat and thus pose a risk to drinking water (this should be consulted on with the appropriate CA/SPA). Where an activity poses a risk to drinking water, the proponent must document and discuss in the Project File Report/ESR how the project adheres to or has regard to applicable policies in the local SPP. This section should then be used to inform and should be reflected in other sections of the report, such as the identification of net positive/ negative effects of alternatives, mitigation measures, evaluation of alternatives etc. As a note, even if the project activities in a vulnerable area are deemed to not to be a drinking water risk, there may be other policies that apply and so consultation with the local CA/SPA is important.

Thank you for the opportunity to comment on this project. Please keep this office fully informed of the status of this project as it proceeds through the Class EA process. Thank you in advance.

Yours truly,

Tammie Ryall

Tammie Ryall
Regional Environmental Planner / Regional EA Coordinator
Ministry of Environment and Climate Change
733 Exeter Road
London ON, N6E 1L3
519 873-5115 | tammie.ryall@ontario.ca

Copy: Mr. Robert Walton, P. Eng., Director of Public Works
Mr. Stephen Nutt, XCG Consulting Limited

Attachment (1)

(BY EMAIL ONLY)

ABORIGINAL CONSULTATION INFORMATION

Consultation with Interested Persons under the Ontario Environmental Assessment Act

Proponents subject to the Ontario *Environmental Assessment Act* are required to consult with interested persons, which may include First Nations and Métis communities. In some cases, special efforts may be required to ensure that Aboriginal communities are made aware of the project and are afforded opportunities to provide comments. Direction about how to consult with interested persons/communities is provided in the Code of Practice: Consultation in Ontario's Environmental Assessment Process available on the Ministry's website:

https://www.ontario.ca/environment-and-energy/consultation-ontarios-environmental-assessment-process

As an early part of the consultation process, proponents are required to contact the Ontario Ministry of Aboriginal Affairs' Consultation Unit and visit Aboriginal Affairs and Northern Development Canada's Aboriginal and Treaty Rights Information System (ATRIS) to help identify which First Nation and Métis communities may be interested in or potentially impacted by their proposed projects.

ATRIS can be accessed through the Aboriginal Affairs and Northern Development Canada website:

http://sidait-atris.aadnc-aandc.gc.ca/atris_online/

For more information with regard to Aboriginal consultation as part of the Environmental Assessment process, refer to the Ministry's website:

www.ontario.ca/government/environment-assessments-consulting-aboriginal-communities

You are advised to provide notification directly to all of the First Nation and Métis communities who may be interested in the project. You should contact First Nation communities through their Chief and Band Council, and Metis communities through their elected leadership.

Rights-based consultation with First Nation and Métis Communities

Proponents should note that, in addition to requiring interest-based consultation as described above, certain projects may have the potential to adversely affect the ability of First Nation or Métis communities to exercise their established or credibly asserted Aboriginal or treaty rights. In such cases, Ontario may have a duty to consult those Aboriginal communities.

Activities which may restrict or reduce access to unoccupied Crown lands, or which could result in a potential adverse impact to land or water resources in which harvesting rights are exercised, may have the potential to impact Aboriginal or treaty rights. For assistance in determining whether your proposed project could affect these rights, please refer to the attached "Preliminary Assessment Checklist: First Nation and Métis Community Interest."

If there is likely to be an adverse impact to Aboriginal or treaty rights, accommodation may be required to avoid or minimize the adverse impacts. Accommodation is an outcome of consultation and includes any mechanism used to avoid or minimize adverse impacts to

Aboriginal or treaty rights and traditional uses. Solutions could include mitigation such as adjustments in the timing or geographic location of the proposed activity. Accommodation may in certain circumstances involve the provision of financial compensation, but does not necessarily require it.

For more information about the duty to consult, please see the Ministry's website at:

www.ontario.ca/government/duty-consult-aboriginal-peoples-ontario

The proponent must contact the Director, Environmental Approvals Branch if a project may adversely affect an Aboriginal or treaty right, consultation has reached an impasse, or if a Part II Order or an elevation request is anticipated. The Ministry will then determine whether the Crown has a duty to consult.

The Director of the Environmental Approvals Branch can be notified either by email with the subject line "Potential Duty to Consult" to EAASIBgen@ontario.ca or by mail or fax at the address provided below:

Email:	EAASIBGen@ontario.ca Subject: Potential Duty to Consult
Fax:	416-314-8452
Address:	Environmental Approvals Branch 135 St. Clair Avenue West, 1st Floor Toronto, ON, M4V 1P5

Delegation of Procedural Aspects of Consultation

Proponents have an important and direct role in the consultation process, including a responsibility to conduct adequate consultation with First Nation and Métis communities as part of the environmental assessment process. This is laid out in existing environmental assessment codes of practice and guides that can be accessed from the Ministry's environmental assessment website at: www.ontario.ca/environmentalassessments

The Ministry relies on consultation conducted by proponents when it assesses the Crown's obligations and directs proponents during the regulatory process. Where the Crown's duty to consult is triggered, various additional procedural steps may also be asked of proponents as part of their delegated duty to consult responsibilities. In some situations, the Crown may also become involved in consultation activities.

Ontario will have an oversight role as the consultation process unfolds but will be relying on the steps undertaken and information you obtain to ensure adequate consultation has taken place. To ensure that First Nation and Métis communities have the ability to assess a project's potential to adversely affect their Aboriginal or treaty rights, Ontario requires proponents to undertake certain procedural aspects of consultation.

The proponent's responsibilities for procedural aspects of consultation include:

- Providing notice to the elected leadership of the First Nation and/or Métis communities (e.g., First Nation Chief) as early as possible regarding the project;

- Providing First Nation and/or Métis communities with information about the proposed project including anticipated impacts, information on timelines and your environmental assessment process;
- Following up with First Nation and/or Métis communities to ensure that they received project information and that they are aware of the opportunity to express comments and concerns about the project. If you are unable to make the appropriate contacts (e.g. are unable to contact the Chief) please contact the Environmental Assessment and Planning Coordinator at the Ministry's appropriate regional office for further direction;
- Providing First Nation and/or Métis communities with opportunities to meet with appropriate proponent representatives to discuss the project;
- Gathering information about how the project may adversely impact the relevant Aboriginal and/or Treaty rights (for example, hunting, fishing) or sites of cultural significance (for example, burial grounds, archaeological sites);
- Considering the comments and concerns provided by First Nation and/or Métis communities and providing responses;
- Where appropriate, discussing potential mitigation strategies with First Nation and/or Métis communities;
- Bearing the reasonable costs associated with these procedural aspects of consultation, which may include providing support to help build communities' capacity to participate in consultation about the proposed project;
- Maintaining a Consultation Record to show evidence that you, the proponent, completed all the steps itemized above or at a minimum made meaningful attempts to do so;
- Upon request, providing copies of the Consultation Record to the Ministry. The Consultation Record should:
    - summarize the nature of any comments and questions received from First Nation and/or Métis communities
    - describe your response to those comments and how their concerns were considered
    - include a communications log indicating the dates and times of all communications; and
    - document activities in relation to consultation.

Successful consultation depends, in part, on early engagement by proponents with First Nation and Métis communities. Information shared with communities must be clear, accurate and complete, and in plain language where possible. The consultation process must maintain sufficient flexibility to respond to new information, and we trust you will make all reasonable efforts to build positive relationships with all First Nation and Métis communities contacted.
If you need more specific guidance on Aboriginal consultation steps in relation to your proposed project, or if you feel consultation has reached an impasse, please contact the Environmental Assessment and Planning Coordinator at the Ministry's appropriate regional office.

Preliminary Assessment Checklist: First Nation and Métis Community Interests and Rights

In addition to other interests, some main concerns of First Nation and Métis communities may pertain to established or asserted rights to hunt, gather, trap, and fish – these activities generally occur on Crown land or water bodies. As such, projects related to Crown land or water bodies, or changes to how lands and water are accessed, may be of concern to Aboriginal communities.

Please answer the following questions and keep related notes as part of your consultation record. "Yes" responses will indicate a potential adverse impact on Aboriginal or treaty rights.

Where you have identified that your project may trigger rights-based consultation through the following questions, you should arrange for a meeting between you and the Environmental Assessment and Planning Coordinator at the Ministry's appropriate regional office to provide an early opportunity to confirm whether Ontario's duty to consult is triggered and to discuss roles and responsibilities in that event.

	YES	NO
1. Are you aware of concerns from First Nation and Métis communities about your project or a similar project in the area? The types of concerns can range from interested inquiries to environmental complaints, and even to land use concerns. You should consider whether the interest represents on-going, acute and/or widespread concern.		
2. Is your project occurring on Crown land, or is it close to a water body? Might it change access to either?		
3. Is the project located in an open or forested area where hunting or trapping could take place?		
4. Does the project involve the clearing of forested land?		
5. Is the project located away from developed, urban areas?		
6. Is your project close to, or adjacent to, an existing reserve? Projects in areas near reserves may be of interest to the First Nation and Métis communities living there.		
7. Will the project affect First Nations and/or Métis ability to access areas of significance to them?		
8. Is the area subject to a land claim? Information about land claims filed in Ontario is available from the Ministry of Aboriginal Affairs; information about land claims filed with the federal government is available from Aboriginal Affairs and Northern Development Canada.		
9. Does the project have the potential to impact any archaeological sites?		

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Public Works
P. O. Box 1614, 21 Reeve Street
Woodstock, Ontario N4S 7Y3
Tel: 519-539-9800 ♦ 800-755-0394
Fax: 519-421-4711
Website: www.oxfordcounty.ca

July 15, 2016

Mr. Patrick Grace
Director
Land Transactions, Hydro Corridors and Public Works
Infrastructure Ontario
One Dundas Street West, Suite 2000
Toronto, ON M5G 2L5

**RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment
Infrastructure Ontario's Response to Notice of Public Consultation Centre No. 1**

Dear Mr. Grace:

Thank you for your June 21, 2016 response to Oxford County's Notice of Public Consultation Centre No. 1 for the Drumbo Wastewater Treatment Plant Class Environmental Assessment (Class EA).

Oxford County is undertaking a Class EA in accordance with the Municipal Engineer's Association Municipal Class EA. At this time, a number of alternative solutions have been identified. These alternative solutions will be evaluated during the next steps of the study process. If the evaluation of alternative solutions identifies that IO lands would be required, Oxford County will advise you.

In the meantime, if you have any questions or would like further information about the study, please contact Mark Maxwell by phone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca. Thank you for your interest in this study.

Sincerely,

Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services

cc. Robert Walton, Oxford County
Stephen Nutt, XCG

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Infrastructure Ontario

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June 21, 2016

Response to EA Notice

Thank you for providing Infrastructure Ontario (IO) with a copy of your Environmental Assessment Notice. From the information you have provided, it is unclear if you are proposing to use lands under the control of the Minister of Economic Development, Employment and Infrastructure (MIO lands) to support your proposed project.

Prior to MOI consenting to the use of MIO lands, the applicable environmental assessment, duty to consult Aboriginal peoples (if triggered) and heritage obligations will need to be met. In order for MIO to allow you access to MIO lands and to carry out proposed activities, MIO must ensure that provincial requirements and due diligence obligations are satisfied. These requirements are in addition to any such obligations you as the proponent of the project may have.

You as the proponent of the project will be required to work with Infrastructure Ontario (IO) to fulfill MIO's obligations which may include considering the use of any MIO lands as part of your individual environmental assessment. All costs associated with meeting MIO's obligations will be the responsibility of the proponent. Please note that time should be allocated in your project timelines for MIO to ensure that its obligations have been met and to secure any required internal government approvals required to allow for the use of the MIO lands for your proposed project.

In order for MIO and IO to assist you to meet your required project timelines, please recognize that early, direct contact with IO is imperative. The due diligence required prior to the use of MIO lands for your proposed project, may include but may not be limited to the following:

- Procedural aspects of the Provincial Crown's Aboriginal Duty to Consult obligations – *see Instruction Note 1*
- Requirements of the MOI Public Work Class Environmental Assessment – *see Instruction Note 2*
- Requirements of the Ministry of Tourism Culture and Sport (MTCS) Standards and Guidelines for Consultant Archaeologists– *see Instruction Note 3*
- Requirements of the MTCS Standards and Guidelines for the Conservation of Provincial Heritage Properties Consultant Archaeologists – *see Instruction Note 4*

Representatives from IO are available to discuss your proposed project, the potential need for MIO lands and the corresponding provincial requirements and due diligence obligations.

Please review the attached instruction notes which provide greater detail on the due diligence obligations associated with the use of MIO lands for your proposed project. We are providing this information to allow you as the proponent to allocate adequate time and funding into your project schedule and budgets. If your project requires you to study MIO lands, then an agreement is required and all studies undertaken on MIO lands will be considered confidential until approval is received. IO will require electronic copies of all required studies on MIO lands that you undertake.

We strongly encourage you to work with IO as early as possible in your process to identify if any

MIO lands would be required for your proposed project. Please note that on title MIO control may be identified under the name of MIO or one of its predecessor ministries or agencies which may include but is not limited to variations of the following: Her Majesty the Queen/King, Hydro One, MBS, MEI, MGS, MOI, OLC, ORC, PIR or Ministry of Public Works[1].

Please provide Rita Kelly with a confirmation in writing of any MIO lands that you propose to use for your proposed project and why the lands are required along with a copy of a title search for the MIO lands.

For more information concerning MIO lands in your study area or the process for acquiring access to or an interest in MIO lands, please contact:

Rita Kelly
Project Manager
Land Transactions, Hydro Corridors & Public Works
Infrastructure Ontario
1 Dundas St. West, Suite 2000
Toronto ON
M5G 2L5
Tel: (416) 212-4934
Email: rita.kelly@infrastructureontario.ca

An application package and requirements checklist is attached for your reference. Please note that transfer of an interest in MIO lands to a proponent can take up to one year and there is no certainty that approval will be obtained.

For more information concerning the MOI Public Work Class Environmental Assessment process and due diligence requirements, please contact:

Lisa Myslicki
Environmental Specialist
Infrastructure Ontario
1 Dundas Street West, Suite 2000
Toronto, ON
M5G 2L5
Tel: (416) 212-3768
Email: lisa.myslicki@infrastructureontario.ca

[1] MBS - Management Board Secretariat; MEI - Ministry of Energy and Infrastructure; MGS - Ministry of Government Services; MOI - Ministry of Infrastructure; OLC - Ontario Lands Corporation; ORC - Ontario Realty Corporation; PIR - Ministry of Public Infrastructure Renewal

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If MIO lands are not to be impacted by the proposed project, please provide a confirmation in writing to Infrastructure Ontario.

Thank you for the opportunity to provide initial comments on your proposed project.

Sincerely,

Patrick Grace
Director
Land Transactions, Hydro Corridors & Public Works
Infrastructure Ontario
Dundas St. West, Suite 2000
Toronto, ON, M5G 2L5

One Dundas Street West, Suite 2000, Toronto, ON M5G 2L5
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INSTRUCTION NOTE 1

Provincial Crown's Aboriginal Duty to Consult obligations

The Crown has a constitutional Duty to Consult (DTC) in certain circumstances and Aboriginal consultation may be required prior to MIO granting access to MIO lands or undertaking other activities. The requirement for Aboriginal consultation may be triggered given Aboriginal or treaty rights, established consultation or notification protocols, government policy and/or program decisions, archaeological potential or results, and/or cultural heritage consultation obligations. The requirement for Aboriginal consultation will be assessed by MIO.

Prior to the use of MIO lands, MIO must first meet any duty to consult obligations that may be triggered by the proposed use of MIO lands. It is incumbent on you to consult with IO as early in the process as possible once you have confirmed that MIO lands would be involved.

MIO will evaluate the potential impact of your proposed project on Aboriginal and treaty rights. MIO may assess that the Crown's Duty to Consult (DTC) requires consultation of Aboriginal communities. Proponents should discuss with IO whether MIO will require consultation to occur and if so, which communities should be consulted.

Where MIO determines that Aboriginal consultation is required, MIO will formally ask you to consult or continue to consult with Aboriginal peoples at the direction of MIO.

On behalf of MIO you will also be required to:

1. Maintain a record and document all notices and engagement activities, including telephone calls and/or meetings;
2. Provide the Ministry updates on these activities as requested; and
3. Notify the Ministry of any issues raised by Aboriginal communities.

If consultation has already occurred, IO strongly encourages you to provide complete Aboriginal consultation documentation to IO as soon as possible. This documentation should include all notices and engagement activities, including telephone calls and/or meetings.

Any duty to consult obligations must be met prior to publically releasing the Notice of Completion for the assessment undertaken under the MOI PW Class EA.

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INSTRUCTION NOTE 2

Requirements of the MOI Public Work Class Environmental Assessment

MIO has an approved Class EA (the Ministry of Infrastructure Public Work Class Environmental Assessment (Public Work Class EA) to assesses undertakings that affect MIO lands including disposing of an interest in land or site development. Details on the Public Work Class EA can be found at:
http://www.infrastructureontario.ca/Templates/Buildings.aspx?id=2147490336&langtype=1033

You may be required to work with IO to complete an environmental assessment under the Public Work Class EA for the undertakings related to MIO lands. IO will work with you to ensure that all of the MIO undertakings or activities related to the use of MIO lands are identified, that the appropriate Category of undertaking is used and a monitoring and report back mechanism is established to ensure that MIO's obligations are met.

The completion of another environmental assessment process that assesses the undertakings related to MIO lands may satisfy MIO's obligations under the Public Work Class EA. You will be required to work with IO to determine the most appropriate approach to meeting the Public Work Class EA obligations for undertakings related to MIO lands on a case by case basis.

Where it is decided that the assessment of undertakings related to MIO lands can be assessed as part of the environmental assessment being undertaken by the proponent then it is likely that the following provisions will be required:

- that the environmental assessment documents set out that one process will be relied on by both the proponent and MIO to evaluate their respective undertakings and meet their respective obligations to assess the potential impacts of their undertakings;
- that the proponent's description of the undertaking to be assessed include all of the MIO undertakings related to the use or access to MIO lands (see Glossary of Terms);
- the associated EA Category from the Public Works Class EA be identified and met by the environmental assessment (see Figure 22. Category Listing Matrix and/or Tale 2.1 EA Category Identification Table);
- that the proponent's environmental assessment indicate that MIO would be relying on the proponent's assessment to satisfy MIO's obligations under the *Environment Assessment Act*;
- establish a monitoring and report back mechanism to ensure that any obligations of MIO resulting from the assessment will be met; and

An environmental assessment consultation plan be developed to ensure that all stakeholders required to be consulted regarding the undertakings on the MIO lands are consulted

Other Due Diligence Requirements

There may also be other additional due diligence requirements for the use of MIO lands in the proposed project. These may include:

- Phase One Environmental Site Assessment and follow up
- Stage 1 Archaeological Assessment and follow up

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- Survey
- Title Search
- Species at Risk Survey(s)
- Appraisal

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INSTRUCTION NOTE 3 – ARCHAEOLOGY - (see also *Instruction Note on Duty to Consult*)

Archaeological sites are recognized and protected under the *Ontario Heritage Act*. Carrying out archaeological fieldwork is a licensed, regulated activity under the 2011 Ministry of Culture Standards and Guidelines for Consulting Archaeologists. Please visit………………

Archaeological due diligence is required for any proposed project on MIO land that could cause significant below ground disturbance such as, new building construction, installation/modification of site services, and installation/maintenance of new pipelines or transmission lines.

You, as the proponent, must engage IO prior to undertaking any archaeological work on MIO lands.

IO has two in-house licensed archaeologists who should be consulted early in the preparatory stages of a proposed project when geographic and site locations are being considered so that the potential for archaeological resources including historic and Aboriginal material (ion Aboriginal villages and burials sites) can be assessed.

To support both the Public Work Class EA and MIO's duty to consult analysis, archaeological assessments are required to determine if there are any significant findings that may be of cultural value or interest to Aboriginal people (e.g., archaeological or burial sites).

Archaeological work can begin before the assessment under the Public Works Class EA begins but the Class EA cannot be completed until the duty to consult that may be triggered regarding archaeological resources are fulfilled.

Depending upon the number or significance of resources found, the duty to consult may be triggered during any of the 4 phases of archaeological work (see below) or anytime during project construction.

The discovery of Aboriginal resources can impact on activities, including project and site plans, timelines and all costs. As the proponent, you are expected to ensure that you project timelines include adequate time and resources to address MIO due diligence obligations, including internal government approvals. All costs associated with meeting MIO's archaeological obligations will be the responsibility of the proponent.

For Archaeological Assessments (Stages 1 through 4), proponents must adhere to the four stage archaeological fieldwork process prescribed by the Ontario Ministry of Tourism, Culture and Sport (MTCS) as per the 2011 Standards and Guidelines for Consultant Archeologists. Not all noted Stages will be necessary for all work. Respondents must follow industry procedures and practices as per the MTCS Standards and Guidelines for Consultant Archeologists 2011 for each Stage of archaeological assessment, all reporting criteria and formatting, and any other license requirements and/or obligations.

- Stage 1 Background Study - Evaluation of Archaeological Potential
  - Archival research and non-intrusive site visit
- Stage 2 Property Assessment

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- In-field systematic pedestrian survey or test pitting and reporting
-

- Stage 3 Site-specific Assessment
  - Limited excavation to determine site significance and size
  - Field works and reporting

- Stage 4 Site mitigation
  - Through either avoidance/protection or excavation Field work 4 to 8 weeks
  - Develop summary report
  - MTCS review – expedited review of summary report 6 weeks
  - Final report
  - Time to develop and implement mitigation measures – negotiation, legal protections, avoidance

IO Contact Information and direction to IO website....

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One Dundas Street West, Suite 2000, Toronto, ON M5G 2L5
1, rue Dundas Ouest, bureau 2000, Toronto, ON M5G 2L5

INSTRUCTION NOTE 4 – HERITAGE REQUIREMENTS

Built Heritage/Cultural Landscapes

Built heritage/cultural landscapes (cultural heritage) are recognized and protected under the Ontario Heritage Act, the regulations to that Act and the 2010 Ministry of Culture Standards and Guidelines for Conservation of Provincial Heritage Properties (S&Gs) Criteria for determining cultural heritage value or interest are set out in O. Reg. 9/06 and 10/06. The S&Gs set out a process for identifying properties of cultural heritage value, and the standards for protection, maintenance, use and disposal of these properties. Please visit……………..

Cultural heritage due diligence will be required for any proposed project on MIO land with the potential to impact cultural heritage resources, such as new building construction, installation/modification of site services, landscape modifications and installation/maintenance of new pipelines, transmission lines.

To support MIO's heritage and MOI PW Class EA obligations, proponents will be required to undertake cultural heritage assessments for all projects that require MIO lands. This will help to determine if the MIO lands are of cultural value or interest to the Province and the level of heritage significance. Where a property has heritage value, proponents may be required to develop appropriate conservation measures/plans and heritage management plans.

You, as the proponent, are strongly encouraged engage IO heritage staff as early in your project planning process as possible and in advance of beginning any cultural heritage assessment work. IO staff will be able to provide advice on the S&Gs and will provide any available heritage information for the MIO lands.

Proponents must also follow industry procedures and practices for all components of cultural heritage assessment work, all reporting criteria and formatting, and any other requirements and/or obligations. IO heritage staff can help identify any required reports.

Should MIO lands be identified under the S&Gs as a Provincial Heritage Property (local significance) or a Provincial Heritage Property of Provincial Significance, IO must be engaged to determine next steps.

Please note that if a Provincial Heritage Property of Provincial Significance is to be impacted, it is likely that consent from the Minister, Ontario Minister, Tourism, Culture and Sport (MTCS) will be required prior to access being granted to MIO lands. Minister's consent requires a detailed application and approvals should land dispositions or building demolitions be applied for as part of the proposed project.

As the proponent, you are expected to ensure that your project timelines include adequate time and resources to address MIO's heritage due diligence obligations, including internal government approvals. All costs associated with meeting MIO's heritage obligations are the responsibility of the proponent.

Staff contacts……

Ministry of Tourism, Culture and Sport

Culture Services Unit
Programs and Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7
Tel: 416 212-4019
Fax: 416 212 1802

Ministère du Tourisme, de la Culture et du Sport

Unité des services culturels
Direction des programmes et des services
401, rue Bay, Bureau 1700
Toronto ON M7A 0A7
Tél: 416 212-4019
Téléc: 416 212 1802

Ontario

March 12, 2014 (EMAIL ONLY)

Mark Maxwell
Oxford County, Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, ON N6S 7Y3
E: mmaxwell@oxford.ca

RE: MTCS file #: 0000040
Project: Oxford County Drumbo Wastewater Treatment Plant
Location: Woodstock, Ontario

Dear Mark Maxwell:

Thank you for providing the Ministry of Tourism, Culture and Sport (MTCS) with the Notice of Commencement related to your project. MTCS's interest in this EA project relates to its mandate of protecting, conserving and preserving Ontario's cultural heritage, which includes:

- Archaeological resources, including land-based and marine;
- Built heritage resources, including bridges and monuments; and,
- Cultural heritage landscapes.

Under the EA process, the proponent is required to determine project's potential impact on cultural heritage resources. Please advise MTCS whether any technical heritage studies will be completed for your EA project, and provide them to MTCS before issuing a Notice of Completion.

Archaeological Resources
Your EA project may impact archaeological resources and you may screen the project with the MTCS *Criteria for Evaluating Archaeological Potential* to determine if an archaeological assessment is needed. MTCS archaeological sites data are available at *archaeologysites@ontario.ca*. If your EA project area exhibits archaeological potential, then an archaeological assessment (AA) should be undertaken by a licensed, consultant archaeologist and the report must be forwarded to MTCS for review.

Built Heritage and Cultural Heritage Landscapes
The attached MTCS checklist *Screening for Impacts to Built Heritage and Cultural Heritage Landscapes* helps determine whether your EA project may impact cultural heritage resources. The clerk for the municipality encompassing your EA project can provide information on property registered or designated under the Ontario Heritage Act. Municipal Heritage Planners can also provide information that will assist you in completing the checklist.

If potential built heritage resources or cultural heritage landscapes are identified within the study area, the first step is to confirm if these resources are of cultural heritage value or interest. If heritage resources are present, the second step is to assess how your EA project will impact those resources. These considerations are addressed and documented through a Heritage Impact Assessment (HIA), prepared by a qualified consultant. Our Ministry's *Info Sheet #5: Heritage Impact Assessments and Conservation Plans* outlines the scope of HIAs. Please make the HIA available for review to the local municipality, aboriginal communities and any local organizations or individuals who have expressed their interested in heritage, as applicable.

Environmental Assessment Reporting
CHER, HIA and AA reports and their recommendations are to be addressed and incorporated into EA projects. If your screening has identified no known or potential cultural heritage resources, or no impacts to these resources, please include the completed checklists and supporting documentation in the EA report or file. It is up to the proponent to demonstrate that they have completed the required due diligence with respect to the cultural heritage component of an EA project.

Thank-you for circulating MTCS on this project: please continue to do so through the EA process, and contact me for any questions or clarification.

Sincerely,

Penny Young
Heritage Planner
Penny.Young@Ontario.ca

Copied to: Shahab Shafai, Oxford County

Please notify MTCS if archaeological resources are impacted by EA project work. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out a determination of their nature and significance.

If human remains are encountered, all activities must cease immediately and the local police be contacted as well as the Cemeteries Regulation Unit of the Ministry of Consumer Services must be contacted. In situations where human remains are associated with archaeological resources, MTCS should also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act.

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.

OxfordCounty
growing stronger...together
Public Works
P. O. Box 1614, 21 Reeve Street
Woodstock, Ontario N4S 7Y3
Tel: 519-539-9800 ♦ 800-755-0394
Fax: 519-421-4711
www.oxfordcounty.ca

December 16, 2013

Bob Aggerholm
Environmental Planner/ Regional EA Coordinator
733 Exeter Road
London, ON
N6E 1L3

Dear Bob,

RE: Drumbo Wastewater Treatment Plant (WWTP) Class EA

Further to our meeting of December 4, 2013 to discuss the Drumbo WWTP Class EA, the County has reviewed the capacity of the individual unit processes and equipment comprising the Drumbo WWTP and has concluded that the plant is capable of treating flows beyond the current rated capacity of 272 m^3/d and up to at least 300 m^3/d through operational changes to the existing works only. At our meeting on December 4, Scott Abernethy stated that, for an interim increase in capacity up to 300 m^3/d, the effluent loadings from the plant would be maintained at the levels specified in the existing Certificate of Approval (CofA #3-2191-90-916), with corresponding decreases in the effluent concentration limits and objectives to reflect the higher plant capacity.

The Municipal Class Environmental Assessment (Municipal Engineers Association, June 2000, as amended in 2007 and 2011) indicates that a project to "increase sewage treatment plant capacity beyond the existing rated capacity through improvements to operation and maintenance activities only, without construction of works to expand, modify or retrofit the plant or the outfall to the receiving water body, with no increase to total mass loading to receiving water body as identified in the Certificate of Approval" is a Schedule A Pre-Approved Activity.

Therefore, the County is proceeding with an Environmental Compliance Approval (ECA) application, with appropriate documentation, to increase the rated Average Day Flow (ADF) capacity of the Drumbo WWTP from 272 m^3/d to 300 m^3/d. At the same time, the County will be proceeding to complete the Schedule C Class EA that has been initiated to allow a further increase in the capacity of the Drumbo WWTP to beyond 300 m^3/d to service the planned growth in the community.

If you have any questions with respect to the planned re-rating or the Schedule C Class EA for the Drumbo WWTP, please do not hesitate to contact the undersigned at your convenience. Thank you for your assistance.

Sincerely,

Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services

cc. Robert Walton, Oxford County
Steve Nutt, XCG Consultants Ltd.

Ministry of Aboriginal Affairs

160 Bloor St. East, 9th Floor
Toronto, ON M7A 2E6
Tel: (416) 326-4740
Fax: (416) 325-1066
www.aboriginalaffairs.gov.on.ca

Ministère des Affaires Autochtones

160, rue Bloor Est, 9e étage
Toronto ON M7A 2E6
Tél. : (416) 326-4740
Téléc. : (416) 325-1066
www.aboriginalaffairs.gov.on.ca

Ontario

2013-10-03

Mark Maxwell, P.Eng
Oxford County Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3

Re: Class Environmental Assessment
Oxford County Drumbo Wastewater Treatment Plant
Notice of Commencement

Dear Mr. Maxwell:

Thank you for informing the Ministry of Aboriginal Affairs (MAA) of your project. Please note that MAA treats all letters, emails, general notices, etc. about a project as a request for information about which Aboriginal communities may have rights or interests in the project area.

As a member of the government review team, the Ministry of Aboriginal Affairs (MAA) identifies First Nation and Métis communities who may have the following interests in the area of your project:

- reserves;
- land claims or claims in litigation against Ontario;
- existing or asserted Aboriginal or treaty rights, such as harvesting rights; or
- an interest in your project's potential environmental impacts.

MAA is not the approval or regulatory authority for your project, and receives very limited information about projects in the early stages of their development. In circumstances where a Crown-approved project may negatively impact a claimed Aboriginal or treaty right, the Crown may have a duty to consult the Aboriginal community advancing the claim. The Crown often delegates procedural aspects of its duty to consult to proponents. Please note that the information in this letter should not be relied on as advice about whether the Crown owes a duty to consult in respect of your project, or what consultation may be appropriate. Should you have any questions about your consultation obligations, please contact the appropriate ministry.

You should be aware that many First Nations either have or assert rights to hunt and fish in their traditional territories. For First Nations, these territories typically include lands and waters outside of their reserves.

In some instances, project work may impact aboriginal archaeological resources. If any Aboriginal archaeological resources could be impacted by your project, you should contact your regulating or approving Ministry to inquire about whether any additional Aboriginal communities should be contacted. Aboriginal communities with an interest in archaeological resources may include communities who are not presently located in the vicinity of the proposed project.

With respect to your project, and based on the brief materials you have provided, we can advise that the project appears to be located in an area where First Nations may have existing or asserted rights or claims in Ontario's land claims process or litigation, that could be impacted by your project. Contact information is below:

Six Nations of the Grand River Territory P.O. Box 5000 Ohsweken, Ontario N0A 1M0	Chief William K. Montour (519) 445-2201 (Fax) 445-4208 wkm@sixnations.ca arleenmaracle@sixnations.ca
Haudenosaunee Confederacy Chiefs Council 2634 6th Line Road RR 2 Ohsweken, ON N0A 1M0	Hohahes Leroy Hill Secretary to Haudenosaunee Confederacy Chiefs Council Cell 519 717 7326 jocko@sixnationsns.com
Mississaugas of the New Credit First Nation 2789 Mississauga Rd., R.R. #6 HAGERSVILLE, Ontario NOA 1HO	Chief Bryan LaForme (905) 768-1133 (Fax) 768-1225 bryanlaforme@newcreditfirstnation.com

Through Aboriginal Affairs and Northern Development (AANDC), the Government of Canada sometimes receives claims that Ontario does not receive, or with which Ontario does not become involved. AANDC's Consultation and Accommodation Unit (CAU) established a "single window" to respond to requests for baseline information held by AANDC on established or potential Aboriginal Treaty and rights. To request information from the Ontario Subject Matter Expert send an email to: UCA-CAU@aadnc-aandc.gc.ca

Additional details about your project or changes to it that suggest impacts beyond what you have provided to date may necessitate further consideration of which Aboriginal communities may be affected by or interested in your undertaking. If you think that further consideration may be required, please bring your inquiry to whatever government body oversees the regulatory process for your project. MAA does not wish to be kept informed of the progress of the project; please be sure to remove MAA from the mailing list.

The information upon which the above comments are based is subject to change. First Nation or Métis communities can make claims at any time, and other developments can occur that could result in additional communities being affected by or interested in your undertaking.

Yours truly,

Heather Levecque
Manager, Consultation Unit
Aboriginal Relations and Ministry Partnerships Division

From:	Guylaine Gaudreau <Guylaine.Gaudreau@aadnc-aandc.gc.ca>
Sent:	August-27-13 4:55 PM
To:	Mark Maxwell
Cc:	Karine Dagenais
Subject:	Class Environmental Assessment – Oxford County Drumbo Wastewater Treatment Plant – Notice of Commencement
Follow Up Flag:	Follow up
Flag Status:	Flagged

Mr. Maxwell,

I am writing in response to your letter of July 11, 2013 inquiring about claims in the above noted area.

In determining your duty to consult, you may wish to contact the First Nations in the vicinity of your area of interest to advise them of your intentions. To do this you may:

1. find the Reserves in your area of interest by consulting a map of the region such as the Province of Ontario Ministry of Aboriginal Affairs online map at http://www.ainc-inac.gc.ca/ai/scr/on/rp/mcarte/mcarte-eng.asp ; then
2. search for the First Nations located on those Reserves by using the *INAC Search by Reserve* site at http://pse5-esd5.ainc-inac.gc.ca/fnp/Main/Search/SearchRV.aspx?lang=eng.

To determine the First Nations in your area of interest who have submitted claims please consult the *Reporting Centre on Specific Claims* at http://pse4-esd4.ainc-inac.gc.ca/SCBRI/Main/ReportingCentre/External/ExternalReporting.aspx?lang=eng.

It should be noted that the reports available on the AANDC website are updated regularly and therefore, you may want to check this site often for updates. In accordance with legislative requirements, confidential information has not been disclosed.

Please rest assured that it is the policy of the Government of Canada as expressed in *The Specific Claims Policy and Process Guide* that:

> "in any settlement of specific native claims the government will take third party interests into account. As a general rule, the government will not accept any settlement which will lead to third parties being dispossessed."

We can only speak directly to claims filed under the Specific Claims Policy in the Province of Ontario. We cannot make any comments regarding potential or future claims, or claims filed under other departmental policies. This includes claims under Canada's Comprehensive Claims Policy or legal action by a First Nation against the Crown. You may wish to contact the Assessment and Historical Research Directorate at (819) 994-6453, the Consultation and Accommodation Unit at (613) 944-9313 and Litigation Management and Resolution Branch at (819) 934-2185 directly for more information.

You may also wish to visit http://www.ainc-inac.gc.ca/ai/mr/is/acp/acp-eng.asp on the AANDC website for information regarding the Federal Action Plan on Aboriginal Consultation and Accommodation.

To the best of our knowledge, the information we have provided you is current and up-to-date. However, this information may not be exhaustive with regard to your needs and you may wish to consider seeking information from other government and private sources (including Aboriginal groups). In addition, please note that Canada does not act as a representative for any Aboriginal group for the purpose of any claim or the purpose of consultation.

I hope this information will be of assistance to you. I trust that this satisfactorily addresses your concerns.

Sincerely,

Guylaine Gaudreau
A/Research Manager
Specific Claims Branch

Grand River Conservation Authority

400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6

Phone: 519.621.2761 **Toll free:** 866.900.4722 **Fax:** 519.621.4844 **Online:** www.grandriver.ca

August 21, 2013

COUNTY OF OXFORD
RECEIVED

AUG 26 2013

REFER TO ______________

File/ EDMS: ______________

Mr. Mark Maxwell
County of Oxford
Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, ON N4S 7Y3

Dear Mr. Maxwell:

Re: Notice of Study Commencement for a Class Environmental Assessment
County of Oxford
Drumbo Wastewater Treatment Plant
Schedule 'C' Project
Village of Drumbo, Township of Blandford-Blenheim
GRCA File #: W.88.146

The Grand River Conservation Authority (GRCA) has received the Notice of Study Commencement and advises that the project study limits are located within an Area of Interest. As such, we offer the following comments for your review and consideration.

Information currently available at this office indicates that the Drumbo Wastewater Treatment Plan (WWTP) is located within 120 metres of adjacent wetland areas. We further note that the effluent from this WWTP outlets to the Cowan Drain. Consequently, there are areas within the study area that are regulated by the GRCA under Ontario Regulation 150/06 (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation).

It is our understanding that the purpose of this study is to determine the most cost-effective, environmentally sound and sustainable approach to increase the treatment capacity of the Drumbo WWTP. It is our further understanding that an assimilative capacity study will be undertaken as part of the completion of this Class Environmental Assessment (EA). The GRCA is supportive of this initiative and would be pleased to provide further review and comment on this part of the Class EA.

Given the extent of the wetland areas surrounding the Drumbo WWTP, we would recommend that the wetlands be confirmed in the field. We would also recommend that you contact the Aylmer District Office of the Ontario Ministry of Natural Resources (MNR) with regards to confirming the presence of endangered/rare species data within the study area and for any available fish data.

The GRCA's Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Ontario Regulation 150/06), prohibits development in or on the following areas:

a) adjacent or close to the shoreline of the Great Lakes-St. Lawrence River System or to inland lakes that may be affected by flooding, erosion or dynamic beaches, and within the 15m allowance,

b) within 15 metres of a river or stream valleys that have depressional features associated with a river or stream, whether or not they contain a watercourse,

c) hazardous lands;

d) wetlands; or

e) other areas where development could interfere with the hydrologic function of a wetland, including areas within 120 metres of all provincially significant wetlands and wetlands greater than or equal to 2.0 hectares in size, and areas within 30 metres of wetlands less than 2.0 hectares in size, but not including those where development has been approved pursuant to an application made under the Planning Act or other public planning or regulatory process;

And prohibits alteration to:

f) straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream or watercourse or change or interfere in any way with a wetland prior to receiving written consent of the GRCA.

Any future development within the regulated areas within the study area will require the prior issuance of a Permit pursuant to Ontario Regulation 150/06 from the GRCA. The Permit process involves the submission of a Permit Application to this office, the review of the application by Authority staff and the subsequent approval/refusal of the Permit Application by the GRCA.

Based on the foregoing, the GRCA would be interested in receiving additional information on this study and participating in the study process.

We trust you will find the above of assistance on this matter. If you have any questions or require further clarification, please do not hesitate to contact the undersigned at ext. 2233.

Yours truly,

John Brum
Resource Planner
Grand River Conservation Authority

JB/

Encl.

cc: Jim Watson, Township of Blandford-Blenheim
Sandra Cooke, GRCA

N:\OXFORD\Blandford-Blenheim\2013\EA\Drumbo WWTP\1st Notice-Aug2013

Grand River Conservation Authority

Map created: July 25, 2013
Prepared by: J. Brum

Drumbo WWTP Class EA

LEGEND

- WATERSHED BOUNDARY (GRCA)
- UTILITY LINE (NRVIS)
- ROADS-ADDRESSED (MNR)
- RAILWAY (NRVIS)
- DRAINAGE-NETWORK (GRCA)
- PARCELS-ASSESSMENT (MPAC)
- FLOODPLAIN (GRCA)
  - ENGINEERED
  - APPROXIMATE
  - ESTIMATED
- WETLAND (GRCA)
- SLOPE VALLEY (GRCA)
  - STEEP
  - OVERSTEEP
- SLOPE EROSION (GRCA)
  - STEEP
  - OVERSTEEP
  - TOE
- PARKS (GRCA)
- REGULATION LIMIT (GRCA)
- DRAINAGE-POLY (NRVIS)
- 2010 ORTHO (ONT)

THIS MAP IS NOT TO BE USED FOR NAVIGATION

GRCA Disclaimer

This map is for illustrative purposes only. Information contained hereon is not a substitute for professional review or a site survey and is subject to change without notice. The Grand River Conservation Authority takes no responsibility for, nor guarantees, the accuracy of the information contained on this map. Any interpretations or conclusions drawn from this map are the sole responsibility of the user.

The source for each data layer is shown in parentheses in the map legend. For a complete listing of sources and citations go to:

http://grims.grandriver.ca/docs/SourcesCitations1.htm

0 42 84 126 168 m.

NAD 1983, UTM Zone 17 Scale 1:3,661

N

July 29, 2013

Mark Maxwell
Oxford County
Public Works
P.O. Box 1614
21 Reeve Street
Woodstock, ON N4S 7Y3
mmaxwell@oxfordcounty.ca

Dear Mr. Maxwell,

Thank you for your letter of July 11, 2013 regarding your request for information held by Aboriginal Affairs and Northern Development Canada (AANDC) on established or potential Aboriginal and treaty rights in the vicinity of the wastewater treatment capacity increase project, for Drumbo, Ontario.

Consulting with Canadians on matters of interest or concern to them is an important part of good governance, sound policy development and decision-making. In addition to good governance objectives, there may be statutory or contractual reasons for consulting, as well as the common law duty to consult with First Nations, Métis and Inuit when conduct that might adversely impact rights Aboriginal or treaty rights (established or potential) is contemplated.

It is important to note that much of the information provided in this response is contextual and may or may not pertain directly to Aboriginal or treaty rights. In most cases, the Aboriginal communities identified are best placed to explain their traditional use of land, their practices or their claims that may fall under section 35 of the *Constitution Act* of 1982.

The Consultation Information Service response

The Consultation Information Service (CIS) of the Consultation and Accommodation Unit responds to requests for information on established or potential Aboriginal and treaty rights known to AANDC. In preparing its responses, the CIS relies on AANDC's Aboriginal and Treaty Rights Information System (ATRIS), which brings together information regarding Aboriginal groups such as their location, related treaty information, claims (specific, comprehensive and special) and on the support of AANDC sectors and regions. The attached report consists of the following categories of information:

1. **Key Features of the Project Area** provides a synopsis of the key section 35 considerations that characterize the location in question and, where appropriate, CIS's methodology in identifying the information provided.

2. **Aboriginal Community Information** includes key contact information and any other information such as Tribal Council affiliation.

3. **Treaties** includes information on historic and modern treaties, which define established rights of the signatory Aboriginal groups.

4. **Claims** includes comprehensive, specific and special claims:

   a) Comprehensive claims are those which, when accepted for negotiation, address broad assertions of Aboriginal rights and title and are intended to result in a modern treaty or agreement that defines and clarifies s. 35 rights within the treaty area.

   b) Specific claims are claims made by a First Nation against the federal government related to outstanding lawful obligations, such as the administration of land and other First Nation assets, and to the fulfillment of Indian treaties, although the treaties themselves are not open to re-negotiation. Claims that are closed, settled or not land-related to lands or treaty obligations have been excluded from this response. As the claims progress regularly, it is recommended that the status of each claim be reviewed through the Reporting Centre on Specific Claims at: http://pse5-esd5.ainc-inac.gc.ca/SCBRI_E/Main/ReportingCentre/External/externalreporting.aspx

   c) Special claims, or claims of a third kind, are those that do not meet the definition of comprehensive or specific claims but deal with some form of historic obligations.

5. **Legal Proceedings** usually refer to litigation between the Aboriginal Group and the Crown, often pertaining to section 35 rights assertions or consultation matters. The groups in question may have various other matters being litigated, however, only those that are related to land or s.35 rights are included herein.

6. **Self-Government Agreements** may be part of comprehensive claims or stand-alone negotiations and may or may not be protected under section 35. Unless they form part of a treaty, they are not geographically defined and address such areas of responsibility as internal governance, education, culture and justice.

7. **Other Considerations** may also be included to make you aware of groups, rights assertions or consultation-related matters that may also be relevant.

Should you require further assistance regarding the information provided, or if you have any questions and/or comments about the enclosed response, please do not hesitate to contact me.

Regards,

Allison Berman
Regional Subject Expert for Saskatchewan, Manitoba and Ontario
Consultation and Accommodation Unit
Aboriginal Affairs and Northern Development Canada
5H- 5th Floor, 10 Wellington
Gatineau, QC K1A 0H4
Tel: 819-934-1873

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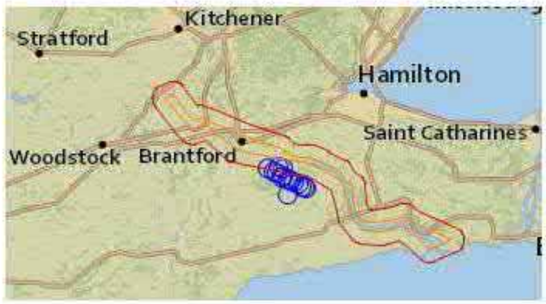
Consultation Information Service Response – July, 2013
Wastewater treatment capacity increase project: Drumbo, ON



On the map below, a 5 km radius (red line) around the approximate project location (orange line) is provided to reflect the proximity of other First Nation communities nearby.

Darker red shapes on the map below indicate reserve lands surrounding the project site. For further information on localized hunting, fishing, trapping activities which may be occurring contact the Ministry of Natural Resources.

Information for the following First Nations is provided in alphabetical order for the following highlighted communities near the project. Please contact the CIS if information is required for First Nations who are more distant to the project.

Aamjiwnaang
Caldwell
Chippewas of Kettle and Stony Point
Chippewas of the Thames First Nation
Mississaugas of the Credit
Moravian of the Thames
Munsee-Delaware Nation
Oneida Nation of the Thames
Six Nations

Information on other Aboriginal groups and/or the Métis is provided in the section "Other Considerations".

Important Contextual Information Related to Section 35 Rights

Treaty Area
In general, where historic treaties have been signed, the rights of signatory First Nation's are defined by the terms of the Treaty. In many cases, however, there are divergent views between First Nations and the Crown as to what the treaty provisions imply or signify. For each First Nation below, the relevant treaty area is provided.

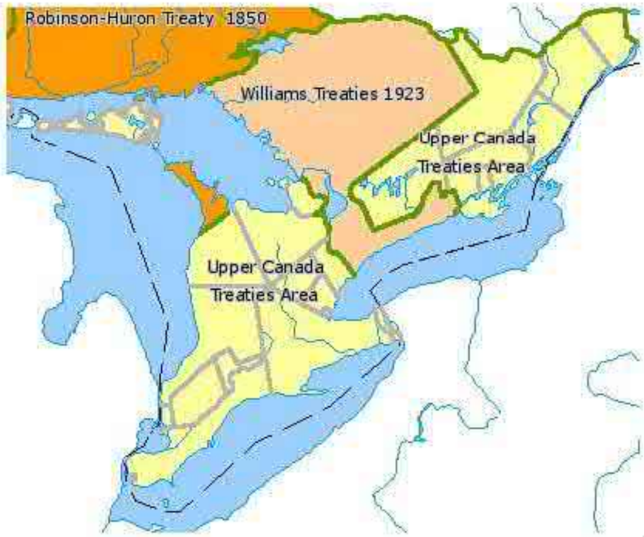
In areas where no historic treaty exists or where such treaties were limited in scope (i.e. where only certain rights were addressed by the treaty, such as the Peace and Friendship Treaties), there may be comprehensive claims that are asserted or being negotiated. Comprehensive claim negotiations are the means by which modern treaties are achieved.

Treaties of Southern Ontario- The Upper Canada Treaties
There are several treaty making eras which impact the province of Ontario. These eras are known as the Upper Canada Land Surrenders from 1764 to 1862. These surrenders are seen as treaties which transfer all Aboriginal rights and title to the Crown in exchange for one-time payments or annuities. They tended to be made with individual First Nation groups for tracts of land.

1764-1782 – Early Land Surrenders
The Royal Proclamation of 1763 established the protection from encroachment of an Aboriginal territory outside of the colonial boundaries. Rules and protocols for the acquisition of Aboriginal lands by Crown officials were set out and became the basis for all future land treaties. In response to military and defensive needs around the Great Lakes, the Indian Department negotiated several land surrender treaties in the Niagara region.

1783-1815- Treaties for Settlement
As part of the plan to resettle some 30,000 United Empire Loyalists who refused to accept American rule, and fled to Montreal, the Indian Department undertook a series of land surrenders west of the Ottawa River with the Mississauga and the Chippewa of the southern Great Lakes. <u>These tended to be uncomplicated arrangements whereby for a particular</u>

Aboriginal group was paid a specific sum paid in trade goods, to surrender a stated amount of land.



*Atlas of Canada

1815-1862- Treaties to Open the Interior
After the war of 1812, the colonial administration of Upper Canada focused on greater settlement of the colony. The Indian Department completed the last of the over 30 Upper Canada Land Surrenders around the Kawartha, Georgian Bay, and the Rideau and Ottawa Rivers. All of this land which today is known as Southern Ontario, was ceded to the Crown.

Treaty Land Entitlement (TLE)
This term is used to describe treaty rights to reserve lands in the Prairie Provinces, northern Ontario and northern British Columbia which flow from Treaties 1 to 11, negotiated and confirmed between various First Nations and the Crown in right of Canada. It is a "subset of specific claims.

Treaty Land Entitlement claims are intended to settle the land debt owed to those First Nations who did not receive all the land they were entitled to under historical treaties signed by the Crown and First Nations. Settlement agreements are negotiated among First Nations, the Government of Canada and provincial/territorial governments. According to the terms of the agreement, a specified amount of Crown lands is identified and/or a cash settlement is provided so that a First Nation may purchase federal, provincial/territorial, or private land to settle the land debt. Once selected or purchased, this land can be added to the First Nations' reserve under the Additions to Reserve process.

All selections and acquisitions are proceeding through the TLE and Additions to Reserves processes and are at various stages ranging from initial acquisition/selection to the Federal Order that would set the lands apart as reserve. For more information on Treaty Land Entitlement, please consult the AANDC website. www.ainc-inac.gc.ca/enr/lds/tle-eng.asp

First Nation/Aboriginal Community Information

The following information is organized by First Nation in alphabetical order.

Aamjiwnaang
Chief Christopher Plain
978 Tashmoo Avenue
Sarnia, Ontario, N7T 7H5
Phone: (519) 336-8410 Fax: (519) 336-0382
www.aamjiwnaang.ca

Treaty Area - Southern Ontario Treaties to open the Interior: 1815 to 1862

Associate Organizations:
Union of Ontario Indians
Chiefs of Ontario
Southern First Nations Secretariat (London District Chiefs Council)

Specific Claims:
Name: Clench Defalcation
Status: in negotiations since 2011
Description: The Plaintiffs claim a misappropriation of sale proceeds.

Legal Proceedings:
Name: Ada Lockridge v. Ministry of the Environment, HMTQ in Right of Ontario, Suncor Energy Products Inc., Attorney General of Ontario, Minister of the Environment Ontario
Status: active
Court File No.: 528/10
Description: The Plaintiffs allege that the Ministry of the Environment has granted permits and licenses resulting in the release of pollutants in an area south of Sarnia which surrounds the territory around the Applicants' reserve.

Name: Chippewas of Sarnia v. Attorney General of Canada et al, Attorney General of Canada, CN Realties, Great Western Railway
Status: active
Court File No.: not available
Description: In 1995 the Sarnia First Nation launched a lawsuit against Canada, Ontario, several thousand property owners, and business and industries, regarding an 1839 sale of 1/3 of the Sarnia reserve to Malcolm Cameron. On Dec 21, 2000, the Ontario Court of Appeal found that although there was no formal surrender, the actions of the First Nation indicated their intent to

surrender the land. In these exceptional circumstances, the Court ruled that the rights of the innocent third parties who have relied on the patent must prevail. The patent was therefore found to be valid. The Court left open the right of the Chippewas to proceed with a claim for damages against the Crown.

Community background:
In September of 2011, the First Nation launched the above lawsuit (*Ada Lockridge v. Ministry of the Environment et al*) against Ontario's Ministry of the Environment. Two members of the First Nation assert that by permitting a recent 25 % increase in production at a Suncor refinery, the government has violated Section 7 of the Canadian Charter of Rights and Freedoms: the right to life, liberty and the security of the person. Lawyers also cite a violation of equality rights under Section 15 of the Charter, saying the First Nation bears a disproportionate environmental burden. Within 25 kilometres of the Aamjiwnaang reserve, there are more than 60 industrial facilities, about 46 of them on the Canadian side of the border. These concerns are of great importance to the Aamjiwnaang First Nation, and should be taken in to consideration when contacting the community.

Agreement negotiations:
Anishinabek Nation (UOI) negotiations on Governance and Education
Please see "Other Considerations" below for more details.

Caldwell First Nation
Chief Louise Hillier
P.O. Box 388
Leamington, Ontario, N8H 3W3
Phone: 519-322-1766 Fax: 519-322-1533

Treaty area – Southern Ontario Treaties for Settlement: 1783 to 1815
In the early part of the 20th century, the Department of Indian Affairs took some preliminary steps to provide a reserve for this First Nation. None of these attempts were completed, and the First Nation remained without a land base and other benefits under Treaty 2 of 1790. The Caldwell land claim is being settled through the Specific Claims process. For more information on the treaties, see the "Important Contextual Information Related to Section 35 Rights" section above.

Associate Organizations:
Association of Iroquois and Allied Indians
Southern First Nations Secretariat (London District Chiefs Council)
Chiefs of Ontario

Specific Claims:
No active claims to report:

Legal Proceedings:
Name: Peter Welch v. HMTQ in Right of Ontario

Status: active (as of 23/11/2011)
Court File No.: not yet available
Description: This is a Fish and Wildlife Conservation Act prosecution involving a member of the Caldwell First Nation. The case involves an investigation regarding the shooting of a deer in 2011. The applicant is claiming Aboriginal and treaty rights to hunt, and will argue that his Charter rights were breached in the investigation.

Chippewas of Kettle and Stony Point
Chief Thomas Bressette (tenure expires June 23, 2014)
6247 Indian Lane
Kettle and Stony Point First Nation, Ontario, N0N 1J1
Phone: (519) 786-2125 Fax: (519) 786-2108
www.kettlepoint.org/home.html

Treaty Area - Southern Ontario Treaties to open the Interior: 1815 to 1862

Associate Organizations:
Southern First Nations Secretariat (London District Chiefs Council)
Union of Ontario Indians
Chiefs of Ontario

Specific Claims:
Name: Clench Defalcation
Status: active negotiations since 2011
Description: The Plaintiffs claim a misappropriation of sale proceeds.

Legal Proceedings:
Name: Chippewas of Sarnia et al. v. HMTQ in Right of Canada, Laurie Desautels, Polysar Hydrocarbons Limited
Status: active
Court File No.: 1796A/87
Description: In 1987, the Chippewas of Sarnia and Kettle Point (Chippewas) sued Ontario and Polysar for a declaration of Aboriginal rights recognized by the Royal Proclamation of 1763 and never ceded to the waterbeds of the St. Clair River and Lake Huron and damages for Polysar's gas pipeline contained therein. The Plaintiffs allege that Ontario has breached its fiduciary duties and trust obligations to the band as a result of granting licenses to the various companies named as defendants. The plaintiffs seek damages and declatory relief.

Name: Chippewas of Kettle and Stony Point v. Attorney General of Canada et al.
Status: active
Court No: C22725
Description: The Plaintiffs allege that the 1927 surrender and subsequent letters patent for a portion of the Kettle Point Reserve is invalid, and that the beach front was not surrendered.

Name: Rosalie Winnifred Manning et al v. HMTQ

Status: active
Court File No.: T-3077-94
Description: The plaintiffs, who claim to be members of the self-styled Stony Point First Nation, and the defendants, the Chippewas of Kettle and Stony Point are recognized as one band by the department. The plaintiffs claim, among other things, that the Crown breached its fiduciary duty. They allege this occurred through the Crown's failure to ensure the plaintiffs' interests: with regards to the Stony Point Reserve; when represented in its negotiations with the Chippewas of Kettle and Stony Point Band; trespassing from 1942 to 1994; the environmental degradation of the land; and the plaintiffs loss of the use and enjoyment of the lands.

Name: Corporation of Township of Bosanquet v. Attorney General of Canada, Chippewas of Kettle and Stoney Point
Status: active
Court File No.: 24085/96
Description: The Town of Bosanquet has initiated a claim against Canada in which they are asking the court for a declaration that the beachfront at Camp Ipperwash is dedicated to public use and that any transfer of land to the First Nation would be restricted by the declaration. The land in question was originally surrendered by the Chippewas of Kettle and Stony Point in 1928 and subsequently sold to private individuals. In 1944, the land was transferred to the Department of National Defence and became part of Camp Ipperwash. In accordance with the 1981 Order in Council (PC 1981-499), Canada made the commitment to return Camp Ipperwash, including the portion obtained from private individuals in 1944, to the band when no longer needed for military purposes. Canada is negotiating the return of the land with the Kettle and Stony Point First Nation. In separate litigation involving Canada, the Town of Bosanquet and a number of private homeowners, the Chippewas of Kettle and Stony Point are claiming a portion of the West Ipperwash Beach, which is adjacent to the Kettle Point Reserve.

Name: HMTQ v. David Cloud
Status: active
Court File No.: to be determined
Description: This case relates to a criminal proceeding in the Ontario Court Provincial Division. The Plaintiffs allege that they have a treaty right to hunt and that the Game and Fish Act of Ontario is of no force and effect with respect to them by virtue of section 52 of the Constitution Act and by reason of their Treaty rights within the meaning of section 35.

Name: Reta George, Maynard George, Roy George, Noreen Kewageshig, Janet Cloud, Lee George v. HMTQ in Right of Canada, Department of Indian Affairs and Northern Development, Department of National Defence,
Status: active
Court File No.: T-2565-94
Description: In 1942 approximately 2,111 acres of lands comprising the Stony Point Indian Reserve were expropriated by the Department of National Defence under the authority of the War Measures Act. Since the end of the war, the Chippewas of Kettle and Stony Point have sought the return of this land to reserve status. In 1981, after extensive negotiations with the band council, the federal government entered into a settlement with the band and agreed to return the lands when no longer required for military purposes. In 1994, the government announced its intentions to return the lands to the Chippewas of Kettle and Stony Point. The plaintiffs claim to be members of the self-styled 'Stoney Point First Nation' which they claim is a

separate First Nation from the Chippewas of Kettle and Stony Point and the rightful beneficiary of the Camp Ipperwash lands. The essence of their claim is that the 'Stoney Point First Nation' originally occupied the former Stony Point Reserve and therefore, the Crown should return the Camp to the members of the 'Stoney Point First Nation' rather than the Chippewas of Kettle and Stony Point. The Crown does not recognize the 'Stoney Point First Nation as a separate Band.

Name: Chippewas of Kettle and Stoney Point First Nation v. HMTQ in Right of Canada
Status: dormant
Court File No.: T-863-95
Description: In 1942, approximately 2,111 acres of lands comprising the Stony Point Indian Reserve were appropriated by the Department of National Defence under the authority of the War Measures Act. Since the end of the war the Chippewas of Kettle and Stony Point have sought the return of this land, now Camp Ipperwash, to reserve status.

Traditional Territory:
In March 2012 and March of 2013, the Chippewas of Kettle and Stony Point First Nation reaffirmed their claim (see above Chippewas of Sarnia et al. v. HMTQ) to the lakebed surrounding their First Nation in letters to AANDC. They wish to be notified by government, proponents, groups or individuals who use, or who plan to use, the area they consider their traditional territory. This area is described as such:

"from the point of intersection of the surrendered lands with Lake Huron at its most northerly point, extending directly out onto Lake Huron to the International boundary, then running along the international boundary to the southerly limit of the herein described lands at the water's edge of the St. Clair River, and the land underlying this portion of Lake Huron (lake bed)"

Additions to Reserve:
Since 2009, the Province has been engaged with the First Nation to transfer the Ipperwash Provincial Park lands as an addition to their reserve. These lands are being transferred through the federal Additions to Reserve process.

Agreement negotiations:
Anishinabek Nation (UOI) negotiations on Governance and Education
Please see "Other Considerations" below for more details.

Chippewas of the Thames
Chief Joe Miskokomon (tenure expires June 27, 2013)
320 Chippewas Road
Muncey, Ontario, N0L 1Y0
Phone: (519) 289-5555 Fax: (519) 289-2230
www.cottfn.ca/index.html

Treaty Area – Southern Ontario Treaties to open the Interior: 1815 to 1862

Associate Organizations:
Southern First Nations Secretariat (London District Chiefs Council)
Union of Ontario Indians
Chiefs of Ontario

Specific Claims:
Name: Big Bear Creek Reserve
Status: active negotiations since 2008
Description: It is alleged that the 5,120 acre Big Bear Cree Reserve was patented and sold by the Crown in the 1830s without a proper surrender by the First Nation. Furthermore, the compensation paid by the Crown for the loss of the reserve in 1849-50 was inadequate. The land in question was reserved for the First Nation under the Longwoods Treaties (1819-1822). A community vote on whether to accept Canada's offer to settle is expected to take place over the fall of 2012. The government has offered to pay the costs of acquiring land in Southwestern Ontario of the size believed to be the equivalent of the lost reserve (21 sq. Km).

Name: Caradoc Reserve 1834 Surrender
Status: under assessment
Description: The First Nation alleges that Canada breached fiduciary duties and duty of honour and integrity in relation to the 1834 Surrender.

Legal Proceedings:
Name: Ether Deleary, Virgil Wilson, Eldon French, George Henry, Mina Riley, Martha Albert, John Riley, Mark French, Merle Fisher, Chippewas of Thomas Band of Indians
Status: now pursued as a specific claim
Court File No.: T-541-83
Description: This action was instituted in February; 1983 but pursued as a specific claim. The plaintiffs; the Chippewas of the Thames allege that; as part of the surrender of their traditional lands in 1922; they were promised certain reserve lands. When the Caradoc reserve was set aside for this band; two parcels of land were not included which should have been; according to the band. The Town of Muncey is located on part of this disputed land. The plaintiffs ask for a declaration that these parcels are part of their reserve.

Agreement negotiations:
Anishinabek Nation (UOI) negotiations on Governance and Education
Please see "Other Considerations" below for more details.

Mississaugas of the Credit
Chief Bryan Laforme (tenure expires December 15, 2013)
2789 Mississauga Road
RR 6
Hagersville, Ontario, N0A 1H0
Phone: (905) 768-1133 Fax: (905) 768-1225
www.newcreditfirstnation.com

Treaty Area – Southern Ontario treaties for Settlement: 1783 -1815

Associate Organizations:
Association of Iroquois and Allied Indians
Chiefs of Ontario

Specific Claims:
Name: 1923 Williams Treaties
Status: active litigation
Description: The United Indian Council alleged that the Williams Treaty was invalid. They state that compensation has been inadequate for land taken, along with a failure to provide reserves. The First Nations involved are: Alderville, Beausoleil, Chippewas of Georgina Island, Chippewas of Mnjikaning, Curve Lake, Hiawatha, Mississauga's of Scugog Island.

Legal Proceedings:
Name: Mississaugas of the New Credit – Toronto Purchase v.
Status: inactive
Court File No.: not available
Description: This concerns an 1805 surrender of land presumably by the Mississaugas of the New Credit. Documentation concerns discussions for a letter accepting settlement of the issue.

Name: Mississaugas of the New Credit First Nation v. Attorney General of Canada, Maurice Bryan Laforme, Kerri Louise King, Attorney General of Ontario
Status: active
Court File No.: CV-12-373
Description: In this matter, the Mississaugas of the New Credit First Nation seeks a declaration of fee simple interest to a parcel of land in Hagersville which lies adjacent to the Applicant's Reserve. The Applicant also seeks a declaration that the reservation of mines and minerals as set out in the original Crown Patent issued February 18, 1884 is null and void. The Applicant asserts that this property was originally part of a larger tract of land to which the Applicant had aboriginal rights, and that this larger tract of land was sold by the Applicant to the Crown in the 18th century. The Applicant claims that in 1999, the Applicant entered into a Land Claim Settlement Agreement whereby Canada agreed that it would recommend an addition to the Applicant's reserve. The Applicant claims that following their application to the Crown to have the property added to its reserve, the Crown had concerns which prevented the completion of the Addition to Reserve process. The Crown's concerns were regarding the capacity of a First Nation to hold title to lands in fee simple, and also about a reservation clause found in the original Crown Patent whereby the rights to all mines and minerals were reserved to the Government of Ontario.

Moravian of the Thames (Delaware Nation)
Chief Greg Peters (tenure expires May 31, 2013)
RR 3
Thamesville, Ontario, N0P 2K0
Phone: (519) 692-3936 Fax: (519) 692-5522
http://www.delawarenation.on.ca/

Treaty Area - Southern Ontario treaties for settlement: 1783 to 1815
Founded in 1792, the Delaware Nation at Moraviantown settlements was originally located on the north side of the Thames River. During the war of 1812, it was destroyed and then rebuilt on the south shore of the river. The Moravians of the Thames are not signatories to the Southern Ontario treaties, however, their reserve is situated in the area of southern Ontario whose treaties were signed to settlement Loyalists between 1783 and 1815.

Associate Organizations:
Southern First Nations Secretariat
Association of Iroquois and Allied Indians

Specific Claims:
No active claims to report.

Legal Proceedings:
No litigation to report.

Munsee-Delaware Nation
Chief Patrick Waddilove (tenure expires June 4, 2014)
RR1
Muncey, Ontario, N0L 1Y0
Phone: (519) 289-5396 Fax: (519) 289-5156
http://www.munseedelawarenation.org/

Treaty Area- Southern Ontario treaties for settlement: 1783 to 1815
The Munsee-Delaware Nation are not signatories to the Southern Ontario treaties, however, their reserve is situated in the area of southern Ontario whose treaties were signed to settlement Loyalists between 1783 and 1815.

Associate Organizations:
Southern First Nations Secretariat (London District Chiefs Council)
Union of Ontario Indians
Chiefs of Ontario

Specific Claims:

No active claims to report.

Legal Proceedings:
No relevant litigation listed.

Agreement negotiations:
Anishinabek Nation (UOI) negotiations on Governance and Education
Please see "Other Considerations" for more details.

Oneida Nation of the Thames
Chief Joel Abram (tenure expires July, 2014)
2212 Elm Ave.
Southwold, Ontario, N0L 2G0
Phone: (519) 652-3244 Fax: (519) 652-9287
www.oneida.on.ca

Treaty Area- Southern Ontario treaties for settlement: 1783 to 1815
The Oneida Nation of the Thames are not signatories to the Southern Ontario treaties, however, their reserve is situated in the area of southern Ontario whose treaties were signed to settlement Loyalists between 1783 and 1815.

Associate Organizations:
Association of Iroquois and Allied Indians
Southern First Nations Secretariat (London District Chiefs Council)
Chiefs of Ontario

Specific Claims:
No relevant claims to report.

Legal Proceedings:
Name: In the matter of An Arbitration ordered by the Director of the Cemeteries Branch of the Ontario Minister of Government Services Pursuant to the Regulation made pursuant to the Ontario Cemeteries Act
Status: dormant since 2006
Court File No.: not available
Description: This is a Notice of Constitutional Question with respect to an arbitration concerning cemeteries near Dorchester, Ontario. The Oneida Nation Council of Chiefs represent the Haudenosaunee people buried in this land and assert that they have aboriginal title to the land they occupy. 202249 Ontario is a development company that bought this land in late 2003 in order to subdivide the land into lots for single-family homes. Direct negotiations between Oneida Nation Council of Chiefs and the President of the development company failed and an effort to find a mediated resolution was also unsuccessful. In early December 2004, the development company brought heavy equipment onto the land and graded the proposed roads, disturbing two graves in the process. Charges were laid against the company under the

Cemeteries Act, resulting in an order for the development company to return the topsoil and restore the land. The President of the company indicated that he would not comply with this order, and instead made application to The Director of the Cemeteries Branch to appoint an arbitrator pursuant to the Ontario Cemeteries Act. This appointment was to take effect on November 11, 2005.

Six Nations of the Grand River
Chief William (Bill) Kenneth Montour (tenure expires December 6, 2013)
1695 Chiefswood Road
PO Box 5000
Ohsweken, Ontario, N0A 1M0
Phone: (519) 445-2201 Fax: (519) 445-4208
www.sixnations.ca

Recognized Leadership and Consultation:
The Federal Government recognizes the elected Chief and Council (who are elected under the Indian Act) as the official Canadian leadership of Six Nations. For consultation purposes, the Federal Government recommends that the elected Chief and Council of Six Nations be engaged.

Associate Organizations:
Chiefs of Ontario

Land Grant :
Haldimand Proclamation of 1784 and Simcoe Patent of 1793
The Six Nations were native to an area that lies within present-day New York State and were allied with the British Crown during the American War of Independence. As compensation for lands lost as a result of the war, the Six Nations and their descendants were granted lands six miles deep on each side of the Grand River, from its mouth to its source. The granted lands were within a portion of territory that the Mississauga surrendered to the Crown in the Between The Lakes Treaty of 1784/1792 (the 1784 agreement contained a boundary description that was geographically impossible and this error was addressed and corrected in 1792).

The Simcoe Patent of 1793 confirmed the lands granted to the Six Nations by the Haldimand Proclamation; However, it included only lands within the corrected 1792 surrender and thus did not extend to the source so the Grand River. It specifies that the Six Nations can surrender and dispose of their land only to the Crown. Any other leases, sales or grants to people other than Six Nations shall be unlawful and such intruders evicted. A link to a map and additional information can be found at:
http://www.aboriginalaffairs.gov.on.ca/english/negotiate/sixnations/sixnations.asp

Specific Claims:
Between 1980 and 1995, Six Nations submitted 28 specific claims to Aboriginal Affairs and Northern Development Canada under its Specific Claims Policy. These claims focus on the government's management of their lands and other assets from 1784 to the present. In March

1995, Six Nations filed a lawsuit against the Government of Canada and the Province of Ontario, which also related to how Six Nations' lands and monies were managed by the Crown (refer to Six Nations of the Grand River Band of Indians v. HMTQ in Right of Canada and HMTQ in Right of Ontario, Court file no. 406/95 in the litigation section below for additional information). As there was significant overlap between the 28 specific claims and the claims put forward in the litigation, work on the specific claims was suspended.

Other Claims:
In 1994, Six Nations submitted a claim to the Minister of Aboriginal Affairs and Northern Development Canada regarding their "right to hunt and fish," which was premised in part on the Nanfan Treaty of 1701. This Treaty (also known as the Treaty of Albany) was related to the protection of hunting and fishing rights in and around Lakes Erie, Huron and Ontario, as well as a portion of the United States. The Treaty was between representatives of the Five Nations (now the Six Nations) and John Nanfan, the acting colonial governor of New York. Six Nations were referred to the Province of Ontario for remedy, as the province has the primary responsibility for harvesting.

Legal Proceedings:
Name: Six Nations of the Grand River Band of Indians v. HMTQ in Right of Canada and HMTQ in Right of Ontario - Superior Court of Justice
Status: active
Court File No.: 406/95
Description: The Plaintiffs claim an accounting of all Six Nations' assets including money and real property held in trust by the Crown for the benefit of the Six Nations since 1784. The Plaintiff seeks a declaration by the Court that the Defendants are in breach of their fiduciary duties towards the Plaintiff, and are liable for replacing all assets or the value of all assets found to be missing, with compound interest. The allegation of repeated breaches of fiduciary duty is supported by examples of breaches, between 1784 and 1970, that can be separated into 14 discrete claims.

Name: Thahoketoteh of Kanekota v. HMTQ
Status: active
Court File No.: T-1396-12
Description: In this claim, the Plaintiff seeks, among other things, the removal of alleged non-native squatters from Lot 1 Concession 11, Clearview Township, Simcoe County. He alleges that the Crown has not respected the Royal Proclamation of 1784 and he also seeks compensation from other parties, such as the Canadian Hydro Developers, Inc. and Enbridge Gas, for their alleged illegal involvement in the area.

Name: Thahoketoteh of Kanekota v. HMTQ
Status: active (November 2012)
Court File No.: T-2007-12
Description: In this action, the Plaintiff alleges that the Defendant Canada has allowed federal and provincial law to apply to a tract of land described in the *Haldimand Proclamation of 1784* in violation of an alleged British Order in Council dating from 1704, the *Royal Proclamation of 1763*, ss. 90, 91(24) and 109 of the *Constitution Act, 1867* and an alleged Canadian Order in Council relating to disallowance, dating from 1875. The Plaintiff particularly alleges that Canada has violated its duty in allowing the *Indian Act*, the *Supreme Court Act* and the *Ontario Public*

Lands Act to apply to the Haldimand Tract. The Plaintiff seeks as relief a declaration that Canada has the duty not to allow the application of federal or provincial law to the Haldimand Tract except by a treaty in compliance with the *Royal Proclamation of 1763* with any dispute resolved by a Standing Royal Committee constituted under the alleged Order In Council of 1704. The Plaintiff seeks to have the declaration described above determined under Rule 220(1)(a) of the Federal Courts Rules, and in writing under Rule 369

Name: Six Nations Elected Council on its own behalf and on behalf of the Six Nations of the Grand River v. The Corporation of the City of Brantford
Status: active
Court File No.: CV-08-361454
Description: The Plaintiffs seek various declarations pertaining to Ontario and/or the City of Brantford's constitutional duty to consult with and accommodate the Six Nations of the Grand River before considering or undertaking any planning activities and disposition of lands which could potentially affect the interests of the Six Nations of the Grand River.

Name: Aaron Detlor; the Haudenosaunee Development Institute v. the Corporation of the City of Brantford – Superior Court of Justice
Status: active
Court File No.: CV-08-356782
Description: The Applicants Aaron Detlor and the Haudenosaunee Development Institute intend to question the constitutional validity and applicability of By-laws 63-2008 and 64-2008 of the City of Brantford Municipal Code, made under the Municipal Act, 2001, S.O. 2001, c. 25. The hearing is scheduled for November 2012.

Name: King Chief ah'she hodeeheehonto v. HMTQ in Right of Canada
Status: active
Court File No.: 10-20244 JR
Description: This is a Notice of Constitutional Question which seems to involve an argument involving Six Nations that among other things relies on the Two Row Wampum Treaty and other Aboriginal and treaty rights, as protection from the jurisdictional obligation to follow Canada's laws and other obligatory requirements.

Name: Regina v. Michael Clarence Monture
Status: active
Court File No.: not available
Description: The defendant is a member of the Mohawk Nation from the Six Nations of the Grand River, and is seeking relief under section 35 of the Constitution Act, 1982. The defendant alleges that the sub-standard health facilities are infringing on and limiting his Aboriginal rights, as well as preventing him from delivering contemporary health care.

Out-of-Court settlement discussions:
Since 1999, the Government of Canada, the Province of Ontario and Six Nations have made several attempts to resolve the historical grievances raised in Six Nations' 1995 lawsuit (refer to Six Nations of the Grand River Band of Indians v. HMTQ in Right of Canada and HMTQ in Right of Ontario, Court file no. 406/95 in the litigation section above for additional information) through out-of-court settlement negotiations. Information on these discussions, including the negotiation process that commenced after the occupation of the Douglas Creek Estates site in Caledonia,

Ontario, can be found on the AANDC website at: http://www.aadnc-aandc.gc.ca/eng/1100100016334/1100100016335.

Unilateral Protocol:
The Six Nations of the Grand River published a unilateral consultation and accommodation policy in 2009. You may wish to review this protocol to better understand the First Nation's perspective regarding consultation and accommodation. However, the federal government is not a party to this protocol and does not endorse the content. The link to the protocol is: http://www.sixnations.ca/admConsultationAccomodationPolicy.pdf

Other Considerations

Aboriginal Rights Assertions: the Métis
The inclusion of the Métis in s.35 represents Canada's commitment to recognize and value their distinctive cultures, which can only survive if they are protected along with other Aboriginal communities. In 2003, the Supreme Court of Canada affirmed Métis rights under s.35 of the Constitution Act, 1982, in the Sault St. Marie area, in the *Powley* decision. For more information on the *Powley* decision visit the following link: www.aadnc-aandc.gc.ca/eng/1100100014419

The Office of the Federal Interlocutor for Métis and Non-Status Indians (OFI) is aware that the Métis Nation of Ontario (MNO), its regional and community councils, have asserted a Métis right to harvest in a large section of the province.

The provincial government has accommodated Métis rights on a regional basis within Métis harvesting territories identified by the MNO. These accommodations are based on credible Métis rights assertions. An interim agreement (2004) between the MNO and the Ministry of Natural Resources (MNR) recognizes the MNO's Harvest Card system. This means that Harvester's Certificate holders engage in traditional Métis harvest activities within identified Métis traditional territories across the province. For a map of Métis traditional harvesting territories visit the MNO website at: http://www.metisnation.org/harvesting/harvesting-map.aspx

The MNO maintains that Aboriginal 'rights-holders' are Métis communities which are collectively represented through the MNO and its community councils. In partnership with community councils, MNO has established a consultation process. The MNO has published regional consultation protocols on their website which offer pre-consultation stage instructions on engaging the Métis through their community councils (via the consultation committee made up of an MNO regional councilor, a community councilor representative and a Captain of the Hunt). Please note however, that this organization does not represent all Métis in Ontario.

Métis Nation of Ontario
Métis Consultation Unit is located within the MNO head office.
500 Old St. Patrick Street, Unit 3
Ottawa, Ontario, K1N 9G4
Phone: (613) 798-1488 Fax: (613) 725-4225
www.metisnation.org/home.aspx

Métis National Council
4-340 MacLaren Street,
Ottawa, Ontario, K2P 0M6
Phone: (613) 232-3216 Fax: (613) 232-4262
www.metisnation.ca

For an indication of the population in Ontario who self-identify as Métis, visit the Statistics Canada website. The Ontario map indicates populations as small as 250 up to over 2,000 within its borders.
http://geodepot.statcan.gc.ca/2006/13011619/200805130120090313011619/16181522091403090112_13011619/151401021518090709140112_201520011213052009190904161516_0503-eng.pdf

Legal Proceedings concerning the Métis in Ontario
Name: HMTQ in Right of Canada v. Michel Blais
Status: active
Court File No.: 08-213
Description: The Applicant is charged with unlawfully harvesting forest resources in a Crown forest without a license contrary to the Crown Forest Sustainability Act, 1994. The Applicant, a Métis, asserts that he is an Aboriginal person within the meaning of s. 35 of the Constitution Act, 1982 and that the alleged harvesting occurred in lands set apart for the Batchewana Band pursuant to the Robinson Treaty of 1850. He claims that the Batchewana First Nation may permit Métis persons to exercise the same Aboriginal and treaty rights as its members pursuant to this treaty.

Name: HMTQ in Right of Canada, Laurie Desautels v. Henry Wetelainen Jr.
Status: active
Court File No.: CV-08-151
Description: The defendant, Henry Wetelainen Jr., intends to question the constitutional validity of sections 28, 31 and 40 of the Crown Forest Sustainability Act (1994), S.O. 1994, c. 25 and Ontario Regulation 167/95, as amended, in relation to an act or omission of the government of Ontario. The defendant claims that he was exercising Aboriginal and treaty rights afforded by the Adhesion to Treaty 3, by harvesting wood within his traditional territory. He claims that he is a Métis/Non-Status Indian and that the imposition of payment for harvesting or use of the forest resource is an infringement and violates his constitutional rights.

Name: Ministry of Natural Resources v. Kenneth Sr. Paquette
Status: active
Court File No.: to be determined
Description: This Notice of Constitutional Question relates to a provincial prosecution involving a charge pertaining to hunting moose. The Defendant intends to assert his s. 35 right as a Métis person to hunt moose, and he also intends to seek a Charter remedy under s. 15 of the *Charter.*

Court Decisions concerning the Métis in Ontario
R. v. Laurin, Lemieux, Lemieux (2007)
Three Métis defendants were charged with fishing violations and claimed that the decision of the Ministry of Natural Resources (MNR) to prosecute them violated the terms of the Interim Agreement (2004) between the MNR and the Métis Nation of Ontario (MNO). As the defendants

were indeed Harvester Card holders authorized to fish in the Mattawa/Nipissing territory, therefore, they were entitled to the exemption in the agreement.

The Court concluded that laying of charges against any valid Harvester Card holder who is harvesting in the territory designated on the card within 2 years of the 2004 agreement was a breach. The Interim Agreement itself was silent as to any geographic limitations. There was no mention of the Agreement only applying north and east of Sudbury. Further, the reliance on Harvester Cards, which explicitly contained the territorial designation of the cardholder, signified that the MNR accepted such designations for the purpose of the agreement. The Court was clear to note that this case did not make any ruling regarding the merits of any claim that the Mattawa/Nipissing area contains section 35 rights bearing Métis communities.

Harry Daniels (2013)
The Plaintiffs sought judicial declarations that: Métis and non-Status Indians are "Indians" under section 91(24); that the Crown owes a fiduciary duty to Métis and non-Status Indians as Aboriginal peoples; and, Métis and non-Status Indians have the right to be consulted and negotiated with in good faith by the government of Canada, on a collective basis through representatives of their choice. On January 8, 2013, the Federal Court ruled in favour of Harry Daniels et al and declared Métis and non-status Indians as "Indians" under section 91(24) of the *Constitution Act, 1867*. Canada appealed this decision on February 6, 2013.

First Nation Associate Organizations
First Nations may or may not delegate certain authority and/or powers to tribal councils to administer programs, funding and/or services on their behalf. The best source of information with respect to consultation is though individual First Nations themselves.

Claims submitted to the Specific Claims Tribunal
The Tribunal is an independent adjudicative body comprised of up to six full time Federal judges appointed from Provincial Superior Courts across the country. The objective and purpose of the Tribunal is to ensure impartiality and fairness in the process of claims resolution. It makes binding decisions where claims have been rejected by the Government of Canada, or, where negotiations have failed to achieve a settlement. For more information, go to: www.sct-trp.ca/hom/index_e.htm

Self Government Agreement Negotiations
Self-government agreements set out arrangements for Aboriginal groups to govern their internal affairs and assume greater responsibility and control over the decision making that affects their communities. Many comprehensive claims settlements also include various self-government arrangements. Self-government agreements address: the structure and accountability of Aboriginal governments, their law-making powers, financial arrangements and their responsibilities for providing programs and services to their members. Self-government enables Aboriginal governments to work in partnership with other governments and the private sector to promote economic development and improve social conditions.

Anishinabek Nation (Union of Ontario Indians) negotiations on Governance and Education

In 1995, the Anishinabek Nation's Grand Council authorized its secretariat arm, the

Union of Ontario Indians (UOI), to begin self-government negotiations with Canada. Negotiations towards agreements in the areas of education and governance began in 1998.

An agreement-in-principle (AIP) on education was signed in November 2002. In February 2007, the parties signed the AIP with respect to governance. Final agreement negotiations are proceeding in parallel, and together these agreements would mark important steps towards the Anishinabek Nation's long-term objective of supporting participating First Nations to move out from under the *Indian Act*.

The governance agreement will provide the establishment of the Anishinabek Nation government and the recognition of participating First Nation lawmaking authority in four core governance areas: leadership selection, citizenship, culture and language, and management and operations of government.

The education AIP authorized the parties to negotiate a final agreement with respect to lawmaking authority for primary, elementary and secondary education for on-reserve members, and to administer AANDC's post-secondary education assistance program. Negotiations towards a final agreement with respect to education are nearing conclusion. The Province of Ontario is not a party to these negotiations but is engaged in tripartite discussions on particular issues that would assist in the implementation of the final agreement.

To prepare for self-government in member communities, the Union of Ontario Indians has undertaken a range of activities including a Community Engagement Strategy, the development of an appeal and redress process, a constitutional development process and a number of capacity development activities.

Provincial guidelines
Under its responsibility to promote stronger Aboriginal relationships, the Ontario Ministry of Aboriginal Affairs has produced *Draft Guidelines on Consultation with Aboriginal Peoples Related to Aboriginal Rights and Treaty Rights.* These guidelines are for use by ministries who seek input from key First Nations and Métis organizations, all Ontario First Nations and selected non-Aboriginal stakeholders. To review the guidelines, visit:
http://www.aboriginalaffairs.gov.on.ca/english/policy/draftconsultjune2006.pdf

From:	Allison Berman <Allison.Berman@aadnc-aandc.gc.ca>
Sent:	July-22-13 11:53 AM
To:	Mark Maxwell
Subject:	Fwd: RE: Aboriginal Consultation Information re: Oxford County Drumbo Wastewater Treatment Plant - ON
Follow Up Flag:	Follow up
Flag Status:	Flagged

Hi Mark,

If you project is near or intersecting reserve lands, please do contact the Consultation and Accommodation Unit (CAU) of Aboriginal Affairs, and we will prepare a Consultation Information Service (CIS) response for you as well as pass on your project details to the Environment Unit in the Region.

If you require information regarding Aboriginal communities for purposes of consultation, then please contact the CAU and directly request this information. Otherwise, you do not need to contact our Department and you can remove any departmental staff from your mailing list.

As you have requested consultation information, I will prepare a response for you. In the past, the CIS has provided responses with a 100 km buffer around the specific site of activity. Our updated Aboriginal and Treaty Rights Information System (ATRIS) now triggers a wider range of First Nation communities via self-government agreements and treaty affiliation. Therefore, a 100 km buffer may provide you with a great deal more information that you would normally require. As you are best placed to determine what the overall "footprint" of the project is, and how that should be represented geographically, I request that you send me the size of buffer you would like around the site of activity.
I have the notice of commencement, but there is no map or locating information for this project. Could you please send me this as well. Once I have this information, I can put together a response for you.

I look forward to hearing from you,

Allison

Allison Berman
Regional Subject Expert for the Prairie Provinces and Ontario
Consultation and Accommodation Unit / Unité de la consultation et de l'accommodement
Policy and Strategic Direction / Politiques et orientation stratégique
Aboriginal Affairs and Northern Development Canada
10 Wellington, 5-H, 5th Floor
Gatineau, QC
819-934-1873

>>> CAU-UCA 7/22/2013 8:43 AM >>>

>>> Mark Maxwell <mmaxwell@oxfordcounty.ca> 7/19/2013 2:55 PM >>>
Hello,

Oxford County sent several notices regarding the Drumbo WWTP Class EA project to your offices at 10 Wellington in Gatineau, QC. If our project is not within a reserve, would you like us to remove all the contacts from the mailing list, or just a specific department (ie. Consultation and Accommodation Unit)?
Any aboriginal consultation information would be appreciated.

Thanks,

Mark Maxwell
Project Engineer

County of Oxford
21 Reeve Street, Woodstock, ON N4S 3G1
Phone: 519-539-9800 x3195
Fax: 519-421-4711

From: CAU-UCA [mailto:CAU-UCA@aadnc-aandc.gc.ca]
Sent: July-19-13 1:48 PM
To: Mark Maxwell
Subject: Aboriginal Consultation Information re: Oxford County Drumbo Wastewater Treatment Plant - ON

Hello Mark Maxwell,

I am writing on behalf of the Consultation and Accommodation Unit(CAU) of Aboriginal Affairs and Northern Development Canada (AANDC).

As a rule, AANDC officials do not participate in environmental assessments that pertain to projects off-reserve, nor does the department track how other parties carry out their EAs. Therefore, in future please omit AANDC officials from your public information notification for projects that do not intersect with reserve land. This information has been relayed to the Ministry of Environment, and their contact list will be updated shortly.

If you are contacting AANDC to request Aboriginal consultation information, please reply and we will be happy to provide it. The CAU's Consultation Information Service (CIS)has been established as a 'single window approach' to help co-ordinate departmental responses to consultation-related queries coming from federal departments and third parties. Please provide a radius (in kilometres) around your project from which you would like information. We will provide information related to Aboriginal groups and their asserted or established Aboriginal and/or treaty rights and claims, to the extent that these are known by AANDC.

Future requests for Aboriginal consultation information from AANDC, can be submitted directly to the following mailbox: UCA-CAU@aadnc-aandc.gc.ca.To facilitate a more timely response, use the following subject heading in your e-mail: request for 'Aboriginal consultation information'. If you do not require this information from the CAU, please remove us from your notification mailing list.

Kind regards,

Consultation and Accommodation Unit
Aboriginal Affairs and Northern Development Canada
5H- 5th Floor, 10 Wellington
Gatineau, QC
K1A0H4

Ministry of the Environment
733 Exeter Road
London ON N6E 1L3
Tel': 519 873-5000
Fax: 519 873-5020

Ministère de l'Environnement
733, rue Exeter
London ON N6E 1L3
Tél.: 519 873-5000
Téléc.: 519 873-5020

Ontario

Transmitted by e-mail as a PDF File

July 22, 2013

County of Oxford
Department of Public Works
21 Reeve Street
P.O. Box 1614
Woodstock, Ontario
N4S 7Y3

Attention: Shahab Shafai, P. Eng, Manager of Wastewater Services

RE: Notice of Commencement
Oxford County Drumbo Wastewater Treatment Plant

Dear Shahab:

This letter is our response to the Notice of Study Commencement issued by the County for the above-noted project.

At this early stage of the project we have the following comments to offer:

Project Problem or Opportunity
The need for the project was not evident from the Notice of Commencement. Please provide this office with an overview of why an expansion is being investigated. Is this project intended to accommodate growth outside the service area of the last Class EA or servicing study?

In addition, please advise this office if the project involves a request for compliance or action by an MOE official or any other government authority.

Associated or Related Amendments to the Official Plan

We wish to be notified if an application for an amendment to the Official Plan or any type of land use planning or infrastructure study is being considered for the study area.

PIC Materials

Please forward this office a copy of the materials and presentations used by your project team for public Public Information Centres. A PDF copy of this material, forwarded to me by e-mail, is acceptable. We rely on this material to acquaint our staff with the nature and status of the project.

Effluent Quality

Please provide this office with an overview of your proposal for effluent quality and monitoring. A meeting can be arranged between your office and the Region's Surface Water advisers.

Review of Draft Project File or ESR

MOE will wish to review a draft of the Environmental Study Report. A 30 to 45 day review period is requested. A text-searchable PDF copy is requested.

Final Documentation

Notices of Completion must be accompanied by a CD/DVD of the Project File/Environmental Study Report in text-searchable format.

Consultation with First Nation and Métis Communities

The Ministry has instructed its Regional EA Coordinators to provide the following guidance to proponents with respect to First Nations and Métis consultation.

> *The Crown has a duty to consult First Nation and Métis communities if there is a potential impact to Aboriginal or treaty rights. As the proponent of this project, you have a responsibility to conduct adequate consultation with First Nation and Métis communities as part of the environmental assessment process. The Crown is therefore, delegating the procedural aspects of consultation to you as outlined in*

the attached document.

You must contact the Director, Environmental Approvals Branch if a project may adversely affect an Aboriginal or treaty right, or if a Part II order request is anticipated. The Ministry will then determine whether the Crown has a duty to consult. Information and resources to assist you in fulfilling this requirement are provided in the attachment to this letter.

Should you have any questions, please do not hesitate to contact me at (519) 873-5012.

Yours truly,

R. Aggerholm
Regional Environmental Assessment Coordinator
Southwest Region

/ra
Encl.

ABORIGINAL CONSULTATION INFORMATION

Interest-based consultation with First Nation and Métis Communities

Proponents subject to the *Environmental Assessment Act* are required to consult with interested First Nation and Métis communities in addition to consultation with interested persons. Special effort may be required to ensure that First Nation and Métis communities are made aware of the project and are afforded an opportunity to provide comments.

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 communities may be impacted by your project. **It is important to ensure that MAA and AANDC are advised of any communities identified for consultation during previous stages of the project when making this request.** For more information in this regard, refer to the Aboriginal Information Resources web page of the Ministry of the Environment's internet site at:

http://www.ene.gov.on.ca/en/eaab/aboriginal-resources.php

You are advised to provide notification directly to all of the First Nation and Métis communities who may be interested in the project.

Rights-based consultation with First Nation and Métis Communities

Proponents should also be aware that certain projects may affect the ability of a First Nation or Métis community to exercise their confirmed or asserted Aboriginal or treaty rights. In such cases, Ontario may have a duty to consult to ensure the protection of the potentially affected right. Activities which may restrict access to unoccupied Crown lands, or could result in a potential to impact to land or water resources, generally have the potential to impact Aboriginal or treaty rights. For assistance in determining whether your project could affect these rights, refer to the attached "Preliminary Assessment Checklist: First Nation and Métis Community Interest."

If there is an impact to Aboriginal or treaty rights, accommodation may be required to avoid or minimize the adverse impacts. Accommodation is an outcome of consultation and includes any mechanism used to avoid or minimize adverse impacts to Aboriginal or treaty rights and traditional uses. Solutions could include adjustments in the timing or geographic location of the proposed activity; accommodation does not necessarily require the provision of financial compensation.

The proponent must contact the Director, Environmental Approvals Branch if a project may **adversely affect an Aboriginal or treaty right**, or if a **Part II Order or an elevation request is anticipated**; the Ministry will then determine whether the Crown has a duty to consult.

The Director of the Environmental Approvals Branch can be notified either by email with the subject line "Potential Duty to Consult" to EAASIBgen@ontario.ca or by mail or fax at the address provided below:

Email:	EAASIBgen@ontario.ca Subject: Potential Duty to Consult
Fax:	416-314-8452
Address:	Environmental Approvals Branch 12A Flr 2 St Clair Ave W Toronto ON M4V1L5

Delegation of Procedural Aspects of Consultation

Proponents, by virtue of their knowledge and participation in project activities, have an important and direct role in the consultation process to ensure both success and certainty. Where the Crown's duty to consult is triggered, **Ontario is delegating these procedural aspects of this rights-based consultation to you as the proponent of the project.**

Ontario will have an oversight role as the consultation process unfolds but will be relying on the steps undertaken and information you obtain to ensure adequate consultation has taken place. To ensure that First Nation and Métis communities have the ability to assess a project for its potential to impact on an Aboriginal or treaty right, there are certain procedural aspects of consultation that Ontario requires proponents to undertake.

The responsibilities of the proponent for procedural aspects of consultation include:

- Providing notice to the elected leadership of the First Nation and/or Métis communities (e.g., First Nation Chief) as early as possible regarding the project;
- Providing First Nation and/or Métis communities with information about the proposed project including anticipated impacts, information on timelines and your environmental assessment process;
- Following up with First Nation and/or Métis communities to ensure they received project information and that they are aware of the opportunity to express comments and concerns about the project; **if you are unable to make the appropriate contacts (e.g. are unable to contact the Chief) please contact the Ministry of the Environment for further direction.**
- Providing First Nation and/or Métis communities with opportunities to meet with appropriate representatives to discuss the project;

- Gathering information about how the project may adversely impact the Aboriginal and/or Treaty rights (for example, hunting, fishing) or sites of cultural significance (for example, burial grounds, archaeological sites);
- Considering the comments and concerns provided by First Nation and/or Métis communities and providing responses;
- Where appropriate, discussing potential mitigation strategies with First Nation and/or Métis communities;
- Bearing the reasonable costs associated with these procedural aspects of consultation.
- Maintaining a Consultation Record and upon request, providing copies of the Consultation Record to Ontario. The Consultation Record should:
    - o summarize the nature of any comments and questions received from First Nation and/or Métis communities
    - o describe the response to comments and how concerns were considered
    - o include a communications log indicating the dates and times of all communications; and
    - o document activities in relation to consultation.

Successful consultation depends, in part, on early engagement by proponents with First Nation and Métis communities. Information shared with communities must be clear, accurate and complete, and in plain language where possible. The consultation process must maintain sufficient flexibility to respond to new information, and we trust you will make all reasonable efforts to build positive relationships with all First Nation and Métis communities contacted.

Preliminary Assessment Checklist: First Nation and Métis Community Interest

Some main concerns of First Nation and Métis communities deal with/address rights for hunting, gathering, trapping, and fishing – these activities generally occur on Crown land or water bodies. As such, projects related to Crown land or water bodies, or changes to them, may be of concern.

Where you have identified that your project may trigger rights-based consultation through the following questions, a pre-consultation meeting with the ministry and proponent will provide an early opportunity to confirm whether Ontario's duty to consult is triggered and to discuss roles and responsibilities in that event.

Please answer the following questions. A "yes" response will indicate a potential impact on Aboriginal or treaty rights.

	YES	NO
1. Are you aware of concerns from First Nation and Métis communities about your project or a similar project in the area? The types of concerns can range from interested inquiries to environmental complaints, and even to land use concerns. You should consider whether the interest represents on-going, acute and/or widespread concern.		
2. Is your project occurring on Crown land, or is it close to a water body, or might it change access to either?		
3. Is the project located in an open or forested area where hunting or trapping could take place?		
4. Does the project involve the clearing of forested land?		
5. Is the project located away from developed, urban areas?		
6. Is your project close to, or adjacent to, an existing reserve? Projects in areas near reserves may be of interest to your First Nation and Métis community neighbours.		
7. Will the project affect First Nations and/or Métis right of access?		

8. Is the area subject to a land claim? Information about land claims filed in Ontario is available from the Ministry of Aboriginal Affairs; information about claims filed with the federal government is available from Aboriginal Affairs and Northern Development Canada.		
9. Does the project have potential to cause cumulative effects at the present time or over a long period of time (e.g. several small expansions of an urban area)?		
10. Does the project have the potential to impact any archaeological sites?		

Public Works
P. O. Box 1614, 21 Reeve Street
Woodstock, Ontario N4S 7Y3
Tel: 519-539-9800 ♦ 800-755-0394
Fax: 519-421-4711
www.oxfordcounty.ca

October 8, 2013

Bob Aggerholm
Environmental Planner/ Regional EA Coordinator
733 Exeter Road
London, ON
N6E 1L3

Dear Bob,

RE: Drumbo Wastewater Treatment Plant (WWTP) Class EA
Notice of Commencement

Thank you for your comments on the Notice of Commencement for the Drumbo WWTP Class EA, provided in your letter dated July 22, 2013. Oxford County has reviewed the MOE comments and offers clarifications and responses below, following the format of the Ministry's letter.

<u>Project Problem or Opportunity</u>

The current Class EA was initiated due to increasing influent flows at the WWTP. In 2011, the average day flow reached 282 m^3/day, or 104% of the plant's rated capacity of 272 m^3/day.

The proposed rated capacity increase is intended to accommodate lands within the existing community boundary only, with growth limited to infill lots and a 66 lot subdivision that received draft approval on March 27, 1996.

<u>Associated or Related Amendments to the Official Plan</u>

Currently, there has been no consideration to amend the Official Plan as part of this project.

<u>PIC Materials</u>

Public Information Centre presentation material will be forwarded to your attention following each PIC.

<u>Effluent Quality</u>

Oxford County staff wish to meet with MOE staff to discuss the best approach to establishing future effluent requirements for an expanded plant.

Review of Draft Project File or ESR

The draft ESR will be provided to MOE for review ahead of being presented to County Council and before the 30-day public review period.

Final Documentation

Once complete, an electronic copy of the final Class Environmental Assessment will be provided to the MOE with the Notice of Completion.

Consultation with First Nation and Métis Communities

Indian and Northern Affairs Canada (INAC), the Ministry of Aboriginal Affairs, and the following First Nations have been included on the notification list for this project:

- Munsee-Delaware Nation
- Chippewas of the Thames River First Nation
- Delaware Nation
- Oneida Nation of the Thames
- Métis Nation of Ontario
- Walpole Island First Nation

Please feel free to contact the undersigned with any questions or comments.

Sincerely,

Shahab Shafai, M.Sc., P.Eng.
Manager of Wastewater Services

cc. Steve Nutt, XCG Consultants Ltd.

STAKEHOLDERS

Dianne Damman

From:	Rob Walton
Sent:	August-09-13 2:28 PM
To:	
Cc:	Mark Maxwell; Shahab Shafai
Subject:	Drumbo Wastewater Treatment Plant (WWTP)
Attachments:	Notice of Commencement, Drumbo WWTP Class EA - Jun. 28, 2013.pdf

Dear Murray,

As per our recent telephone conversation, I am writing to confirm the process and timing of the study to upgrade the Drumbo WWTP.

I have enclosed the notice of commencement that was advertised on the County website and the local newspapers. Please pass this on to your client.

The schedule to complete the study will take until mid-2014. At this time we are budgeting $1.5M for upgrades. This may impact the Development Charges for Drumbo (study also underway as our DC bylaw expires in August 2014) and we encourage you and your client to follow that process. I can confirm that the 33 lots not currently having capacity in your clients lands are being considered as part of the study.

By copy of this message to Mark Maxwell I will have him add you to the notification list for the study.

Please call with any questions or comments.

Yours truly,

Robert Walton, P.Eng.
Director of Public Works
County of Oxford

OxfordCounty
growing stronger...together

NOTICE OF COMMENCEMENT

CLASS ENVIRONMENTAL ASSESSMENT
OXFORD COUNTY DRUMBO WASTEWATER TREATMENT PLANT

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Oxford County Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a rated capacity of 272 m^3/d.

A preliminary review of available treatment capacity for the Oxford County Drumbo WWTP was completed in 2012, and included a review of current flow data to determine the available capacity of the Plant. Oxford County has initiated the current Class Environmental Assessment (Class EA) to examine upgrade options in detail and to determine the most cost-effective, environmentally sound, and sustainable approach to increase the treatment capacity of the Oxford County Drumbo WWTP. The study will include a door-to-door survey of all properties to ensure that sump pumps and foundation drains are not connected to the sanitary sewers.

The study will be undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, 2011), and will include opportunities for public comment.

Public input and comments will be an important component of the Class EA process. Two Public Information Centres (PICs) will be held during the course of the study to present and receive comments on the preferred alternative for upgrading the WWTP. Notice of the PICs will be advertised in advance of each public meeting.

Please contact Mark Maxwell at the address below if you have any questions or comments about the study, or if you would like to be added to the mailing list to receive future notifications for the study.

Mark Maxwell, P.Eng.
Oxford County, Department of Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800, ext. 3195
Fax: 519-421-4711
E-mail: mmaxwell@oxfordcounty.ca

This Notice issued on June 28, 2013

Robert Walton, P.Eng.
Director of Public Works

A-7

ABORIGINAL CONSULTATION

- *NOTICE OF COMMENCEMENT*
- *NOTICE OF PUBLIC CONSULTATION CENTRE NO. 1*
- *NOTICE OF PUBLIC CONSULTATION CENTRE NO. 2*
- *RESPONSE TO PCC NO. 2 NOTIFICATION*

NOTICE OF COMMENCEMENT

Oxford County
growing stronger...together
Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 ♦ Fax: 519-421-4711
Web site: www.oxfordcounty.ca

July 11, 2013

Chief Patrick Waddilove
Munsee-Delaware Nation
R.R. # 1
Muncey, ON N0L 1Y0

RE: Class Environmental Assessment
Oxford County Drumbo Wastewater Treatment Plant
Notice of Commencement

Dear Chief Waddilove:

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Oxford County Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a rated capacity of 272 m^3/d.

A preliminary review of available treatment capacity for the Drumbo WWTP was completed in 2012, and included a review of current flow data to determine the available capacity of the Plant. Oxford County has initiated the current Class Environmental Assessment (Class EA) to examine upgrade options in detail and to determine the most cost-effective, environmentally sound, and sustainable approach to increase the treatment capacity of the Oxford County Drumbo WWTP. The study will include a door-to-door survey of all properties to ensure that sump pumps and foundation drains are not connected to the sanitary sewers.

The study will be undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, 2011), and will include opportunities for public comment.

The purpose of this letter is to advise you of the commencement of this study. We have attached a Notice of Commencement that will be published in local newspapers to advise the general public of the study.

If you have any initial concerns or comments regarding this project, we would appreciate receiving your comments in writing. It is recognized that you may not want to receive further notifications regarding the study. If this is the case, please respond in writing.

Please note that two Public Information Centres (PICs) will be held during the course of the study to present and receive comments on the preferred alternative for upgrading the WWTP. Notice of the PICs will be advertised in advance of each public meeting.

..... Page 2

If you have any questions or would like further information about the project, please contact Mark Maxwell, P.Eng. by telephone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca.

Thank you for your interest in the project.

Sincerely,

Shahab Shafai

Shahab Shafai, M.Sc., P.Eng.
Manager of Wastewater Services

Encl.

Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 • Fax: 519-421-4711
Web site: www.oxfordcounty.ca

July 11, 2013

Chief Richard "Joe" Miskokomon
Chippewas of the Thames River First Nation
320 Chippewa Road
R.R. # 1
Muncey, ON N0L 1Y0

RE: Class Environmental Assessment
Oxford County Drumbo Wastewater Treatment Plant
Notice of Commencement

Dear Chief Miskokomon:

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Oxford County Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a rated capacity of 272 m^3/d.

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Thank you for your interest in the project.

Sincerely,

Shahab Shafai

Shahab Shafai, M.Sc., P.Eng.
Manager of Wastewater Services

Encl.

Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 • Fax: 519-421-4711
Web site: www.oxfordcounty.ca

July 11, 2013

Chief Greg Peters
Delaware Nation
14760 School House Line
R.R. # 3
Thamesville, ON N0P 2K0

RE: Class Environmental Assessment
Oxford County Drumbo Wastewater Treatment Plant
Notice of Commencement

Dear Chief Peters:

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Oxford County Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a rated capacity of 272 m^3/d.

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..... Page 2

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Thank you for your interest in the project.

Sincerely,

Shahab Shafai

Shahab Shafai, M.Sc., P.Eng.
Manager of Wastewater Services

Encl.

Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 • Fax: 519-421-4711
Web site: www.oxfordcounty.ca

July 11, 2013

Chief Joel Abram
Oneida Nation of the Thames
2212 Elm Avenue
R.R. # 2
Southwold, ON N0L 2G0

RE: Class Environmental Assessment
Oxford County Drumbo Wastewater Treatment Plant
Notice of Commencement

Dear Chief Abram:

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Oxford County Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a rated capacity of 272 m^3/d.

A preliminary review of available treatment capacity for the Drumbo WWTP was completed in 2012, and included a review of current flow data to determine the available capacity of the Plant. Oxford County has initiated the current Class Environmental Assessment (Class EA) to examine upgrade options in detail and to determine the most cost-effective, environmentally sound, and sustainable approach to increase the treatment capacity of the Oxford County Drumbo WWTP. The study will include a door-to-door survey of all properties to ensure that sump pumps and foundation drains are not connected to the sanitary sewers.

The study will be undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, 2011), and will include opportunities for public comment.

The purpose of this letter is to advise you of the commencement of this study. We have attached a Notice of Commencement that will be published in local newspapers to advise the general public of the study.

If you have any initial concerns or comments regarding this project, we would appreciate receiving your comments in writing. It is recognized that you may not want to receive further notifications regarding the study. If this is the case, please respond in writing.

Please note that two Public Information Centres (PICs) will be held during the course of the study to present and receive comments on the preferred alternative for upgrading the WWTP. Notice of the PICs will be advertised in advance of each public meeting.

..... Page 2

If you have any questions or would like further information about the project, please contact Mark Maxwell, P.Eng. by telephone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca.

Thank you for your interest in the project.

Sincerely,

Shahab Shafai

Shahab Shafai, M.Sc., P.Eng.
Manager of Wastewater Services

Encl.

Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 ♦ Fax: 519-421-4711
Web site: www.oxfordcounty.ca

July 11, 2013

Mr. Gary Lipinski
President
Métis Nation of Ontario
500 Old St. Patrick St., Unit D
Ottawa, ON K1N 9G4

RE: Class Environmental Assessment
Oxford County Drumbo Wastewater Treatment Plant
Notice of Commencement

Dear Mr. Lipinski:

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Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 • Fax: 519-421-4711
Web site: www.oxfordcounty.ca

July 11, 2013

Dr. Dean M. Jacobs
cc. Chief Joseph Gilbert
Walpole Island First Nation
Heritage Centre
R.R. # 3
Wallaceburg, ON N8A 4K9

RE: Class Environmental Assessment
Oxford County Drumbo Wastewater Treatment Plant
Notice of Commencement

Dear Dr. Jacobs:

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Shahab Shafai

Shahab Shafai, M.Sc., P.Eng.
Manager of Wastewater Services

Encl.

NOTICE OF
PUBLIC CONSULTATION CENTRE No. 1

Public Works
P. O. Box 1614, 21 Reeve Street
Woodstock, Ontario N4S 7Y3
Tel: 519-539-9800 ♦ 800-755-0394
Fax: 519-421-4711
Website: www.oxfordcounty.ca

June 6, 2016

Mr. Lonny Bomberry
Six Nations of the Grand River, Land & Resources Department
2498 Chiefswood Road
P.O. Box 5000 Ohsweken, ON
N0A 1M0

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre 1

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Time: 6:30 p.m. to 8:30 p.m.

Location: Princeton Centennial Hall
35 Main Street South
Princeton, Ontario

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Information on the Drumbo WWTP Class EA is posted on the Oxford County website at: www.oxfordcounty.ca.

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Sincerely,

Shahab Shafai

Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services

cc. Robert Walton, P.Eng., Director of Public Works
Stephen Nutt, XCG Consulting Limited

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Fax: 519-421-4711
Website: www.oxfordcounty.ca

June 6, 2016

Mr. Paul General
Six Nations of the Grand River, Six Nations Council
2676 Fourth Line Road
P.O. Box 5000 Ohsweken, ON
N0A 1M0

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre 1

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Manager of Environmental Services

cc. Robert Walton, P.Eng., Director of Public Works
Stephen Nutt, XCG Consulting Limited

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Website: www.oxfordcounty.ca

June 6, 2016

Chief G. Ava Hill
Six Nations of the Grand River
1695 Chiefswood Road
P.O. Box 5000 Ohsweken, ON
N0A 1M0

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
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Shahab Shafai

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cc. Robert Walton, P.Eng., Director of Public Works
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Website: www.oxfordcounty.ca

June 6, 2016

Mr. Leroy Hill
Secretary, Haudenosaunee Resource Centre
2634 6th Line
RR # 2 Ohsweken, ON
N0A 1M0

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre 1

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Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services

cc. Robert Walton, P.Eng., Director of Public Works
Stephen Nutt, XCG Consulting Limited

OxfordCounty growing stronger...together

Public Works
P. O. Box 1614, 21 Reeve Street
Woodstock, Ontario N4S 7Y3
Tel: 519-539-9800 ♦ 800-755-0394
Fax: 519-421-4711
Website: www.oxfordcounty.ca

June 6, 2016

Chief Roger Thomas
Munsee-Delaware Nation
R.R. # 1
Muncey, ON
N0L 1Y0

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre 1

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June 6, 2016

Chief Leslee White-Eye
Chippewas of the Thames River First Nation
320 Chippewa Road
R.R. # 1 Muncey, ON
N0L 1Y0

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre 1

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Manager of Environmental Services

cc. Robert Walton, P.Eng., Director of Public Works
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Woodstock, Ontario N4S 7Y3
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Fax: 519-421-4711
Website: www.oxfordcounty.ca

June 6, 2016

Chief Greg Peters
Delaware Nation
14760 School House Line
R.R. # 3 Thamesville, ON
N0P 2K0

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
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Manager of Environmental Services

cc. Robert Walton, P.Eng., Director of Public Works
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Fax: 519-421-4711
Website: www.oxfordcounty.ca

June 6, 2016

Chief Sheri Doxtator
Oneida Nation of the Thames
2212 Elm Avenue
R.R. # 2 Southwold, ON
N0L 2G0

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre 1

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![Oxford County growing stronger...together]

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June 6, 2016

Dr. Dean M. Jacobs
cc.Chief Dan Miskokomon, Walpole Island First Nation
Heritage Centre
R.R. # 3 Wallaceburg, ON
N8A 4K9

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Sincerely,

Shahab Shafai

Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services

cc. Robert Walton, P.Eng., Director of Public Works
Stephen Nutt, XCG Consulting Limited

OxfordCounty
growing stronger...together

Public Works
P. O. Box 1614, 21 Reeve Street
Woodstock, Ontario N4S 7Y3
Tel: 519-539-9800 ♦ 800-755-0394
Fax: 519-421-4711
Website: www.oxfordcounty.ca

June 6, 2016

Chief R. Stacey LaForme
Mississaugas of the New Credit
2789 Mississauga Road
R.R. # 6 Hagersville, ON
N0A 1H0

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre 1

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a current rated capacity of 300 m^3/d. The Community of Princeton is currently serviced by private sewage systems.

Oxford County is now undertaking a Class Environmental Assessment (Class EA) to develop a wastewater servicing plan for the Community of Drumbo, to service planned growth in the Community in a cost-effective, environmentally sound and sustainable manner. The Drumbo WWTP Class EA will also consider the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP.

The study is being undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, June 2000, as amended in 2007, 2011 and 2015).

Public input and comments are an important component of the Class EA process. The first of two Public Consultation Centers (PCCs) has been scheduled to receive input and comments on the project from interested members of the public. The PIC will provide background information on the study, as well as information on the Class EA process, the Problem/Opportunity Statement, alternatives identified to date, and next steps and timing. The PCC will be held as follows:

Date: Thursday, June 16, 2016	**Location: Princeton Centennial Hall**
Time: 6:30 p.m. to 8:30 p.m.	**35 Main Street South**
	Princeton, Ontario

The PCC will be a drop-in open house format, with project information posted on display boards, and County staff and their consultants in attendance to provide further explanation, and to receive your comments and answer any questions. There will be no formal presentation at the PCC.

Information on the Drumbo WWTP Class EA is posted on the Oxford County website at: www.oxfordcounty.ca.

If you have any questions or would like further information about the study, please contact Mark Maxwell by phone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca. Thank you for your interest in this study.

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June 6, 2016

Mr. Gary Lipinski
President, Métis Nation of Ontario
500 Old St. Patrick St
Unit D Ottawa, ON
K1N 9G4

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NOTICE OF
PUBLIC CONSULTATION CENTRE No. 2

Oxford County
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Public Works
21 Reeve Street
PO Box 1614
Woodstock ON N4S 7Y3
Tel 519-539-9800 | Fax 519-421-4711

May 1, 2017

Six Nations of the Grand River
Mr. Lonny Bomberry, Director
Land and Resources Department
P.O. Box 5000, 2498 Chiefswood Road
Ohsweken, ON N0A 1M0

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre No. 2

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Manager of Water and Wastewater Services

cc: Mr. Stephen Nutt, XCG Consulting Limited

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Woodstock ON N4S 7Y3
Tel 519-539-9800 | Fax 519-421-4711

May 1, 2017

Six Nations of the Grand River
Mr. Paul General, Eco-Centre Manager
Lands and Resources Department
Six Nations Council
2676 Fourth Line Road, P.O. Box 5000
Ohsweken, ON N0A 1M0

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May 1, 2017

Six Nations of the Grand River
Chief G. Ava Hill
1695 Chiefswood Road
P.O. Box 5000
Ohsweken, ON N0A 1M0

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Woodstock ON N4S 7Y3
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May 1, 2017

Six Nations Haudenosaunee Confederacy Council
Mr. Leroy Hill, Secretary
Haudenosaunee Resource Centre
2634 6th Line, RR # 2
Ohsweken, ON N0A 1M0

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Woodstock ON N4S 7Y3
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May 1, 2017

Munsee-Delaware Nation
Chief Roger Thomas
R.R. # 1
Muncey, ON N0L 1Y0

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Tel 519-539-9800 | Fax 519-421-4711

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Chippewas of the Thames River First Nation
Chief Leslee White-Eye
320 Chippewa Road, R.R. # 1
Muncey, ON N0L 1Y0

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PO Box 1614
Woodstock ON N4S 7Y3
Tel 519-539-9800 | Fax 519-421-4711

May 1, 2017

Delaware Nation
Chief Greg Peters
14760 School House Line
R.R. # 3
Thamesville, ON N0P 2K0

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May 1, 2017

Oneida Nation of the Thames
Chief Sheri Doxtator
2212 Elm Avenue
R.R. # 2
Southwold, ON N0L 2G0

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Dr. Dean M. Jacobs
Heritage Centre
R.R. # 3
Wallaceburg, ON N8A 4K9

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre No. 2

Oxford County is currently undertaking a Class Environmental Assessment (Class EA) to develop a wastewater servicing plan for the Community of Drumbo, to service planned growth in the community in a cost-effective, environmentally sound and sustainable manner. The Drumbo WWTP Class EA has also considered the potential to provide servicing for the Community of Princeton at an expanded or new Drumbo WWTP. The study is being undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, June 2000, as amended in 2007, 2011 and 2015).

Oxford County owns and operates the Drumbo Wastewater Treatment Plant (WWTP), which provides treatment for wastewater generated in the Community of Drumbo. The Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a current rated capacity of 300 m^3/d. The community of Princeton is currently serviced by private sewage systems.

The Drumbo Class EA has considered seven (7) alternative solutions, including the "Do Nothing" alternative. The recommended preferred solution is to service growth in the Community of Drumbo at an expanded Drumbo WWTP. The recommended preferred alternative would provide additional capacity for 20 years of projected growth in Drumbo. The treatment of Princeton wastewater at an expanded Drumbo WWTP is not part of the recommended preferred solution.

Public input and comments are an important component of the Class EA process. The second of three Public Consultation Centres (PCCs) has been scheduled to receive input and comments on the project from interested members of the public. The PCC will provide information on the alternative solutions considered, the evaluation criteria and methodology, the evaluation of the alternative solutions, the recommended preferred solution, and next steps and timing. The PCC will be held as follows:

Date: Tuesday, May 16, 2017
Time: 6:00 p.m. to 8:00 p.m.

Location: Drumbo Agricultural Hall
42 Centre Street
Drumbo, Ontario

The PCC will be a drop-in open house format, with project information posted on display boards, and County staff and their consultants in attendance to provide further explanation, and to receive your comments and questions. Oxford County Public Health will be available to provide information to Princeton residents on septic system care and replacement.

Following this public meeting and confirmation of the preferred alternative solution, the study will proceed to Phase 3 of the Municipal Class EA process to develop and evaluate alternative design concepts for the preferred solution, and identify the preferred design. A third PCC will be held during Phase 3.

Information on the Drumbo WWTP Class EA is posted on the Oxford County website at: www.oxfordcounty.ca.

If you have any questions or would like further information about the study, please contact Mark Maxwell by phone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca. Thank you very much for your interest in the study.

Sincerely,

Deborah Goudreau, P.Eng.
Manager of Water and Wastewater Services

cc: Mr. Stephen Nutt, XCG Consulting Limited

Public Works
21 Reeve Street
PO Box 1614
Woodstock ON N4S 7Y3
Tel 519-539-9800 | Fax 519-421-4711

May 1, 2017

Mississaugas of the New Credit
New Credit
Chief R. Stacey LaForme
2789 Mississauga Road
R.R. # 6
Hagersville, ON N0A 1H0

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
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Deborah Goudreau, P.Eng.
Manager of Water and Wastewater Services

cc: Mr. Stephen Nutt, XCG Consulting Limited

Public Works
21 Reeve Street
PO Box 1614
Woodstock ON N4S 7Y3
Tel 519-539-9800 | Fax 519-421-4711

May 1, 2017

Métis Nation of Ontario
Ms. Margaret Froh
President
500 Old St. Patrick St., Unit D
Ottawa, ON K1N 9G4

RE: Drumbo Wastewater Treatment Plant Class Environmental Assessment with Consideration for Servicing Princeton
Notice of Public Consultation Centre No. 2

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If you have any questions or would like further information about the study, please contact Mark Maxwell by phone at 519-539-9800, ext. 3195 or by e-mail at mmaxwell@oxfordcounty.ca. Thank you very much for your interest in the study.

Sincerely,

Deborah Goudreau, P.Eng.
Manager of Water and Wastewater Services

cc: Mr. Stephen Nutt, XCG Consulting Limited

RESPONSE TO NOTICE OF PCC NO. 2

CHIPPEWAS OF THE THAMES FIRST NATION

May 9, 2017

Mr. Mark Maxwell
Project Engineer
Oxford County
Department of Public Works
21 Reeve Street
P.O. Box 1614
Woodstock, Ontario
N4S 7Y3

Subject: **Drumbo Wastewater Treatment Plan Class Environmental Assessment**

Dear Mr. Maxwell,

We are in receipt of correspondence of the aforementioned project, **May 1, 2017**.

In our screening of your correspondence, we have identified no concerns with your project or the information that you have presented. Based on the proximity of the project, we feel we no longer require regular project updates or notices.

If you have any questions please feel to free to contact me. Thank you for notifying Chippewas of the Thames First Nation.

Sincerely,

Fallon Burch
Chippewa of the Thames
Consultation Coordinator

c: Mr. Stephen Nutt, Consultant Project Manager, XCG Consulting Limited

OxfordCounty
Growing stronger together

Public Notice

NOTICE OF PUBLIC CONSULTATION CENTRE NO. 3
CLASS ENVIRONMENTAL ASSESSMENT
DRUMBO WASTEWATER TREATMENT PLANT

Oxford County is currently undertaking a Class Environmental Assessment (Class EA) to develop a wastewater treatment plan for the Community of Drumbo, to service existing and planned growth in the community in a cost-effective, environmentally sound and sustainable manner. To meet the wastewater treatment requirements of future growth, the Drumbo Wastewater Treatment Plant (WWTP) will need to be expanded beyond its existing rated capacity. The study is being undertaken as a Schedule C project in accordance with the requirements of the *Municipal Class Environmental Assessment* (Municipal Engineers Association, June 2000, as amended in 2007, 2011 and 2015).

Oxford County owns and operates the Drumbo WWTP, which provides treatment for wastewater generated in the community of Drumbo. The Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a current rated capacity of 300 cubic metres per day. Flows to the plant are approaching the Certificate of Approval rated capacity, and community growth is expected to increase flows beyond this capacity in the near future.

Public input and comments are an important component of the Class EA process. This final Public Consultation Centre (PCC) has been scheduled to provide information to the public on the alternative solutions considered, the evaluation criteria and methodology, the evaluation of the alternative solutions, the recommended preferred solution, next steps and timing. The PCC will be held as follows:

Thursday, July 19, 2018
5:00 p.m. — 7:00 p.m.

Drumbo Agricultural Hall
42 Centre Street
Drumbo, Ontario

The PCC will be a drop-in open house format, with project information posted on display boards. County staff and their consultants will also be available to provide further explanation and to receive your comments and questions on the Class EA recommendations.

Information on the Drumbo WWTP Class EA is posted on the Oxford County website. Please contact either of the following project team members if you have any questions or comments about the study, or if you would like to be added to the mailing list to receive future notifications for the study.

Mitchell Heighway, P.Eng.
Project Engineer
Oxford County Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, Ontario N4S 7Y3
519-539-9800 Ext. 3020 | Fax: 519-421-4711
mheighway@oxfordcounty.ca

Mike Newbigging, P.Eng.
Consultant Project Manager
Jacobs
72 Victoria St. South, Suite 300
Kitchener, Ontario N2G 4Y9
519-514-1642 | Fax: 519-579-8986
mike.newbigging@jacobs.com

This notice issued on July 5, 2018

Oxford County
Drumbo WWTP Class EA
Agency Notification - PCC3

No.	Name	Position	Agency
1	Mark Anderson		Grand River Conservation Authority
2	Mark Peterson	Councilor	Township of Blandford-Blenheim
3	David Mayberry	Warden	Oxford County
4	John Brum		Grand River Conservation Authority
5	Peter Heywood		Southwestern Public Health
6	Rodger Mordue	CAO	Township of Blandford-Blenheim
7	Sandra Cooke		Grand River Conservation Authority
8	Woodstock Site		Southwestern Public Health
9	Dr. Joyce Lock	Medical Officer of Health	Southwestern Public Health
10	Gord Hough	Director of Community Planning	Oxford County
11	Marion Wearn	Mayor	Township of Blandford-Blenheim
12	Rodger Mordue	CAO/Clerk	Township of Blandford-Blenheim
13	Jim Borton	Director of Public Works	Township of Blandford-Blenheim
14	John Scherer	Chief Building Official	Township of Blandford-Blenheim
15		Director of Public Works	County of Brant
16		Resource Planner	Grand River Conservation Authority
17		Senior Water Resources Engineer	Grand River Conservation Authority
18		Chief Administrative Officer	Grand River Conservation Authority
19	Land Use Regulations Officer	Hydrology and Regulatory Services	Upper Thames River Conservation Authority
20	Regional Subject Expert for Ontario	Consultation and Accommodation Unit	Aboriginal Affairs and Northern Development Canada
21	Senior Policy Advisor	Aboriginal and Ministry Relationships Branch	Ministry of Aboriginal Affairs
22	Correspondence Unit	Aboriginal and Ministry Relationships Branch	Ministry of Aboriginal Affairs
23	Manager, Consultation Unit	Aboriginal Relations and Ministry Partnerships	Ministry of Aboriginal Affairs
24	Environmental Planner	Regional EA Coordinator	Ministry of the Environment, Conservation, and Parks
25	Rural Planner		Ministry of Argriculture, Food, and Rural Affairs
26	Heritage Planner	Programs and Services Branch	Ministry of Tourism, Culture, and Sport
27	Dwayne Evans	Planner	Ministry of Municipal Affairs and Housing Municipal Services Office - Western
28	Craig Cooper	Planner	Ministry of Municipal Affairs and Housing Municipal Services Office - Western
29	District Planner	Aylmer District	Ministry of Natural Resources and Forestry
30	SAR Biologist		Ministry of Natural Resources and Forestry
31	David Marriott	District Planner	Ministry of Natural Resources and Forestry
32	Mike Stone	District Planner	Ministry of Natural Resources and Forestry
33	Environmental Coordinator		Infrastructure Ontario
34	Manager, Consultation Unit	Environmental Services and Approvals	Hydro One Networks Inc.
35	Construction Project Manager		Union Gas Limited
36	Director of Operations		Union Gas Limited
37	Contracts Supervisor		Canadian National Railway Company
38	Manager, Public Works		Canadian National Railway Company
39	Engineering Division		Canadian National Railway Company
40	Supervisor of Planning and Design		Enbridge Gas Distribution
41	Planner		Rogers Cable
42	Chris Seasons		Bell Canada
43	Silvio Korasanfucci		Bell Canada
44	Director of Operations	Land and resources Department	Six Nations of the Grand River
45	Eco-Centre Manager	Land and resources Department	Six Nations of the Grand River
46	Chief G. Eva Hill		Six Nations of the Grand River
47	Secretary	Haudenosaunee Resource Centre	Six Nations Handenosaunee Confederacy Council
48	Chief Roger Thomas		Munsee-Delaware Nation
49	Chief Leslee White-Eye		Chippewas of the Thames River First Nation
50	Chief Greg Peters		Delaware Nation
51	Chief Sheri Doxator		Oneida Nation of the Thames
52	Chief Dan Misokomon		Walpole Island First Nation
53	Chief R. Stacey LaForme		Mississaugas of the New Credit
54	President		Metis Nation of Ontario
55	Margaret Fisher		Frank Cowan Company
56	Deb MacDonald		Princeton Centennial Hall
57	Guy Bellehumeur		GB Architects Inc. Stratford
58	Russ and Judy King		Woodstock
59	Alex Donn		Princeton
60	Debbie Randall		Princeton
61	Murray Lipton	Owner's Representative	Taylor Development
62	Craig Van Wees		Woodstock
63	Bev Beaton		Princeton
64	Sheryl	Last name not provided	Princeton
65	John Liett		Drumbo
66	Anna Leach		Drumbo
67	Jason Park		Drumbo
68	Annie Dupuis		Drumbo
69	Joseph Singer		Drumbo
70	Garnet Harris		Drumbo
71	Kimberley Dedman		Drumbo
72	Lawrence Etherington		Drumbo

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21 Reeve Street, PO Box 1614
Woodstock, ON N4S 7Y3
519.539.9800 I 1.800.755.0394
oxfordcounty.ca

July 5, 2018

Re: Drumbo Wastewater Treatment Plant Upgrade Class Environmental Assessment Invitation to Public Consultation Centre

The Drumbo Wastewater Treatment Plant (WWTP) upgrade Class Environmental Assessment (Class EA) is nearing completion. As such, one more Public Consultation Centre (PCC) will be held to present the work completed to date, including alternative solutions identified for expanding the WWTP, an evaluation of these alternative solutions, and the selection of the preferred upgrade alternative. County staff and members of the Consulting Team will be available to discuss the project, answer questions, and receive comments on the proposed Class EA recommendations.

Feedback received at the public meeting will be taken into consideration and incorporated into the final report for this Class EA.

The PCC has been scheduled for July 19th at 5pm at the Drumbo Agricultural Hall at 42 Centre Street in Drumbo. Please find the PCC notice attached to this letter.

If you have questions about the project in advance of the meeting, please contact Mitchell Heighway at 519-539-9800 x3020 or by email at mheighway@oxfordcounty.ca.

Sincerely,

D Goudreau

Deborah Goudreau, P.Eng.
Manager of Water and Wastewater Services

cc: David Simpson, County of Oxford
Mike Newbigging, Jacobs

Drumbo Wastewater Treatment Plant Expansion Class Environmental Assessment Study

Public Consultation Centre No. 3

July 19, 2018

www.jacobs.com | worldwide

Welcome

Drumbo Wastewater Treatment Plant Expansion Class Environmental Assessment Study

Public Consultation Centre #3
July 19, 5:00 pm to 7:00 pm

- ✓ Your feedback is important to us. Please sign the attendance sheet and fill out the Comment Sheet provided.
- ✓ Oxford County staff and consultants from Jacobs are available to answer your questions.

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Drumbo Wastewater Treatment Plant

Study Purpose

Oxford County has undertaken a Schedule C Class Environmental Assessment (EA) to develop a wastewater treatment plan for the Community of Drumbo (Drumbo) to service existing and planned growth in the community. The Drumbo Wastewater Treatment Plant (WWTP) is nearing capacity under the existing Environmental Compliance Approval.

Problem Statement

As a fully-serviced village, Drumbo is a candidate for further development within the Township of Blandford-Blenheim. To accommodate this growth, the Drumbo WWTP requires additional capacity. The purpose of the current study is to develop a wastewater treatment plan to service existing and planned growth in the community in a cost effective, environmentally sound, and sustainable manner for the 20 planning year horizon.

Project Objectives

Develop a wastewater treatment plan for the Community of Drumbo that is environmentally responsible, socially acceptable, and economically sustainable to accommodate existing and future planned development within the community to at least 2036. This project was conducted in accordance with the requirements for a Schedule C project as described in the Municipal Class EA document (MEA, 2000, as amended in 2007, 2011, and 2015). Phase 1 and 2 were completed in 2016.

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Project Location

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Public Consultation

PCC #1

PCC #1 was held on June 16, 2016 during Phase 1 of the Municipal Class Environmental Assessment (MCEA). The purpose was to providing the public with background information about the study, present the problem statement, and outline the alternatives that would be evaluated in Phase 2.

PCC #2

PCC #2 was held on May 16, 2017 during Phase 2 of the MCEA. This consultation presented the alternatives that were evaluated in Phase 2 and delineated the methodology by which the recommended alternative was selected. The recommended alternative (Alternative 2) was presented.

PCC #3

The purpose of this PCC is to:

- Provide background information about the study
- Present the identified preferred alternative
- Present the recommended conceptual design to be used to implement the preferred alternative
- Outline next steps and schedule

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Municipal Class Environmental Assessment Process

The study was conducted in accordance with the requirements for a Schedule C project as described in the Municipal Engineers Association Municipal Class EA document (2000, as amended in 2007, 2011, and 2015).

We are Here

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Identify Problem or Opportunity	Develop and Evaluate Alternative Solutions and Identify Preferred Solution	Develop and Evaluate Alternative Design Concepts for Preferred Solution and Identify Preferred Design	Environmental Study Report (ESR)	Implementation (Design and Construction)

Class EA Process for this Study

PCC No. 1	PCC No. 2	PCC No. 3
June 2016	June 2017	July 2018

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Background

History of the Drumbo WWTP Class EA

- Class EA process began in 2012
- Treatment facility nearing capacity and development is restricted
- Phases 1 and 2 completed in 2017
  - Recommended expanding the WWTP on the same site to service growth for Drumbo only
  - Community questioned ability of the proposed works to accommodate future growth

Since Spring 2017

- Further review of growth forecast from a Township-wide perspective
- In-depth evaluation of treatment technology design alternatives was completed
- Cost estimates were reviewed and updated, where applicable
- In June 2018, the recommended alternative was presented to, and accepted by, Oxford County Council

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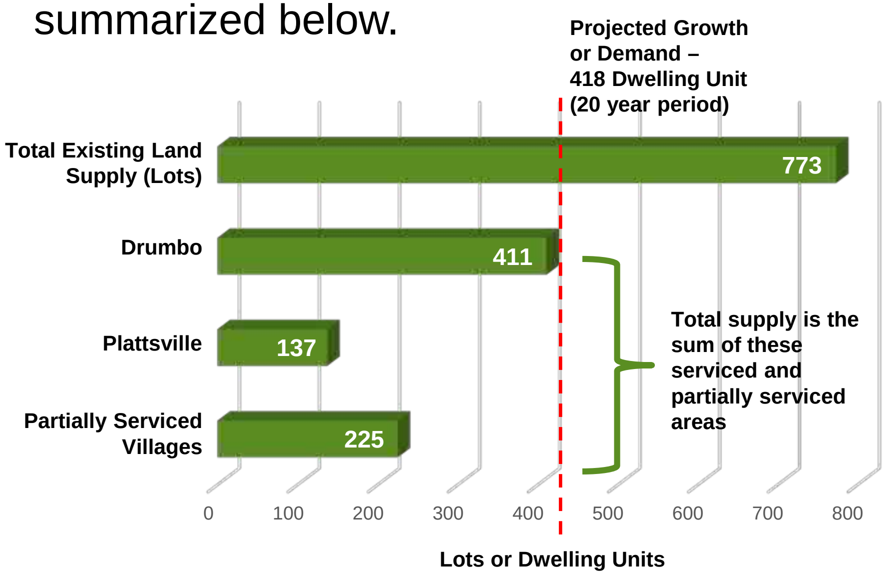
Township Growth Forecasts

- The County's Official Plan directs the majority of growth to fully serviced Villages (e.g., Drumbo and Plattsville)

- The current Township demand and supply is summarized below.



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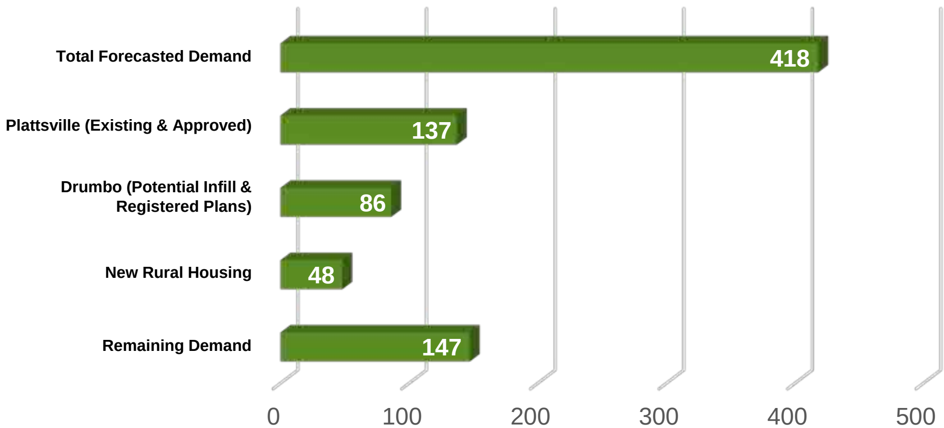
Township Growth Projections

- Of the 418 dwelling units forecasted, there are existing approvals for development in Plattsville (137 units/lots), Drumbo (86 units/lots), and additional rural housing (48 units/lots). Therefore, there are 147 units/lots remaining that can be accommodated in Drumbo, Princeton and Bright.



- Available land in Drumbo may be more than sufficient to accommodate the remainder of the Township's forecasted growth; however, it is currently constrained due to servicing capacity limitations. An increase from the previous WWTP design flow of 322 m^3/d to 450 m^3/d will allow Drumbo to handle additional development (i.e., 233 total additional lots).

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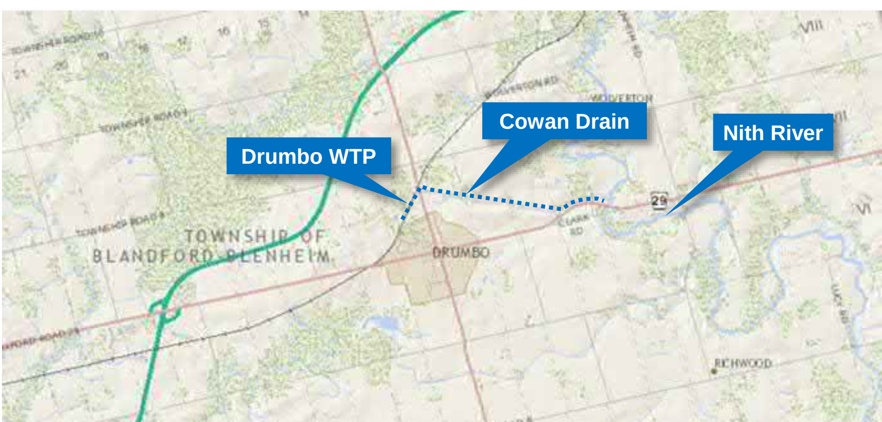
Drumbo WWTP Discharge Receiver

- Drumbo WWTP discharges to the Cowan Drain
- Discharge flows 3.55 km from WWTP to the Nith River
- Drumbo WWTP is approximately 7.5% of total flow in Cowan Drain on average
- Effluent loadings to Cowan Drain may be potentially limited; the EA found that increased design flows up to 450 m^3/day will result in significantly lower effluent limits that cannot be achieved with the SBR/Filter technology currently in use.



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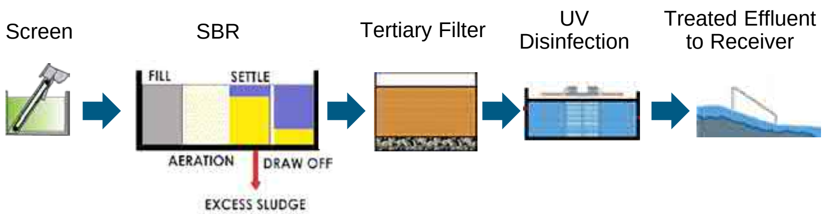
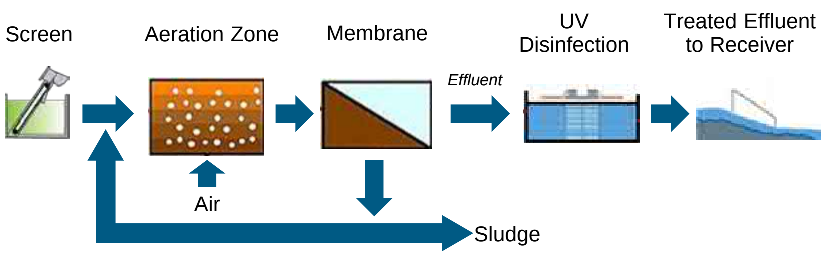
Technology Review/Evaluation

- Based on the servicing needs, two technologies were considered.
  - **Sequencing Batch Reactor (SBR) with Tertiary Filter (current WWTP technology)**



  - **Membrane Bioreactor (MBR)**



- Comparison:
  - Capital costs similar
  - Operating costs higher for MBR (includes membrane replacement and electricity costs)
  - SBR/Filter alternative limited by effluent phosphorus criteria

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Drumbo Recommended Design Alternative

- **MBR Plant**
  - Prefabricated, modular unit(s)
  - Retrofitted into existing plant, utilize existing tanks
  - Rated for 322 m^3/d initially
  - Expandable to approximately 450 m^3/d to meet growth

- **Capital Cost Estimates**
  - $2.6 million for 322 m^3/d
  - $3.7 million for 450 m^3/d

- **Operating Cost**
  - $350,000 annually or an additional $15 to $20 per month per customer compared to the SBR/Filter WWTP

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Evaluation

Alternative	Technical	Capacity Requirements	Environment	Social	Financial
SBR + Tertiary Filter	Technically viable ○	Capacity limitations for growth ◔	Meets current effluent criteria ◑	Minor impacts to community and site ◔	Most economical ○
MBR	Technically viable ○	Addresses range of growth expected ○	Provides higher quality effluent ○	Minor impacts to site ○	Economical ◑

● ◕ ◑ ◔ ○

Least Preferred → Most Preferred

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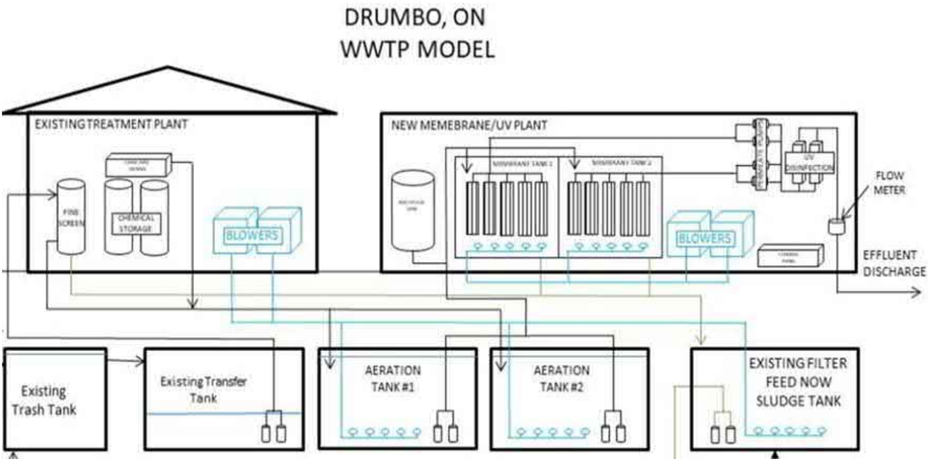
Drumbo WWTP Recommended Design Alternative



Potential Membrane Bioreactor Retrofit of Existing Plant

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Thank you for your interest in the Drumbo WWTP EA

Next Steps:

- Complete the Environmental Study Report and publish for public and agency comment (this will be for a 30-day review period) – Summer 2018
- Implement first phase of expansion of Drumbo WWTP (Design and Construction)

Public and agency consultation is a key component of the Class EA process, and we value your input. Please fill out the Comment Sheet provided.

If you have any questions or concerns about this study, please feel free to contact any member of the Project team, including:

Mitchell Heighway, P.Eng.
Project Engineer
Oxford County, Public Works
21 Reeve St.
PO Box 1614
Woodstock ON N4S 7Y3

519-539-9800 x3020
mheighway@oxfordcounty.ca

Mike Newbigging, P.Eng.
Project Manager
Jacobs
72 Victoria St. South
Suite 300
Kitchener ON N2G 4Y9

519-514-1642
mike.newbigging@jacobs.com

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COMMENT SHEET

Drumbo Wastewater Treatment Plant Expansion
Class Environmental Assessment Study
Public Consultation Centre No. 3
Thursday, July 19, 2018

Thank you for your interest in the **Drumbo Wastewater Treatment Plant (WWTP) Expansion Class Environmental Assessment Study**. Please take the time to complete this comment sheet. We are very interested in receiving comments and suggestions from residents and stakeholders. Please print legibly.

Name: ______________________________

Address: ______________________ Street ________ Apt. No.

______________ City ______________ Province ______________ Postal Code

Phone: ______________________ **E-mail:** ______________________

I would like to be placed on a mailing list to receive future notifications regarding this project.
Please indicate Yes or No. ☐ Yes ☐ No

Please feel free to provide additional comments on a separate sheet. Leave your comments on your departure or mail, fax or e-mail them to either of the following by August 17, 2018:

Mr. Mitchell Heighway, P. Eng.
Project Engineer
Oxford County, Public Works
21 Reeve Street, P.O. Box 1614
Woodstock, ON N4S 7Y3

Phone: 519-539-9800, ext. 3020
E-mail: mheighway@oxfordcounty.ca

or

Mr. Mike Newbigging, P. Eng.
Project Manager
Jacobs
72 Victoria St. South, Suite 300
Kitchener, ON N2G 4Y9

Phone: 519-514-1642
Email: mike.newbigging@jacobs.com

Please provide any comments on the recommended technology to expand the existing Drumbo WWTP on the existing site to service growth in the Community of Drumbo.

____
____
____
____
____
____

Please provide any other comments.

The collection of personal information on this form is necessary for the proper administration of a lawfully authorized activity under the Environmental Assessment Act and will be used for the purposes of proving compliance with the consultation and public notice requirements under the Act. For more information about this collection, please contact Mitchell Heighway, P. Eng. at the County of Oxford, 21 Reeve Street, P.O. Box 1614, Woodstock, ON, N4S 7Y3 or (519) 539-9800 (ext. 3020).

Drumbo Wastewater Treatment Plant
Class Environmental Assessment

PUBLIC CONSULTATION CENTRE NO. 3
Drumbo Agricultural Hall
42 Centre Street
Drumbo, Ontario
Thursday, July 19, 2018
5:00 p.m. to 7:00 p.m.

ATTENDANCE SHEET

Thank you for your interest in this project. Please print legibly.

NAME	ADDRESS	PHONE NUMBER	EMAIL ADDRESS
Marian Wearn	[redacted]	[redacted]	[redacted]
Deb Gondrea	[redacted]		
MARK PETERSON	[redacted]	[redacted]	[redacted]
JUSTIN READ	[redacted]	[redacted]	[redacted]
Larry Etherington	[redacted]	[redacted]	[redacted]
Bev Beaton	[redacted]	[redacted]	[redacted]
JOHN LIBBRECHT	[redacted]	[redacted]	
Ron Roach	[redacted]		

Mitchell Heighway, P.Eng.
Public Works
21 Reeve Street, PO Box 1614
Woodstock, ON N4S 7Y3
mheighway@oxfordcounty.ca

December 18, 2018

Dear Mr. Heighway,

We are the Mississaugas of the New Credit First Nation (MNCFN), the descendants of the Mississaugas of the River Credit. Our traditional territory extends from the Rouge River Valley in the east, across to the headwaters of the Thames River, down to Long Point on Lake Erie, and back along the shores of Lake Erie, the Niagara River, and Lake Ontario to the Rouge River Valley. It encompasses present-day London, Hamilton, and Toronto, as well as our communal lands. Our traditional territory has defined and sustained us as a First Nation for countless generations, and must continue to do so for all our generations to come.

Thank you for your notification on *the Completion Notice for Drumbo Wastewater Treatment Plant Class Environmental Assessment* dated *November 1, 2018*. The Mississaugas of the New Credit First Nation (MNCFN) has various treaty rights across its traditional territory, including the area contemplated by your project. For further information, please see our website, http://www.newcreditfirstnation.com/. MNCFN continues to exercise treaty rights which include, but are not limited to, rights to harvest, fish, trap and gather species of plants, animals and insects for any purpose including food, social, ceremonial, trade and exchange purposes. The MNCFN also has the right to use the water and resources from the rivers, creeks and lands across the MCNFN traditional territory.

At this time, MNCFN *does not* have a high level of concern regarding the proposed project and therefore, by way of this letter, approves the continuation of this project. However, MNCFN requests that you continue to notify us about the status of the project. **In addition, we**

respectfully ask you to immediately notify us if there are any changes to the project as they may impact MNCFN's interests and that you please provide us with a copy of all associated environmental and archaeology reports. This includes, but is not limited to changes related to the scope of work and expected archaeological and environmental impacts.

Additionally, MNCFN employs Field Liaison Representatives ("FLRs") to act as official representatives of the community and who are answerable to MNCFN Chief and Council through the Department of Consultation and Accommodation. The FLRs' mandate is to ensure that MNCFN's perspectives and priorities are considered in the field and to enable MNCFN to provide timely, relevant, and meaningful comment on the Project. Therefore, **it is MNCFN policy that FLRs are on location whenever any fieldwork for environmental and/or archaeological assessments are undertaken.** It is expected that the proponent will cover the costs of this FLR participation in the fieldwork. Please also provide the contact information of the person, or consultant, in charge of organizing this work so they may facilitate the participation of the MNCFN FLRs.

Nothing in this letter shall be construed as to affect the Aboriginal or Treaty rights and hence shall not limit any consultation and accommodation owed to MNCFN by the Crown or any proponent, as recognized by section 35 of the Constitution Act, 1982.

MNCFN reserves the right in relation to any development project or decision, to decide whether it supports a project and to: comment to regulators, participate in regulatory processes and hearings, seek intervener funding or status, or to challenge and seek remedies through the courts.

MNCFN expects all proponents to act according to the following best practices:

- Engage early in the planning process, before decisions are made
- Provide information in meaningful and understandable formats.
- Convey willingness to transparently describe the project and consider any MNCFN concerns.
- Recognize the significance of cultural activities and traditional practices of the MNCFN
- Demonstrate a respect for MNCFN knowledge and uses of land and resources.
- Understand the importance of youth and elders in First Nation communities.
- Act with honour, openness, transparency and respect.
- Be prepared to listen and allow time for meaningful discussion.

Sincerely,

Fawn D. Sault
Consultation Manager
MNCFN Department of Consultation and Accommodation
cc – Mark LaForme; Director, Department of Consultation and Accommodation

72 Victoria Street South, Suite 300
Kitchener, ON N2G 4Y9
Canada
www.jacobs.com
T +1.519.514.1642
www.jacobs.com

TELEPHONE CONVERSATION RECORD

Date: Jan 8/19 Time: 3:15pm Phone No. 905-768-4260
Project No. 700053CH

To: Fawn D. Sault (FDS), Mississaugas of the New Credit First Nation/Department of Consultation & Accommodation

From: Mike Newbigging, Jacobs

Subject Drumbo Wastewater Servicing ESR

Details

Indicated calling concerning the Drumbo WWTP Wastewater Servicing Class EA project and ESR. Indicated could provide some background on the project, FDS indicated she would just ask a few questions, these being:

1. Is this an expansion of the plant – response: Yes, an expansion to address future growth in the community
2. Is this a Class EA project – response: Yes, it is and followed the Class EA process, ESR is complete
3. Is there archeological/environmental work required – response: Not expected, footprint of the existing WWTP or fenced.disturbed area is not being expanded, and hence there are no anticipated impacts to archaeological resources.

FDS asked that link to the ESR be provided. I asked if we should also contact Chief Stacey LaForme and FDS said no that the new Department of Consultation and Accommodation was the only department and person to contact.

Followup – email sent to FDS at 7:45 am Wednesday January 9, 2019 acknowledging earlier letter from Mississaugas of the New Credit to the County on December 19, 2018. Link to Oxford County website for ESR also provided.

72 Victoria Street South, Suite 300
Kitchener, ON N2G 4Y9
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www.jacobs.com

TELEPHONE CONVERSATION RECORD

Date: Jan 8/19 Time: 3:30 pm Phone No. 519-445-4222
Project No. 700053CH

To: Hohahes Leroy Hill, Haudenosauee Confederacy Chiefs Council, subsequently to Todd William (TW)

From: Mike Newbigging, Jacobs

Subject Drumbo Wastewater Servicing ESR

Details

Asked for Leroy Hill, indicated not at this number, was asked the reason for the call, indicated Class EA project, was told to contact Todd Williams (TW), not available today. Indicated would try tomorrow.

Called January 9th, 2019, got answering machine, didn't leave further message. Called 9:15am January 10 2019 and spoke with Todd Williams. Discussed project and TW requested link to Environmental Study Report (ESR) be provided to email address provided which was HDI2@bellnet.ca. Email was subsequently sent to this website with link to Oxford County website with ESR, email sent 9:52 am January 10, 2019.

Oxford County
Growing stronger together

Public Notice

NOTICE OF COMPLETION

CLASS ENVIRONMENTAL ASSESSMENT (CLASS EA STUDY)
DRUMBO WASTEWATER TREATMENT PLANT CAPACITY EXPANSION

Oxford County has completed a Class Environmental Assessment (Class EA Study) to consider alternatives for the upgrade and capacity expansion of the Drumbo Wastewater Treatment Plant (WWTP) which provides treatment and servicing of wastewater generated in the Village of Drumbo.

The Drumbo WWTP, constructed in 1993, is a Sequencing Batch Reactor (SBR) with tertiary filtration and UV disinfection with a current rated capacity of 300 cubic metres per day. To meet the wastewater treatment requirements of future growth, the Drumbo WWTP will need to be expanded beyond its existing rated capacity.

The purpose of the Class EA Study was to determine the most cost-effective, environmentally sound and socially sustainable approach to upgrade and expand the Drumbo WWTP in order to service growth to the year 2038. The Study was undertaken as a Schedule C project in accordance with the requirements of the Municipal Class Environmental Assessment (Municipal Engineers Association, June 2000, as amended in 2007, 2011 and 2015).

An Environmental Study Report (ESR) has been completed that documents the Class Environmental Assessment process. The ESR was accepted by Oxford County Council on June 13, 2018, and will be available for public review for 45 days starting on Thursday November 6, 2018 and ending on Friday December 21, 2018 at the following locations:

Oxford County
Administration Building
Customer Service
21 Reeve St
Woodstock ON N4S 3G1

The Township of Blandford-Blenheim
47 Wilmot St. South
Drumbo ON N0J 1G0

Oxford County Library
Princeton Branch
25 Main St.
Princeton ON N0J 1V0

The ESR is also available for review on the Oxford County website at: www.oxfordcounty.ca

Written comments on the ESR should be provided within 45 calendar days of the date of first issue of this notice and should be addressed to:

Mitchell Heighway, P.Eng., Project Engineer
Oxford County Public Works
21 Reeve St, P.O. Box 1614, Woodstock, ON N4S 7Y3
Fax: 519-421-4711, email: mheighway@oxfordcounty.ca

If concerns regarding this Class EA Study cannot be resolved with Oxford County, a person may request the Minister of Environment, Conservation and Parks to issue a Part II Order for an individual environmental assessment. Requests for a Part II Order must be received by the Minister at the address noted below by December 17, 2018. More information about Part II Orders as well as the Part II Order form and submission instructions can be found online here: https://www.ontario.ca/page/class-environmental-assessments-part-ii-order

If there is no request for a Part II Order, implementation of the preferred solution for Drumbo Wastewater Servicing as presented in the ESR will proceed.

This Notice first issued November 6, 2018.

Attachments: 0478E.pdf; 0500E.pdf

From: Mitchell Heighway <mheighway@oxfordcounty.ca>
Sent: Wednesday, January 9, 2019 4:34 PM
To: 'Livingstone, Kimberly (MTCS)' <Kimberly.Livingstone@ontario.ca>
Cc: 'Kirzati, Katherine (MTCS)' <Katherine.Kirzati@ontario.ca>; 'Eckert, Anneleis (MECP)' <Anneleis.Eckert@ontario.ca>; 'Barboza, Karla (MTCS)' <Karla.Barboza@ontario.ca>
Subject: RE: MTCS File No: 000040- Drumbo Wastewater Treatment Plant Capacity Expansion EA

Hi Kimberly,

Thank you for your response to Oxford County's Notice of Completion for the Drumbo WWTP Capacity Expansion EA. Please find attached to this email completed checklists as per your request. Per form 0478E it looks like an archaeological assessment may be required since the site is within 300 metres of a body of water. Can you please confirm if an archaeological assessment is required for this site?

Thank you,

Mitchell Heighway, P.Eng.
Project Engineer

From: Livingstone, Kimberly (MTCS) [mailto:Kimberly.Livingstone@ontario.ca]
Sent: December-17-18 2:08 PM
To: Mitchell Heighway
Cc: Kirzati, Katherine (MTCS); Eckert, Anneleis (MECP); Barboza, Karla (MTCS)
Subject: MTCS File No: 000040- Drumbo Wastewater Treatment Plant Capacity Expansion EA

Hello Mr. Heighway,

MTCS has received the Final Notice of Completion for the Drumbo Wastewater Treatment Plant Capacity Expansion EA and has reviewed the Drumbo Wastewater Servicing Environmental Study Report dated May 8, 2018 and revised on September 19, 2018.
MTCS has the following concerns:

Although it has been noted in the report that the preferred option to expand the wastewater treatment plant will not have any impacts to cultural heritage resources or archaeological resources, there is no description of the property and whether it has cultural heritage value or interest. As such, MTCS requires the following checklists to be completed in order to confirm these statements in the ESR:

Archaeological Resources
This EA project may impact archaeological resources and should be screened using the MTCS *Criteria for Evaluating Archaeological Potential* to determine if an archaeological assessment is needed.

Built Heritage and Cultural Heritage Landscapes
The MTCS *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* should be completed to help determine whether this EA project may impact cultural heritage resources.

Please complete the checklists and email them to Katherine and myself for review.
Should you have any questions or comments, please contact Katherine or myself.

Regards,

Kimberly Livingstone | Heritage Planner (A)
Culture Division | Programs and Services Branch | Heritage Planning Unit
Ministry of Tourism, Culture and Sport
401 Bay Street
17th Floor, Suite 1700
Toronto, ON M7A 0A7
416.314.7133
kimberly.livingstone@ontario.ca

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Archaeological Potential

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area may contain archaeological resources i.e., have archaeological potential
- it includes all areas that may be impacted by project activities, including – but not limited to:
  - the main project area
  - temporary storage
  - staging and working areas
  - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Archaeological assessment

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a licensed consultant archaeologist (see page 4 for definitions) to undertake an archaeological assessment.

The assessment will help you:

- identify, evaluate and protect archaeological resources on your property or project area
- reduce potential delays and risks to your project

Note: By law, archaeological assessments **must** be done by a licensed consultant archaeologist. Only a licensed archaeologist can assess – or alter – an archaeological site.

What to do if you:

- **find an archaeological resource**

  If you find something you think may be of archaeological value during project work, you must – by law – stop all activities immediately and contact a licensed consultant archaeologist

  The archaeologist will carry out the fieldwork in compliance with the *Ontario Heritage Act* [s.48(1)].
- **unearth a burial site**

  If you find a burial site containing human remains, you must immediately notify the appropriate authorities (i.e., police, coroner's office, and/or Registrar of Cemeteries) and comply with the *Funeral, Burial and Cremation Services Act*.

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – separate checklist
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages when completing this form.

Project or Property Name
Drumbo Wastewater Treatment Plant Capacity Expansion Class Environmental Assessment

Project or Property Location (upper and lower or single tier municipality)
Blandford-Blenheim, Oxford County

Proponent Name
Oxford County

Proponent Contact Information
mheighway@oxfordcounty.ca, 519-539-9800 x3020

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☐	☑

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

	Yes	No
2. Has an archaeological assessment been prepared for the property (or project area) and been accepted by MTCS?	☐	☑

If Yes, do **not** complete the rest of the checklist. You are expected to follow the recommendations in the archaeological assessment report(s).

The proponent, property owner and/or approval authority will:

- summarize the previous assessment
- add this checklist to the project file, with the appropriate documents that demonstrate an archaeological assessment was undertaken e.g., MTCS letter stating acceptance of archaeological assessment report

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g., environmental assessment document
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Are there known archaeological sites on or within 300 metres of the property (or the project area)?	☐	☑
4. Is there Aboriginal or local knowledge of archaeological sites on or within 300 metres of the property (or project area)?	☐	☑
5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 300 metres of the property (or project area)?	☐	☑
6. Is there a known burial site or cemetery on the property or adjacent to the property (or project area)?	☐	☑
7. Has the property (or project area) been recognized for its cultural heritage value?	☐	☑

If Yes to any of the above questions (3 to 7), do **not** complete the checklist. Instead, you need to hire a licensed consultant archaeologist to undertake an archaeological assessment of your property or project area.

If No, continue to question 8.

	Yes	No
8. Has the entire property (or project area) been subjected to recent, extensive and intensive disturbance?	☐	☑

If Yes to the preceding question, do **not** complete the checklist. Instead, please keep and maintain a summary of documentation that provides evidence of the recent disturbance.

An archaeological assessment is not required.

If No, continue to question 9.

	Yes	No
9. Are there present or past water sources within 300 metres of the property (or project area)?	✓	☐

If Yes, an archaeological assessment is required.

If No, continue to question 10.

	Yes	No
10. Is there evidence of two or more of the following on the property (or project area)?	☐	✓

- elevated topography
- pockets of well-drained sandy soil
- distinctive land formations
- resource extraction areas
- early historic settlement
- early historic transportation routes

If Yes, an archaeological assessment is required.

If No, there is low potential for archaeological resources at the property (or project area).

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g., under the *Environmental Assessment Act, Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
  - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

In this context, the following definitions apply:

- **consultant archaeologist** means, as defined in Ontario regulation as an archaeologist who enters into an agreement with a client to carry out or supervise archaeological fieldwork on behalf of the client, produce reports for or on behalf of the client and provide technical advice to the client. In Ontario, these people also are required to hold a valid professional archaeological licence issued by the Ministry of Tourism, Culture and Sport.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may be already in place for identifying archaeological potential, including:

- one prepared and adopted by the municipality e.g., archaeological management plan
- an environmental assessment process e.g., screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s. B.2.]

2. Has an archaeological assessment been prepared for the property (or project area) and been accepted by MTCS?

Respond 'yes' to this question, if all of the following are true:

- an archaeological assessment report has been prepared and is in compliance with MTCS requirements
  - a letter has been sent by MTCS to the licensed archaeologist confirming that MTCS has added the report to the Ontario Public Register of Archaeological Reports (Register)
- the report states that there are no concerns regarding impacts to archaeological sites

Otherwise, if an assessment has been completed and deemed compliant by the MTCS, and the ministry recommends further archaeological assessment work, this work will need to be completed.

For more information about archaeological assessments, contact:

- approval authority
- proponent
- consultant archaeologist
- Ministry of Tourism, Culture and Sport at archaeology@ontario.ca

3. Are there known archaeological sites on or within 300 metres of the property (or project area)?

MTCS maintains a database of archaeological sites reported to the ministry.

For more information, contact MTCS Archaeological Data Coordinator at archaeology@ontario.ca.

4. Is there Aboriginal or local knowledge of archaeological sites on or within 300 metres of the property?

Check with:

- Aboriginal communities in your area
- local municipal staff

They may have information about archaeological sites that are not included in MTCS' database.

Other sources of local knowledge may include:

- property owner
- local heritage organizations and historical societies
- local museums
- municipal heritage committee
- published local histories

5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 300 metres of the property (or property area)?

Check with:

- Aboriginal communities in your area
- local municipal staff

Other sources of local knowledge may include:

- property owner
- local heritage organizations and historical societies
- local museums
- municipal heritage committee
- published local histories

6. Is there a known burial site or cemetery on the property or adjacent to the property (or project area)?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulation Unit, Ontario Ministry of Consumer Services – for database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, 'adjacent' means 'contiguous', or as otherwise defined in a municipal official plan.

7. Has the property (or project area) been recognized for its cultural heritage value?

There is a strong chance there may be archaeological resources on your property (or immediate area) if it has been listed, designated or otherwise identified as being of cultural heritage value by:

- your municipality
- Ontario government
- Canadian government

This includes a property that is:

- designated under *Ontario Heritage Act* (the OHA), including:
  - individual designation (Part IV)
  - part of a heritage conservation district (Part V)
  - an archaeological site (Part VI)
- subject to:
  - an agreement, covenant or easement entered into under the OHA (Parts II or IV)
  - a notice of intention to designate (Part IV)
  - a heritage conservation district study area by-law (Part V) of the OHA
- listed on:
  - a municipal register or inventory of heritage properties
  - Ontario government's list of provincial heritage properties
  - Federal government's list of federal heritage buildings
- part of a:
  - National Historic Site
  - UNESCO World Heritage Site
- designated under:
  - *Heritage Railway Station Protection Act*
  - *Heritage Lighthouse Protection Act*
- subject of a municipal, provincial or federal commemorative or interpretive plaque.

To determine if your property or project area is covered by any of the above, see:

- Part A of the MTCS Criteria for Evaluating Potential for Built Heritage and Cultural Heritage Landscapes

Part VI – Archaeological Sites

Includes five sites designated by the Minister under Regulation 875 of the Revised Regulation of Ontario, 1990 (Archaeological Sites) and 3 marine archaeological sites prescribed under Ontario Regulation 11/06.

For more information, check Regulation 875 and Ontario Regulation 11/06.

8. Has the entire property (or project area) been subjected to recent extensive and intensive ground disturbance?

Recent: after-1960

Extensive: over all or most of the area

Intensive: thorough or complete disturbance

Examples of ground disturbance include:

- quarrying
- major landscaping – involving grading below topsoil
- building footprints and associated construction area
    - where the building has deep foundations or a basement
- infrastructure development such as:
    - sewer lines
    - gas lines
    - underground hydro lines
    - roads
    - any associated trenches, ditches, interchanges. **Note**: this applies only to the excavated part of the right-of-way; the remainder of the right-of-way or corridor may not have been impacted.

A ground disturbance does **not** include:

- agricultural cultivation
- gardening
- landscaping

Site visits

You can typically get this information from a site visit. In that case, please document your visit in the process (e.g., report) with:

- photographs
- maps
- detailed descriptions

If a disturbance isn't clear from a site visit or other research, you need to hire a licensed consultant archaeologist to undertake an archaeological assessment.

9. Are there present or past water bodies within 300 metres of the property (or project area)?

Water bodies are associated with past human occupations and use of the land. About 80-90% of archaeological sites are found within 300 metres of water bodies.

Present

- Water bodies:
    - primary - lakes, rivers, streams, creeks
    - secondary - springs, marshes, swamps and intermittent streams and creeks
- accessible or inaccessible shoreline, for example:
    - high bluffs
    - swamps
    - marsh fields by the edge of a lake
    - sandbars stretching into marsh

Water bodies not included:

- man-made water bodies, for example:
  - temporary channels for surface drainage
  - rock chutes and spillways
  - temporarily ponded areas that are normally farmed
  - dugout ponds
- artificial bodies of water intended for storage, treatment or recirculation of:
  - runoff from farm animal yards
  - manure storage facilities
  - sites and outdoor confinement areas

Past

Features indicating past water bodies:

- raised sand or gravel beach ridges – can indicate glacial lake shorelines
- clear dip in the land – can indicate an old river or stream
- shorelines of drained lakes or marshes
- cobble beaches

You can get information about water bodies through:

- a site visit
- aerial photographs
- 1:10,000 scale Ontario Base Maps - or equally detailed and scaled maps.

10. Is there evidence of two or more of the following on the property (or project area)?

- elevated topography
- pockets of well-drained sandy soil
- distinctive land formations
- resource extraction areas
- early historic settlement
- early historic transportation routes

- **Elevated topography**

  Higher ground and elevated positions - surrounded by low or level topography - often indicate past settlement and land use.

  Features such as eskers, drumlins, sizeable knolls, plateaus next to lowlands, or other such features are a strong indication of archaeological potential.

  Find out if your property or project area has elevated topography, through:

  - site inspection
  - aerial photographs
  - topographical maps

- **Pockets of well-drained sandy soil, especially within areas of heavy soil or rocky ground**

  Sandy, well-drained soil - in areas characterized by heavy soil or rocky ground - may indicate archaeological potential

  Find out if your property or project area has sandy soil through:

  - site inspection
  - soil survey reports

- **Distinctive land formations**

  Distinctive land formations include – but are not limited to:

  - waterfalls
  - rock outcrops
  - rock faces
  - caverns
  - mounds, etc.

  They were often important to past inhabitants as special or sacred places. The following sites may be present – or close to – these formations:

  - burials
  - structures
  - offerings
  - rock paintings or carvings

  Find out if your property or project areas has a distinctive land formation through:

  - a site visit
  - aerial photographs
  - 1:10,000 scale Ontario Base Maps - or equally detailed and scaled maps.

- **Resource extraction areas**

  The following resources were collected in these extraction areas:

  - food or medicinal plants e.g., migratory routes, spawning areas, prairie
  - scarce raw materials e.g., quartz, copper, ochre or outcrops of chert
  - resources associated with early historic industry e.g., fur trade, logging, prospecting, mining

  Aboriginal communities may hold traditional knowledge about their past use or resources in the area.

- **Early historic settlement**

  Early Euro-Canadian settlement include – but are not limited to:

  - early military or pioneer settlement e.g., pioneer homesteads, isolated cabins, farmstead complexes
  - early wharf or dock complexes
  - pioneers churches and early cemeteries

  For more information, see below – under the early historic transportation routes.

- **Early historic transportation routes** - such as trails, passes, roads, railways, portage routes, canals.

  For more information, see:

  - historical maps and/or historical atlases
    - for information on early settlement patterns such as trails (including Aboriginal trails), monuments, structures, fences, mills, historic roads, rail corridors, canals, etc.
    - Archives of Ontario holds a large collection of historical maps and historical atlases
    - digital versions of historic atlases are available on the Canadian County Atlas Digital Project
  - commemorative markers or plaques such as local, provincial or federal agencies
  - municipal heritage committee or other local heritage organizations
    - for information on early historic settlements or landscape features (e.g., fences, mill races, etc.)
    - for information on commemorative markers or plaques

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area:
  - is a recognized heritage property
  - may be of cultural heritage value
- it includes all areas that may be impacted by project activities, including – but not limited to:
  - the main project area
  - temporary storage
  - staging and working areas
  - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Cultural Heritage Evaluation Report (CHER)

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a qualified person(s) (see page 5 for definitions) to undertake a cultural heritage evaluation report (CHER).

The CHER will help you:

- identify, evaluate and protect cultural heritage resources on your property or project area
- reduce potential delays and risks to a project

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – separate checklist
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages for more detailed information and when completing this form.

Project or Property Name
Drumbo Wastewater Treatment Plant Capacity Expansion Class Environmental Assessment

Project or Property Location (upper and lower or single tier municipality)
Blandford-Blenheim, Oxford County

Proponent Name
Oxford County

Proponent Contact Information
mheighway@oxfordcounty.ca, 519-539-9800 x3020

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☐	☑

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

Part A: Screening for known (or recognized) Cultural Heritage Value

	Yes	No
2. Has the property (or project area) been evaluated before and found **not** to be of cultural heritage value?	☐	☑

If Yes, do **not** complete the rest of the checklist.

The proponent, property owner and/or approval authority will:

- summarize the previous evaluation and
- add this checklist to the project file, with the appropriate documents that demonstrate a cultural heritage evaluation was undertaken

The summary and appropriate documentation may be:

- submitted as part of a report requirement
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Is the property (or project area):		
a. identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value?	☐	☑
b. a National Historic Site (or part of)?	☐	☑
c. designated under the *Heritage Railway Stations Protection Act*?	☐	☑
d. designated under the *Heritage Lighthouse Protection Act*?	☐	☑
e. identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office (FHBRO)?	☐	☑
f. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	☐	☑

If Yes to any of the above questions, you need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report, if a Statement of Cultural Heritage Value has not previously been prepared or the statement needs to be updated

If a Statement of Cultural Heritage Value has been prepared previously and if alterations or development are proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No, continue to Question 4.

Part B: Screening for Potential Cultural Heritage Value

	Yes	No
4. Does the property (or project area) contain a parcel of land that:		
a. is the subject of a municipal, provincial or federal commemorative or interpretive plaque?	☐	☑
b. has or is adjacent to a known burial site and/or cemetery?	☐	☑
c. is in a Canadian Heritage River watershed?	☐	☑
d. contains buildings or structures that are 40 or more years old?	☐	☑

Part C: Other Considerations

	Yes	No
5. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area):		
a. is considered a landmark in the local community or contains any structures or sites that are important in defining the character of the area?	☐	☑
b. has a special association with a community, person or historical event?	☐	☑
c. contains or is part of a cultural heritage landscape?	☐	☑

If Yes to one or more of the above questions (Part B and C), there is potential for cultural heritage resources on the property or within the project area.

You need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report (CHER)

If the property is determined to be of cultural heritage value and alterations or development is proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No to all of the above questions, there is low potential for built heritage or cultural heritage landscape on the property.

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g. under the *Environmental Assessment Act, Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
  - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

For more information, see the Ministry of Tourism, Culture and Sport's Ontario Heritage Toolkit or Standards and Guidelines for Conservation of Provincial Heritage Properties.

In this context, the following definitions apply:

- **qualified person(s)** means individuals – professional engineers, architects, archaeologists, etc. – having relevant, recent experience in the conservation of cultural heritage resources.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may already be in place for identifying potential cultural heritage resources, including:

- one endorsed by a municipality
- an environmental assessment process e.g. screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport (MTCS) under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s.B.2.]

Part A: Screening for known (or recognized) Cultural Heritage Value

2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?

Respond 'yes' to this question, if all of the following are true:

A property can be considered not to be of cultural heritage value if:

- a Cultural Heritage Evaluation Report (CHER) - or equivalent - has been prepared for the property with the advice of a qualified person and it has been determined not to be of cultural heritage value and/or
- the municipal heritage committee has evaluated the property for its cultural heritage value or interest and determined that the property is not of cultural heritage value or interest

A property may need to be re-evaluated, if:

- there is evidence that its heritage attributes may have changed
- new information is available
- the existing Statement of Cultural Heritage Value does not provide the information necessary to manage the property
- the evaluation took place after 2005 and did not use the criteria in Regulations 9/06 and 10/06

Note: Ontario government ministries and public bodies [prescribed under Regulation 157/10] may continue to use their existing evaluation processes, until the evaluation process required under section B.2 of the Standards & Guidelines for Conservation of Provincial Heritage Properties has been developed and approved by MTCS.

To determine if your property or project area has been evaluated, contact:

- the approval authority
- the proponent
- the Ministry of Tourism, Culture and Sport

3a. Is the property (or project area) identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value e.g.:

i. designated under the *Ontario Heritage Act*

- individual designation (Part IV)
- part of a heritage conservation district (Part V)

Individual Designation – Part IV

A property that is designated:

- by a municipal by-law as being of cultural heritage value or interest [s.29 of the *Ontario Heritage Act*]
- by order of the Minister of Tourism, Culture and Sport as being of cultural heritage value or interest of provincial significance [s.34.5]. **Note**: To date, no properties have been designated by the Minister.

Heritage Conservation District – Part V

A property or project area that is located within an area designated by a municipal by-law as a heritage conservation district [s. 41 of the *Ontario Heritage Act*].

For more information on Parts IV and V, contact:

- municipal clerk
- Ontario Heritage Trust
- local land registry office (for a title search)

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ii. subject of an agreement, covenant or easement entered into under Parts II or IV of the *Ontario Heritage Act*

An agreement, covenant or easement is usually between the owner of a property and a conservation body or level of government. It is usually registered on title.

The primary purpose of the agreement is to:

- preserve, conserve, and maintain a cultural heritage resource
- prevent its destruction, demolition or loss

For more information, contact:

- Ontario Heritage Trust - for an agreement, covenant or easement [clause 10 (1) (c) of the *Ontario Heritage Act*]
- municipal clerk – for a property that is the subject of an easement or a covenant [s.37 of the *Ontario Heritage Act*]
- local land registry office (for a title search)

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iii. listed on a register of heritage properties maintained by the municipality

Municipal registers are the official lists - or record - of cultural heritage properties identified as being important to the community.

Registers include:

- all properties that are designated under the *Ontario Heritage Act* (Part IV or V)
- properties that have not been formally designated, but have been identified as having cultural heritage value or interest to the community

For more information, contact:

- municipal clerk
- municipal heritage planning staff
- municipal heritage committee

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iv. subject to a notice of:

- intention to designate (under Part IV of the *Ontario Heritage Act*)
- a Heritage Conservation District study area bylaw (under Part V of the *Ontario Heritage Act*)

A property that is subject to a **notice of intention to designate** as a property of cultural heritage value or interest and the notice is in accordance with:

- section 29 of the *Ontario Heritage Act*
- section 34.6 of the *Ontario Heritage Act.* **Note**: To date, the only applicable property is Meldrum Bay Inn, Manitoulin Island. [s.34.6]

An area designated by a municipal by-law made under section 40.1 of the *Ontario Heritage Act* as a **heritage conservation district study area.**

For more information, contact:

- municipal clerk – for a property that is the subject of notice of intention [s. 29 and s. 40.1]
- Ontario Heritage Trust

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v. included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties

Provincial heritage properties are properties the Government of Ontario owns or controls that have cultural heritage value or interest.

The Ministry of Tourism, Culture and Sport (MTCS) maintains a list of all provincial heritage properties based on information provided by ministries and prescribed public bodies. As they are identified, MTCS adds properties to the list of provincial heritage properties.

For more information, contact the MTCS Registrar at registrar@ontario.ca.

3b. Is the property (or project area) a National Historic Site (or part of)?

National Historic Sites are properties or districts of national historic significance that are designated by the Federal Minister of the Environment, under the *Canada National Parks Act*, based on the advice of the Historic Sites and Monuments Board of Canada.

For more information, see the National Historic Sites website.

3c. Is the property (or project area) designated under the *Heritage Railway Stations Protection Act*?

The *Heritage Railway Stations Protection Act* protects heritage railway stations that are owned by a railway company under federal jurisdiction. Designated railway stations that pass from federal ownership may continue to have cultural heritage value.

For more information, see the Directory of Designated Heritage Railway Stations.

3d. Is the property (or project area) designated under the *Heritage Lighthouse Protection Act*?

The *Heritage Lighthouse Protection Act* helps preserve historically significant Canadian lighthouses. The Act sets up a public nomination process and includes heritage building conservation standards for lighthouses which are officially designated.

For more information, see the Heritage Lighthouses of Canada website.

3e. Is the property (or project area) identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office?

The role of the Federal Heritage Buildings Review Office (FHBRO) is to help the federal government protect the heritage buildings it owns. The policy applies to all federal government departments that administer real property, but not to federal Crown Corporations.

For more information, contact the Federal Heritage Buildings Review Office.

See a directory of all federal heritage designations.

3f. Is the property (or project area) located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?

A UNESCO World Heritage Site is a place listed by UNESCO as having outstanding universal value to humanity under the Convention Concerning the Protection of the World Cultural and Natural Heritage. In order to retain the status of a World Heritage Site, each site must maintain its character defining features.

Currently, the Rideau Canal is the only World Heritage Site in Ontario.

For more information, see Parks Canada – World Heritage Site website.

Part B: Screening for potential Cultural Heritage Value

4a. Does the property (or project area) contain a parcel of land that has a municipal, provincial or federal commemorative or interpretive plaque?

Heritage resources are often recognized with formal plaques or markers.

Plaques are prepared by:

- municipalities
- provincial ministries or agencies
- federal ministries or agencies
- local non-government or non-profit organizations

For more information, contact:

- municipal heritage committees or local heritage organizations – for information on the location of plaques in their community
- Ontario Historical Society's Heritage directory – for a list of historical societies and heritage organizations
- Ontario Heritage Trust – for a list of plaques commemorating Ontario's history
- Historic Sites and Monuments Board of Canada – for a list of plaques commemorating Canada's history

4b. Does the property (or project area) contain a parcel of land that has or is adjacent to a known burial site and/or cemetery?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulations, Ontario Ministry of Consumer Services – for a database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, adjacent means contiguous or as otherwise defined in a municipal official plan.

4c. Does the property (or project area) contain a parcel of land that is in a Canadian Heritage River watershed?

The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage.

Canadian Heritage Rivers must have, and maintain, outstanding natural, cultural and/or recreational values, and a high level of public support.

For more information, contact the Canadian Heritage River System.

If you have questions regarding the boundaries of a watershed, please contact:

- your conservation authority
- municipal staff

4d. Does the property (or project area) contain a parcel of land that contains buildings or structures that are 40 or more years old?

A 40 year 'rule of thumb' is typically used to indicate the potential of a site to be of cultural heritage value. The approximate age of buildings and/or structures may be estimated based on:

- history of the development of the area
- fire insurance maps
- architectural style
- building methods

Property owners may have information on the age of any buildings or structures on their property. The municipality, local land registry office or library may also have background information on the property.

Note: 40+ year old buildings or structure do not necessarily hold cultural heritage value or interest; their age simply indicates a higher potential.

A building or structure can include:

- residential structure
- farm building or outbuilding
- industrial, commercial, or institutional building
- remnant or ruin
- engineering work such as a bridge, canal, dams, etc.

For more information on researching the age of buildings or properties, see the Ontario Heritage Tool Kit Guide Heritage Property Evaluation.

Part C: Other Considerations

5a. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) is considered a landmark in the local community or contains any structures or sites that are important to defining the character of the area?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has potential landmarks or defining structures and sites, for instance:

- buildings or landscape features accessible to the public or readily noticeable and widely known
- complexes of buildings
- monuments
- ruins

5b. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) has a special association with a community, person or historical event?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has a special association with a community, person or event of historic interest, for instance:

- Aboriginal sacred site
- traditional-use area
- battlefield
- birthplace of an individual of importance to the community

5c. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) contains or is part of a cultural heritage landscape?

Landscapes (which may include a combination of archaeological resources, built heritage resources and landscape elements) may be of cultural heritage value or interest to a community.

For example, an Aboriginal trail, historic road or rail corridor may have been established as a key transportation or trade route and may have been important to the early settlement of an area. Parks, designed gardens or unique landforms such as waterfalls, rock faces, caverns, or mounds are areas that may have connections to a particular event, group or belief.

For more information on Questions 5.a., 5.b. and 5.c., contact:

- Elders in Aboriginal Communities or community researchers who may have information on potential cultural heritage resources. Please note that Aboriginal traditional knowledge may be considered sensitive.
- municipal heritage committees or local heritage organizations
- Ontario Historical Society's "Heritage Directory" - for a list of historical societies and heritage organizations in the province

An internet search may find helpful resources, including:

- historical maps
- historical walking tours
- municipal heritage management plans
- cultural heritage landscape studies
- municipal cultural plans

Information specific to trails may be obtained through Ontario Trails.

From: Livingstone, Kimberly (MTCS) <Kimberly.Livingstone@ontario.ca>
Sent: Friday, January 11, 2019 8:23 AM
To: Mitchell Heighway <mheighway@oxfordcounty.ca>
Subject: RE: MTCS File No: 000040- Drumbo Wastewater Treatment Plant Capacity Expansion EA

Good morning,

Thanks for your email. I will speak to some of my colleagues about the project area and I should have a reply for you early next week.

Regards,

Kimberly Livingstone | Heritage Planner (A)
Culture Division | Programs and Services Branch | Heritage Planning Unit
Ministry of Tourism, Culture and Sport
401 Bay Street
17th Floor, Suite 1700
Toronto, ON M7A 0A7
416.314.7133
kimberly.livingstone@ontario.ca

From: Mitchell Heighway <mheighway@oxfordcounty.ca>
Sent: January-09-19 4:34 PM
To: Livingstone, Kimberly (MTCS) <Kimberly.Livingstone@ontario.ca>
Cc: Kirzati, Katherine (MTCS) <Katherine.Kirzati@ontario.ca>; Eckert, Anneleis (MECP) <Anneleis.Eckert@ontario.ca>; Barboza, Karla (MTCS) <Karla.Barboza@ontario.ca>
Subject: RE: MTCS File No: 000040- Drumbo Wastewater Treatment Plant Capacity Expansion EA

Hi Kimberly,

Thank you for your response to Oxford County's Notice of Completion for the Drumbo WWTP Capacity Expansion EA. Please find attached to this email completed checklists as per your request. Per form 0478E it looks like an archaeological assessment may be required since the site is within 300 metres of a body of water. Can you please confirm if an archaeological assessment is required for this site?

Thank you,

Mitchell Heighway, P.Eng.
Project Engineer

From: Livingstone, Kimberly (MTCS) [mailto:Kimberly.Livingstone@ontario.ca]
Sent: December-17-18 2:08 PM
To: Mitchell Heighway
Cc: Kirzati, Katherine (MTCS); Eckert, Anneleis (MECP); Barboza, Karla (MTCS)
Subject: MTCS File No: 000040- Drumbo Wastewater Treatment Plant Capacity Expansion EA

Hello Mr. Heighway,

MTCS has received the Final Notice of Completion for the Drumbo Wastewater Treatment Plant Capacity Expansion EA and has reviewed the Drumbo Wastewater Servicing Environmental Study Report dated May 8, 2018 and revised on September 19, 2018.
MTCS has the following concerns:

Although it has been noted in the report that the preferred option to expand the wastewater treatment plant will not have any impacts to cultural heritage resources or archaeological resources, there is no description of the property and whether it has cultural heritage value or interest. As such, MTCS requires the following checklists to be completed in order to confirm these statements in the ESR:

Archaeological Resources
This EA project may impact archaeological resources and should be screened using the MTCS *Criteria for Evaluating Archaeological Potential* to determine if an archaeological assessment is needed.

Built Heritage and Cultural Heritage Landscapes
The MTCS *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* should be completed to help determine whether this EA project may impact cultural heritage resources.

Please complete the checklists and email them to Katherine and myself for review.
Should you have any questions or comments, please contact Katherine or myself.

Regards,

Kimberly Livingstone | Heritage Planner (A)
Culture Division | Programs and Services Branch | Heritage Planning Unit
Ministry of Tourism, Culture and Sport
401 Bay Street
17th Floor, Suite 1700
Toronto, ON M7A 0A7
416.314.7133
kimberly.livingstone@ontario.ca

Ministry of the Environment, Conservation and Parks

733 Exeter Road
London ON N6E 1L3
Tel': 519 873-5000
Fax: 519 873-5020

Ministère de l'Environnement, de la Protection de la nature et des Parcs

733, rue Exeter
London ON N6E 1L3
Tél.: 519 873-5000
Fax: 519 873-5020

December 19, 2018

County of Oxford
21 Reeve St. P.O. Box 1614
Woodstock ON N4S 7Y3

Attention: Mitchell Heighway, Project Engineer

Re: Drumbo Wastewater Servicing EA

Dear Mitchell Heighway:

Thank you for circulating the Ministry of Environment, Conservation and Parks (MECP) on the Notice of Completion for the Drumbo Wastewater Servicing EA in the community of Drumbo in the Township of Blandford-Blenheim, Oxford County. It is MECP's understanding that this project is to improve wastewater servicing through an expansion to the existing wastewater treatment plant.

MECP has reviewed the Environmental Study Report (ESR) for surface water concerns, Indigenous Consultation, and EA process. MECP offers the following comments:

Effluent Limits

The proposed limits for Total Phosphorus (TP) as identified in table 2-6 vary slightly from values previously agreed to by the Ministry. It appears that these numbers have been rounded up. For example, the ESR lists the current TP as 0.5 mg/L; the actual value should be 0.47 mg/L. At 400 m^3/day the value in the table is listed as 0.4mg/L which is rounded up from a calculated value of 0.35 mg/L. The Ministry will accept a value of 0.3 mg/L. Please advise if you have concerns with a value of 0.3 mg/L at 400m^3/day instead of 0.4 mg/L and of the non-rounded values.

While the EA does not directly address effluent parameters of E. coli, pH, or dissolved oxygen, we expect these values to remain the same. Please advise if the municipality anticipates these values to change. The proposed plant expansion would service growth plans projected for the next twenty years, but environmental requirements may change in the future. For example a phosphorus loading target for the eastern basin of Lake Erie may be developed and it would apply to this sewage plant and to others in the larger Grand River watershed. Therefore, the effluent limits in the ESR will need periodic re-assessment over the next two decades.

The current system discharges into the Lower Nith Wolverton Wetland Complex. It is proposed to extend and relocate the sewage plant outfall to the Cowan Drain at Oxford Road 3. This is a key aspect of this project and must be implemented.

Indigenous Consultation

MECP has reviewed the consultation documents associated with this EA including the Consultation Summary Report and Appendices. The ESR and associated documents do not identify consultation efforts beyond sending the notices of commencement, PIC, completion, etc. Part of consultation with Indigenous Communities should include follow-up correspondence, phone calls, and offers to meet. These consultation efforts should be recorded in the ESR and include: the date and time of phone calls; who was spoken to or left a message with; any responses or concerns raised; and how concerns have or will be addressed. If no responses were received to the consultation efforts, this should also be noted. I have been in contact with the County on this matter and understand through conversations that this follow-up occurred for a portion of the project but was not recorded. I appreciate the additional information provided via email on December 17th in response to our phone conversation the previous week. The documents identify direction from the Ministry on Indigenous consultation including phone calls, unfortunately, it does not provide assurance that these calls were conducted. As such, to fulfill the Duty to Consult requirement, please follow-up with the below identified communities and provide documentation to MECP.

Haudenosaunee Confederacy Chiefs Council	Haudenosaunee Confederacy Chiefs Council 2634 6th Line Road, RR#2 Ohsweken, ON N0A 1M0 Hohahes Leroy Hill, Secretary jocko@sixnationsns.com	Brantford, ON
Mississaugas of the New Credit First Nation	Mississaugas of the New Credit First Nation 2789 Mississauga Road R.R. #6, Hagersville, ON N0A 1H0 519-768-1133 Chief Stacey LaForme Stacey.Laforme@mncfn.ca Other Contact: Fawn Sault Consultation Coordinator Department of Consultation & Accommodation Fawn.Sault@mncfn.ca 6 First Line Rd., Unit 1 R.R.#6 Hagersville, ON N0A 1H0 905-768-4260	Brantford, ON

Source Water Protection

Source water protection and well head protection were mentioned in the evaluation of alternatives, however no details were provided. An examination of the protection policies should be included in discussion on the existing environmental conditions. Specifically, it should discuss whether or not the project is located in a vulnerable area or changes or creates new vulnerable areas, and provide applicable details about the area. If located in a vulnerable area, proponents should document whether any project activities are a prescribed drinking water threat and thus pose a risk to drinking water (this should be consulted on with the appropriate CA/SPA). Where an activity poses a risk to drinking water, the proponent must document and discuss in the ESR how the project adheres to or has regard to applicable policies in the local SPP. If creating or changing a vulnerable area, proponents should document whether any existing uses or activities may potentially be affected by the implementation of source protection policies. This section should then be used to inform and should be reflected in other sections of the report, such as the identification of net positive/ negative effects of alternatives, mitigation measures, evaluation of alternatives etc. As a note, even if the project activities in a vulnerable area are deemed not to be a drinking water risk, there may be other policies that apply and so consultation with the local CA/SPA is important. MECP will review the source water protection section when it is submitted and comment as necessary.

Archaeology, Heritage, and Culture
MECP is in receipt of comment from the Ministry of Tourism Culture and Sport (MTCS) dated December 17, 2018, in which that ministry identifies concerns over incomplete screening checklists. Please provide MECP with the checklists when you provide them to MTCS.

Climate Change
MECP did not find reference to climate change in the ESR. Please include climate change from both an adaptation and mitigation perspective. The Ministry has recently released a guidance document to support proponents in including climate change in environmental assessments. The guide can be found online: https://www.ontario.ca/page/considering-climate-change-environmental-assessment-process. It should be noted that Climatic Features is identified in Appendix 2 of the Municipal Class EA page 2-7 (2015).

Evaluation of Alternatives
The ESR does not contain an evaluation of the "Do Nothing" option. In the Technical Evaluation Matrix, it is noted that the "do nothing" option does not meet the objectives of the problem/opportunity statement; will not accommodate planned community growth; and does not meet the needs of the County and was, therefore, not considered further. The purpose of the "do nothing" alternative is to provide a baseline to demonstrate the current and future impacts of the existing as a comparison to the proposed alternatives. In many cases, the "do nothing" option does not solve the existing problem and will be screened out at the decision stage for that reason. However, it cannot be assumed that it will be screened out and therefore not explored to exist as a baseline.
The following are excerpts from the MCEA that refer to the "Do Nothing" alternative:

> Glossary of Terms (page G-2)
> Alternative Solutions: Means feasible alternative ways of solving an identified problem (deficiency) or addressing an opportunity, from which a preferred solution is selected. Note: alternative solutions include the "Do Nothing" alternative.
>
> Section A.1.1 (page A-2)
> Consideration of a reasonable range of alternatives, both the functionally different "alternatives to" and the "alternative methods" of implementing the solution. The "Do nothing" alternative, which provides a benchmark for the evaluation of alternatives, must be considered.
>
> C.2 #3 (page C-5)
> The "Do Nothing" alternative examines what may happen if none of the alternatives under consideration are carried out, and should be considered by the proponent in all cases. The "Do Nothing" alternative assists project participants by providing a benchmark against which the consequences of the other alternatives can be measured.

> C.2.1.3 h) (page C-10)
> In the “Do Nothing” alternative, no improvements or changes would be made to solve the identified problem(s). This means that the problem(s) would remain in the system. It does not necessarily mean however, that no further development in the community would occur. The “Do Nothing alternative will be documented in the ESR along with any other alternative solutions. The “Do Nothing” alternative may be implemented at any time during the design process prior to the commencement of construction. A decision to “Do Nothing” would typically be made when the costs of all other alternatives, both financial and environmental, significantly outweigh the benefits.

Prior to proceeding with the undertaking the County needs to complete an analysis of the “do nothing” option to provide a baseline.

Master Plan
MECP has concerns regarding the status of the Princeton Class EA for Wastewater. It has come to the Ministry’s attention that the County views the Princeton EA as on-going. The Ministry has emails and meeting minutes from 2014 and 2016 indicating that the County was not proceeding with that EA but instead investigating other options. MECP is concerned with the transparency of the two processes for the two communities especially since alternatives presented in the Drumbo EA included servicing of Princeton. The County has not provided a response as to why this was done if the Princeton EA is on-going.

The County should consider a Master Plan to address wastewater servicing in this area as the public and the County have expressed need in Drumbo and Princeton. This EA, by also examining options for Princeton, took on elements of a Master Plan. The County has communicated to MECP that servicing studies for Princeton are on-going. With these two processes and the geographic proximity of the two communities, a Master Plan would provide a cohesive, transparent, and clear plan for addressing deficiencies (real and/or perceived) in both. A Master Plan would also avoid duplication of work that would be required for two separate EA processes.

General
Given the number of outstanding items to be addressed prior to proceeding with the project, the Ministry strongly recommends that the County update the ESR and re-issue the Notice of Completion. This ensures public confidence and transparency in the process. Any documentation to address the outstanding items that is not included in the ESR must be submitted to the Ministry and maintained as part of the ESR including any possible future addenda.

Conclusion
This concludes MECP comments at this time. I look forward to receiving responses to the outstanding items. Please do not hesitate to contact me if you have questions or wish to discuss.

Yours truly,

Anneleis Eckert

Anneleis Eckert
Regional Environmental Planner / Regional EA Coordinator
Ministry of Environment, Conservation and Parks
733 Exeter Road
London ON, N6E 1L3
519 873-5115

Copy:
David Simpson, County of Oxford
Scott Abernethy, MECP
Lareina Rising, MECP
Roland Plante, MECP
Bob Slivar, MECP

Oxford County
Growing stronger together

Public Works
21 Reeve Street, PO Box 1614
Woodstock, ON N4S 7Y3
519.539.9800 I 1.800.755.0394
oxfordcounty.ca

February 14, 2019

Ministry of the Environment, Conservation and Parks
733 Exeter Road
London, ON N6E 1L3

Attention: Anneleis Eckert, Regional Environmental Planner / Regional EA Coordinator

Re: Drumbo Wastewater Servicing EA

Dear Anneleis Eckert,

Thank you for your response letter to the Notice of Completion for the Drumbo Wastewater Treatment Class EA Study. Please find below responses to the eight subjects highlighted in your letter.

Effluent Limits

Rounding was applied in the previous version of Table 2-6 *Proposed Effluent Limits for the Drumbo WWTP for Increasing Design Flows.* The table has been revised to show two decimal places for the TP parameter;

Parameter	Loading	Effluent Limit Concentration (mg/L) at Various Design Flows (m^3/d)			
	(kg/d)	300	350	400	450
$cBOD_5$	2.8	9.3	8.0	7.0	6.2
TSS	2.8	9.3	8.0	7.0	6.2
TP	0.14	0.47	0.40	0.35	0.31
TAN - May-Oct	0.8	2.7	2.3	2.0	1.8
TAN - Nov-Apr	1.36	4.5	3.9	3.4	3.0

The plant's current loading limit for TP per ECA 8752-9Q4H96 is 0.14 kg/d which equates to 0.31 mg/L at a capacity of 450m^3/d. The upgraded plant's treatment capacity will be 450m^3/d. It is also important to note that the 0.31mg/L limit of TP will be the concentration limit of discharge, the plant will be designed to achieve the lower effluent objective which will be within the treatment capabilities of a membrane bioreactor plant.

The effluent parameters for E. Coli, pH, and dissolved oxygen are expected to remain the same.

Indigenous Consultation

Further to your recommendation that Oxford County is to phone the Haudenosaunee Confederacy Chiefs Council and the Mississaugas of the New Credit First Nation, the County's consultant phoned them on January 8, 2019. Summaries of these conversations can be found in Appendix A, attached to this letter. No concerns have been noted by these stakeholders as a result of the recommended alternative of the Drumbo WWTP Class EA Study.

Source Water Protection

A report completed by XCG as part of Phase 2 of this Class EA study titled *Feasibility Study of Alternative Expansion Options for the Drumbo WWTP* includes a letter identifying that the Drumbo WWTP is located within the WHPA-A for Well 3 of the Drumbo Drinking Water system. Please see Appendix B for this letter. Since the location of the WWTP is within a WPA-A zone the following actions are proposed; more frequent cleanings and inspections, more stringent specifications on construction materials, more robust spill response plans and procedures, and additional reporting requirements for spills.

Archaeology, Heritage, and Culture

The MECP will be copied on all email correspondence with the MTCS regarding archaeological assessment requirements. The checklists that the MTCS has requested to be filled out have been completed and returned to the MTCS on January 9, 2019. The MTCS is currently evaluating the forms and will advise on archaeological assessment requirements, if there are any. Considering that the existing footprint for the WWTP is not changing, the impact to archaeological resources is likely minimal.

Climate Change

Refer to attached Appendix C for a summary of climate change impact and mitigation strategies for the upgraded Drumbo WWTP.

Evaluation of Alternatives

The evaluation of alternatives, Phase 2 of the Class EA process, was completed originally by XCG and included the evaluation of the 'Do Nothing' alternative. Jacobs completed a review of the work done XCG and confirmed their findings. The ESR primarily focuses on the *Alternative Design Concepts for Preferred Solution*, not the evaluation of alternatives. As the 'Do Nothing' alternative was ruled out in Phase 2 of the Class EA process, and confirmed by two different engineering consultants, alternative 'Do Nothing' designs were not considered by Jacobs. The evaluation performed by Jacobs in this ESR was an evaluation of different preferred design concepts for the preferred solution, not an alternative solution evaluation.

Master Plan

The Drumbo WWTP Class EA Study was initiated in June 2013 as a study evaluating the wastewater treatment options for Drumbo only. The Princeton wastewater servicing Class EA was initiated in February 2011 at the request of residents of Princeton through Oxford County Council, and considered wastewater servicing in Princeton only. These studies were originally independent.

Oxford County Council directed staff to expand the scope of the Drumbo WWTP Class EA Study to review the option of upgrading the Drumbo WWTP in order to accommodate wastewater flows from both Drumbo and Princeton. The review of this servicing option was completed in Phase 2 of the Class EA process, *Alternative Solutions*, and it was concluded that treating the wastewater flows from Princeton at the Drumbo WWTP was not feasible. This option was not carried through the remaining phases of the Class EA process and both studies continued to proceed independently.

Community Planning reviewed the 20 year growth projections for Blandford-Blenheim Township which were used in the Drumbo WWTP Class EA Study. The Drumbo WWTP Class EA has recommended allocating enough treatment capacity in Drumbo to service the expected 20 year horizon Township growth.

General

We trust that all items noted in your response letter have been adequately addressed and that the Notice of Completion does not need to be reissued. If you'd like to discuss any of these items further, it may be beneficial to arrange a meeting. Please advise if you'd like us to arrange one.

Thank you,

Mitchell Heighway, P.Eng.
Project Engineer, Oxford County

cc. David Simpson, P.Eng., PMP, Oxford County
Mike Newbigging, M.Eng., P.Eng., Jacobs
Deb Goudreau, P.Eng., Oxford County
Mark Maxwell, P.Eng., Oxford County

Appendix A

JACOBS

72 Victoria Street South, Suite 300
Kitchener, ON N2G 4Y9
Canada
www.jacobs.com
T +1.519.514.1642
www.jacobs.com

TELEPHONE CONVERSATION RECORD

Date: Jan 8/19 Time: 3:15pm Phone No. 905-768-4260
Project No. 700053CH

To: Fawn D. Sault (FDS), Mississaugas of the New Credit First Nation/Department of Consultation & Accommodation

From: Mike Newbigging, Jacobs

Subject Drumbo Wastewater Servicing ESR

Details

Indicated calling concerning the Drumbo WWTP Wastewater Servicing Class EA project and ESR. Indicated could provide some background on the project, FDS indicated she would just ask a few questions, these being:

1. Is this an expansion of the plant – response: Yes, an expansion to address future growth in the community
2. Is this a Class EA project – response: Yes, it is and followed the Class EA process, ESR is complete
3. Is there archeological/environmental work required – response: Upgrade to the WWTP will not increase the plant's footprint, no impact to archeological resources is anticipated

FDS asked that link to the ESR be provided. I asked if we should also contact Chief Stacey LaForme and FDS said no that the new Department of Consultation and Accommodation was the only department and person to contact.

Followup – email sent to FDS at 7:45 am Wednesday January 9, 2019 acknowledging earlier letter from Mississaugas of the New Credit to the County on December 19, 2018. Link to Oxford County website for ESR also provided.

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TELEPHONE CONVERSATION RECORD

Date: Jan 8/19 Time: 3:30 pm Phone No. 519-445-4222
Project No. 700053CH

To: Hohahes Leroy Hill, Haudenosauee Confederacy Chiefs Council, subsequently to Todd William (TW)

From: Mike Newbigging, Jacobs

Subject Drumbo Wastewater Servicing ESR

Details

Asked for Leroy Hill, indicated not at this number, was asked the reason for the call, indicated Class EA project, was told to contact Todd Williams (TW), not available today. Indicated would try tomorrow.

Called January 9th, 2019, got answering machine, didn't leave further message. Called 9:15am January 10 2019 and spoke with Todd Williams. Discussed project and TW requested link to Environmental Study Report (ESR) be provided to email address provided which was HDI2@bellnet.ca. Email was subsequently sent to this website with link to Oxford County website with ESR, email sent 9:52 am January 10, 2019.

Appendix B

OxfordCounty growing stronger...together

PUBLIC WORKS
P. O. Box 1614, 21 Reeve Street, Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 • Fax: 519-421-4711
Website: www.oxfordcounty.ca

January 25, 2016

Shahab Shafai, P.Eng.
Manager of Environmental Services
Oxford County
21 Reeve Street, P.O.Box. 1614
Woodstock, ON N4S 7Y3

RE: Drumbo Wastewater Treatment Plant Class EA

The Risk Management Office has conducted a preliminary review of the above noted planned Class EA and has the following comments:

The Drumbo Wastewater Treatment Plant (WWTP) is located within the WHPA-A (100 m zone) for well 3 of the Drumbo Drinking Water System (map attached). The vulnerability score in that area is 10 and as such the WWTP has been identified as a significant drinking water threat under the Clean Water Act, 2006 (the Act).

Under the Act, the establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage is considered a significant drinking water threat activity. Specifically, there are 3 components of the WWTP that have been flagged as significant drinking water threats, under specific circumstances:

1) Collection system piping,
2) Discharge, and
3) Tankage for treatment or storage, whether above or below grade

The detailed significant threat circumstances are included in Appendix A.

The above-noted activities associated with the WWTP will be subject to the policies in the Grand River Source Protection Plan (the Plan), which will come into effect on July 1, 2016. The Plan contains policies for both existing and future activities. Unless otherwise noted in the specific policies, it is intended that replacements, modifications and expansions to existing significant threat activities be considered as part of the existing significant threat activity and, therefore, evaluated in accordance with the policies pertaining to existing threats. Therefore, the WWTP upgrade will be subject to policies OC-MC-3.5 and OC-MC-3.7. Policies OC-MC-3.5 and OC-MC-3.7 direct the MOECC to review and where necessary amend the ECA to incorporate terms and conditions to ensure the activity ceases to be considered a significant drinking water threat. The policy excerpts are included in Appendix B for reference.

Conditions imposed by the MOECC may include requirements such as more frequent cleaning/inspection, more stringent specifications on construction material types, more robust spill response plans and procedures and additional reporting requirements for spills. It is recommended that you consult with the MOECC early in the Class EA process.

For further questions or clarifications please contact the undersigned at 519-539-9800 extension 3116.

Deborah Goudreau, P.Eng.
Manager of Water Services
Oxford County

Copy: Mark Maxwell, P.Eng., Oxford County

Appendix A

Tables of Drinking Water Threats *Clean Water Act, 2006*

Excerpt from Table 2 – Drinking Water Threats – Pathogens:

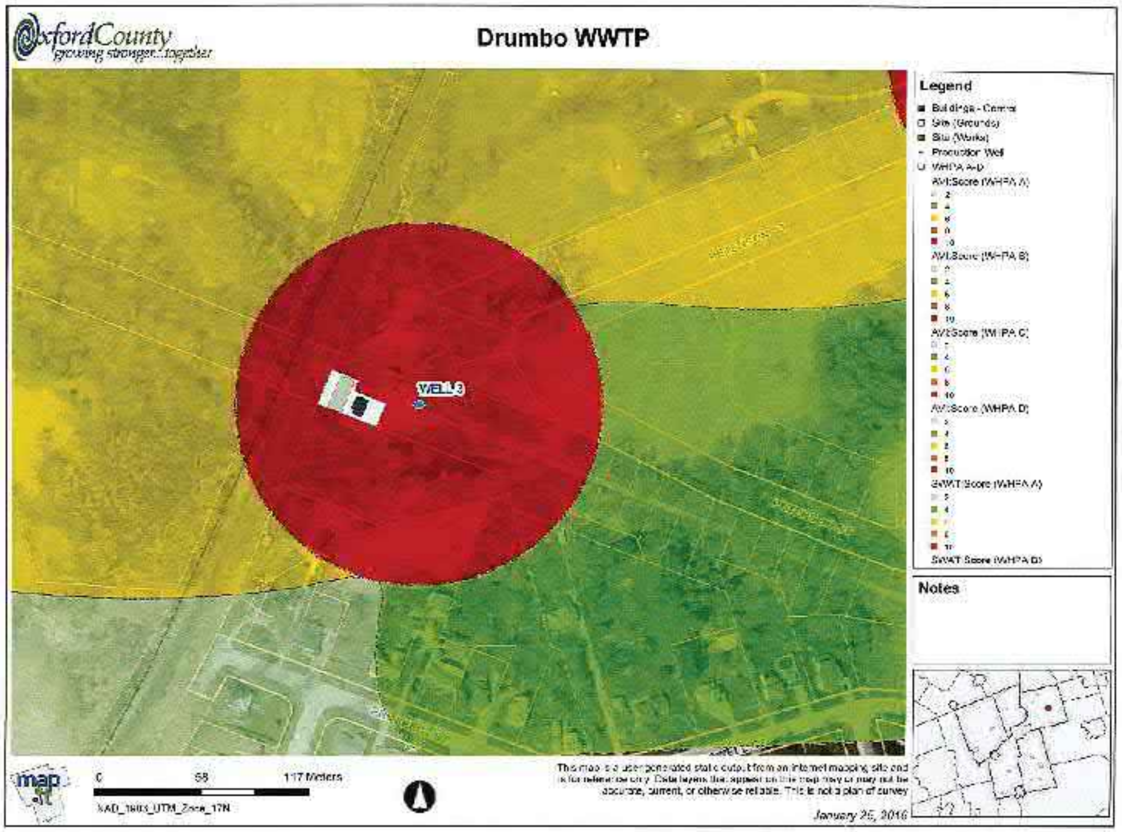
Drinking Water Threat:	Reference Number	Under the following circumstances
The establishment operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	1958	1. The system is a wastewater collection facility that collects or transmits sewage containing human waste, but does not include any part of the facility that is a sewage storage tank or works used to carry out a designed bypass. 2. The discharge from the system may result in the presence of one or more pathogens in groundwater or surface water
	1959	1. The system is a wastewater treatment facility that discharges to surface water through a means other than a designed bypass. 2. A discharge may result in the presence of one or more pathogens in groundwater or surface water
	1960	1. The system is a sewage treatment tank or sewage storage tank in either a wastewater collection facility or wastewater treatment facility, and any part of the tank is at or above grade. 2. A spill from the tank may result in the presence of one or more pathogens in groundwater or surface water.
	1961	1. The system is a sewage treatment tank or sewage storage tank in a wastewater collection facility or a wastewater treatment facility and the tank is below grade. 2. A spill from the tank may result in the presence of one or more pathogens in groundwater or surface water.

Appendix B

Grand River Source Protection Plan Volume II – Approved

Excerpt from Chapter 12:

Policy Number	Source Protection Plan Policies within the County of Oxford
Sewage System or Sewage Works- Storage of Sewage (e.g. treatment plant tanks)	
Sewage System or Sewage Works- Sewage Treatment Plant Effluent Discharges	
OC-MC-3.5 *Existing* *Prescribed Instr* *WHPA-A- v.10;* *WHPA-B- v.10 WHPA-B-v.8;* *WHPA-C-v.8*	For any existing sewage treatment plant effluent discharges or storage of sewage, where these activities are significant drinking water threats, the Ministry of the Environment and Climate Change shall review, and where necessary, amend Environmental Compliance Approvals to incorporate terms and conditions that, when implemented, ensure these activities cease to be significant drinking water threats.
OC-MC-3.6 *Future* *Prescribed Instr* *WHPA-A- v.10;* *WHPA-B- v.10 WHPA-B-v.4;* *WHPA-C-v.8*	For any new sewage treatment plant effluent discharge or storage of sewage, where these activities would be significant drinking water threats, the Ministry of the Environment and Climate Change shall prohibit these activities through the Environmental Compliance Approvals process to ensure these activities never become significant drinking water threats.
Sewage System or Sewage Works – Sanitary Sewers and Related Pipes	
OC-MC-3.7 *Existing/Future* *Prescribed Instr* *WHPA-A- v.10;* *WHPA-B- v.10*	For any existing or new sanitary sewer and related pipes, where this activity is, or would be a significant drinking water threat, the Ministry of the Environment and Climate Change shall ensure that the Environmental Compliance Approval for this activity is prepared, or, where necessary, amended to incorporate terms and conditions that, when implemented ensure this activity ceases to be or will never become a significant drinking water threat. The terms and conditions may include, but not necessarily be limited to requirements for regular maintenance and inspections by the holder of the Environmental Compliance Approval.


OxfordCounty
growing stronger...together
Drumbo WWTP
Legend
Notes
WELL 3
0
58
117 Meters
January 25, 2016

Appendix C

The Project was conducted in accordance with the requirements for a Schedule C project as described in the Municipal Engineers Association (MEA)'s Municipal Class EA document (MEA, 2000, as amended in 2007, 2011, and 2015). Phase 1 and 2 were completed in 2016 (XCG Consulting Limited, 2017) and CH2M HILL Canada Ltd (CH2M) was retained to complete Phases 3 and 4. As per the Ministry's guidance document *Considering climate change in the environmental assessment process*, consideration for climate change mitigation and adaptation should be included in the predicted significance of the project's potential effects.

Mitigation Perspective

To address the consideration of climate change, potential Project effects and associated mitigation measures are presented below for the construction and operation phases of the Project.

Construction

Upgrades (i.e., permanent infrastructure) and construction activities will be conducted within the existing, previously-disturbed wastewater treatment plant (WWTP) site. Therefore, the Project will not require vegetation clearing, the removal of any trees or burning during construction (i.e., construction activities are not anticipated to contribute to the reduction of carbon storage potential).

Vehicle and equipment use during construction will contribute to greenhouse gas (GHG) emissions. The combustion of fuel (usually diesel) in construction equipment and vehicles releases carbon dioxide (CO_2) and nitrous oxide (N_2O) to the atmosphere. During construction, mitigation measures to reduce the amount of GHG emissions (i.e., climate change mitigation) include:

Where practical and applicable, use multi-passenger vehicles for the transport of crews to and from job sites.

The Contractor will ensure equipment is well-maintained.

Reduce idling of equipment, where possible.

Confine construction activities to the existing defined WWTP boundaries.

With the implementation of the mitigation measures listed above, it is anticipated that the increase in GHG emissions during construction is an isolated event, extended-term in duration and of low magnitude; therefore, the Project's contribution to GHG emissions during construction are not likely to result in a significant effect.

Operation

WWTPs are known to emit CO_2, methane (CH_4), and N_2O; specifically, N_2O is produced during the biological nitrogen removal process. Opportunities to reduce a WWTP's contribution to GHG emissions, and subsequently climate change, can be realized during the technical design process. To reduce potential adverse environmental effects during operation, mitigation measures provided in Appendix 2 of the Municipal Class EA were reviewed to ensure specific mitigation could be included in the development of alternatives solutions, including:

Increased capacity of sewer and treatment systems to accommodate additional flows.

Monitoring and adaptive management to manage flow rates.

Back-up features and infrastructure for upset conditions and emergency response procedures (e.g. standby power for water and wastewater facilities).

Water conservation and efficiency through leakage/loss detection and prevention in distribution system.

Notably, the recommended solution to retrofit the existing WWTP to a membrane bioreactor (MBR) facility follows one of the recommended measures provided for the potential effects of climatic features in Appendix 2 of the Municipal Class EA page 2-7 (i.e., increased capacity of treatment system to accommodate additional flows).

Additional fugitive emissions are likely to result from energy consumption that is required to operate the WWTP; however, the recommended solution includes components that will increase energy efficiency during operation (e.g., variable frequency drives, efficient lighting fixtures, etc.) ultimately reducing energy requirements during operation. While the MBR process is more energy-intensive than the SBR process it will replace it would eliminate the tertiary filter process and its associated energy needs (influent pumps, backwashing pumps) and the MBR process will produce a higher quality effluent, thereby reducing downstream environmental impacts.

With the implementation of proper structural design and the mitigation measures listed above, it is anticipated that an increase in GHG emissions during operations is continuous in duration, irreversible and of low magnitude considering the existing plant will be upgraded; therefore, a significant effect is not likely to occur.

Adaptation Perspective

Climate change is acknowledged as the variability of local climate that is identified and/or documented over an extended period of time. Therefore, the effects of changing climate trends (e.g., severe weather, changes in precipitation levels and/or temperature) should be considered through the operational phase of a project.

Factors that help determine the risk for natural hazards or conditions (e.g., climate change) are considered variable, and while the County cannot predict the exact nature, likelihood or timing of a natural event, exposure to these influences can be controlled (e.g., infrastructure design). In general, operational performance is determined during the design stage, in consideration of a variety of environmental stressors (e.g., severe weather and changing climate trends), and typically addressed using engineering and industry standards. Through proper planning, engineering design and construction practices, environmental stressors can be anticipated and managed within the receiving environment. During operation, a site-specific Emergency Management Plan will be adhered to, in the event of an emergency such as a flood or severe weather.

Mitigation measures that are anticipated to reduce the potential effects of changing climate trends and severe weather events include:

All new infrastructure will be designed to withstand extreme weather events (e.g., flooding, high winds and precipitation, extreme heat or cold). Materials used will be relevant to the environmental setting of the Project (e.g., resilient to extreme weather events such as the freeze-thaw effect and salting).

During operations, utilize an adaptive management approach to accommodate local environmental conditions that may shift due to changing climatic conditions.

In the event of a severe weather event that results in flooding or extreme conditions, implement the Emergency Management Plan.

Infrastructure will be built in accordance with industry standards and to code and will be routinely monitored throughout the duration of operations. Damage to infrastructure as a result of climate change would be confined to the existing WWTP site and is anticipated to be a rare occurrence after considering Project-specific engineering and design. In the event that infrastructure is damaged, it may be considered reversible, and of low to high magnitude depending upon the extent and location of the damage. Therefore, a significant effect is not likely to occur.

Ministry of the Environment, Conservation and Parks

733 Exeter Road
London ON N6E 1L3
Tel': 519 873-5000
Fax: 519 873-5020

Ministèrede l'Environnement, de la Protection de la nature et des Parcs

733, rue Exeter
London ON N6E 1L3
Tél.: 519 873-5000
Fax: 519 873-5020

March 6, 2019

County of Oxford
21 Reeve St. P.O. Box 1614
Woodstock ON N4S 7Y3

Attention: Mitchell Heighway, Project Engineer

Re: Drumbo Wastewater Servicing EA

Dear Mitchell Heighway:

Thank you for your response dated February 14, 2019 to the Ministry of Environment, Conservation and Parks' (MECP) comments for the Drumbo Wastewater Servicing EA in the community of Drumbo in the Township of Blandford-Blenheim, Oxford County. MECP has reviewed your letter. We offer the following comments:

Effluent Limits

We have outstanding concerns regarding the effluent limits. An effluent limit of 0.35 mg/L at 400 m^3/day is higher than an upstream wastewater treatment plant also discharging in the Nith River and therefore, may require a water quality monitoring program which would need to be discussed in the ESR. Also, the effluent limit of TP at 450 m^3/day is now proposed to be 0.31 mg/L instead of 0.3 mg/L as identified in the ESR revised September 2018 ESR. Please explain why the effluent limit of TP at 400 m^3/day is proposed to be 0.35 mg/L and 0.31 mg/L at 450m^3/day.

Source Water Protection

In the letter of February 14th, it is identified that the Drumbo WWTP is located within a WHPA-A and actions are proposed to mitigate potential effects. This information must be identified in the ESR. Please see Section A.2.10.6 of the MCEA which states:

> Proponents undertaking a Municipal Class EA project must identify early in their process whether a project is or could potentially be occurring within a vulnerable area; this would fall within Phase 1 of the Class EA process and must be clearly documented in the project file or Environmental Study Report (ESR), as may be appropriate.

Actions required to mitigate potential environmental effects and the impact to the Environmental Compliance Approval should be included in the ESR.

Evaluation of Alternatives

This ESR is a standalone document and must contain and evaluate all information necessary to fulfill the requirements of the class EA. It cannot "primarily focus" on alternative designs of the preferred alternative solution. The County, as the proponent, is responsible for the completion of the ESR in its entirety and must submit all information to fulfill all EA requirements regardless of which consultant conducted which part. Please refer to MECP's December 19, 2018 letter for references to the process in the MCEA regarding the "Do nothing" alternative, including Section A.1.1 of the Municipal Class EA which states:

> Consideration of a reasonable range of alternatives, both the functionally different "alternatives to" and the "alternative methods" of implementing the solution. **The "Do nothing" alternative, which provides a benchmark for the evaluation of alternatives, must be considered** [emphasis added].

The evaluation matrix does not provide evaluation of the "Do nothing" option. Please conduct and record proper evaluation of the "Do nothing" alternative to provide a benchmark for the evaluation of alternatives.

General

This ESR has not fulfilled the requirements of the MCEA process. The ministry recommends the County withdraw the notice of completion, add the outstanding information to the ESR and reissue the notice. This ensures public confidence and transparency in the process. Any documentation to address the outstanding items must be added to the revised ESR. This includes the additional information submitted with the February 14th letter in response to previous MECP comments.

Conclusion

This concludes MECP comments at this time. We look forward to receiving responses to the outstanding items. Please do not hesitate to contact me if you have questions or wish to discuss.

Yours truly,

Anneleis Eckert
Regional Environmental Planner / Regional EA Coordinator
Ministry of Environment, Conservation and Parks
733 Exeter Road
London ON, N6E 1L3
519 873-5115

Copy:
Scott Abernethy, MECP
Bob Slivar, MECP
Angelune Des Lauriers, MECP

From: Mitchell Heighway <mheighway@oxfordcounty.ca>
Sent: Friday, March 22, 2019 3:06 PM
To: Abernethy, Scott (MECP)
Subject: Re: Drumbo WWTP ESR Conversation

Hi Scott,

Thank you for taking the time to discuss the Drumbo WWTP ESR with me. As per your recommendation the ESR will be updated to include a statement that at the recommended treatment capacity of 450 m3/day the effluent limit of TP will be 0.3 mg/L.

Thanks again,

Mitchell Heighway, P.Eng.
Project Engineer
Oxford County | 21 Reeve St., PO Box 1614, Woodstock, ON, N4S 7Y3 | T 519-539-9800 /1-800-755-0394, Ext 3020
mheighway@oxfordcounty.ca

Oxford County is committed to 100% Renewable Energy by 2050

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oxfordcounty.ca

April 15, 2019

Ministry of the Environment, Conservation and Parks
733 Exeter Road
London, ON N6E 1L3

Attention: Craig Newton, Regional Environmental Planner / Regional EA Coordinator

Re: Drumbo Wastewater Servicing EA

Dear Craig Newton,

Thank you for MECP's response letter dated March 6, 2019 to Oxford County and the follow up email sent on April 8, 2019. Please find attached to this letter a restructured Drumbo Wastewater Treatment Plant Expansion Environmental Study Report which addresses MECP's outstanding comments. Below is a brief summary of how the Ministry's concerns have been addressed. Please refer to the attached restructured ESR for complete details.

Effluent Limits
The effluent limit of TP at the recommended wastewater treatment capacity of 450 m^3/day has been changed to 0.3mg/L. This limit was confirmed as acceptable with Scott Abernethy during a phone call on March 22, 2019. Table 2-6 in the report and Section 2.3 have been updated to reflect the TP limit of 0.3mg/L.

Source Water Protection
The report now specifies that source water protection is a critical component of the wastewater treatment plant upgrade and that any upgrade to the Drumbo WWTP would be subject to policies within the approved Grand River Source Protection Plan. This plan dictates that conditions are to be included in the amended WWTP ECA to ensure that any expansion would not result in a significant drinking water threat. Conditions include, but are not limited to; more frequent cleaning/inspection, more stringent specifications on construction materials, more robust spill response plans and procedures, and additional reporting requirements for spills. Sections 4.3, 4.4, and 5.3.6 have been updated to include information on source water protection.

Evaluation of Alternatives
The ESR now functions as a standalone document and clearly goes through the methodology of how the recommended preferred design solution of upgrading the Drumbo Wastewater Treatment Plant to an MBR treatment facility was determined. In sections 4.1, 4.4, and 4.5 the 'Do Nothing' alternative is shown to have been evaluated in the Alternatives Solutions Phase where it was ruled out.

Comments from the MECP's letter dated December 19, 2018 pertaining to Indigenous Consultation, Archaeology, Heritage, and Culture, as well as Climate Change have also been addressed in the attached restructured ESR.

The ESR document now includes all previous work completed and all public consultation efforts including correspondence up to, and including, this letter.

Oxford County believes that the Class EA Study requirements have been satisfied and we look forward to the conference call with MECP staff on April 25, 2019 to confirm the Ministry's acceptance and approval to proceed to Phase 5 – Implementation of the Preferred Alternative.

Thank you,

Mitchell Heighway, P.Eng.
Project Engineer, Oxford County

cc. David Simpson, P.Eng., PMP, Oxford County
Mike Newbigging, M.Eng., P.Eng., Jacobs
Deb Goudreau, P.Eng., Oxford County
Mark Maxwell, P.Eng., Oxford County

Mitchell Heighway

From:	Newton, Craig (MECP) <Craig.Newton@ontario.ca>
Sent:	April-26-19 8:54 AM
To:	David Simpson
Cc:	Deborah Goudreau; Mark Maxwell; Abernethy, Scott (MECP); Mitchell Heighway; Lafrance, Crystal (MECP); DesLauriers, Angelune (MECP); Smith, Mark (MECP)
Subject:	RE: Drumbo Wastewater Treatment Plant ESR

Good Morning David:

There is no need to schedule a teleconference for next week to discuss the Revised Drumbo Wastewater Treatment Plant ESR dated April 2019.

MECP's responses to the County of Oxford's e-mail of April 15th, 2019, and accompanying letter attachment are as follows:

Effluent Limits:

The revised ESR is acceptable for surface water concerns. Specifically the proposed effluent limits in Table 2-6.

Source Water Protection

The MECP has taken a look at the source protection information Oxford County has added, and the revised ESR is acceptable from a source protection perspective. The County has addressed source protection in section 4.3 *Impact of Alternatives*, section 4.4 *Evaluation of Alternatives*, and 5.3.6 *Mitigating Measures*.

The Drumbo WWTP was identified as a significant drinking water threat when the local assessment reports were prepared several years ago. Therefore, this is not new information for the community and in the opinion of this ministry does not represent a "Change in Project or Environment" that might require an addenda to the ESR as per section A.4.3 of the MEA Class EA Parent Document. The expansion and improvement of the facility will not change this designation, but should provide more protection for the source of drinking water.

That said, the MECP would like to flag for the County that when they apply for their Environmental Compliance Approval for the WWTP, **section 4.5 in Part B of the guide to applying for an environmental compliance approval** explains the information that is required for source protection. The corresponding section 4.5 in the **application form** needs to be completed to include the relevant source protection information.

Evaluation of Alternatives

The MECP has reviewed and is now satisfied with the manner by which Evaluation of Alternatives has been addressed, including but not limited to the evaluation of the "Do Nothing" alternative.

Other

MECP SWR concurs that this ministry's previous comments as conveyed by letter of December 19th, 2018 pertaining to Indigenous Consultation, Archaelology, Heritage and Culture, as well as Climate Change has also been addressed in the Revised ESR.

Conclusion

MECP expects the Revised ESR dated April 2019 to remain publicly available at any time on the County of Oxford's Study webpage.

Yours truly,

Craig Newton
Regional Environmental Planner / Regional EA Coordinator
Ministry of the Environment, Conservation and Parks
Southwestern Region
733 Exeter Road
London, Ontario
N6E 1L3

Telephone: (519) 873-5014
E-mail: craig.newton@ontario.ca

From: David Simpson <dsimpson@oxfordcounty.ca>
Sent: April-25-19 12:38 PM
To: Lafrance, Crystal (MECP) <Crystal.Lafrance@ontario.ca>
Cc: Deborah Goudreau <dgoudreau@oxfordcounty.ca>; Mark Maxwell <mmaxwell@oxfordcounty.ca>; Abernethy, Scott (MECP) <Scott.Abernethy@ontario.ca>; Mitchell Heighway <mheighway@oxfordcounty.ca>; Newton, Craig (MECP) <Craig.Newton@ontario.ca>
Subject: RE: Drumbo Wastewater Treatment Plant ESR

Crystal – please provide us with 3 alternative dates/times next week for a teleconference.

Thanks,
David

DAVID SIMPSON, P.Eng., PMP
Director of Public Works, OXFORD COUNTY T 519.539.9800 ext 3100

From: Lafrance, Crystal (MECP) [mailto:Crystal.Lafrance@ontario.ca]
Sent: April-25-19 12:04 PM
To: David Simpson <dsimpson@oxfordcounty.ca>; Newton, Craig (MECP) <Craig.Newton@ontario.ca>
Cc: Deborah Goudreau <dgoudreau@oxfordcounty.ca>; Mark Maxwell <mmaxwell@oxfordcounty.ca>; Abernethy, Scott (MECP) <Scott.Abernethy@ontario.ca>; Mitchell Heighway <mheighway@oxfordcounty.ca>
Subject: RE: Drumbo Wastewater Treatment Plant ESR

Hello David,

Thank-you to those who prepared the revised ESR. We appreciate your efforts to provide sewage treatment for your community in a way that protects the environment.

I understand that the ministry received the revised ESR on April 16th. The ministry is currently reviewing it and we expect to have comments shortly. As these comments are forthcoming, and would be quite valuable for the discussion, I would suggest that we continue to find an alternate date to meet. We would like the team to have an opportunity to receive and review the comments so that we can best assist you through this EA process.

Thank-you,

Crystal Lafrance
Air, Pesticides and Environmental Planning Supervisor
Ministry of the Environment, Conservation and Parks, Southwest Region
733 Exeter Road, London ON N6E 1L3
Tel: 519-873-5055
Fax: 519-873-5020
crystal.lafrance@ontario.ca

From: David Simpson <dsimpson@oxfordcounty.ca>
Sent: April-24-19 1:58 PM
To: Newton, Craig (MECP) <Craig.Newton@ontario.ca>
Cc: Deborah Goudreau <dgoudreau@oxfordcounty.ca>; Mark Maxwell <mmaxwell@oxfordcounty.ca>; Abernethy, Scott (MECP) <Scott.Abernethy@ontario.ca>; Lafrance, Crystal (MECP) <Crystal.Lafrance@ontario.ca>; Mitchell Heighway <mheighway@oxfordcounty.ca>
Subject: RE: Drumbo Wastewater Treatment Plant ESR

Craig,

To be frank I am unclear why the delay in the review. We have had the teleconference set over a month ago and provided the updated ESR to your office on April 16 to which you had indicated would provide MECP with ample time to review the few remaining sections in the ESR that were previously requested to be addressed and updated.

I am concerned with the ongoing delay as we have been going back and forth with MECP comments since December, 2018. I would ask that you do everything you can to acquire the SWP comments today in advance of our planned teleconference call tomorrow. Again, not clear on what any SWP concern might be given there is no change to the existing site location under the preferred alternative, and given the outfall has been further enhanced beyond the existing condition (i.e. extended beyond the existing outfall, outside of the WHPA). We need some common sense around this review.

Please get back with an update today.

Thanks,
David

DAVID SIMPSON, P.Eng., PMP
Director of Public Works, OXFORD COUNTY T 519.539.9800 ext 3100

From: Newton, Craig (MECP) [mailto:Craig.Newton@ontario.ca]
Sent: April-24-19 8:09 AM
To: David Simpson <dsimpson@oxfordcounty.ca>
Subject: FW: Drumbo Wastewater Treatment Plant ESR

From: Newton, Craig (MECP)
Sent: April-24-19 8:04 AM
To: 'Mitchell Heighway' <mheighway@oxfordcounty.ca>
Cc: 'dgoudreau@oxfordcounty.ca' <dgoudreau@oxfordcounty.ca>; 'mmaxwell@oxfordcounty.ca' <mmaxwell@oxfordcounty.ca>; Abernethy, Scott (MECP) <Scott.Abernethy@ontario.ca>; Lafrance, Crystal (MECP) <Crystal.Lafrance@ontario.ca>; 'dsimpson@oxfordcouinty.ca' <dsimpson@oxfordcouinty.ca>
Subject: RE: Drumbo Wastewater Treatment Plant ESR

Mitchell:

Thank you for your preceding e-mail.

In response, no MECP has not concluded its review as yet. I have yet to receive comments from my circulation of the Restructured Class EA to our Source Protection Staff. I personally think deferring the teleconference scheduled for Thursday until I am in receipt of that Unit's comments, and have an opportunity to review them, and hold a teleconference after that would better serve everyone's time. I could call you and setup another date for a teleconference once I am in receipt of my internal circulation of the Revised Draft ESR. Does that approach work for you also?

Yours truly,

Craig Newton
Regional Environmental Planner / Regional EA Coordinator
Ministry of the Environment, Conservation and Parks
Southwestern Region
733 Exeter Road
London, Ontario
N6E 1L3

Telephone: (519) 873-5014
E-mail: craig.newton@ontario.ca

From: Mitchell Heighway <mheighway@oxfordcounty.ca>
Sent: April-23-19 4:50 PM
To: Newton, Craig (MECP) <Craig.Newton@ontario.ca>
Cc: Deborah Goudreau <dgoudreau@oxfordcounty.ca>; Mark Maxwell <mmaxwell@oxfordcounty.ca>; Abernethy, Scott (MECP) <Scott.Abernethy@ontario.ca>; Lafrance, Crystal (MECP) <Crystal.Lafrance@ontario.ca>; David Simpson <dsimpson@oxfordcounty.ca>
Subject: RE: Drumbo Wastewater Treatment Plant ESR

Good Afternoon Craig,

Following up on your below email; has the MECP concluded its review of the restructured Drumbo WWTP Expansion Class EA Study? Is the teleconference this Thursday needed to walk through the ESR's revisions and to discuss perspectives around the Notice of Study Completion? If the teleconference is needed, please kindly send me the call in instructions.

Thank you,

Mitchell Heighway, P.Eng.
Project Engineer

From: Newton, Craig (MECP) [mailto:Craig.Newton@ontario.ca]
Sent: April-08-19 11:11 AM
To: David Simpson
Cc: Mitchell Heighway; Deborah Goudreau; Mark Maxwell; Abernethy, Scott (MECP); Lafrance, Crystal (MECP)
Subject: RE: Drumbo Wastewater Treatment Plant ESR

David:

Further to our telephone conversation of April 4th, 2019, and your subsequent e-mail of the same date below, please be advised that Scott Abernethy, Crystal Lafrance, and I have all tentatively booked our calendars for a teleconference, if needed, on **April 25th, 2019 from 2:00 pm. to 3:00 pm**. I will send you the call in instructions closer to that date if needed, pending MECP's receipt of and MECP's findings of its review of the Revised Draft EA.

In the meantime, MECP awaits provision of the Revised Draft EA. Thank you in advance.

Yours truly,

Craig Newton
Regional Environmental Planner / Regional EA Coordinator
Ministry of the Environment, Conservation and Parks
Southwestern Region
733 Exeter Road
London, Ontario
N6E 1L3

Telephone: (519) 873-5014
E-mail: craig.newton@ontario.ca

From: David Simpson <dsimpson@oxfordcounty.ca>
Sent: April-04-19 2:44 PM
To: Newton, Craig (MECP) <Craig.Newton@ontario.ca>
Cc: Mitchell Heighway <mheighway@oxfordcounty.ca>; Deborah Goudreau <dgoudreau@oxfordcounty.ca>; Mark Maxwell <mmaxwell@oxfordcounty.ca>; Abernethy, Scott (MECP) <Scott.Abernethy@ontario.ca>
Subject: RE: Drumbo Wastewater Treatment Plant ESR

Hi Craig,

Thank you for your time reviewing the remaining matters on the Drumbo WWTP Expansion Class EA Study. As noted, we plan to have the revised ESR available for your team's review within the next 2 weeks which we believe fully satisfies the concerns raised to date.

I would prefer to hold anyone of the teleconference meeting times noted in my March 13 email below in order to walk you through the revisions and further discuss perspectives around the Notice of Study Completion.

Regards,
David

DAVID SIMPSON, P.Eng., PMP
Director of Public Works, OXFORD COUNTY T 519.539.9800 ext 3100

From: David Simpson
Sent: March-18-19 4:47 PM
To: 'anneleis.eckert@ontario.ca' <anneleis.eckert@ontario.ca>; 'craig.newton@ontario.ca' <craig.newton@ontario.ca>; Abernethy, Scott (MECP) <Scott.Abernethy@ontario.ca>
Cc: Mitchell Heighway <mheighway@oxfordcounty.ca>; Deborah Goudreau <dgoudreau@oxfordcounty.ca>; Mark Maxwell <mmaxwell@oxfordcounty.ca>
Subject: RE: Drumbo Wastewater Treatment Plant ESR

Hi Anneleis/Craig

The County is not in favour of your approach in regard to finalizing the review of the ESR. We have received and are currently addressing your comments through amendments to the final ESR.

I note we are not in a "Draft" ESR stage rather are merely amending updated information to the final ESR. Since December 2018, we have been working back and forth with the MECP based on review comments provided on the final ESR. In our opinion, the amendments are not overly substantive and should not require extensive review by the MECP, contrary to what you have suggested below. As such, we prefer to walk you/Craig, Scott and your manager through the updates via meeting/teleconference on any one of the dates/times noted below.

The amended ESR will remain publicly available at any time on our Study webpage, given that the formal ESR public review period has since ended some time ago and to which we received no response or interest from stakeholders or the public (only the MECP).

Please confirm when MECP is available for this discussion.

Regards,
David

DAVID SIMPSON, P.Eng., PMP | **Director of Public Works**
OXFORD COUNTY | 21 Reeve St., PO Box 1614, Woodstock, ON, N4S 7Y3
WWW.OXFORDCOUNTY.CA | T 519.539.9800 / 1-800-755-0394, ext 3100

From: Eckert, Anneleis (MECP) [mailto:Anneleis.Eckert@ontario.ca]
Sent: March-14-19 9:09 AM
To: Mitchell Heighway

Cc: Newton, Craig (MECP)
Subject: RE: Drumbo Wastewater Treatment Plant ESR

Hello Mitchell,
Thanks for letting me know your desire to push back the meeting. I am going on secondment shortly. My colleague, Craig Newton (cc'd here) will be taking over this file in my absence. In conversation with Craig, we would like to suggest that if you are intending to revise the ESR, it would be best for MECP to have an opportunity to review the document prior to attending a teleconference to enable us to participate in discussion with the County.

We are able to review draft ESRs and provide comments. Typically we require a minimum of 30 days to review. After our review we can discuss the need for a teleconference.

Please let me know if you would be interested in submitting a draft ESR.
Thank you,

Anneleis Eckert
Environmental Planner / Environmental Assessment Coordinator
519-873-5115 | anneleis.eckert@ontario.ca

From: Mitchell Heighway <mheighway@oxfordcounty.ca>
Sent: March 13, 2019 4:32 PM
To: Eckert, Anneleis (MECP) <Anneleis.Eckert@ontario.ca>
Subject: RE: Drumbo Wastewater Treatment Plant ESR

Hi Anneleis,

Please disregard the previous email I sent. To prepare for our meeting regarding the Drumbo WWTP Class EA and to assist the MECP in reviewing/understanding the work completed as part of this study, the County will be restructuring the ESR document. In order to allow the Consultant sufficient time to complete the restructuring, we would like to postpone the scheduled conference until the week of April 22nd. Below is a list of dates that work for the County's project team. If you could please provide availability for the relevant MECP staff, I will set the meeting/teleconference date accordingly.

April 23rd Afternoon
April 25th Afternoon
April 26th Any time

Thank you,

Mitchell Heighway, P.Eng.
Project Engineer

From: Eckert, Anneleis (MECP) [mailto:Anneleis.Eckert@ontario.ca]
Sent: March-08-19 12:13 PM
To: Mitchell Heighway
Subject: RE: Drumbo Wastewater Treatment Plant ESR

Hello Mitchell,

We can look into setting up a teleconference. Please outline, specifically, what it is that you would like to discuss. This ensures an efficient meeting with the correct staff present.

Please note that the items regarding the evaluation of the "do nothing" alternative and source water protection are requirements of the Class EA. The Ministry is not in a position to alter requirements or components of the Class EA process.

Thank you,

Anneleis Eckert
Environmental Planner / Environmental Assessment Coordinator
519-873-5115 | anneleis.eckert@ontario.ca

From: Mitchell Heighway <mheighway@oxfordcounty.ca>
Sent: March 6, 2019 2:29 PM
To: Eckert, Anneleis (MECP) <Anneleis.Eckert@ontario.ca>
Subject: RE: Drumbo Wastewater Treatment Plant ESR

Hi Anneleis,

Thank you for the response letter. I think it would be a good idea for the Oxford County project team to meet with you and the Environmental Assessment Manager to discuss the Drumbo WWTP ESR. Can you please advise which dates and times in the coming weeks work for you?

Thank you very much,

Mitchell Heighway, P.Eng.
Project Engineer

From: Eckert, Anneleis (MECP) [mailto:Anneleis.Eckert@ontario.ca]
Sent: March-06-19 10:00 AM
To: Mitchell Heighway
Cc: Abernethy, Scott (MECP); Slivar, Bob (MECP); Source Protection Screening (MECP); DesLauriers, Angelune (MECP)
Subject: Drumbo Wastewater Treatment Plant ESR

Good Morning Mitchell,
Thank you for your letter in response to MECP's comments of December 19, 2018 on the Drumbo Wastewater Treatment Plant. Please find attached MECP's response to your letter of February 14, 2019. Don't hesitate to contact me should you wish to discuss.
Thank you,

Anneleis Eckert
Environmental Planner / Environmental Assessment Coordinator
519-873-5115 | anneleis.eckert@ontario.ca
Air, Pesticides and Environmental Planning | Drinking Water and Environmental Compliance Division | Southwest Region | Ministry of the Environment, Conservation and Parks | 733 Exeter Road, London ON N6E 1L3