

Township of North Stormont

# Villages of Crysler, Finch and Moose Creek Water and Wastewater Master Plan

February 12, 2024



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RVA 226348

February 12, 2025

The Township of North Stormont  
15 Rue Union Street, P.O. Box 99  
Berwick, ON, K0C 1G0

**Attention: Craig Calder**  
**CAO / Clerk**

Dear Mr. Calder:

**Re: Villages of Crysler, Finch, and Moose Creek  
Water and Wastewater Master Plan**

Please find attached the final version of the Water and Wastewater Master Plan (W/WW MP) for the Township of North Stormont (Township). The Township is responsible for the provision of water and wastewater services to its serviced communities and has undertaken this study to develop, evaluate and select preferred long-term water and wastewater servicing strategies to support existing servicing needs and accommodate future projected population and employment growth to the year 2051. This report covers the following:

- The legislative and planning background to W/WW MP including the Municipal Class Environmental Assessment Process and assumptions on population growth;
- The consultation and engagement that has been undertaken;
- The evaluation criteria used in the W/WW MP;
- The Water Master Plan covering service requirements to meet expected water demand solutions to provide servicing to 2051;
- The Wastewater Master Plan covering service requirements to meet expected wastewater flow solutions to provide servicing to 2051;
- Project Recommendations; and
- A proposed Capital Implementation Plan.

This report has been updated post the 30-day Public Review Period as required by the MCEA process. This final report can now be issued with the Notice of Completion.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**



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Encls.: Township of North Stormont – Villages of Cryslar, Finch and Moose Creek Master Plan Report

## Villages of Crysler, Finch, and Moose Creek Water and Wastewater Master Plan

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## 1.0 INTRODUCTION

### 1.1 Background

The Township of North Stormont (Township) is located in eastern Ontario and is one of six Townships that form the United Counties of Stormont, Dundas and Glengarry (County). Largely composed of rural communities, the Township has three main urban settlements – Finch, Crysler, and Moose Creek – that are fully serviced by municipal drinking water systems (DWS) and wastewater treatment systems (WWTS), and comprise business and commercial areas as well as community and residential areas. The remaining communities across the Township are primarily bedroom communities and agricultural areas with private servicing.

In 2023, the Township undertook the *Growth Management Strategy* study (2023, Watson & Associates Economists Ltd.), which identified that North Stormont is anticipated to accommodate 11% of the total residential population growth in the County from 2021 to 2051. Based on the 2018 County Official Plan, growth in each Township is to be directed to areas that are fully serviced by municipal water and wastewater infrastructure. In response, the Township has undertaken the Villages of Crysler, Finch, and Moose Creek Water & Wastewater Master Plan (W/WW MP) which provides a 30-year municipal services planning strategy for the three urban settlements.

### 1.2 Master Plan Objective

#### 1.2.1 Problem and Opportunity Statement

The study follows the framework of the Municipal Engineers Association Class Environmental Assessment (MCEA) Process Master Plan Approach No.1. This includes Phase 1 – *Identify Problem & Opportunity Statement*; and part of Phase 2 - *Identify Alternative and Recommended Solutions* of the Class EA process. As the first step in Phase 1 of the Class EA process, the proponent (the Township) must identify and describe the problem or opportunity that the project is intended to address. In essence, the Problem and Opportunity (PaP) statement outlines the need and justification for the overall project and establishes the general parameters, or scope, of the study. The Township has chosen the following as its statement of the problem/opportunity to be addressed by the Master Plan:

*The Township of North Stormont is undertaking a Master Servicing Plan for the Villages of Finch, Crysler, and Moose Creek to plan for additional water and wastewater servicing needed to accommodate future growth to the year of 2051.*



## 1.2.2 Master Plan Objectives

This Master Plan identified key improvements to the existing water and wastewater infrastructure to service the short- and long-term needs of the villages. Key undertakings of the Master Plan process included:

- A background review of key water and wastewater services including water supply and storage, and wastewater collection and treatment;
- Analysis of the projected population growth and its impact on the future water demand and wastewater flows;
- Development of alternative solutions that are evaluated using a criterion established based on the Township's infrastructure management goals; and
- Public engagement to obtain consultation and feedback on the preferred solution.

The preferred solution/strategy for addressing the PaP statement was determined based on its potential to:

- Comply with applicable regulations to provide adequate water and wastewater servicing;
- Comply with the Official Plan and Growth Management Strategy;
- Consider stakeholder comments and concerns;
- Be financially viable;
- Be technically feasible and operationally sustainable; and
- Be socially and environmentally responsible.

Figure 1.1 to Figure 1.4 provide a layout of the key water and wastewater infrastructure across Finch, Crysler and Moose Creek.



Figure 1.1: Study Area of the Village of Finch.

Finch’s wastewater is treated by the Chrysler wastewater treatment lagoons. Finch’s wastewater collection system discharges to the Chrysler wastewater collection system.



Figure 1.2: Study Area of the Village of Chrysler (West)



Figure 1.3: Study Area of the Village of Crysler (East)

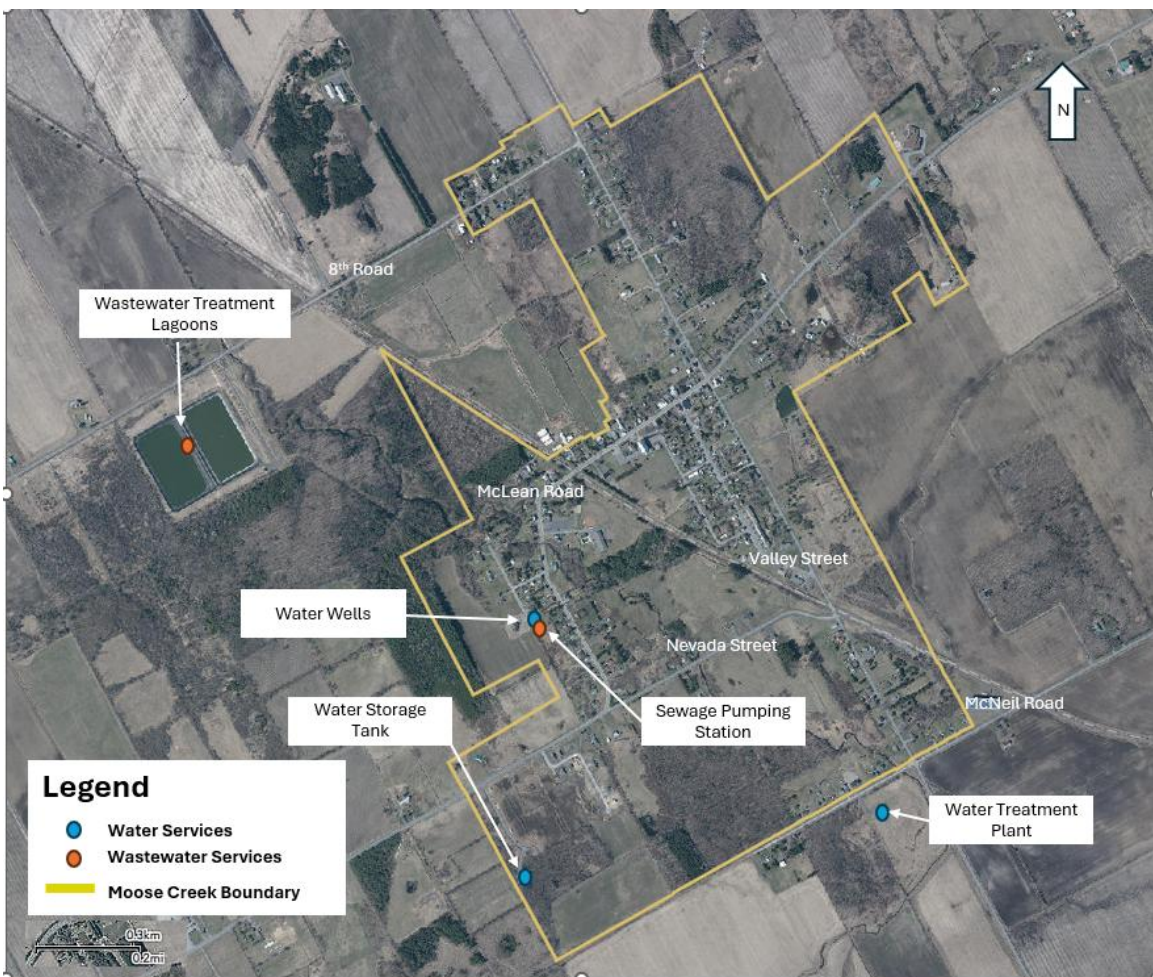


Figure 1.4: Study Area of the Village of Moose Creek

## **2.0 MASTER PLANNING PROCESS**

### **2.1 Municipal Class Environmental Assessment Process**

This Master Plan is being undertaken in accordance with the requirements of the Municipal Class Environmental Assessment (MCEA) as amended in March 2023. The MCEA sets out the Class Environmental (Class EA) planning process that a proponent must follow to meet the requirements of the Ontario Environmental Assessment Act for a class or category of infrastructure projects. The following are five elements in the Class EA planning process:

Phase 1 - Identification of problem (deficiency) or opportunity;

Phase 2 - Identification of alternative solutions to address the problem or opportunity. Public and review agency contact is mandatory during this phase and input received along with information on the existing environment is used to establish the preferred solution. It is at this point that the appropriate Schedule (B or C) is chosen for the undertaking. If Schedule B is chosen, the process and decisions are then documented in a Project File. Schedule C projects proceed through the following Phases;

Phase 3 - Examination of alternative methods of implementing the preferred solution established in Phase 2. This decision is based on the existing environment, public and review agency input, anticipated environmental effects and methods of minimizing negative effects and maximizing positive effects;

Phase 4 - Preparation of an Environmental Study Report summarizing the rationale, planning, design, and consultation process of the project through Phases 1-3. The ESR is then to be made available to agencies and the public for review; and

Phase 5 - Completion of contract drawings and documents. Construction and operation to proceed. Construction to be monitored for adherence to environmental provisions and commitments. Monitoring during operation may be necessary if there are special conditions.

### **2.2 Master Plan Process**

#### **2.2.1 Overview**

The Master Plan Process provides the basis for developing a long-range plan which integrates infrastructure requirements for existing and future land use. The W/WWMP has been developed following Approach Number (No.) 1 of the MCEA process, which involves a

broad scope and a low level of assessment of the projects identified in the Master Plan. The process follows, at minimum, the same steps of the first two phases of the MCEA process, allowing integration of infrastructure requirements for existing and future land use with the MCEA process, including public and agency consultation. Therefore, any Schedule B and C projects as identified per the new MPAP will require a more detailed investigation at the project-specific level to fulfill the MCEA requirement. Figure 2.1 shows the MCEA Master Plan process, with the phases being completed by this Master Plan boxed in red.

## **2.2.2 Class EA Project Schedules**

The projects identified via the Master Planning process are divided into schedules based on their type, and the schedules are further categorized as either **Exempt, Schedule B** or **Schedule C** based on the magnitude of their anticipated environmental impact. These are described briefly in the following paragraphs.

Exempt projects include various municipal maintenance, operational activities, rehabilitation works, minor reconstruction or replacement of existing facilities, and new facilities that are limited in scale and have minimal adverse effects on the environment. These projects are exempt from the requirements of the Environmental Assessment Act.

Schedule B projects are those which have a potential for adverse environmental effects. A screening process must be undertaken which includes consultation with directly affected public and relevant review agencies. Projects generally include improvements and minor expansions to existing facilities. The project process must be filed, and all documentation prepared for public and agency review.

Schedule C projects have the potential for significant environmental effects and must follow the full planning and documentation procedures specified in the Class EA document. An Environmental Study Report (ESR) must be prepared and filed for review by public and review agencies. Projects generally include the construction of new facilities and major expansions to existing facilities.

## **2.2.3 Requirements for Compliance with Regulations and Permitting Process**

While the MPAP effectively reduces the timelines for undertaking Class EA, it is not necessarily the Class EA process that is the time critical component in project planning and implementation. The MPAP requires approvals and clearances from agencies to be obtained and given the complexity and potential impacts to the environment, the overall timeline may not be significantly reduced. One example is the requirement to obtain an Environmental Compliance Certificate (ECA) for sewage works from the MECPC. If major items are not reviewed and decided at or before the Class EA with local MECPC staff, then

there is an elevated risk that the ECA application will be rejected, or rework will be required, and the assumed costs carried in the Class EA or the project may no longer be valid.

### 2.2.4 Level of Cost Opinions

ASTM E 2516 (Standard Classification for Cost Estimate Classification System) provides a five-level classification system based on several characteristics, with the primary characteristic being the level of project definition (i.e., percentage of design completion). Table 2.1 illustrates the typical accuracy ranges that maybe associated with the general building industries. The cost estimate developed in this report would be best described as a Class 5 Cost Estimate which is typically used for high level study projects.

Table 2.1: ASTM E2516 Accuracy Range of Cost Opinions

Cost Estimate Class	Expressed as % of Design Completion	Anticipated Accuracy Range as % of Actual Cost
5	0-2	-30 to +50
4	1-15	-20 to +30
3	10-40	-15 to +20
2	30-70	-10 to +15
1	50-100	-5 to +10

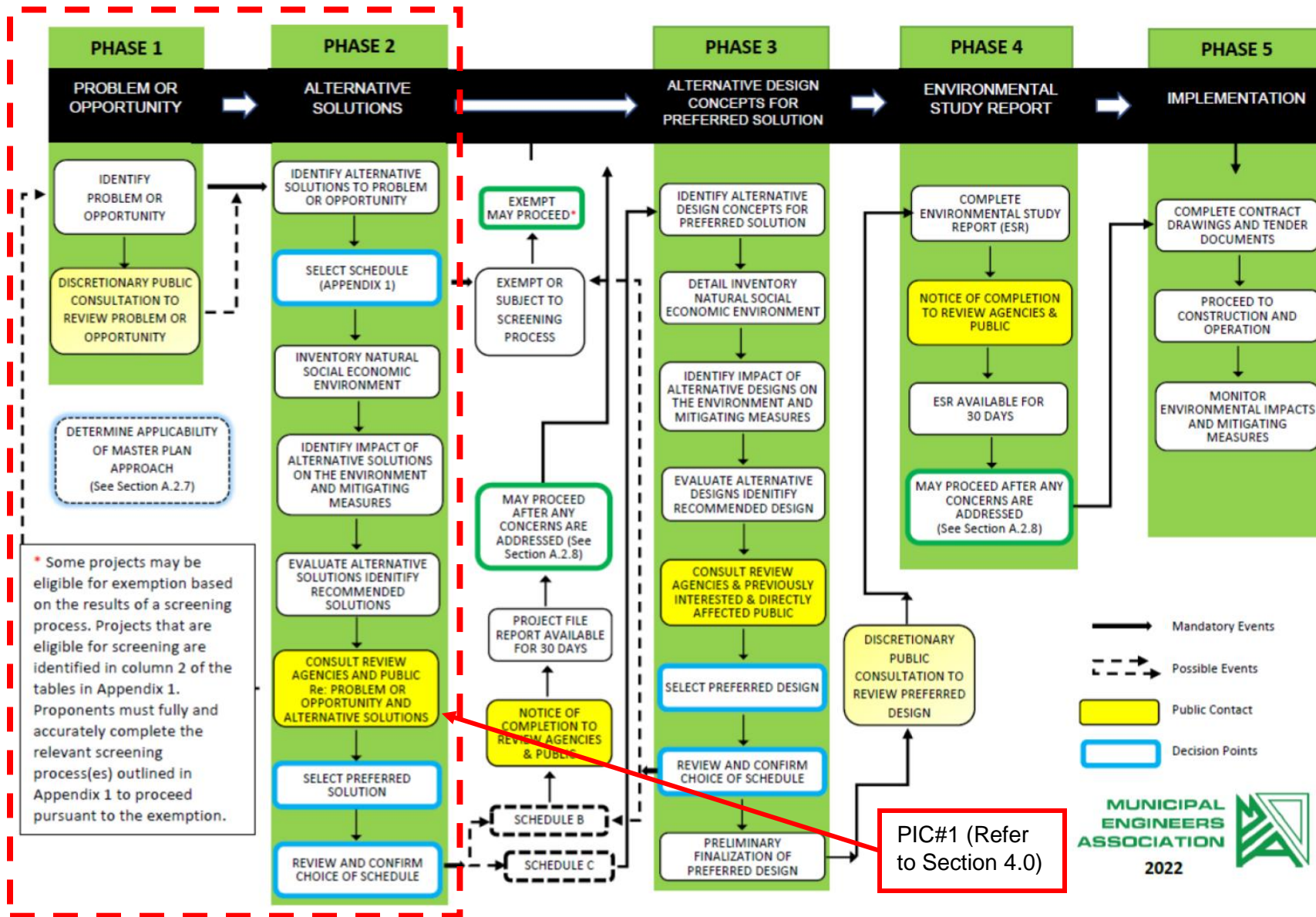


Figure 2.1: Municipal Class EA Planning and Design Process, Exhibit A.2

## 3.0 REFERENCED LEGISLATIONS AND POLICIES

### 3.1 Legislations

#### 3.1.1 Provincial Acts and Regulations

The following Provincial Acts and Regulations were referenced for the development of the W/WW Master Plan. Details for each are provided in Appendix A.

- Environmental Assessment Act (EAA)
- Environmental Protection Act (EPA)
- Ontario Water Resources Act (OWRA)
- Water Opportunities and Water Conservation Act (WCA)
- Nutrient Management Act (NMA)
- Safe Drinking Water Act (SDWA)
- Clean Water Act (CWA)
- Sustainable Water and Sewage Systems Act
- Provincial Policy Statement 2020

#### 3.1.2 Federal Acts and Regulations

The following Federal Acts were referenced for the development of the W/WW Master Plan. Details for each are provided in Appendix A.

- Federal Fisheries Act.
- Species at Risk Act.
- Endangered Species Act.

### 3.2 County and Township Policies

#### 3.2.1 United Counties Official Plan

The *United Counties of Stormont, Dundas, and Glengarry Official Plan* (Official Plan) recognizes Finch, Crysler and Moose Creek as Urban Settlement Areas, which are defined as communities with a diverse mix of land uses and full or partial municipal sewage and water services. The Official Plan provides the following objectives that was used to develop the water and wastewater servicing recommendations for this Master Plan:

1. Growth will focus on re-development and intensification that best uses existing or planned public services including municipal water and wastewater systems;



2. Servicing capacity, including calculation of uncommitted reserve capacity for water supply and sewage disposal, will be considered at all stages of the planning process to ensure efficient use and optimization of existing sewage and water services.
3. Planned infrastructure should be designed to meet the growth and development projections or capacity requirements of settlement areas for a 10 to 20-year period. Extensions or expansion to existing infrastructure should not be made which are unnecessary or uneconomical. Infrastructure improvements may be made to address public health or safety issues.
4. Full water and sewage disposal services are the preferred servicing for urban settlement development. Private Communal sewage and water servicing shall be strongly discouraged for any development. Development may be permitted on individual on-site water and sewage systems outside service limits but within the Settlement Areas where pockets of private services exist or if the site is suitable for the long-term provision of such services with no negative impacts. In settlement areas, these services may be used for infilling and minor rounding out of existing development.
5. Reserve capacity for private communal sewage services and individual on-site sewage services is considered sufficient if the hauled sewage from the development can be treated and land-applied on agricultural land under the Nutrient Management Act, or disposed of at sites approved under the Environmental Protection Act or the Ontario Water Resources Act.
6. Generally, facility expansion or infiltration control should be considered when effluent flows reach 80% of the daily design capacity.

### **3.2.2 Municipal Asset Management**

#### **3.2.2.1 OVERVIEW**

Strategies developed in this Master Plan took into consideration the Township's current strategy for managing its assets to ensure the performance required of them is maintained throughout their lifecycle. The Asset Management Plan (AMP) for the Township of North Stormont establishes the approach for the management of the Township's assets and provides an assessment of the current performance of municipal infrastructures based on the service level to the connected population. The Township's approach to risk management of its assets is based on the criticality of each asset related to its role in the community. The capital plan is then developed to ensure asset performance is maintained, with more critical assets having higher performance expectations. Strategies for the management of the assets over its lifecycle are as follows:

- Operational: operational activities, routine preventative maintenance, and studies on asset performance;
- Major Maintenance: repairs and component replacement to maintain asset performance;
- Rehabilitation: project to extend asset service life;
- Replacement: project resulting in a replacement of an asset with an asset that meets top industry and community expectations; and
- New Asset: construction or purchase of new assets that results in net growth of the asset inventory and an enhancement in service levels provided to the community.

### 3.2.2.2 2022 ASSET MANAGEMENT PLAN

The 2022 AMP was prepared by the Ontario Clean Water Agency (OCWA). It noted the following for the Township's water and wastewater assets as of 2022:

- Finch
  - › Water Assets: mostly in fair conditions with some deficiencies.
  - › Wastewater Assets: nearly all assets in good condition with no deficiencies, some rehabilitation required.
- Crysler
  - › Water Assets: mostly in good condition with some assets containing deficiencies and in need of rehabilitation.
  - › Wastewater Assets: mostly in fair condition with deficiencies and a portion of assets in need of treatment.
- Moose Creek
  - › Water Assets: nearly all assets in good condition with no deficiencies, some rehabilitation required.
  - › Wastewater Assets: most assets in good or fair condition with some deficiencies.

The 2022 AMP noted that development trends occurring during the time of the report preparation could result in water supply and wastewater treatment capacities reaching their limits within 10 years. To enhance asset performance, installation of water meters and reducing inflow and infiltration to the collection systems were also recommended.

### 3.2.2.3 2024 ASSET MANAGEMENT PLAN

The 2024 AMP was prepared by PSD Citywide. It noted the following for the Township's water and wastewater assets as of 2024:

- Finch, Chrysler and Moose Creek’s Water Treatment is in fair condition with the most critical item being water valves which were identified to be in very poor condition; and
- Finch, Chrysler and Moose Creek’s Wastewater Treatment systems were in fair condition with fair sewer network conditions. The most critical item being the Moose Creek Lagoon experiencing increased operating and maintenance costs associated with the aging of the lagoon.

### 3.2.2.4 CAPITAL PLAN

The Township’s proposed 5-year (2024 – 2026) capital forecast provided recommended projects as part of *Major Maintenance Recommendations* for its water and wastewater infrastructure. From the list, the projects listed in Table 3.1 were considered during the development of the Master Plan recommendations with the aim of combining projects for cost and time savings.

Table 3.1: OCWA Capital Projects

Urban Settlement	Project	Total	Year
<b>Water Capital Projects</b>			
Moose Creek	New Well Construction – Replacement Well No. 3	\$225,000	2024
	New Well Construction – Replacement Well No. 2	\$225,000	2025
<b>Wastewater Capital Projects</b>			
Finch	Replacement of Sewage Pump at SPS No. 1	\$35,000	2024
Moose Creek	New Sewage Pump for SPS	\$22,000	2024

## 4.0 CONSULTATION AND ENGAGEMENT

### 4.1 Introduction

The consultation process is an integral component of the MCEA process. As illustrated in Figure 2.1 and per the MECA process, at least two mandatory contact points are required to inform, engage, and consult with public representatives.

The Stakeholder Consultation Record for this Master Plan is attached to Appendix B and includes the following:

- Notices sent to the public including identified project stakeholders;
- Stakeholder Log containing a list of stakeholders;
- Public Information Centres presentations; and
- Public responses.

### 4.2 Notices

The following two notices were published:

- The Notice of Study Commencement was published on the Township's Website News & Notices Page (<https://www.northstormont.ca/living-stormont/news-notices/notice-study-commencement-water-and-wastewater>) and the project page for the Master Plan is at the following address: <https://www.northstormont.ca/living-stormont/news-notices/water-and-wastewater-master-servicing-plan>
- The Notice Of Public Information Centre was published on the Township's Website News & Notices Page (<https://www.northstormont.ca/living-stormont/news-notices/notice-public-information-centre-1>)

### 4.3 Stakeholder Consultation

The MCEA process requires stakeholder consultation to incorporate input from interested or impacted groups. Potential stakeholders included but were not limited to:

- Public – This includes individual members of the public including property owners who may be affected by the project, individual citizens who may have a general interest in the project, special interest groups, community representatives, and developers; and
- Review agencies – This includes government agencies who represent the policy positions of their respective departments, ministries, authorities, or agencies.

Public and Agency contact lists are compiled in the Stakeholder Log.

## 4.4 Indigenous Consultation

The information provided ensures the appropriate communities have been included in the contact lists for the duration of the MCEA project. Based on discussions and recommendations provided by the MECP regional office, the following Indigenous communities were to be consulted through this Master Plan process:

- Algonquins of Ontario (AOO)
- Algonquins of Pikwàkanagàn First Nation
- Mohawk Council of Akwesasne

It was determined that the Akwesasne territory is outside the Study Area Boundary and, therefore, the Mohawk Council of Akwesasne were not included on the contact list. The other two Indigenous communities were contacted and emailed all the information regarding the Master Plan. MECP additionally recommended that the Huron-Wendat be contacted if archeological studies were undertaken. These studies were not part of the project scope and therefore the Huron-Wendat were not included on the contact list.

## 4.5 Public Information Centres

A Public Information Centre (PIC) is a method to communicate with the public, interested parties and review agencies. For this project, one PIC was held to present the (PoP) Statement, background information collected, a review of the servicing strategies being evaluated, present the evaluation criteria, the preliminary preferred solution, and the project timeline. PIC No. 1 was held on Tuesday September 17, 2024 at Moose Creek Recreational Hall. Posted hours were from 6:00 PM to 9:00 PM.

## 4.6 Incorporating Consultation Input

The input and information gathered from the various parties who participated in the consultation were reviewed by the Project Team and used to develop the W/WWMP.

## 5.0 POPULATION ANALYSIS

### 5.1 Historical and Forecasted Serviced Population

All three urban settlements are not fully serviced, with properties within the urban settlement boundaries that have private septic systems and private wells. Settlement Area maps with delineated serviced boundary were obtained from the Official Plan. Each map was updated by the Township to reflect current service boundaries (as of 2023) and are attached to Appendix C. Housing units outside the serviced boundary but within the urban settlement boundary are residents of the village but are on private servicing.

As such, the actual serviced population in recent years was estimated using the sources listed below. The studies below also provided information for population growth and housing development:

- 2022 and 2024 Water and Sewage Reserve Capacity Study (RCS), R.V.A.
  - › Provided information of the number of units serviced by the DWS and WWTS
- 2023 Growth Management Strategy (GMS) study, Watson & Associates Economists
  - › Provided the forecasted residential and employment population growth.
- 2024 McBain Subdivision Servicing and Stormwater Management Report, EVB Engineering.
  - › Listed approved developments with committed municipal capacities.

Population analysis details from the information obtained from each source above are provided in Appendix C. Table 5.1 summarizes the historical and the projected serviced population to 2051.

Table 5.1: Historical and Projected Serviced Population

Urban Settlement	A = 2021 Serviced Population	2021 – 2051 Additional Population		A + B + C = 2051 Serviced Population
		B = Residential Population	C = Employment Population	
<b>Drinking Water System</b>				
Finch	650	290	5	950
Crysler	1,140	980	25	2,150
Moose Creek	680	490	10	1,180

Urban Settlement	A = 2021 Serviced Population	2021 – 2051 Additional Population		A + B + C = 2051 Serviced Population
		B = Residential Population	C = Employment Population	
<b>Wastewater Treatment System</b>				
Finch	600	290	5	900
Chrysler	1,120	980	25	2,130
Moose Creek	580	490	10	1,080

The projection calculations assume that all future growth (resulting from new developments, intensification of existing serviced areas etc.) will be connected to municipal services. If the Township desires to connect the existing non-serviced lots, an updated *Reserve Capacity* study is recommended to determine the required capacity of municipal services needed to service the existing lots. Additionally, cost impacts of extending the water distribution network and sewage collection system to existing built areas would need to be considered.

## 5.2 Population Corresponding to Approved Development

Table 5.2 lists the approved developments in each urban settlement as of 2023 that were accounted for in the current reserved capacities of the DWS and WWTS. Finch and Moose Creek’s committed units as of 2024 was emailed by the Township Planning Staff. Servicing Management Reports approved by the Township provided the estimated population growth from the approved and planned developments. During the preparation of this Master Plan, development plans for a total of 1,062 units (that can accommodate 3,030 people) was submitted. The units are to be constructed in four phases, of which only Phase 1 comprising of 329 units which can accommodate 875 people is currently approved.

Table 5.2: Committed Housing Developments and Corresponding Population as of 2023

Urban Settlement	Units	PPU <sup>1</sup>	Population
Finch	14	2.55	36
Chrysler <sup>1</sup>	329	-	875
Moose Creek	12	2.55	31

1: Average PPU from 2021 – 2051 is 2.55 as provided in the GMS Report

### 5.3 Sensitivity Analysis

The current approved development triggered a need for a sensitivity analysis on Crysler’s population growth as it introduced a larger housing growth within the next 5 years than previously estimated in the GMS report. The sensitivity analysis analyzed the High-Growth scenario for Crysler which is 0.2% higher than the growth rate adopted by the Township in the Official Plan. The population projected under this scenario were used to determine the additional capacity of municipal services that may be needed to support larger than anticipated growth. Table 5.3 provides the results of the analysis.

**Table 5.3: Crysler’s Projected Population under High Growth Scenario**

Parameter	Value
Additional Population Growth 2021 - 2051	980
% Increased Growth Rate under High Growth scenario.	0.2%
Additional Population Growth 2021 – 2051 under High Growth Scenario <sup>1</sup>	1,040
2051 Serviced Population under High Growth Scenario – DWS	2,210
2051 Serviced Population under High Growth Scenario - WWTS	2,190

1: Value calculated using typical growth rate formula:  $POP.FUTURE = POP.PRESENT \times (1+i)^n$ , where  $i$  = growth rate and  $n$  = number of years.

The analysis results show that the difference between the High and Medium Growth Scenarios is very small and yield similar projected water demand and wastewater discharge per person. Therefore, only the High Growth Scenario (HGS) is proceeded with for Crysler’s water and wastewater master planning.

Under HGS, a growth rate of approximately 17 units per year is expected per the GMS report. The application for the four-phase planned development (under which 329 units are already approved) proposes a growth rate of 30 units annually. Figure 5.1 illustrates both growth trends.

A confirmation of actual growth trends can only be obtained post development completion. The Township is recommended to observe the growth rate post development and determine whether the rate stays consistent with the forecasted rate (presented in the GMS report) or if it is accelerated in response to the available housing supply (from the ongoing approved/planned developments). The data can be analysed in the next iteration of the Master Plan or Reserve Capacity Study to determine if the expansion of drinking water and wastewater treatment municipal services needs to occur in the immediate timeline (within 5 to 10 years) instead of long-term (15 + years). Additionally, per the GMS report, Crysler



only has an additional available designated residential land supply of 22 years or 25 acres of net residential area. Further development may require boundary expansion

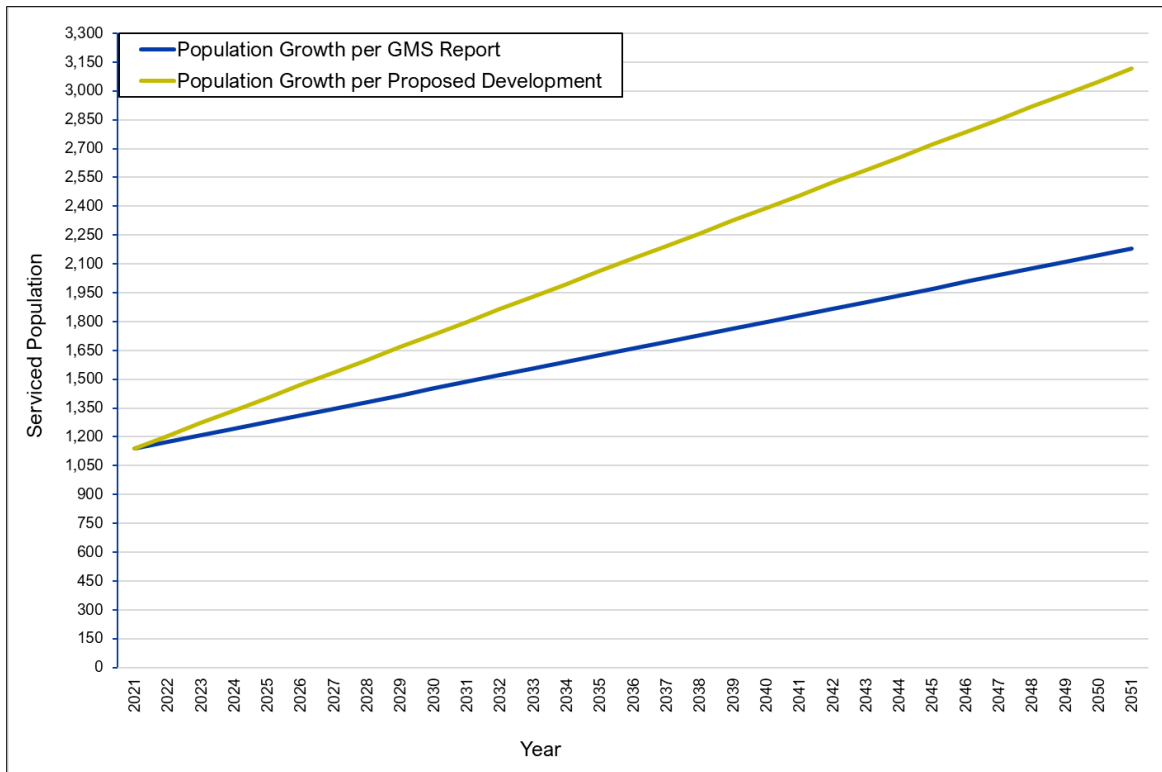


Figure 5.1: Crysler Committed Population Growth Scenarios

Forecasted water demand and wastewater flow to 2051 were calculated for both scenarios above to determine the impact on long-term municipal service planning.

## 6.0 EVALUATION METHODOLOGY

### 6.1 Evaluation Criteria

An MCEA-based evaluation criteria established in four categories as listed in Table 6.1 was used to evaluate the alternative strategies.

Table 6.1: MCEA Evaluation Criteria

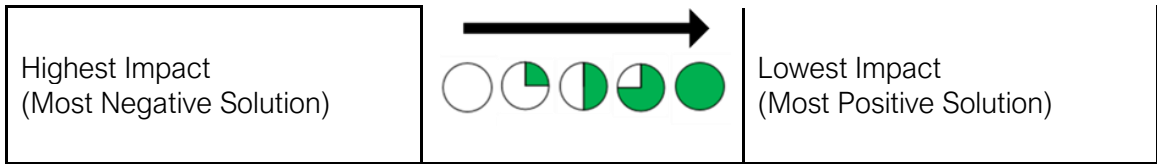
Category	General Criteria to Assess Impact
Technical	<ul style="list-style-type: none"> <li>• Constructability</li> <li>• Improvements to operation</li> <li>• Infrastructure required</li> <li>• Approval requirements</li> </ul>
Social and Cultural	<ul style="list-style-type: none"> <li>• Public Impacts</li> <li>• Impacts to known and potential built heritage resources and cultural heritage landscapes</li> <li>• Impacts to archaeological resources and areas of archaeological potential”</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>• Impact to aquatic and terrestrial species and habitat</li> <li>• Impact to surface water quantity and quality</li> <li>• Climate change resiliency</li> </ul>
Economic	<ul style="list-style-type: none"> <li>• Capital costs</li> <li>• Operational and maintenance costs</li> <li>• User value</li> </ul>

The evaluation process followed a two-step approach; first, each alternative was assessed for its capability of meeting the PaP statement. Alternatives that did not comply were not evaluated further. Alternatives that did align with the PaP statement were shortlisted for further analysis including potential implementation strategies.

The shortlisted alternative strategies were then scored against the four categories to determine the preferred strategy that most satisfies the evaluation criteria. Table 6.2 below shows the rating scale used for the evaluation process.

Table 6.2: Evaluation Rating Scale

<b>Evaluation Rating Scale</b>
--------------------------------



## 6.2 Existing Conditions: Cultural Heritage Resources

The Official Plan states that all heritage resources are to be conserved when making development and infrastructure decisions which may affect them, as mandated by the Ontario Heritage Act (Refer to Appendix A for Act details). To preserve its cultural heritage resources, the County initiated the Lost Villages Historical Society and the Municipal Heritage Committee. The Official Plan also sets out a screening and evaluation process to identify and conserve other heritage resources or areas of archeological potential which have not been identified, recognized or are currently unknown.

A desktop review of the cultural heritage resources in the three villages was undertaken as part of this Master Plan. Crysler's Farm was identified as heritage site in a study undertaken by Abacus Archaeological Services in 2022 in response to a new subdivision development in Crysler.

Future undertakings under the Master Plan may impact known or potential cultural heritage resources, which include archaeological resources, built heritage sites, and cultural heritage landscapes. For all future undertakings under the Master Plan, The Township shall complete the Ministry of Citizenship and Multiculturalism (MCM)'s Criteria for Evaluating Archaeological Potential screening checklist to determine whether an archaeological assessment is needed. If a project area exhibits archaeological potential, then an archaeological assessment shall be completed by a licensed archaeologist under the Ontario Heritage Act. Archaeological assessment reports are to be submitted to MCM for review as early as possible during the planning phase and prior to any ground disturbing activities. In addition, for all future undertakings under the Master Plan, the Township shall complete the MCM's Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage

## 7.0 WATER MASTER PLAN

### 7.1 Data References

The following references were used for developing the Water Master Plan;

- Finch
  - › Drinking Water Works Permit (DWWP), Number 182-201 (Government of Ontario 2002), Issued 11/20/2020
  - › Municipal Drinking Water License (MDWL), Number 182-101 (Government of Ontario 2002), Issued 11/20/2020
  - › Permit to Take Water (PTTW), Number 8713-C2HJT3 (Government of Ontario 2015), Issued 4/28/2021
- Crysler
  - › DWWP, Number 182-202 (Government of Ontario 2002), Issued 11/20/2020
  - › MDWL, Number 182-102 (Government of Ontario 2002), Issued 11/20/2020
  - › PTTW, Number 7670-CTUS46 (Government of Ontario 2015), Issued 12/20/2023
- Moose Creek
  - › DWWP, Number 182-203 (Government of Ontario 2002), Issued 11/20/2020
  - › MDWL, Number 182-103 (Government of Ontario 2002), Issued 11/20/2020
  - › PTTW, Number 4000-9YGLJP (Government of Ontario 2015), Issued 7/16/2015
- Annual Reports from 2021 – 2023 for each DWS.

### 7.2 Water Systems Description

#### 7.2.1 Finch Drinking Water System

Table 7.1 lists the Finch DWS's assets and their capacities. The Finch Water Treatment Plant (WTP) and supply wells are located at 20 William Street. Both are 200 mm in diameter and 54 m deep bedrock wells and currently operate in duty/standby mode. Raw water from the supply wells is treated for Hydrogen Sulphide removal via the 0.84 m<sup>2</sup> Aeration Tower. Chlorination disinfection is then provided in the underground clearwell which are equipped with two high-lift pumps (HLPs) that operate in duty/standby mode. The pumps send the disinfected water to the Baffled Pressure Vessel where it is treated via flocculation, followed by removal of the flocculants in the downstream Dual Media Pressure Filters.

Provision of additional chlorine contact time is also provided in the piping from the point of the aeration stack up to the point of entry into the distribution system, as chlorination is introduced upstream of the aeration stack, and the pipe does not have any service connections over its entire length.

Storage and fire protection is provided by an Elevated Water Storage Tank located at William Street with a total usable capacity of 580 m<sup>3</sup>.

The Finch DWS PTTW limits the water taking per day to 778 m<sup>3</sup>/day combined from both wells. As such, the WTP operates under a MDWL and DWWP which limits the maximum daily production of treated water to 778 m<sup>3</sup>/day. Firm capacity of the water supply is taken as the capacity of a single HLP (432 m<sup>3</sup>/day) that supplies the distribution system.

Table 7.1: Finch DWS Capacity

Infrastructure	Capacity	Source
WTP Rated Capacity	778 m <sup>3</sup> /day	MDWL No. 182-101
Well No. 1 Rated Capacity	778 m <sup>3</sup> /day	PTTW No. 8713-C2HJT3
Well No. 2 Rated Capacity	778 m <sup>3</sup> /day	
Two (2) Submersible Pumps (one in each well)	9.5 L/s (821 m <sup>3</sup> /day)	Information provided by Operation Staff.
Chlorine Contact Pipe	22m of 150 mm diameter, and 12 m of 100mm diameter	DWWP No.182-201
Aeration Tower (Hydrogen Sulphide removal)	8 L/s	
Aeration Tower Blower	264 L/s	
Clearwell <sup>1</sup>	29.7 m <sup>3</sup>	
Two (2) High Lift Pumps	5 L/s (432 m <sup>3</sup> /day)	
Baffled Pressure Vessel	8 L/s	
Two (2) Dual Media Pressure Filters	2 x 4 L/s at 9m/hr	
Backwash Storage Tank	15 m <sup>3</sup>	
Elevated Water Storage Tank	580 m <sup>3</sup>	
Supply Firm Capacity	432 m <sup>3</sup> /day	
WTP Firm Capacity	432 m <sup>3</sup> /day	Largest HLP out of service

1: Clearwell is used entirely for chlorine contact time. Hence, it cannot be used for storage.

## 7.2.2 Crysler Drinking Water System

Table 7.2 lists the Crysler DWS’s assets and their capacities. Crysler is serviced by a WTP located on County Road 13 and houses two groundwater wells. Well No.1 is 12.2m deep and 250mm in diameter and Well No.2 is 13.4 m deep and 250 mm in diameter. Both wells are classified as Groundwater Under the Direct Influence of surface water (GUDI) with effective in-situ filtration. The groundwater is disinfected by a UV treatment system and by sodium hypochlorite treatment with chlorine contact time provided in a chlorine contact pipe.

Storage and fire protection is provided by an Elevated Water Storage Tank located on County Road 13 with a total usable capacity of 1,238 m<sup>3</sup>.

The Crysler DWS PTTW limits the water taking per day to 1,685 m<sup>3</sup>/day combined from both wells. As such, the WTP operates under a MDWL and DWWP which limits the maximum daily production of treated water to 1,685 m<sup>3</sup>/day. Firm capacity of the water supply is taken as the capacity of a single well pump (1,685 m<sup>3</sup>/day).

Table 7.2: Crysler DWS Capacity

Infrastructure	Capacity	Source
WTP Rated Capacity	1,685 m <sup>3</sup> /day	MDWL No.182-102
Well No.1 Rated Capacity	1,685 m <sup>3</sup> /day (365 days)	PTTW No. 3688-CR9HAC
Well No. 2 Rated Capacity	1,685 m <sup>3</sup> /day (142 days)	
Two (2) Submersible Pumps (one in each well)	19.5 L/s (1,685 m <sup>3</sup> /day) at 85m TDH	DWWP No.182-202
UV Disinfection System – Two (2) reactor units	19.5 L/s (1,685 m <sup>3</sup> /day), UV dose pf 40 mJ/cm <sup>2</sup>	
Chlorine Contact Pipe	200mm diameter x 1900 m long feeder main	
Elevated Storage Facility (Water Tower)	1,238 m <sup>3</sup>	
Firm Capacity	1,685 m <sup>3</sup> /day	Largest well pump out of service

## 7.2.3 Moose Creek Drinking Water System

Table 7.3 lists the Moose Creek DWS’s assets and their capacities. Moose Creek’s WTP is located on McNeil Road. Water is supplied from three 200 mm diameter underground wells;

Well No.1 is 15m deep, Well No. 2 is 31m deep, and Well No.3 is 32m deep. Disinfection is provided in a chlorine contact chamber and in the subsequent connected clear wells, from which two high lift pumps pump the treated water to the distribution system.

Storage and fire protection is provided by an Elevated Water Storage Tank located on County Road 15 with a total usable capacity of 622 m<sup>3</sup>.

The Moose Creek DWS PTTW limits the water taking per day to 896 m<sup>3</sup>/day combined from all three wells. As such, the current rated capacity of the Moose Creek DWS under its MDWL and DWWP is 896 m<sup>3</sup>/day. Firm capacity of the DWS is taken as the combined capacity of Wells 2 and 3 (600 m<sup>3</sup>/day).

Table 7.3: Moose Creek DWS Capacity

Infrastructure	Capacity	Source
Permit to Take Water (WTP Rated Capacity)	896 m <sup>3</sup> /day	MDWL No.182-103
Well No.1 Rated Capacity	7.43 L/s (642 m <sup>3</sup> /day)	PTTW No. 4000-9YGLJP
Well No. 2 Rated Capacity	3.5 L/s (299 m <sup>3</sup> /day)	
Well No. 3 Rated Capacity	3.5 L/s (299 m <sup>3</sup> /day)	
High Lift Pumps (HLP) x 2	12 L/S at 55 m TDH	DWWP No.182-203
Clearwell No.1	28.35 m <sup>3</sup>	
Clearwell No.2	23.85 m <sup>3</sup>	
Chlorine Contact Chamber	"L" shaped (5.6m x 2.0m x 5.35m x 1.0m)	
Water Tower	622 m <sup>3</sup>	
Supply Firm Capacity	600 m <sup>3</sup> /day	Largest well pump out of service
Distribution Firm Capacity	1,036 m <sup>3</sup> /day	Largest HLP out of service



## 7.3 Water Design Parameters

### 7.3.1 Overview

Historical average and maximum day water demands for each DWS were obtained from the Annual Reports provided by the Township. Only data from 2021 to 2023 is considered as the connected population information is only available for those three years. The data was then analysed per the MECP *Design Guidelines for Drinking Water Systems* (MECP Guidelines).

Committed capacity is calculated per the MECP D-5-1 formula for sewage and water treatment plants, which accounts for current water demand as well as projected water demand from those future developments that have been approved to be built (as provided in Section 5.2).

### 7.3.2 Water Supply

Table 7.4 summarizes the historical data used to estimate the per-capita (per person) water consumption in each urban settlement. An anomaly in Chrysler’s data was observed; a MDD of 1,064 m<sup>3</sup>/d was reported in August 2021. This can be taken as an anomaly when compared to a MDD of 442 m<sup>3</sup>/d reported in August 2020 and a MDD of 561 m<sup>3</sup>/d in August of 2022. However, the second largest MDD in that year is 599 m<sup>3</sup>/d which is significantly lower than the MDD reported over the 2016 – 2021 period. Hence, the MDD of 1,064 m<sup>3</sup>/d is retained and used to obtain the future maximum day per capita demand.

Table 7.4: Historical Water Demand Analysis

Year	ADD (m <sup>3</sup> /day)	MDD (m <sup>3</sup> /day)	Peaking Factor <sup>1</sup>	Connected Population <sup>2</sup>	Average Daily Per-Capita Demand (L/cap/day)
<b>Finch DWS</b>					
2021	241	537	2.2	645	374
2022	294	574	2.0	658	447
2023	351	605	1.7	671	523
<b>Average</b>	<b>295</b>	<b>572</b>	<b>2.0</b>	<b>-</b>	<b>448</b>
<b>Chrysler DWS</b>					
2021	307	1,064	3.5	1,140	269
2022	323	778	2.4	1,180	274
2023	389	917	2.4	1,220	<b>319</b>

Year	ADD (m <sup>3</sup> /day)	MDD (m <sup>3</sup> /day)	Peaking Factor <sup>1</sup>	Connected Population <sup>2</sup>	Average Daily Per-Capita Demand (L/cap/day)
Average	340	920	2.7	-	287
<b>Moose Creek DWS</b>					
2021	215	506	2.4	679	317
2022	221	523	2.4	692	320
2023	209	471	2.3	704	297
Average	215	500	2.3	-	311

1: Peaking Factor is taken as the ratio of the MDD to the ADD.

2: Values are not rounded, to allow providing the actual numbers used to calculate the per-capita factors.

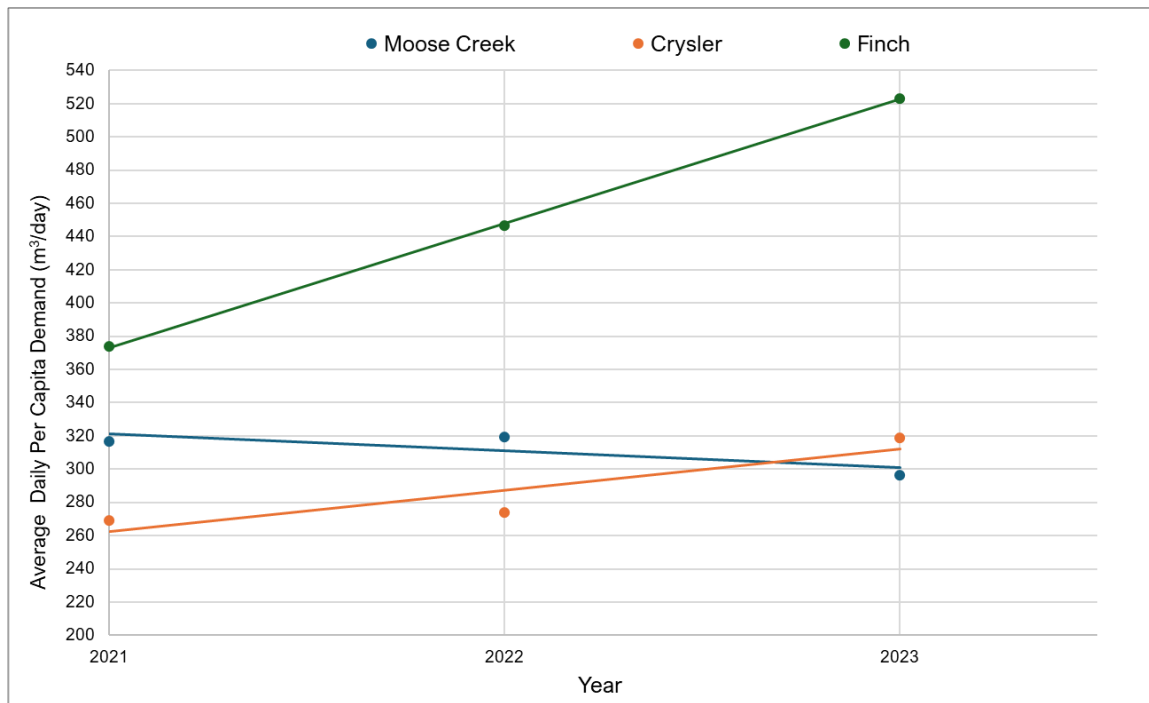


Figure 7.1: Historical Residential Water Demand

The data is illustrated graphically in Figure 7.1 and suggests that:

- The average daily per-person water use is increasing on average in North Stormont with the exception of Moose Creek, which maybe an outlier and not necessarily a reflection of decreasing trend;
- Finch particularly has a significantly high per-capita demand, when compared to typical values of 250 – 450 L/cap/day provided by the MECP Guidelines. This may be a result of lack of water metering, the impacts of which is further detailed in

7.5.4. The maximum day peaking factors range from 1.7 to 2.7, which is typical for the size of each urban settlement; and

- Crysler’s average per capita demand is lower than that of Moose Creek’s and Finch’s, and may result in underestimating the future water demand especially when its trend is observed to be increasing. As such, only the 2023 per capita demand of 319 L/cap/day is used to project Crysler’s future water demand.

### 7.3.3 Water Storage

The required water storage capacity was calculated in accordance with the MECP Guidelines for systems providing fire protection. Table 7.5 provides the water storage capacity required to meet the current demands of each DWS.

Table 7.5: Current Required Water Storage Analysis

Parameter	Finch	Crysler	Moose Creek
2023 Population	671	1,220	704
<b>A = Fire Flow Storage (m<sup>3</sup>)</b> <ul style="list-style-type: none"> <li>• Population &lt; 1,000 = Fire Flow of 38 L/s to be supplied for 2 hours</li> <li>• 1,000 &gt; Population &gt; 1,500 = Fire Flow of 64 L/s to be supplied for 2 hours</li> </ul>	274	461	274
<b>B = Equalization Storage (m<sup>3</sup>) = 0.25 x MDD m<sup>3</sup>/d</b>	151	229	118
<b>Emergency Storage (m<sup>3</sup>) = 0.25 x (A + B)</b>	106	173	98
<b>Required Storage as of 2023 (m<sup>3</sup>) = (A + B + C)</b>	531	863	489
<b>Water Storage Capacity (m<sup>3</sup>)</b>	580	1,238	622
<b>Remaining Additional Available Water Storage (m<sup>3</sup>) as of 2023</b>	<b>49</b>	<b>375</b>	<b>133</b>

## 7.4 Opportunities and Constraints

### 7.4.1 Water Demand Projections

Table 7.6 provides the following information, which are illustrated graphically from Figure 7.2 to Figure 7.7:

- Future water demand using the historical average per-capita water use (from Table 7.4) and the forecasted population (from Table 5.1); and
- DWS committed capacity taken as the capacity of the respective WTPs that are committed as of 2023, and remaining available (uncommitted) capacity that can be allotted to future housing/population growth.

Table 7.6: Forecasted Water Demand to 2051

Parameter	Urban Settlement	Finch	Crysler (HGS)	Moose Creek
<b>Water Supply</b>				
A = 2051 Serviced Population		950	2,200	1,180
B = Per-Capita Demand (m <sup>3</sup> /day)		0.448	0.319	0.311
C = Maximum Day Peaking Factor		2.0	2.7	2.3
A x B x C = D = 2051 MDD (m <sup>3</sup> /day)		828	1,927	850
<b>Water Storage</b>				
E = Fire Flow Storage (m <sup>3</sup> ) <ul style="list-style-type: none"> <li>• Population &lt; 1,000 = Fire Flow of 38 L/s to be supplied for 2 hours</li> <li>• 1,000 &gt; Population &gt; 1,500 = Fire Flow of 64 L/s to be supplied for 2 hours</li> <li>• 2,000 &gt; Population &gt; 3,000 = 95 &gt; Fire Flow &gt; 110 (L/s) to be supplied for 2 hours</li> </ul>		274	706	461
0.25 x D = F = Equalization Storage (m <sup>3</sup> )		207	469	213
0.25 x (E + F) = G = Emergency Storage (m <sup>3</sup> )		120	294	168
E + F + G = H = Required Storage as of 2023 (m <sup>3</sup> )		601	1,468	842
I = Water Storage Capacity (m <sup>3</sup> )		580	1,238	622
I – H = J = Remaining Additional Available Water Storage (m <sup>3</sup> ) as of 2023		(-21)	(-230)	(-220)
<b>Committed Capacity</b>				
K = Committed Population		40	875	30
J = Current MDD (m <sup>3</sup> /day) <sup>1</sup>		572	920	500
L = Per-Capita Demand (m <sup>3</sup> /day)		0.448	0.319	0.311
M = Maximum Day Peaking Factor		2.0	2.7	2.3
K x L x M = N = MDD from Committed Population (m <sup>3</sup> /day)		35	766	36
J + N = O = Total Committed Capacity (m <sup>3</sup> /day)		607	1,685	522
P = DWS Rated Capacity		778	1,685	896
P – O = Q = Remaining Available Capacity (m <sup>3</sup> /day)		170	0	375

1: Current MDD is taken as the average historical MDD from 2021-2023 for each DWS, as provided in Table 7.4.

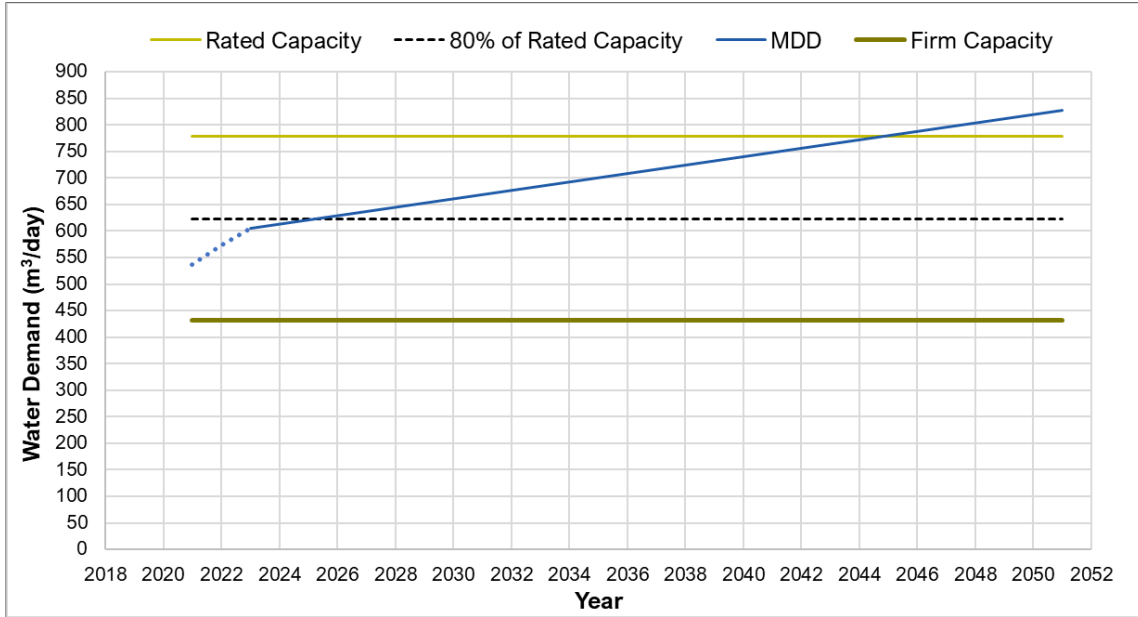


Figure 7.2: Finch DWS - Projected Maximum Day Demand

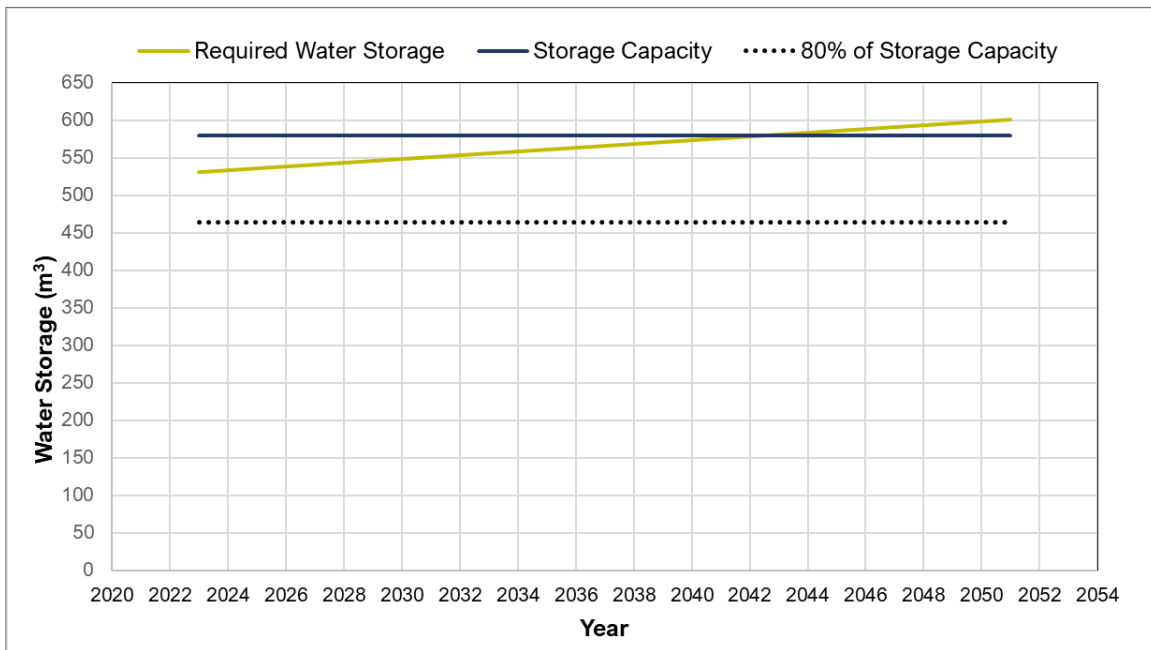


Figure 7.3: Finch DWS - Projected Water Storage Requirements

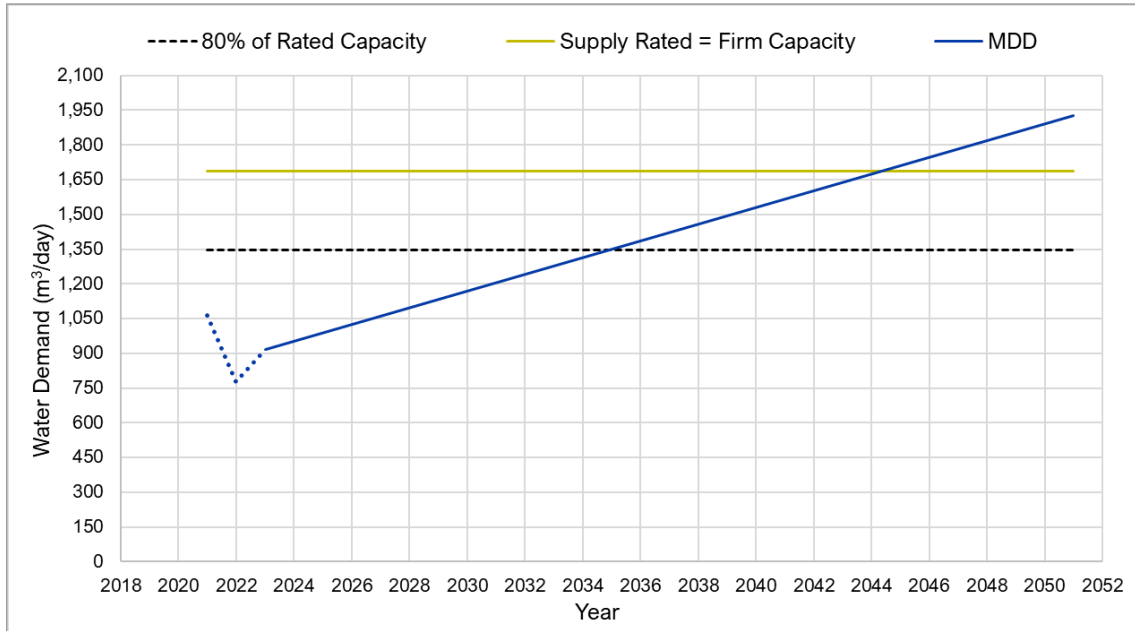


Figure 7.4: Chrysler DWS - Projected Maximum Day Demand

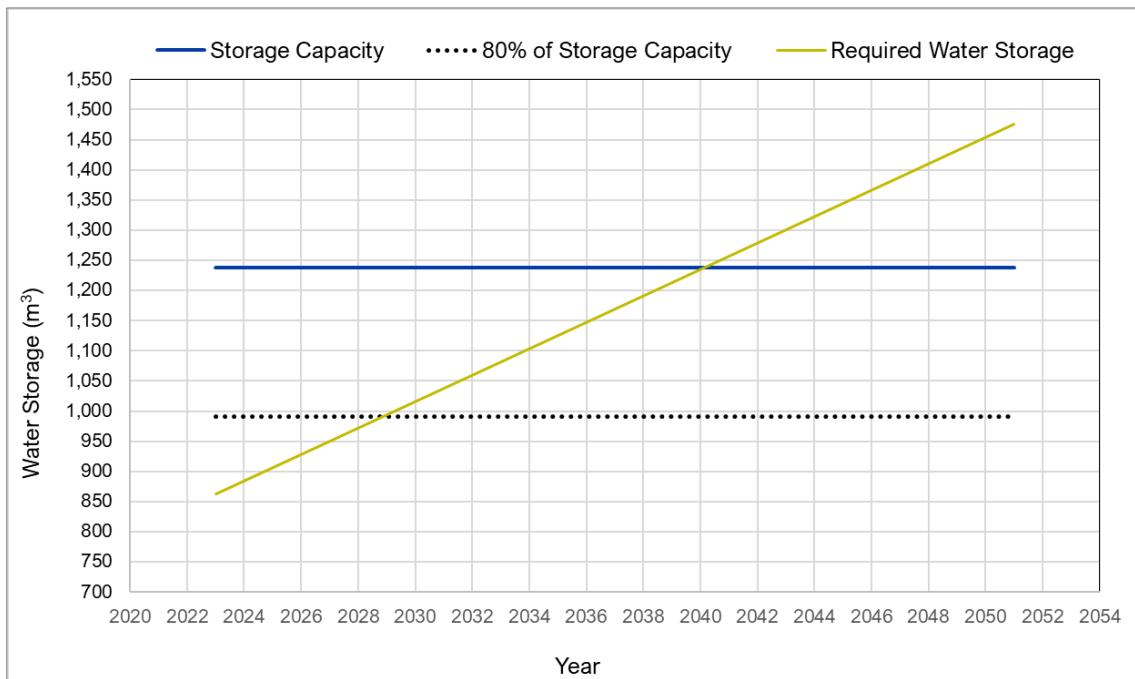


Figure 7.5: Chrysler DWS - Projected Water Storage Requirements

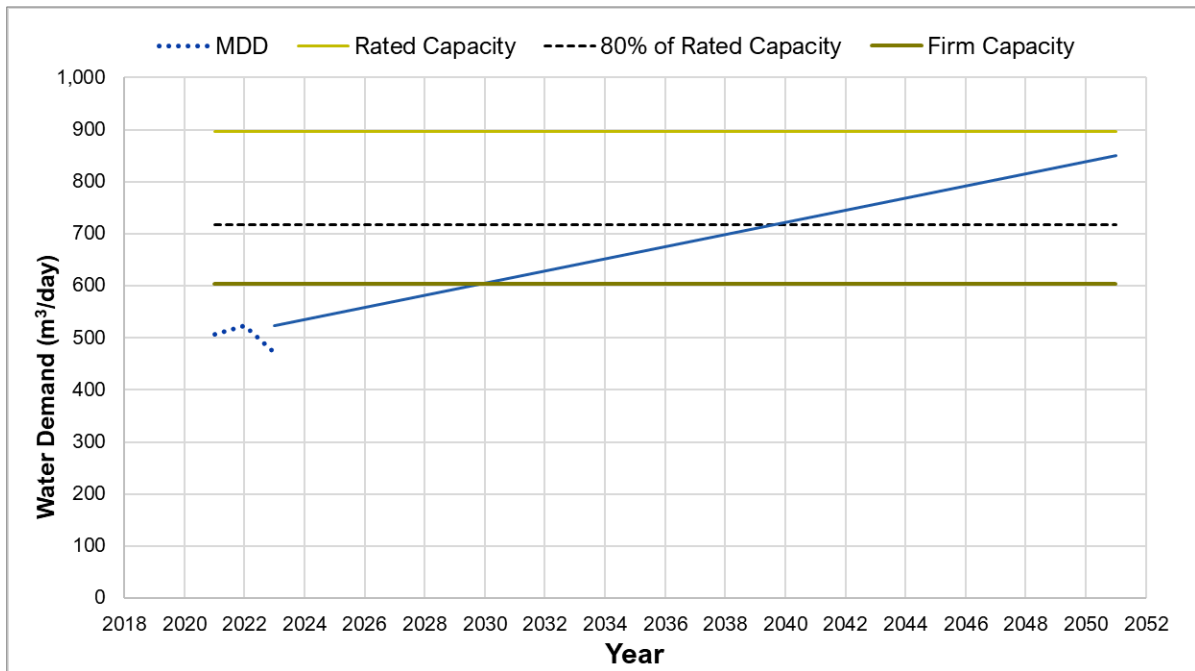


Figure 7.6: Moose Creek DWS - Projected Maximum Day Demand

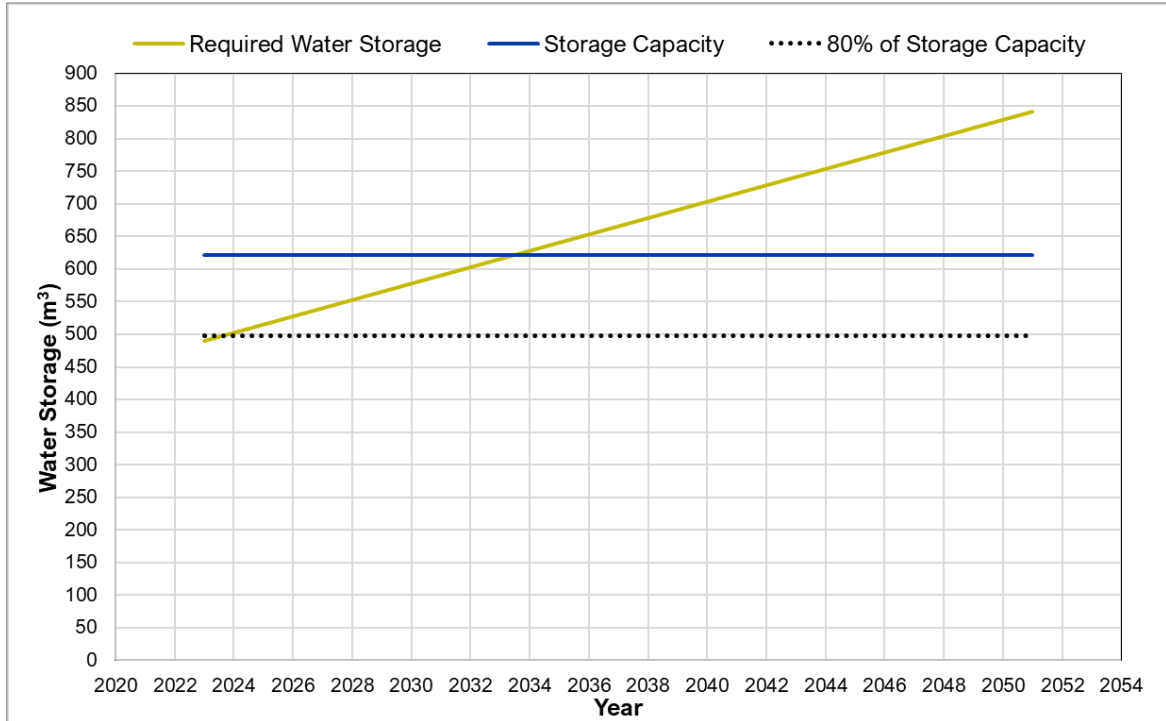


Figure 7.7: Moose Creek DWS - Projected Water Storage Requirements

### 7.4.2 Servicing Constraints

Table 7.7 provides the projected capacity deficits that will result in servicing constraints for each of the DWSs.

Table 7.7: DWS Servicing Constraints

Parameter Urban Settlement	m <sup>3</sup> /day					m <sup>3</sup>		
	2051 MDD	Rated Capacity	Surplus / (Deficit)	Firm Capacity	Surplus / (Deficit)	2051 Required Storage Capacity	Available Storage Capacity	Surplus / (Deficit)
Finch	828	778	(-50)	432	(-396)	601	580	(-21)
Crysler – High Growth Scenario	1,927	1,685	(-242)	Same as Rated Capacity		1,476	1,238	(-238)
Moose Creek	850	896	46	604	(-246)	842	622	(-220)

Additionally, the following issues were obtained from the system operators for the Finch DWS:

- High per capita water usage. Although this may be attributed to several factors including Finch’s leaky water distribution network (that the Township suspects maybe the cause), the key reason can be attributed to not metering water consumption. Although efforts are ongoing efforts to fix the leaky system, this strategy has a low cost/benefit ratio due to difficulty of locating the actual sources of leaks, construction costs to fix them, and potentially low water recovery post work.
- Based on the DWWP and information provided by the Township, the firm capacity of the HLPs is 432 m<sup>3</sup>/day. Per the MECF guidelines, the capacity of HLP distributing treated water should be able to meet the rated capacity of the DWS with the largest unit out of service. This may also lead to water distribution constraints.
- The existing singular clearwell is used for chlorine contact time and poses maintenance difficulties as there is no backup well and cleaning can only be undertaken by scuba divers.



## 7.5 Development of Alternative Strategies

### 7.5.1 Overview

This section provides the assessment of the alternate strategies developed to address the forecasted servicing constraints. The following alternatives strategies were determined as potentials for addressing the identified constraints:

1. Do Nothing;
2. Limit Community Growth;
3. Reduce Water Demand;
4. Expand Existing Water System; and
5. Obtain Water from Another Source.

Each alternate strategy is detailed in the following subsections and evaluated at a high-level for its ability to meet the requirement of the PaP statement. A shortlist of strategies is then established and scored against each category in the evaluation matrix to narrow down to the preferred strategy.

### 7.5.2 Alternative 1 – Do Nothing

As required in the Class EA process, an alternative of 'Do Nothing' must be examined. This alternative provides a benchmark for what would occur should the proposed activities not proceed and also provides a point of reference for the other alternatives.

"Do Nothing" suggests that no improvements or expansions would be undertaken in either of the DWSs. This solution would not address the capacity concerns and would prevent growth and development. Therefore, "Do Nothing" alternative is not an acceptable solution and is not evaluated further.

### 7.5.3 Alternative 2: Limit Community Growth

This alternative solution considers the anticipated impacts if community growth is limited to the existing DWS capacities. Although limiting the community growth would reduce/mitigate the projected storage and water supply deficits, it is contrary to the objectives of the Township and the Official Plan and is similar to the "Do Nothing" alternative. Therefore, this alternative is not evaluated further.

### 7.5.4 Alternative 3: Reduce Water Demand

This strategy looks at reducing water consumption to an efficient value, thereby delaying the year rated capacities will be exceeded by. This can be an effective strategy for Finch as it

only exceeds the rated capacity by 50 m<sup>3</sup>/day, which maybe recoverably if water use per person is reduced. However, since the water demand is much larger than the DWS's firm capacity, reducing water use cannot address the deficits noted in Table 7.6 on its own.

Water conservation programs allow educating water users on limiting water usage and preventing water waste. A key requirement for efficient water use are water meters.

Installation of water meters allows for the following benefits:

- Monitor water consumption and allow comparison of the demand rate to neighbouring municipalities or to typical demand rates based on population size;
- Accurate water charge to each consumer; and
- Identification of a leaking system, pipe damages and other problems that contribute to water loss and non-revenue water.

The Ontario Water Work Association (OWWA) published *Water Efficiency Best Management Practices* in 2005 (prepared by its Water Efficiency Committee) which noted that metering is critically important as it can contribute to 'deferring or eliminating major capital expenditures for plant expansion' which includes wastewater infrastructure. According to the 2001 Environment Canada study, water users that are not metered have a water usage per capita of 475 L/cap/day, whereas metered users only use 272 Lpcd (43% less). As of 2015, survey conducted by Environment Canada showed that 92% of Ontario's communities were metered.

Additionally, several studies conducted for small and large communities across Ontario have found that installing water meters reduced water demand and wastewater flows by 44% and 15% respectively. For instance, the Barrie Water Conservation program has successfully deferred millions of dollars in water and wastewater supply capital expenditures with its retrofit water conservation program, including a reduction of 55L/day per house unit.

As a result, while water conservation alone won't address the PoP, recommendations for all three water systems will start with water conservation as this could significantly delay the need for expensive system upgrades.

## **7.5.5 Alternative 4: Expand Existing Water System**

### **7.5.5.1 ALTERNATIVE 4A: WATER SUPPLY EXPANSION**

Water supply capacity can be increased via the following alternative strategies:

- Alternative 4A-1: *Upgrade/Expand Capacity of Existing Wellfield and Treatment Plant*. This could be completed through the addition of a new well on the existing

site, or increasing the capacity of treatment system, or increasing capacity of the HLPs, or a combination of the three.

- *Alternative 4A-2: New Well and Treatment Plant in a New Wellfield/Treatment Plant Location.*

Both of these alternatives address the PaP statement and offer solutions for the forecasted supply deficits. They are further evaluated in the short list of alternatives. It is important to note, however, that confirmation of any new well capacity would first require hydrogeological investigation, drilling and pump testing.

#### 7.5.5.2 ALTERNATIVE 4B: WATER STORAGE EXPANSION

Water storage capacity can be increased via the following potential options:

- Alternative 4B-1: New Elevated Water Storage Facility.
- Alternative 4B-2: New At-Grade Storage Facility

Both alternatives address the PaP statement and offers solutions for the forecasted water storage deficits. They are further evaluated in the short list of alternatives.

#### 7.5.6 Alternative 5: Obtain Water from Another Source

Water may be bought from adjacent large municipalities with the option of either decommissioning the existing facility and acquiring all water from outside the village, or servicing only the additional growth from the adjacent municipalities. For Finch, Crysler and Moose Creek, the only closest municipality that can provide both options is Cornwall. However, the minimum distance is more than 30km which makes it a non-feasible project with no economical justifications.

For Finch and Crysler, the option to explore a communal water supply and storage facility between the two villages can be implemented under either of the following two options.

- Alternative 5A comprises of installing new wells in only one village and having them sized so that they can meet the additional water demand of both villages to 2051. The communal well water would be treated at the local WTP in the village its located, and then pumped to the connecting village via a new watermain. Provision for re-chlorination of the pumped water would likely be needed. Since the Finch wells are bedrock wells with higher well investigation and treatment costs (due to the presence of hydrogen sulphide), it may be more feasible to install the new well in Crysler with the required treatment provided in the existing Crysler WTP.
- Alternative 5B comprises new well(s) and an associated WTP located between the two villages along County Road 12.

Both solutions above would require a communal storage facility sized to supplement existing storage as required for each of village.

Evaluating the two options above to determine the preferred option under this alternative:

- Option 5A: Although the cost of the new well can be avoided in one of the villages, the total length from the Chrysler Wellfield to the Finch WTP is approximately 15 km. A 200mm watermain for that distance is approximately \$19 Million.
- Option 5B: This solution scores relatively low on social-cultural criteria as land acquisition may be needed for the new location of the WTP, well and storage facility. Although its costs can be offset by the costs of separate new wells, it still scores low on economic criteria due to the long watermain, new WTP, and new storage facility that would be required.

As such, this alternative is not evaluated further due to economical infeasibility.

## 7.6 Post-Screening Results

Based on the screening in Table 7.8, the following alternatives are not considered further:

- Alternative 1 – Do Nothing
- Alternative 2 – Limit Community Growth
- Alternative 5 – Obtain Water from Another Source

Only Alternative 3 – *Reduce Water Demands (Increase Water Conservation)* and Alternative 4 - *Expand Existing Water Supply and Storage System* met the PaP statement and were determined to be feasible against the evaluation criteria. Alternative 3 is a standalone strategy and, therefore, is not evaluated further. The strategies considered under Alternative 4 are evaluated per the MCEA based criteria established in 6.0 to determine the preferred strategy that addresses the identified constraints.

Table 7.8: Long List of Alternatives and Screening

Alternatives		Does the alternative address the Problem & Opportunity Statement?	Is the alternative technical and economically feasible?	Can the alternative be implemented without significant impacts?	Summary
1	Do Nothing	✘	✘	✘	Not an acceptable solution and is not evaluated further.
2	Limit Growth	✘	✔	✘	Not an acceptable solution and is not evaluated further.
3	Reduce Water Demand (Increase Water Conservation)	✘	✔	✔	This alternative on its own is not acceptable as a complete solution. It will be recommended as a general sustainability goal.
4	Expand Existing Water Supply and Storage System	✔	✔	✔	<p><b>Water Supply:</b> Alternative 4A-1: Upgrade/Expand Capacity of Existing Wellfield and Treatment Plant; or Alternative 4A-2: New Well and Treatment Plant in a New Wellfield/Treatment Plant Location.</p> <p><b>Water Storage:</b> Alternative 4B-1: New Water Storage Tower/Standpipe (in addition to the existing storage facility); or Alternative 4B-2: New At-Grade Water Storage Tank (in addition to the existing storage facility)</p>
5	Obtain Water from Another Source	✔	✘	✘	Will require land acquisition, high capital costs, permit and other requirements. Therefore, not evaluated further.

## 7.7 Detailed Evaluation of Post-Screened Alternative Strategies

### 7.7.1 Water Supply

#### 7.7.1.1 ALTERNATIVE 4A-1: UPGRADE/EXPAND CAPACITY OF EXISTING WELLFIELD AND TREATMENT PLANT.

Key advantage of upgrading existing wells or installing a new well in the same wellfield is that it may minimize the hydrogeological investigation needed by relying on the existing site information. It would also minimize costs associated with raw water conveyance to the WTP. In some cases the existing treatment plant will also need to be upgraded and/or expanded, however this would usually be less expensive than constructing a brand new facility. Hence, this alternative scores higher on the technical and economical criteria.

The following are limitations or disadvantages to this strategy:

- Any new well at an existing well site or increase in capacity of an existing well will be subject to a hydrogeological study and testing, then to the approval of the MECP. While the increases required in the three North Stormont water systems is not large, it is still possible that the increased capacity would not be available. In that case, it would be necessary to look for a new well field location to supply the additional capacity (i.e. Alternative 4A-2)
- Installing all wells within the same wellfield results in less water security than having water supplied from two different well fields. Any adverse impacts to the one wellfield could possibly impact all the wells within that area, that could place the full supply at risk.
- Drilling a new well in the existing wellfield could result in temporary water quality in existing wells.

These limitations lower the scores for the technical and social-cultural criteria. The challenges listed above can be addressed to some degree as follows:

- A detailed review of the existing hydrogeological investigation report for:
  - › Existing aquifer conditions;
  - › Sustainable water supply capacity including any constraints to operating at the maximum allowable permit limit; and
  - › Identification of any risks to system operation.

This can become the basis for the hydrogeological investigation that will have to be undertaken for the new well;

- An updated wellhead protection plan for continued protection of the wellfield from potential sources of contamination;
- During drilling, monitoring of the water quality in the adjacent wells and preparing a backup plan for water supply in case the wells must be shutdown; and
- Ongoing source protection management and diligence can reduce risks of aquifer contamination.

#### 7.7.1.2 ALTERNATIVE 4A-2: NEW WELL IN NEW WELLFIELD











Separating sources of water supply to different wellfield provides a measure of water security against issues such as aquifer contamination, thereby implementing a redundant system which raises the score for social-cultural criteria. However, main disadvantages to this alternative are:

- Requirement of a new WTP at the new wellhead location;
- A new watermain will also have to be installed up to the connection point to the existing watermain;
- Higher capital costs for land and for all-new construction; and
- Higher operating costs since there would be an additional site for operations staff to visit and maintain, including new chemical supply and water quality monitoring requirements.

Hence, the cost implications of this alternative are significant and lowers the score for economical and technical criteria.

It must be noted that Alternative 4A-1 is subject to hydrogeological investigations to determine whether additional supply is available from the site. If not, Alternative 4A-2 may be the only possible strategy to address the noted deficits.

Table 7.9: Detailed Evaluation of Water Supply Alternatives

Evaluation Criteria	Alternative 4A-1: New Well in Same Wellfield	Rating	Alternative 4A -2: New Well in New Wellfield	Rating
Technical	<ul style="list-style-type: none"> <li>Hydrogeological investigation can be conducted based on the existing wells which can reduce the investigation size</li> <li>Current treatment processes can be upsized within the same building to meet future treatment demand.</li> </ul>		<ul style="list-style-type: none"> <li>New WTP required at new wellfield location which may require land acquisition</li> <li>Unknown conditions of new site can result in larger hydrogeological investigation</li> </ul>	
Social and Cultural	<ul style="list-style-type: none"> <li>Would likely not require additional land acquisition</li> <li>Known cultural heritage resources</li> <li>Potential impacts to existing supply wells that may impact their ability to supply water; however, this can likely be addressed through construction practices</li> <li>Shorter construction period than Alternative 4A-2</li> </ul>		<ul style="list-style-type: none"> <li>Potential impacts to nearby land uses due to well head protection area (WHPA) delineation</li> <li>Ensures water security and redundancy to all users</li> <li>Unknown cultural heritage resources until specific site is selected</li> </ul>	
Environment	<ul style="list-style-type: none"> <li>Implementation within known and previously investigated environmental conditions</li> <li>Less environmental impacts than Alternative 4A-2 as existing site has been previously disturbed</li> </ul>		<p>Unknown environmental conditions until specific site is selected.</p>	
Economic	<ul style="list-style-type: none"> <li>Minimizes cost of conveying raw water to WTP</li> <li>Lower capital cost than Alternative 4A-2</li> <li>Use of existing facility and existing municipal land</li> <li>Lower operational and maintenance costs compared to Alternative 4A-2</li> </ul>		<ul style="list-style-type: none"> <li>Larger capital cost associated with:</li> <li>A new water treatment facility and pumping</li> <li>Complexity of investigation prior to construction;</li> <li>Operation and maintenance of two facilities instead of one.</li> </ul>	
Overall Score and Summary	<p><b>Recommended Alternative</b></p>		<p>Not recommended (unless Alternative 4A-1 cannot be completed due to hydrogeological limitations) due to</p>	



			higher capital and operating costs and more complex implementation	
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## 7.7.2 Water Storage

### 7.7.2.1 ALTERNATIVE 4B-1: NEW ELEVATED WATER STORAGE FACILITY

This alternative assesses the option of a new water storage facility in a new location, in addition to the existing location. The existing elevated towers are to be retained in each DWS to minimize the size required of the new facility. Recommendations for proposed storage locations consider elevations across the village, redundancy of supply and availability of land.

- Finch DWS
  - › Figure 7.8 is a map of the Finch water distribution network. The map shows the elevations of the village which suggest a relatively flat terrain. To maintain a single pressure zone, the three potential locations for the towers (shaded in purple) are selected based on being at similar elevations to the existing tower location. Location 1 and 2 are at the East end of the village along County Road 43. Location 3 is at the South end along Concession 1-2 Road. The exact location can be determined based on the land availability and potential cost sharing if development is proposed in those areas. Locations 1 and 2 provide an added benefit to being located across the river in that it provides redundancy to the existing serviced units and future developments located east of the river, and fire flows can be fed from both ends of the distribution system.
- Chrysler DWS
  - › Figure 7.9 is a map of the Chrysler water distribution network and illustrates the elevations of the village which suggest that there is relatively flat terrain. As such, one potential location for an elevated storage tank (highlighted in purple) is west of the village, north of the river along Charles Street. The ground at this location is at an elevation similar to the current water tower, possibly allowing the single pressure zone to be maintained. Due to the South Nation River cutting through the village, there is currently only one water distribution pipe connecting the two sides. A tower at this location would therefore be able to provide some emergency water supply redundancy to the systems north of the river in case of watermain failure.
- Moose Creek DWS
  - › Figure 7.10 illustrates a potential location for the storage facility, selected based on being at similar elevations to the existing storage location and being past the tracks which can provide redundancy to existing and future serviced units.

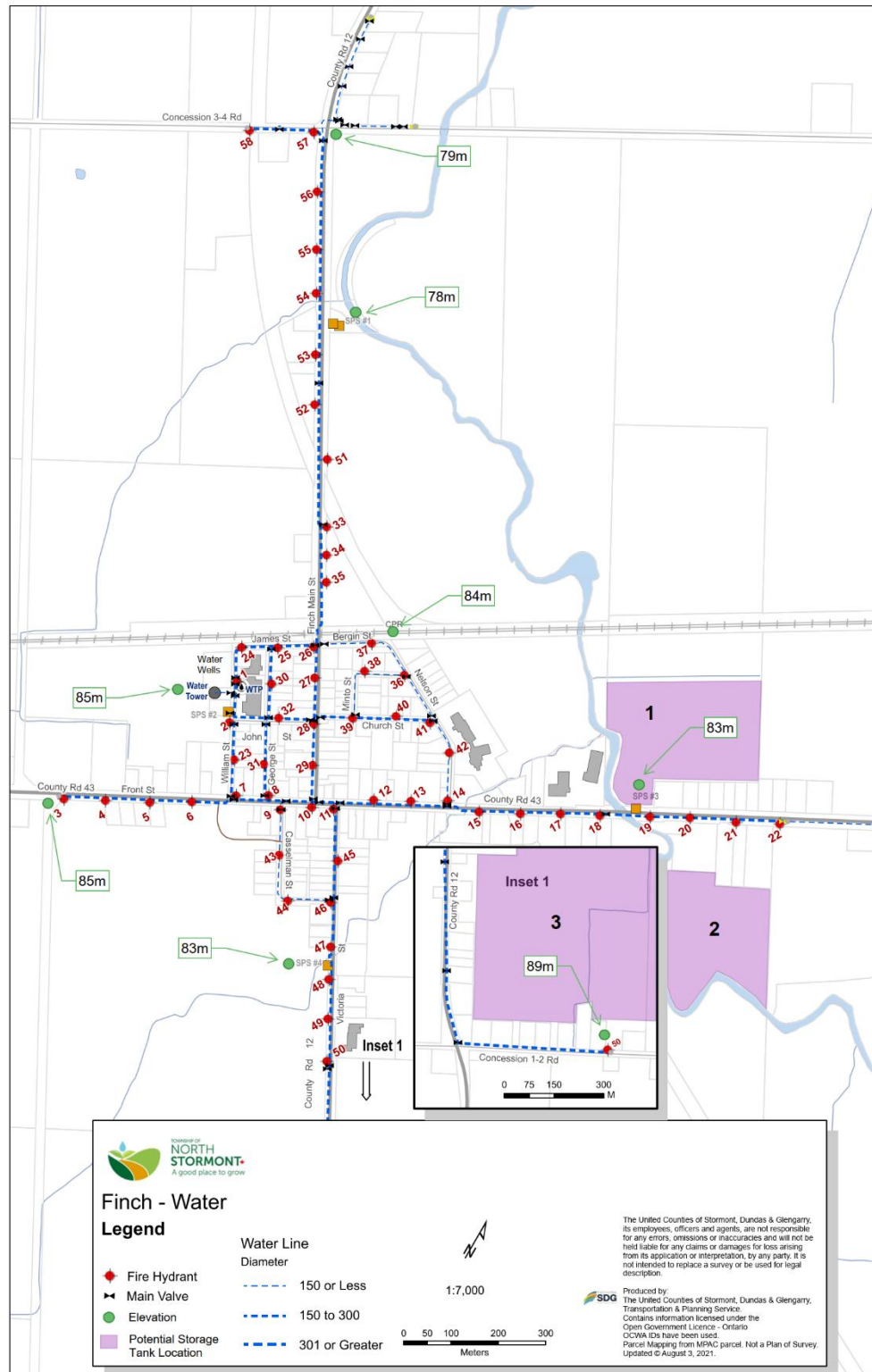


Figure 7.8: Finch DWS Potential Water Storage Locations

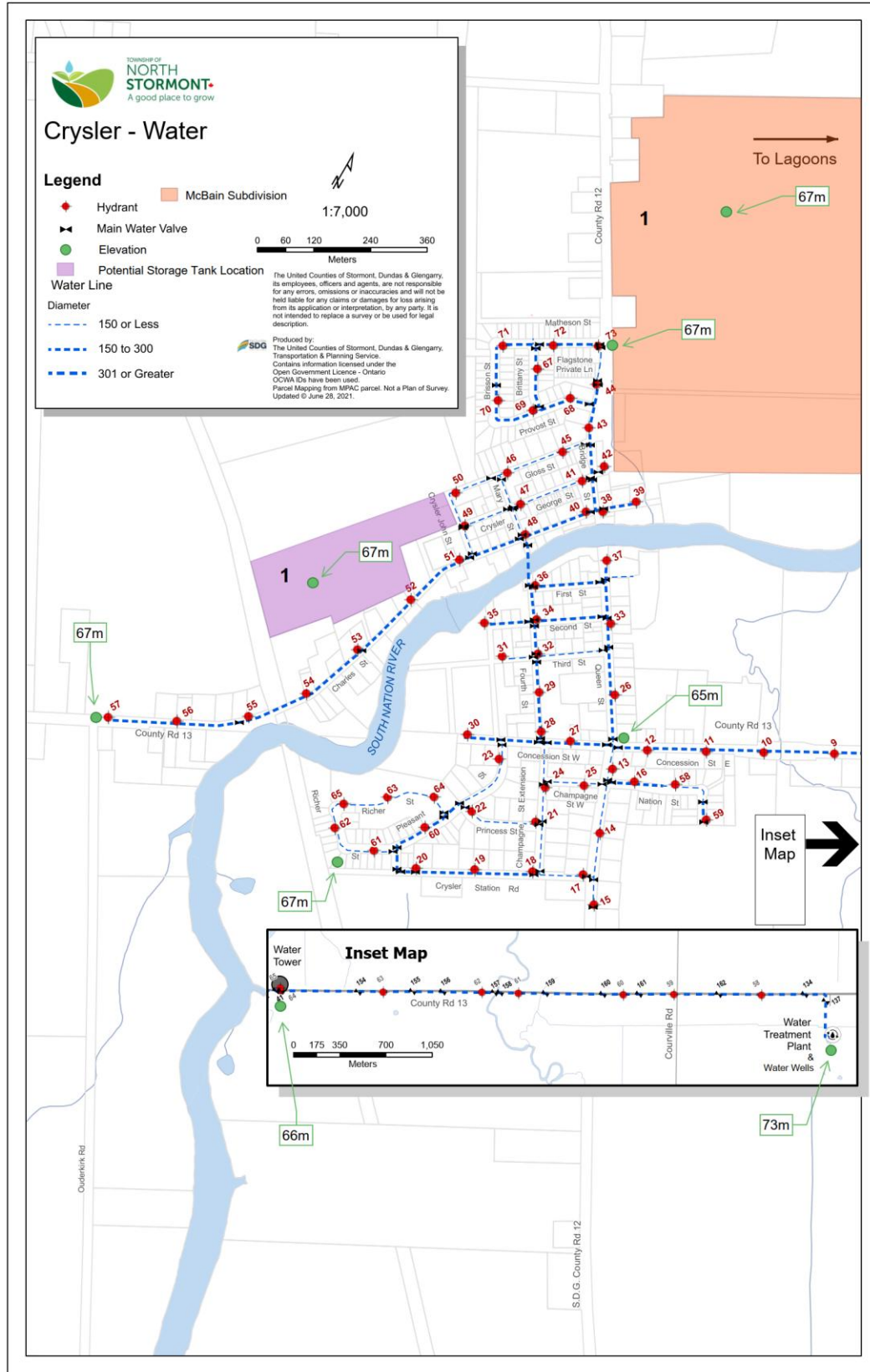


Figure 7.9: Crysler Potential Water Storage Location

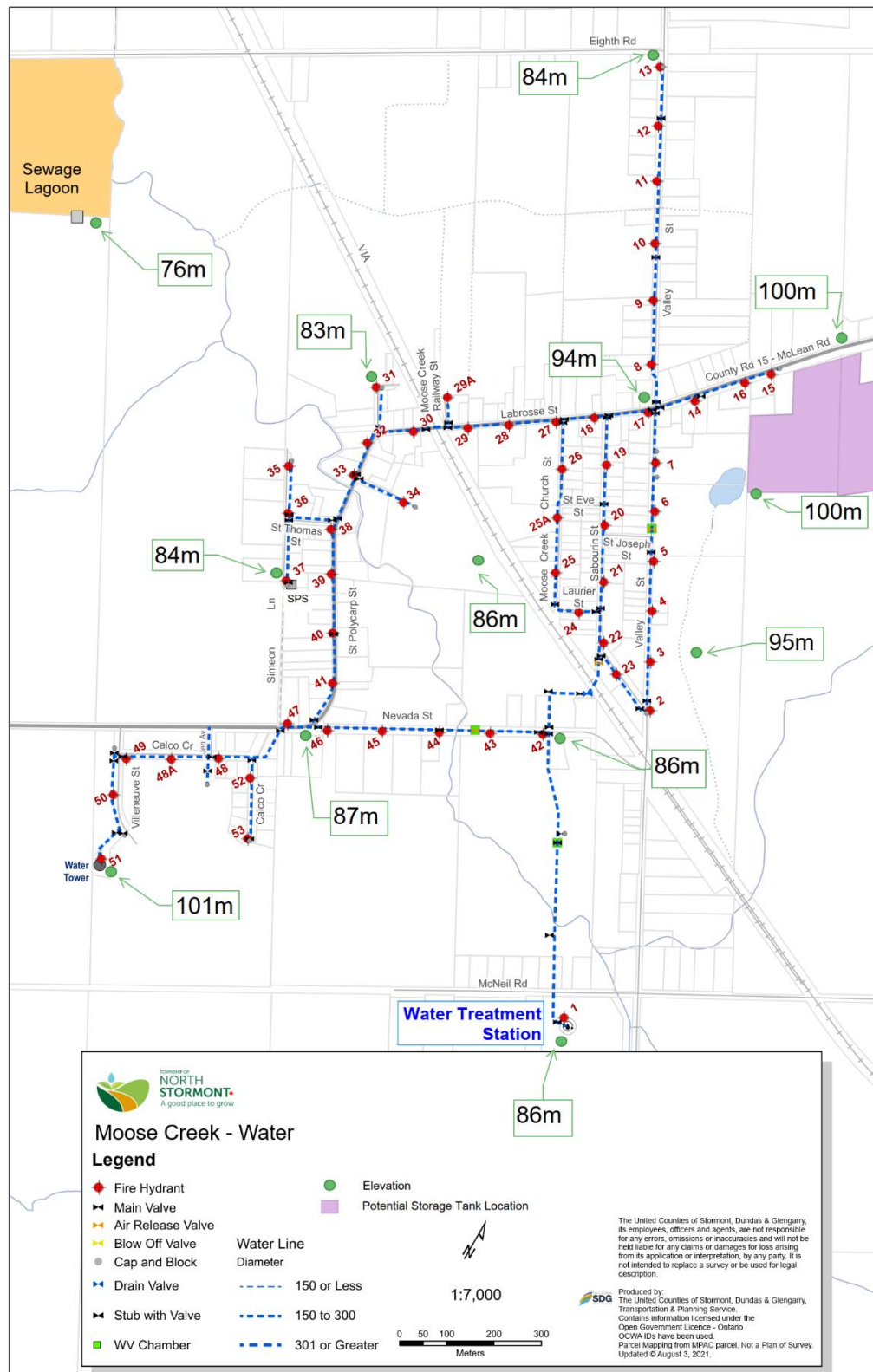


Figure 7.10: Moose Creek Potential Water Storage Location

### 7.7.2.2 ALTERNATIVE 4B-2: NEW AT-GRADE OR IN-GROUND STORAGE FACILITY

This alternative evaluates at-grade or in-ground storage tanks that can be sized to provide the additional storage capacity needed. The tanks can be installed beside or as an addition to the existing water treatment plants which minimize water conveyance infrastructure and facilitates accessibility for operation and maintenance activities. Two strategies are proposed:

1. In-ground storage tank as an extension of the existing clear wells at Moose Creek and Finch DWS
  - Moose Creek:
    - › The current elevated storage tank (capacity of 622 m<sup>3</sup>) can provide the fire flow and emergency water storage capacity required in 2051 (required fire flow + emergency storage in 2051 is 629 m<sup>3</sup>). Then, the new in-ground storage can be sized to provide the remaining volume for equalization storage (at least 230 m<sup>3</sup>).
    - › The inground storage tank could be designed as an extension of the clearwell. An example is shown in . Typically, water in storage tanks is recommended to be stored between one and three days only to reduce risk of deteriorating water quality and helping to maintain minimum disinfectant residuals. Designing the proposed inground tank as an extension of the clearwell will allow water recirculation in the tank, maintaining the water freshness which is a common challenge with storage reservoirs.
    - › Relocation of the existing HLPs to the extended tank. The HLPs may need to be upsized depending on the hydraulic model that will be needed as part of the design.
  - Finch DWS:
    - › Although the additional storage capacity needed is very small and could be eliminated by water conservation measures, extending the existing clear well would not only provide the additional capacity needed but could also be designed to allow for cell isolation capabilities that would allow for improved maintenance access (in response to the concerns raised by the operators).
2. Above-ground storage tank for Crysler DWS
  - › This option looks at an above-ground storage tanks to be located at the Crysler WTP. The current elevated storage tank has capacity (1,238 m<sup>3</sup>) to provide fire flow and equalization storage. An above ground tank with a minimum volume of 250 m<sup>3</sup> can be used to store the emergency supply volume. For this alternative, pumps in the wells can be replaced with low lift pumps that only pump to the

new storage tank. A new HLP system would need to be installed in a new pumphouse building adjacent to the new tank and its firm capacity could be sized for future peak hour flow (under the assumption that fire flow will continue to be supplied from the elevated tower).

- › Although the size of the tank can be minimized by relying on the existing elevated tank, options for providing redundancy and backup storage when the tower is isolated can be explored during design stage. Currently, no fire flows are available when the tower is offline for maintenance.
- › The design will also need to develop a control strategy that will promote circulation of the water through the new storage tank and the existing elevated tank to maintain adequate turnover.

This alternative scores high in all categories. It is an exempt project under the MCEA process and would not need further Class EA investigation; and it requires minimum technical work as options for buried pre-cast tanks or above-ground tanks purchased as design-build contracts are available.

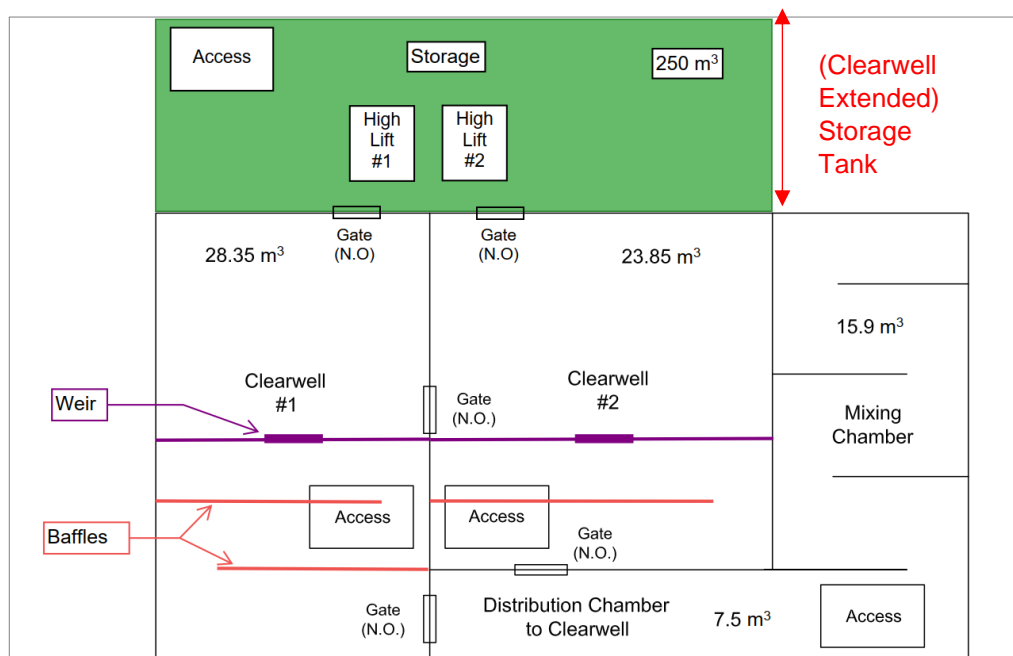


Figure 7.11: Example of extension of Moose Creek’s clearwell with a storage tank

Table 7.10: Detailed Evaluation of Water Storage Alternatives

Evaluation Criteria	4B-1: New Elevated Tower	Rating	4B-2: New At-Grade or In-Ground Storage Facility	Rating
Technical	<ul style="list-style-type: none"> <li>• Re-chlorination maybe required</li> <li>• Provides redundancy for areas located across the river crossing</li> <li>• Schedule B Study required</li> </ul>		<ul style="list-style-type: none"> <li>• Recirculation of water through tank to prevent unused water residual</li> <li>• Potential for increased chlorine contact time</li> <li>• Relocation of high lift pumps</li> <li>• Improves operational and maintenance activities of the existing system</li> </ul>	
Social and Cultural	<ul style="list-style-type: none"> <li>• Requires land acquisition</li> <li>• Ensures water security and redundancy</li> <li>• Aesthetic impacts to surrounding properties</li> </ul>		<ul style="list-style-type: none"> <li>• Use of existing municipal land</li> <li>• Will provide redundancy to systems with clearwell</li> </ul>	
Environment	Unknown environmental conditions until specific site is selected		Construction on existing Municipal site that has been previously disturbed, therefore minimal to no environmental impacts anticipated.	
Economic	Large capital, operational and maintenance cost with minimal benefit that is not justifiable with respect to the severity of the issue		Much lower cost than Alternative 4B-1 while providing operational and maintenance ease; that is, cost that would have been generated from trucking water during emergency or fire flow scenarios can be offset by capital cost of this strategy.	
Overall Score and Summary	Not recommended due to the issue noted above.		<b>Recommended Alternative</b>	



## 7.8 Preferred Water Servicing Strategy

### 7.8.1 Overview

Based on the analysis and evaluation presented above, the following subsections summarize the water servicing master plan recommendations for the three urban settlements.

Since water demand is forecasted to exceed rated capacity beyond 2044 for Finch and Crysler, the key strategy to be implemented immediately is water conservation including universal metering. The costs could allow community growth to occur while delaying or eliminating the need for future expansion/upgrades. Reduced water usage can also reduce the required capacity for water storage for all three DWSs. However, to meet MECP guidelines for a redundant and secure water system, the firm capacity of the DWS must be able to provide the projected MDD and, as such, the recommendations are built upon this requirement.

Post implementation of the meters, monitoring of water demands on an on-going basis will not only provide an accurate representation of actual water use versus water loss, but will also allow identifying and updating the timing of future works as required.

### 7.8.2 Finch DWS

When, following the implementation of water conservation, water demands are confirmed to be climbing above 80% of the existing rated capacity, a hydrogeological investigation is to be undertaken to:

- Consider whether the existing wells could be stressed to allow the permitted capacity to increase slightly. With the existing PTTW capacity limit of 777 m<sup>3</sup>/d, a 6.5% capacity increase would suffice to meet the 2051 demand projected. A higher target increase of perhaps 20% should be considered to allow for potential longer-term demands; and
- Determine whether a third well at the existing wellfield could allow a small increase in firm well capacity.

Assuming that the hydrogeological investigation yields positive results, a Schedule 'C' Class EA study to increase the rated capacity of the plant will be required. As part of the Class EA, a technical cultural heritage study is required for areas that are part of cultural heritage resources. The Class EA would also include an examination of the existing treatment system, including:

- Capacity of existing H<sub>2</sub>S stripping tower, and need for an additional unit;

- Capacity of clearwell for disinfection;
- High lift pump capacity;
- Capacity of existing flocculation tank and pressure filters, and need for additional equipment;
- Consideration of moving the filtration equipment to be upstream of the clearwell; and
- Evaluation of treatment effectiveness and consideration if changes could provide improvements to treated water quality.

Water conservation could likely eliminate the need for additional storage. However, if additional storage is needed, the Class EA study could also consider how best to expand the existing clearwell to accommodate the storage requirements and a technical cultural heritage study would assess any identified cultural heritage resource locations. It is assumed that there is adequate space on site to accommodate the clearwell expansion.

Upon completion of the above, detailed design and construction could proceed.

In addition, ongoing efforts to address Finch's leaking distribution is recommended to continue to estimate the DWS's water loss. The MECP guidelines recommends that DWSs with unaccounted water exceeding 15% of the ADD are to investigate the causes and reduce or eliminate them as much as possible. To determine unaccounted water volumes, water meters are needed to track the total billed water volume and compare to the distributed water volume. As such, implementation of water meters is key to ensuring efficient and sustainable DWSs.

### **7.8.3 Chrysler DWS:**

Since firm capacity exceedance is forecasted after 20 years (2044), the recommended strategy can be re-visited in next iteration of the Master Plan to confirm its applicability, especially with large housing development plans that are currently under planning stage. In the next Master Plan, following the implementation of water conservation, when water demands are confirmed to be climbing above 80% of the existing rated capacity, a hydrogeological investigation is to be undertake to:

- Consider whether the existing wells could be stressed to allow the permitted capacity to increase slightly. With the existing PTTW capacity limit of 1,685 m<sup>3</sup>/d, a 11-15% capacity increase would suffice to meet the 2051 demand projected; and
- Determine whether a third well at the existing wellfield could allow a small increase in firm well capacity.

Post investigation, an engineering study including a Schedule B Class EA or, if possible, a screening to exempt the project from a Class EA is to be undertaken. The project would need to consider:

- Required upgrades, if any, to the existing UV disinfection system and chlorine contact tank; and
- Scope of the identified required upgrades.

The Class EA study could also incorporate scope of the proposed above-grade storage tank including the provision of HLPs to pump the stored water into the distribution system. This design will likely require replacement of the well pumps with pumps of lower TDH capacity. It is assumed that there is sufficient space on the existing site for the new tank and pumping facility.

As part of the Class EA, a technical cultural heritage study would need to be completed to review archaeological resources, BHRs, and CHLs falling within the proposed study areas.

Upon completion of the above, detailed design and construction could proceed.

#### **7.8.4 Moose Creek DWS**

When, following the implementation of water conservation, water demands are confirmed to be climbing above 80% of the existing rated capacity, undertake a hydrogeological investigation to:

- Consider whether the three existing wells could be modified to allow a firm capacity of 850 m<sup>3</sup>/d. It should be noted that the existing PTTW allows for 896 m<sup>3</sup>/d which is above the 2051 projected demand (850 m<sup>3</sup>/day), however the current well pumps have only a firm capacity of 604 m<sup>3</sup>/d at present.
  - › With the replacement of Well No.3 already in the current capital plan, it is recommended that, at minimum, the new well be sized for at least 7 L/s ( $\cong$  600 m<sup>3</sup>/day). A new 4<sup>th</sup> well will not be needed if this additional capacity is acquired from the replacement well, as it will increase the DWS's firm capacity (provided only by Well No.2 and No.3) to 860 m<sup>3</sup>/day when Well No.1 is out of service.
- Determine whether a fourth well at the existing wellfield is required to achieve the required firm capacity.

Following the investigation, undertake an engineer study to develop the details for clearwell expansion and modifications, if deemed necessary, to the high lift pumping. This work would be exempt from Class EA requirements as it is assumed that this work could be done within the existing site.

It was noted by operations staff that there have been water quality concerns. The study should also collect raw and treated water quality samples to determine how significant these concerns are. If water quality is determined to be a problem, then the engineering project may need to expand to a Schedule 'C' class EA to consider alternatives for a new water treatment for the community. As part of this class EA, a technical cultural heritage study would need to be completed.

Upon completion of the above, detailed design and construction could proceed.

### 7.8.5 Implementation Timeline

If the hydrogeological investigations noted in each investigation determine that no capacity expansion is possible within existing wellfields, then the next step would be for the hydrogeological study to expand to examine other potential wellfield locations in close proximity to the various distribution systems. As noted in Section 6.2, if MCM's screening checklist shows potential for archaeological areas or cultural heritage resources, then required studies are to be completed by licenced/ qualified person(s) and submitted for review.

At the current water usage and without water metering, the anticipated timeline required for the recommendations is provided in Table 7.11.

Table 7.11: Water Master Plan Recommendations Implementation Timeline

Work	0 – 5 years (2025 – 2030)	5 – 10 years (2030-2035)	10 – 15 years (2035-2040)	15-20 years (2040-2045)	20-25 years (2045-2050)
Water Meters	<ul style="list-style-type: none"> <li>• Crysler</li> <li>• Finch</li> <li>• Moose Creek</li> </ul>				
Hydrogeological Investigation	Finch	Crysler			
Class EA / Engineering Study	Finch	Crysler			
Implementation of Water Supply Strategy	Moose Creek <sup>1</sup>		Crysler	Finch	
Implementation of Water Storage Strategy		Moose Creek	Crysler	Finch	

1: Assuming that hydrogeological investigation for Replacement Well #3 will incorporate the recommendations in Section 7.8.4, such that firm capacity of DWS can meet the projected MDD to 2051.

### **7.8.6 Chrysler Sensitivity Analysis**

Figure 7.13 and Figure 7.12 illustrate the projected water demand if the committed development is populated under the proposed development growth rate. As seen, both rated water supply and water storage capacities are exceeded at least 10 years sooner. Note that infrastructure designed for this scenario is at risk of being significantly oversized if actual population growth does not follow this rate. Oversized supply and storage facilities pose operational and maintenance issues such as inability to maintain fresh water without excessive flushing, and oversized treatment equipment that will not operated efficiently, etc.

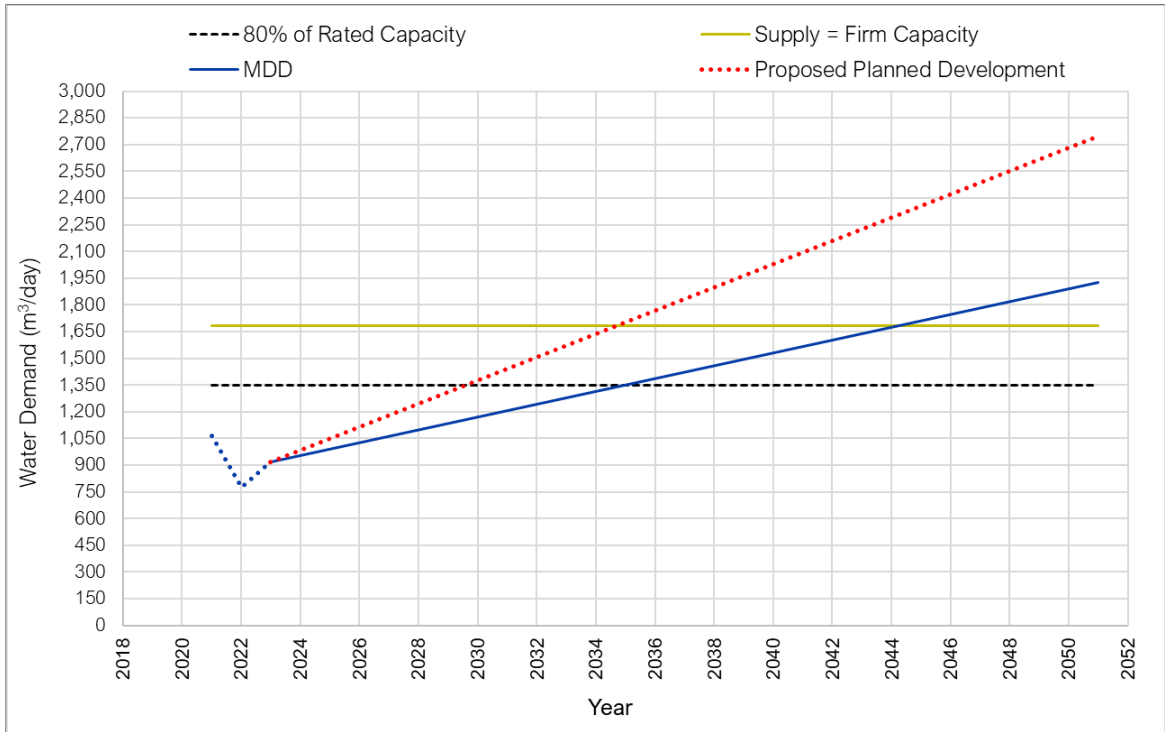


Figure 7.13: Crysler Projected Water Demand under Proposed Planned Development Population Growth Rate Scenario

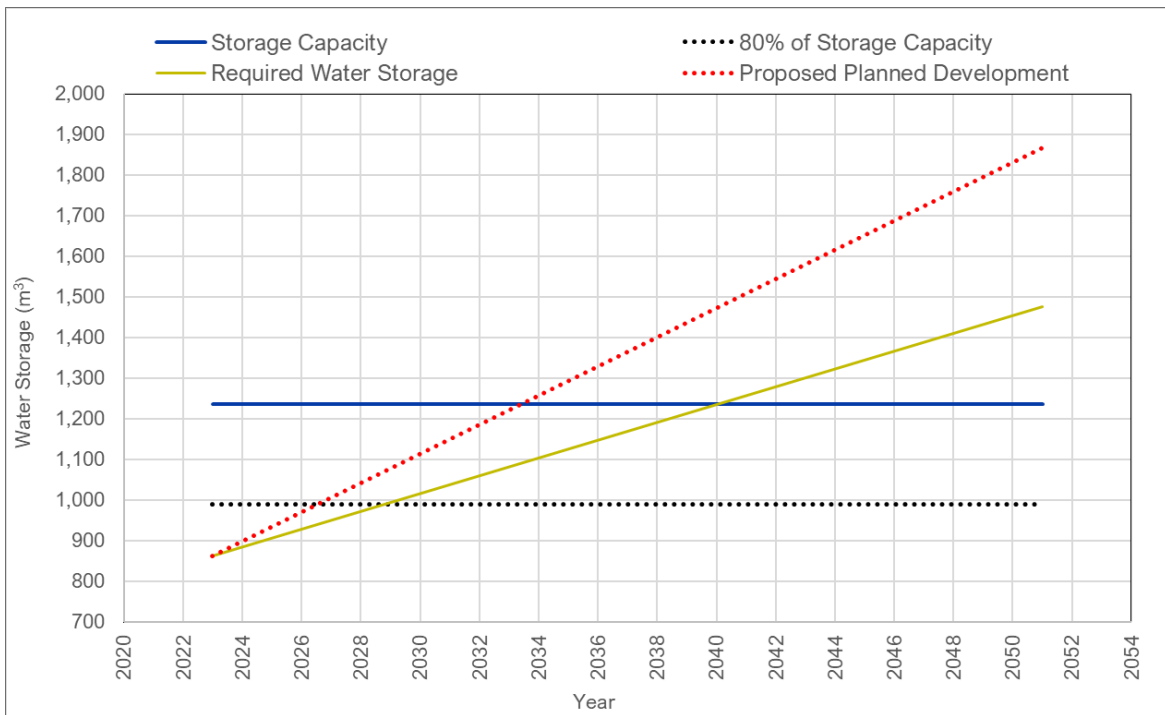


Figure 7.12: Crysler Projected Water Storage Capacity Required under Proposed Planned Development Population Growth Rate Scenario

### **7.8.7 Climate Change Resiliency**

As climate change intensifies, water resource management faces increasingly complex challenges. Variability in rainfall patterns, higher temperatures, and more frequent droughts can cause significant fluctuations in groundwater availability. These changing conditions can directly impact aquifer levels with potential consequences for both water supply and water quality. To sustain reliable water service for the community, it is essential to incorporate climate resilience into long-term planning and operational strategies.

The current system relies on multiple wells within a single wellhead area which can heighten the vulnerability of the overall water supply, as drawdown from one well during a drought period affects the water available in adjacent wells. Such conditions increase the risk of well interference and decrease efficiency. Prolonged drawdown in a single wellhead area can also lead to higher pumping costs, reduced well productivity, and potential impacts on water quality as aquifers experience changes in pressure and flow.

It is essential to consider solutions that address the risks posed by climate change and the associated drops in groundwater levels. Key strategies to bolster resilience include:

1. **Diversification of Well Locations:** One approach to mitigate the risk of aquifer depletion is to diversify the locations of new wells outside of the current wellhead area. While spreading well locations across a larger geographical area could potentially reduce the drawdown impact, this solution has limitations, including the cost and logistical challenges of finding and developing suitable well sites are substantial. In some cases, it may also be impractical due to land availability and regulatory requirements.
2. **Proactive Contingency Planning:** Given the impracticalities of significantly diversifying well locations, a robust contingency plan is essential. This plan should include:
  - a) **Monitoring and Adaptive Management:** Implement real-time monitoring of groundwater levels and aquifer health to enable timely responses to changing conditions. By maintaining a data-driven approach, the utility can adapt operations as drought conditions fluctuate.
  - b) **Water Demand Management:** Instituting water conservation measures during peak drought periods can help reduce the strain on groundwater resources, extending the usability of the aquifer.
  - c) **Supplementary Water Sources:** Investigate the potential for supplementary water sources, such as surface water or treated reclaimed water, to reduce reliance on the aquifer during peak demand periods.

It must be noted that strategies a) and b) in point 2 above requires water metering to be able to implement.

## 8.0 WASTEWATER MASTER PLAN

### 8.1 Data References

The following references for each wastewater treatment system (WWTS) were used for developing the Wastewater Master Plan;

- Finch
  - › Certificate of Approval, Municipal and Private Sewage Works, Number 1853-5N2QGY (Ministry of the Environment 2003)
- Crysler
  - › Amended Environmental Compliance Approval, Number 9170-9PXLXZ (Ministry of the Environmental and Climate Change), Issued 11/19/2014
- Moose Creek
  - › Amendment to Certificate of Approval, Sewage, Number 3-1555-91-936 (Ministry of Environment and Energy 1997)
- Annual Reports from 2021 – 2023 for each WWTS.

### 8.2 Wastewater Treatment System Descriptions

#### 8.2.1 Finch - Crysler Wastewater Collection and Treatment System

The village of Finch has only a wastewater collection system which discharges to that of Crysler's. Finch's sewage collection system comprises of three sewage-pumping stations (SPS) - SPS No. 1, 2, and 3 - that collect wastewater from across the village. Since MCEA Approach 1 for Master Plans directs for a broad level of assessment, only the Finch Main SPS - SPS No. 1 that also collects wastewater from SPS No. 2 and 3 - is evaluated. SPS No. 1 has a rated capacity of 14.5 L/s and houses two submersible pumps (one duty/one standby). It discharges the collected flow to a transition manhole chamber located approximately midway between the two urban settlements via a 150mm diameter and 5.4 km long forcemain. From the forcemain, a 250mm diameter and 3.5 km long gravity sewer discharges flow to Crysler Main SPS.

The Crysler sewage collection system has one SPS located at 4 Queen Street that collects wastewater from the entire village as well as from the Finch SPS No. 1. The SPS houses two pumps (Lead/Lag) and has a rated capacity of 46 L/s. It discharges flow to the Crysler Wastewater Treatment Lagoons (lagoons) via a 200 mm diameter and 2.7 km long forcemain. The forcemain was designed for a peak flow of 35 L/s.



The Crysler lagoons are located at 1521 County Rd.12 and comprise of two facultative cells equipped with wind powered aerators and one aeration cell with sixty helical aerators fixed to the cell floor. The helical aerators are connected to two air blowers housed in an aeration building. Phosphorus control is provided by aluminum sulphate dosing which is stored in a chemical injection building. The lagoons currently discharge in spring time only. Table 8.1 provides the capacities of Crysler’s WWTS.

Table 8.1: Crysler WWTS Capacity

Infrastructure	Capacity	Source
Facultative Cell 1	Surface Area = 4.38 ha Operating Volume = 61,700 m <sup>3</sup>	ECA #9170-9PXLXZ
Facultative Cell 2	Surface Area = 6.16 ha Operating Volume = 87,900 m <sup>3</sup>	
Aeration Cell	Surface Area = 4.14 ha Operating Volume = 148,000 m <sup>3</sup>	
Blowers (total)	2,125 m <sup>3</sup> /hr	
Rated Capacity	1,118 m <sup>3</sup> /day	

Table 8.2 provide the lagoon’s spring and fall discharge objectives, and Table 8.3 provide the lagoon’s spring and fall discharge limits.

Table 8.2: Crysler Lagoons Effluent Objectives

Effluent Parameter	Seasonal Average Concentration		Seasonal Waste Loading	
	Spring <sup>1</sup>	Fall <sup>2</sup>	Spring <sup>1</sup>	Fall <sup>2</sup>
CBOD5	25 mg/L	12 mg/L	7,391 kg	1,349 kg
Total Suspended Solids	25 mg/L	20 mg/L	7,291 kg	2,248 kg
Total Phosphorus	<1 mg/L	0.4 mg/L	<296 kg	45 kg
Total Ammonia + Ammonia Nitrogen	15 mg/L	2 mg/L	4,435 kg	225 kg
Hydrogen Sulfide	<0.26 mg/L	Non-detectable	<77 kg	Non-detectable

1: Spring discharging volume is 295,650 m<sup>3</sup> between March 15 – April 30

2: Fall discharging volume is 112,420 m<sup>3</sup> between November 4 – December 17

Table 8.3: Crysler Lagoons Effluent Limits

Effluent Parameter	Seasonal Average Concentration		Seasonal Waste Loading	
	Spring <sup>1</sup>	Fall <sup>2</sup>	Spring <sup>1</sup>	Fall <sup>2</sup>
CBOD <sub>5</sub>	30 mg/L	15 mg/L	8,870 kg	1,686 kg
Total Suspended Solids	30 mg/L	25 mg/L	8,870 kg	2,811 kg
Total Phosphorus	1 mg/L	0.5 mg/L	296 kg	56.21 kg
Total Ammonia + Ammonia Nitrogen	20 mg/L	6 mg/L	5,930 kg	675 kg
Hydrogen Sulfide	0.26 mg/L	Non-detectable	77 kg	Non-detectable

1: Spring discharging volume is 295,650 m<sup>3</sup> between March 15 – April 30

2: Fall discharging volume is 112,420 m<sup>3</sup> between November 4 – December 17

### 8.2.2 Moose Creek Wastewater Collection and Treatment System

The Moose Creek sewage collection system has one SPS located at 37 Simeon Lane. The SPS houses two pumps operated as lead/lag system, and has a rated capacity of 16.6 L/s. It discharges flow via 150mm diameter and 990m long forcemain to the Moose Creek Lagoons. The SPS has a generator in a control building for backup power.

Wastewater treatment is provided in the Moose Creek lagoons located on Lot 22, Concession 7 and comprises of two facultative-aerated lagoon cells equipped with seven aerators. Each cell is 109 m wide x 220m long (total mean area of 5.6 ha) with a maximum operating liquid depth of 2m, providing a combined storage volume of 110,376 m<sup>3</sup>. The lagoons operate under Certificate of Approval # 3-1555-91-936 which allows annual discharge only to the Moose Creek Drain. Its rated capacity is 302 m<sup>3</sup>/day.

Table 8.4 provides the lagoon’s effluent objectives and permit limits. Effluent TSS has exceeded the objective criteria in 2019, 2020, 2023 and 2024, attributed mainly to algae. Ammonia (TKN) effluent criteria is challenging to meet during colder springs.

Table 8.4: Moose Creek Lagoons CoA Effluent Criteria

Parameter	Objectives		Limit	
	Concentration	Loading	Concentration	Loading
BOD <sub>5</sub>	15 mg/L	166 kg/d	30 mg/L	331 kg/d
Total Suspended Solids	20 mg/L	121 kg/d	30 mg/L	331 kg/d

Parameter	Objectives		Limit	
	Concentration	Loading	Concentration	Loading
Total Phosphorus	<0.5 mg/L	<5.5 kg/d	1.0 mg/L	11 kg/d
TKN	Absent		15 mg/L	166 kg/d
Hydrogen Sulfide	Absent		0.17 mg/L	1.9 kg/d

### 8.3 Wastewater Design Parameters

#### 8.3.1 Overview

Historical average and maximum day wastewater flows for each wastewater system were obtained from the Annual Reports provided by the Township. Only data from 2021 to 2023 is considered as the connected population information is only available for those three years. The data is then analysed per the MECP *Design Guidelines for Sewage Works* and the *Water Environment Federation (WEF) Design Guidelines*.

The peak flow peaking factor obtained will be used to estimate the future peak flows that will be received at the main SPSs.

#### 8.3.2 Wastewater Treatment

Table 8.5 summarizes the historical data used to estimate the per-capita (per person) wastewater flow and peak flow in each urban settlement. The Crysler WWTS flows and connected population are the combined values for the villages of Finch and Crysler, representing the combined system.

#### 8.3.3 Wastewater Collection

Wastewater collection systems comprise of the sanitary sewers and the SPSs which receive peak instantaneous flows. Per the MECP guidelines, the firm capacity (with largest pump out of service) of the SPS is to be sized for the projected peak flows.

Peak flows are typically recorded on a 5-minute interval basis at the main SPSs that discharge to the downstream wastewater treatment facilities. In the absence of this data, peak flows for all three villages can be estimated using WEF guidelines as follows:

- Typical maximum day peaking factor for corresponding ADF per WEF guidelines is 3.0 for all three WWTSs.
- Table 8.5 shows that the actual maximum day peaking factors recorded is plus 0.7 – 1.1 larger, especially in the last two years (2022 and 2023) which shows an increasing trend in the peak flows.

- Therefore, to obtain a peak flow peaking factor that considers the above variance from typical factors, the peak flow peaking factor provided by WEF is increased by 1.0 which is the average additional increase observed in the *actual (observed)* – *typical* maximum day peaking factors (average of 0.7 to 1.1).
- The resulting peak flow peaking factor used for estimating the historical peak flows are provided in the table.

The peak flow peaking factor obtained will be used to estimate the future peak flows that will be received at the main SPSs.

### 8.3.4 Wastewater Treatment

Table 8.5: Historical Wastewater Flow Analysis

Year	ADF (m <sup>3</sup> /day)	MDF (m <sup>3</sup> /day)	Peaking Factor <sup>1</sup>	Connected Population <sup>2</sup>	Per-capita Flow (L/cap/day)	Peak Flow (L/s)
<b>Finch</b>						
2021	149	437	2.9	591	252	Peaking Factor per WEF = 5.5
2022	157	678	4.3	603	260	
2023	180	718	4.0	616	292	
<b>Average</b>	<b>162</b>	<b>611</b>	<b>3.7</b>	<b>-</b>	<b>268</b>	<b>6.5</b>
<b>Finch - Crysler</b>						
2021	558	2,000	3.6	1,704	327	Peaking Factor per WEF = 5.5
2022	567	2,280	4.0	1,757	323	
2023	630	3,030	4.8	1,810	348	
<b>Average</b>	<b>585</b>	<b>2,437</b>	<b>4.1</b>	<b>-</b>	<b>333</b>	<b>6.5</b>
<b>Moose Creek</b>						
2021	228	742	3.3	575	397	Peaking Factor per WEF = 5.5
2022	240	863	3.6	588	408	
2023	252	1,088	4.3	601	420	
<b>Average</b>	<b>240</b>	<b>898</b>	<b>3.7</b>	<b>-</b>	<b>408</b>	<b>6.5</b>

1: Peaking Factor is taken as the ratio of the MDD to the ADD.

2: Values are not rounded, to allow providing the actual numbers used to calculate the per-capita factors.

The data is illustrated graphically in Figure 8.1 and suggests that per-person wastewater flow is increasing in North Stormont. Although not the only factor, lack of water metering can be a cause of this trend.

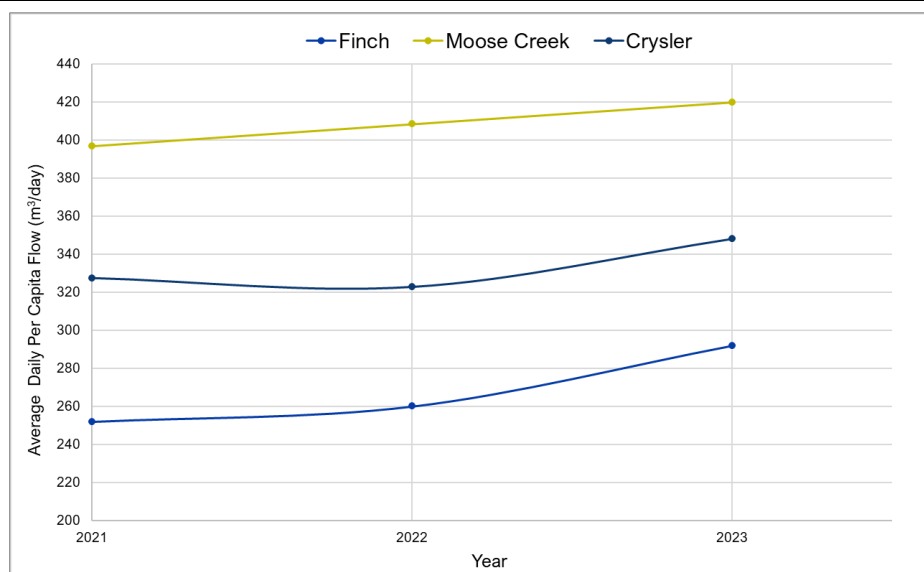


Figure 8.1: Historical Residential Wastewater Flow

## 8.4 Opportunities and Constraints

### 8.4.1 Wastewater Flow Projections

Table 8.6 provides the future wastewater flows for each urban settlement using the historical average per-capita wastewater flow, the forecasted population to 2051 provided in Table 5.1, and the committed population provided in Table 5.2.

Table 8.6: Forecasted Wastewater Flow to 2051

Urban Settlement	Finch	Crysler (HGS)	Moose Creek
<b>Parameter</b>			
<b>Average Daily Flow</b>			
A = 2051 Serviced Population	885	3,060	1,080
B = Per-Capita Flow (m³/day)	0.268	0.333	0.408
A x B = C = 2051 ADF (m³/day)	237	1,018	438
<b>Peak Flow</b>			
D = 2051 ADF (L/s)	2.7	11.78	5.07
E = Peak Flow Peaking Factor (Table 8.5)	6.5	6.5	6.5
D x E = F = 2051 Peak Flow (L/s)	17.8	76.6	32.9
<b>Committed Capacity</b>			
G = Committed Population	N/A	915 <sup>1</sup>	30
H = Per-Capita Flow (m³/day)		0.333	0.408

Parameter	Urban Settlement	Finch	Crysler (HGS)	Moose Creek
$G \times H = I =$ ADF from Committed Population (m <sup>3</sup> /day)			305	12
$J =$ Current ADF (m <sup>3</sup> /day) <sup>1</sup>			585	240
$I + J = K =$ Total Committed Capacity (m <sup>3</sup> /day)			890	252
$L =$ WWTS Rated Capacity			1,118	302
$L - K = M =$ Remaining Available Capacity (m <sup>3</sup> /day)			229	50

1: Includes committed population in both Finch and Crysler (36 + 875 people, refer to Table 5.2)

Figure 8.2 to Figure 8.6 illustrate the wastewater peak and average daily flow trends projected to 2051 for the three urban settlements

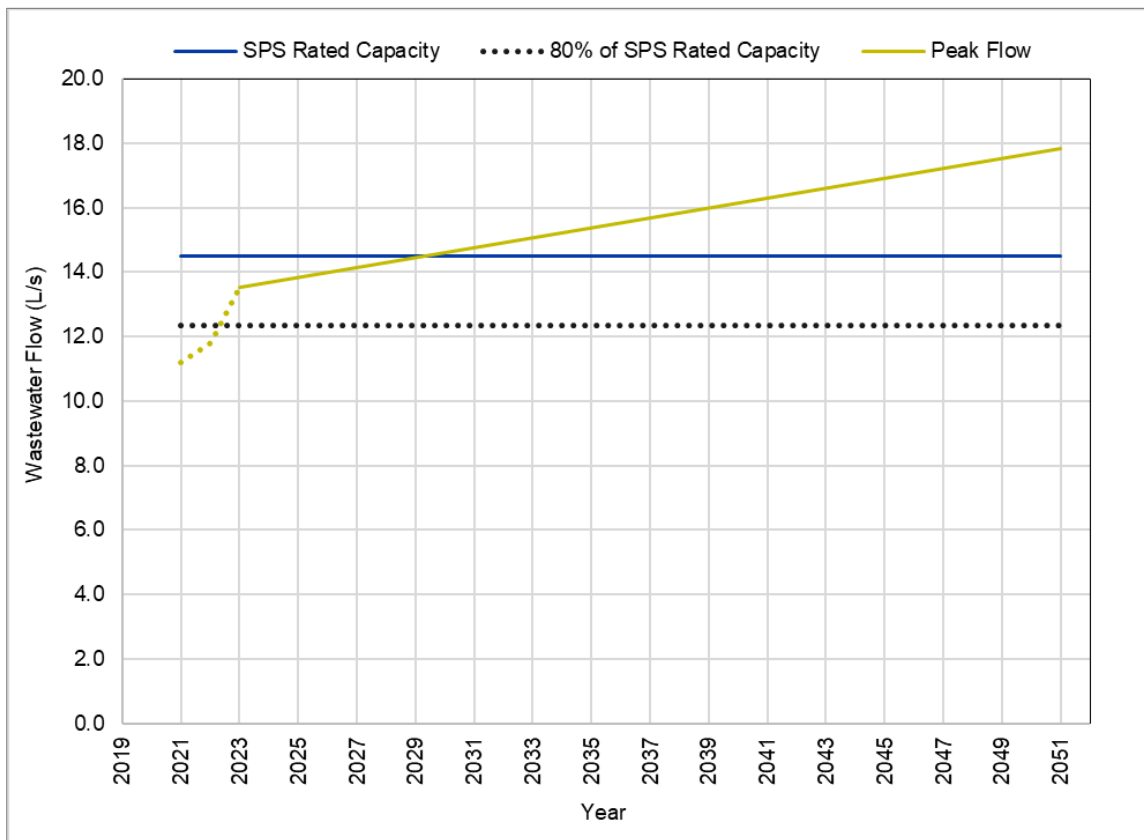


Figure 8.2: Finch SPS - Projected Peak Flow

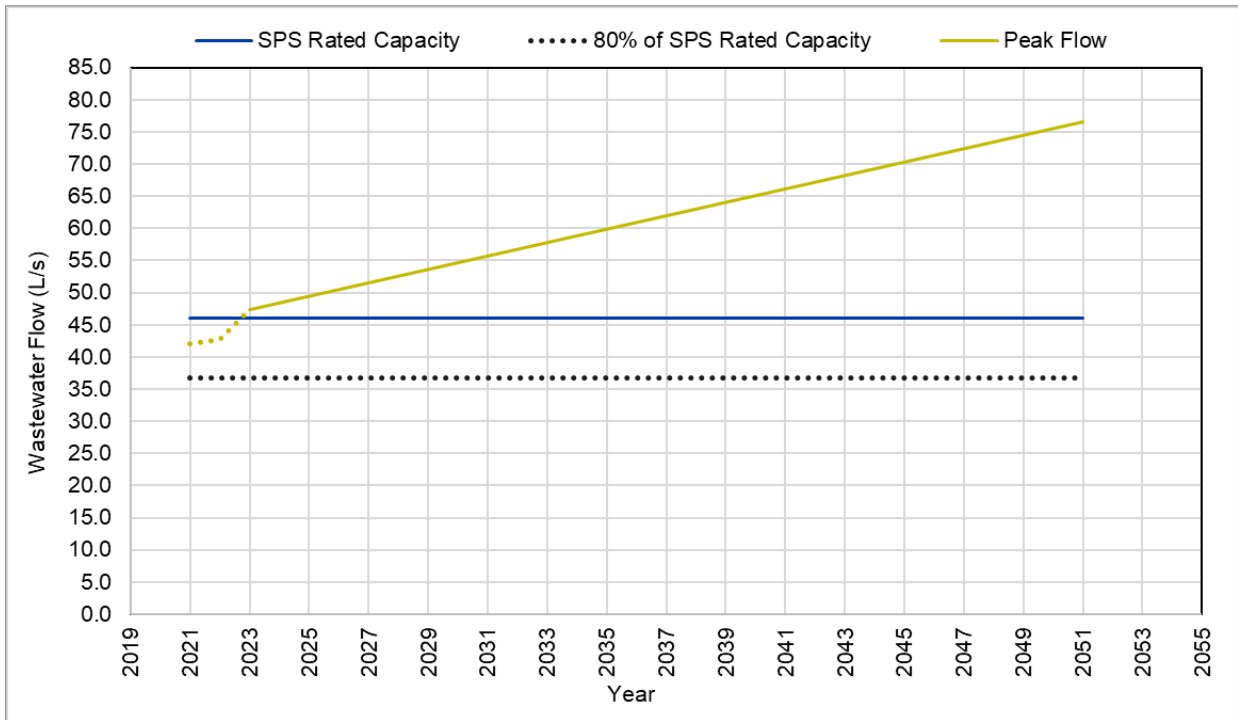


Figure 8.4: Crysler SPS - Projected Peak Flow

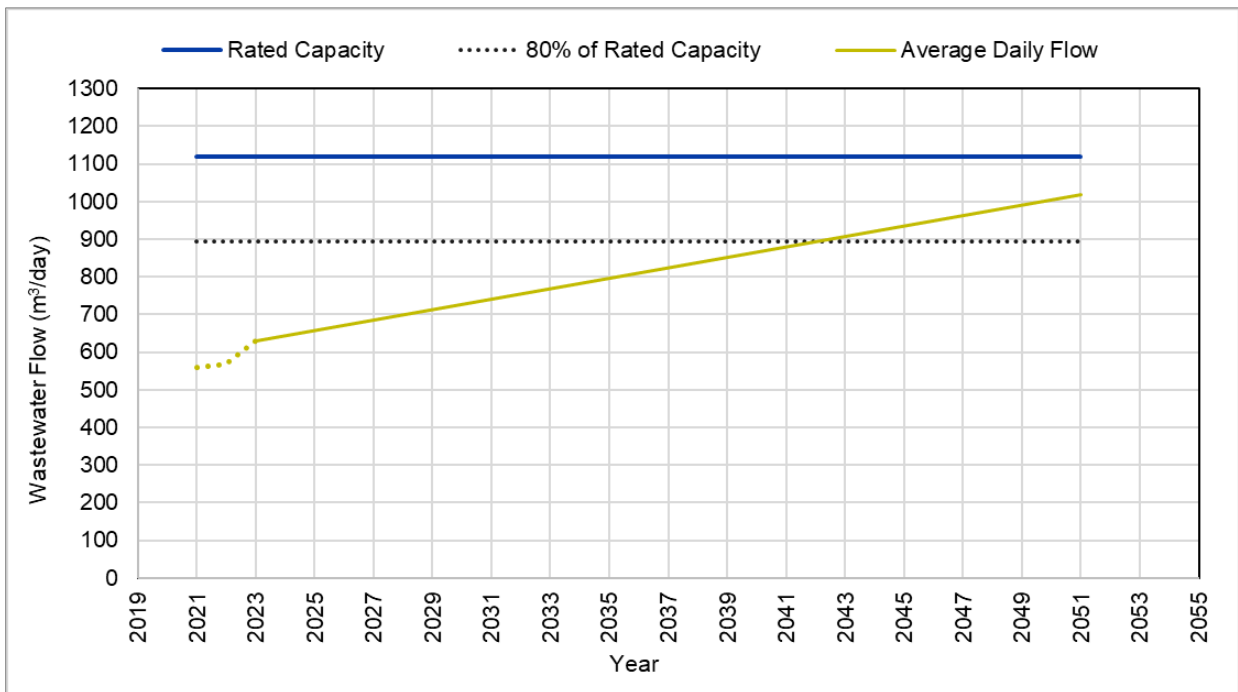


Figure 8.3: Crysler Lagoons - Projected ADF

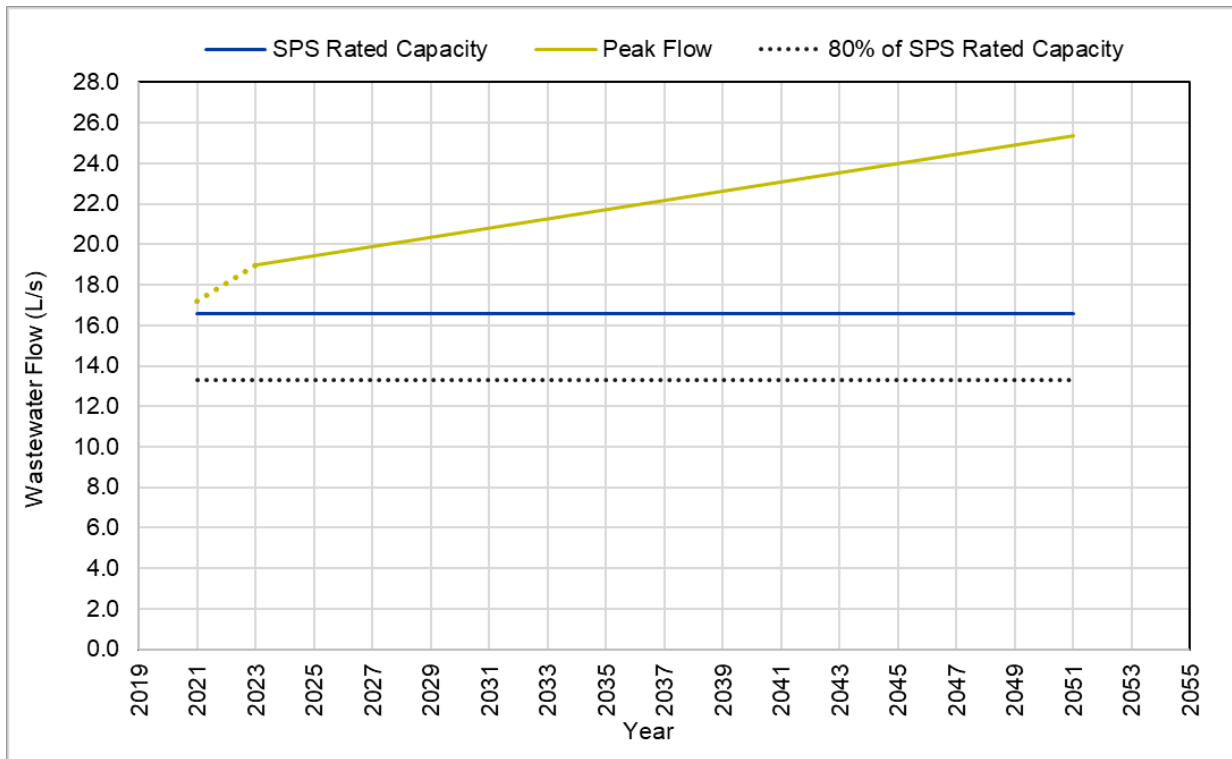


Figure 8.6: Moose Creek SPS - Projected Peak Flow

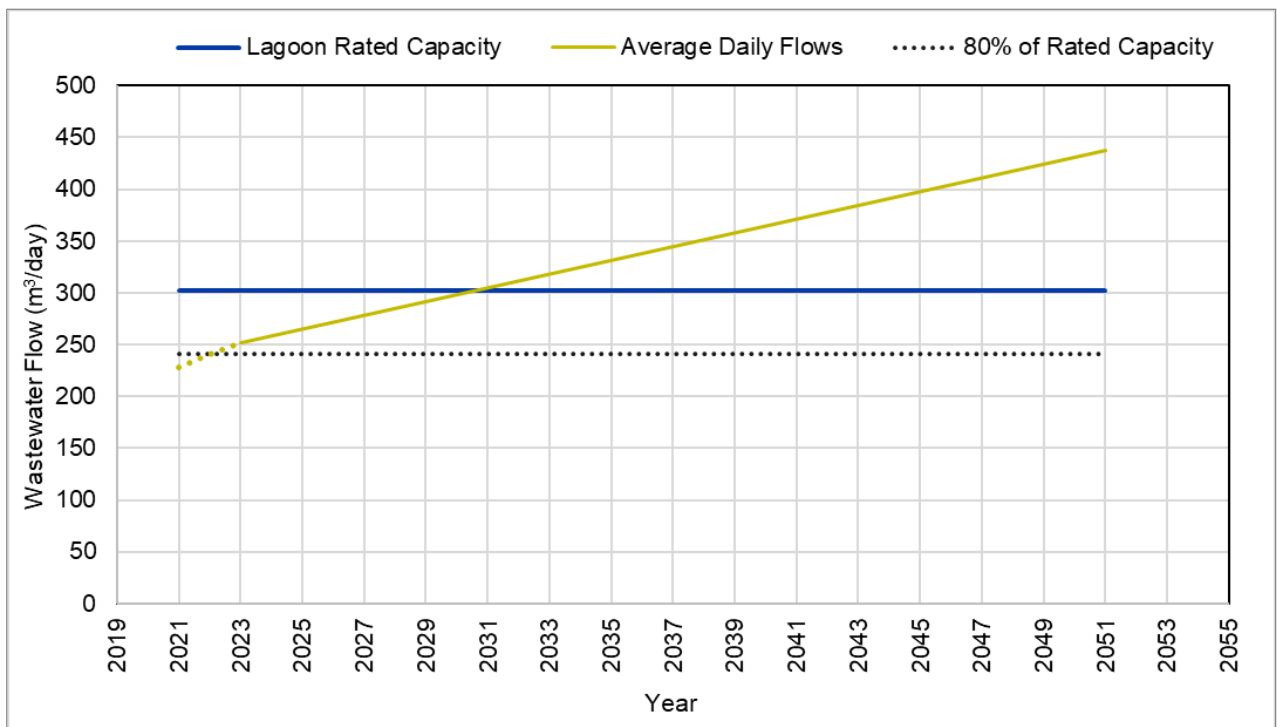


Figure 8.5: Moose Creek Lagoons - Projected ADF



### 8.4.2 Servicing Constraints

Table 8.7 provides the projected capacity deficits that will result in servicing constraints for each of the WWTSs.

Table 8.7: WWTS Servicing Constraints

Parameter	2051 Flow	Rated Capacity	Surplus / (Deficit)
<b>Urban Settlement</b>	<b>Collection System – Peak Flows (L/s)</b>		
Finch	16.5	14.5	(-2.0)
Finch-Crysler	70.7	46.0	(-24.7)
Moose Creek	32.9	16.6	(-16.3)
<b>Urban Settlement</b>	<b>Wastewater Treatment Lagoons – ADF (m<sup>3</sup>/day)</b>		
Finch- Crysler	1,018	1,118	100
Moose Creek	438	302	(-136)

Additionally, the following operational and maintenance issues were communicated from the system operators:

1. Sewage collection system:
  - Finch
    - › Neither of the SPSs across the village have back up power. During power outages, sewage has to be hauled offsite manually.
    - › SPS No. 1 has a history of flooding during peak flows which requires excess sewage to be trucked offsite.
    - › The forcemain transition manhole chamber is located in a farmer’s field and has limited access. Operations staff have noted odor issues that can be attributed to H<sub>2</sub>S presence. The manhole structure shows visual signs of poor concrete condition (concrete pitting) and a corroded access ladder that needs to be replaced as it currently unsafe to be use.
    - › The outlet manhole beside the creek gets flooded during peak flows due to leaking cover.
    - › The SPSs across the village feeding the main SPS No. 1 have maintenance challenges. Due to the size of the wet wells, accessing to the bottom is difficult and, by extension, removing the pumps for inspection and maintenance is also challenging.

- › Control panels for the SPSs are due for replacement due to deteriorating conditions. They are exposed and are prone to heating issues during hot weather. However, this does not cause any monitoring issues.
  - Chrysler
    - › In April 2023, about 8 hours of haul trucks were needed to handle peak flows which shows that the SPS is significantly undersized for current flows. The general location of the station is also not convenient for the trucks access.
    - › Additionally, due to lack of routine exercising maintenance on the isolation valves in the SPS, the operability condition of these valves is unknown. There is also no automatic duty rotation of the pumps and the operating system is old. The standby generator at the SPS is old and is sized to operate only one pump at a time.
  - Moose Creek SPS: structural, and process and mechanical equipment deterioration due to aging, which poses safety hazard during operations and maintenance.
2. Wastewater Treatment Lagoons
- Chrysler Lagoons
    - › Structural deterioration of the inlet structure to the facultative cells.
    - › Both facultative cells have excessive vegetation growth.
    - › South east berm of facultative Cell No. 2 is lower than the overflow elevation in the effluent chamber.
    - › Equipment including aeration system are past their service life.
  - Moose Creek Lagoons: the existing blowers feeding the aeration system in the facultative aerated lagoons need to be replaced with larger capacity blowers.

## 8.5 Development of Alternatives

### 8.5.1 Overview

The following alternatives strategies are identified as potential servicing solutions for the three WWTs.

1. Do Nothing;
2. Limit Community Growth;
3. Infiltration and Inflow Control and Reduction;
4. Upgrade Existing Wastewater Collection and Treatment Facilities; and
5. Expansion of Wastewater System via New Facilities.

Alternative Strategies 1 and 2 are not assessed further following the same reasonings provided for the Water Master Plan. Screening of the long-list of strategies and evaluation of the short-listed strategies follows the same methodology as that of the Water Master Plan.

### **8.5.2 Alternative 3: WWTS Infiltration and Inflow Control and Reduction**

This alternative solution considers implementation of programs to reduce extraneous wastewater flows into the wastewater collection system. Exposure to extraneous flow can arise from the following:

- Groundwater infiltration into sewer pipes through cracked sewer pipes;
- Rainfall-derived inflow into sewer systems through foundation drain connections, roof eaves trough connections, manhole lids, storm sewer interconnections, etc., and;
- Rainfall-derived infiltration through cracked sewer pipes and manholes.

Reduction of extraneous WWTS infiltration and inflow throughout the three urban settlements will help reduce future flow requirements, reduce sewage pumping and wastewater treatment plant operational costs, and regain wastewater treatment plant capacity thereby extending its service life. However, this strategy alone cannot address the PaP statement or address Moose Creek's forecasted capacity deficit on its own, as it is highly unlikely to reduce the forecasted sewage volume to below the collection system's rated capacity for Moose Creek lagoons. This strategy also has very low cost/benefit factor and may have negligible impact to the current flows. As such, this strategy is recommended to be incorporated to comply with the general sustainability goals in combination with the preferred strategy.

### **8.5.3 Alternative 4: Upgrade Existing Wastewater Collection and Treatment Facilities**

This alternative looks at increasing the capacity of the existing facilities by retrofitting them using technology or optimizing their operational settings.

For the wastewater collection system, capacity exceedances are projected for the main SPSs in all three WWTS; therefore Alternative 4A will evaluate upgrading the SPS for expanding the identified bottlenecks in the wastewater collection system.

For wastewater treatment, only the Moose Creek lagoons are forecasted to exceed the capacity; for which the following options to expand its rated capacity while meeting anticipated stringent effluent limits will be explored:

- Alternative 4B-1: Treatment Optimization via Technology; or
- Alternative 4B-2: Modified Lagoon Operation.

The alternative strategies for the lagoons are developed considering two key points below:

- Since the Moose Creek Lagoons capacity need to be upsized to accommodate growth, an Assimilative Capacity Study (ACS) will be required which will determine the capability of the receiving stream to accommodate the increased flows as well as the effluent characteristics of the system. It must be noted that since the establishment of the current effluent limits in 1997, effluent requirements have become more stringent in response to provincial and federal environmental protection goals. It is, therefore, highly likely that the ACS will require lower effluent limits that must be achieved by the Moose Creek lagoons than currently established in the 1997 CoA.
- The wastewater influent characteristics (specifically BOD<sub>5</sub> and TSS) were projected to 2051 to determine the actual additional capacity needed. The preliminary calculation results show that while the existing lagoons do have the surface area needed to provide treatment for the 2051 BOD loadings per MECP guidelines, they do not have the storage volume needed to provide the one year hydraulic detention time (to be able to discharge annually). As such, either additional storage volume or Hydrograph Controlled Release (HCR) is needed to address this issue. Discharge from HCR lagoons are based on the flow conditions in the receiving stream, where effluent discharge is allowed during high flow conditions that can occur through out the year.

Additionally, exceedance of TSS limits in the last two years where flows are at 80% of the rated capacity indicates that the lagoons may not be able to accommodate any increase in flows. With continued exceedances, a freeze on additional connections may be ordered by the MECP until the issue is resolved. As such, the Township is recommended to undertake the Schedule C Class EA required for the lagoon capacity expansion prior to approving any additional growth and development within the village.

## **8.5.4 Alternative 5: Expansion of the Wastewater System via New Facilities**

### **8.5.4.1 OVERVIEW**

This alternative looks at options for addition of collection and treatment facilities to expand the capacity of the WWTSSs.

- Alternative 5A looks at implementing a new SPS to collect the excess flows.
- Options for the Moose Creek lagoons are:
  - › Alternative 5B-1: New Facultative Lagoon
  - › Alternative 5B-2: Convert to Mechanical Treatment Facility

#### 8.5.4.2 ALTERNATIVE 5A: NEW SEWAGE PUMPING STATION

This strategy revises the option of replacing the SPSs in all three villages. The new SPS's firm capacity is to be sized for the design peak flow. This strategy will address the existing operational and maintenance issues, and existing and future capacity issues.

Due to the large capital cost, constructability challenges as existing SPS can only be decommissioned once the new SPS is built adjacent to it, and a requirement for a Schedule B Class EA, this strategy scores low on technical and economical categories. Although this strategy maybe implemented if the existing SPS conditions warrant a complete replacement, this strategy is not recommended if the concrete condition is good or needs only minor rehabilitation.

#### 8.5.4.3 ALTERNATIVE 5B-1: NEW FACULTATIVE LAGOON

This strategy comprises of a new third lagoon to increase treatment rated capacity. Options between aerated facultative lagoon or an aerobic cell depends on the ACS results.

Proceeding with the conservative assumption that more stringent effluent limits will be imposed which will continue limiting discharge to once a year, the third cell can be a facultative lagoon that will have to be sized to provide storage volume for the excess flows.

Aeration treatment may not be required as the two existing aerated facultative lagoons have ample solids loading capacity for biological treatment and nutrient removal. The third cell is needed to store the flows prior to spring discharge. Therefore, a condition assessment of the existing aeration system in the facultative lagoons and their ability to meet the future loadings is recommended as part of this strategy.

This option scores the lowest on all four categories due to the following:

- The new facultative lagoon will require a minimum additional 5.4 ha to meet the detention volume needed for annual discharge. This is a significantly large capital cost compared to the other options;
- Under the MCEA, this project will require a Schedule C Class EA with cultural heritage resources studies due to the large area of additional land required as detailed in Section 6.2;
- Land acquisition may be needed for the new cell plus additional permit requirements for its relatively larger environmental impact;
- This option does not optimize the operation of the existing facility to accommodate the additional flows and the solution is limited to meeting the 2051 flows. Beyond this year, any additional flows cannot be accommodated by these upgrades and the plant will need to be upgraded again; and

- The cost of the lagoon and associated aeration system is estimated at \$10 Million.

If the ACS permits HCR discharge, a complete-mix aerated pond (aerobic cell) can be implemented which will require significantly less area (about 0.05 ha based on plug flow design). The plant can mimic the Chrysler Lagoon system with initial treatment provided in the upstream facultative lagoons followed by additional treatment in the aerobic cell. A tertiary filter system or a settling pond will highly likely be required post-lagoon for TSS removal. However, all disadvantages listed above except bullet point 1 is still applicable to this option, as the reduced cost from the smaller cell will be offset by the capital and operation costs of the aeration system needed for the aerobic cell. As such, this solution does not meet the PaP statement and is not evaluated further.

#### 8.5.4.4 ALTERNATIVE 5B-2: CONVERT TO MECHANICAL TREATMENT FACILITY

This alternative comprises of decommissioning the existing lagoons as treatment units and construct a new full-scale mechanical treatment plant, rated for the 20-year design flow. This mechanical treatment plant will provide activated sludge treatment based on the assumption that the ACS results will approve HCR discharge. The activated sludge plant can meet the more stringent effluent limits anticipated to be the condition for allowing HCR discharge. Although several options can be implemented, a practical configuration is a Sequencing Batch Reactor (SBR) plant, as it reduces the number of tanks required for separate process treatments. The proposed plant configuration for an SBR plant will require the following:

- Headworks facility for raw wastewater screening grit removal;
- At least two SBR tanks for biological treatment and nutrient removal;
- Effluent filtration provided by cloth media filters (if required);
- Effluent disinfection prior to discharge; and
- The existing lagoons can be used for sludge management.

This alternative scores low on all four categories for the following reasons:

- Estimated cost of this facility is approximately \$30 Million including land acquisition;
- Significantly greater energy consumption; and
- Complex operational and maintenance requirements requiring operator training.

Although this strategy is a long-term solution as a mechanical plant can be optimized/upgraded to treat flows beyond the study horizon of 2051, the projected flows are low enough that the capital cost and project requirements cannot be justified. As such, this strategy is not evaluated further.

Table 8.8: Long List of Alternatives and Screening

Alternatives		Does the alternative address the Problem & Opportunity Statement?	Is the alternative technical and economically feasible?	Can the alternative be implemented without significant impacts?	Summary
1	Do Nothing	✗	✗	✗	Not an acceptable solution and is not evaluated further.
2	Limit Growth	✗	✓	✗	Not an acceptable solution and is not evaluated further.
3	Infiltration and Inflow Control and Reduction	✗	✓	✓	This alternative on its own is not acceptable as a complete solution. It will be recommended as a general sustainability goal.
4	Upgrade Existing WWTS	✓	✓	✓	<p><b>Wastewater Collection System:</b></p> <ul style="list-style-type: none"> <li>➤ Alternative 4A: Upgrade Existing SPS</li> </ul> <p><b>Wastewater Treatment Lagoons:</b></p> <ul style="list-style-type: none"> <li>➤ Alternative 4B-1: Treatment Optimization via Technology</li> <li>➤ Alternative 4B-2: Modified Lagoon Operation</li> </ul>
5	Expand the Existing WWTS	✓	✗	✗	<p><b>Wastewater Collection System:</b></p> <ul style="list-style-type: none"> <li>➤ Alternative 5A: Replacement with New SPS</li> </ul> <p><b>Wastewater Treatment Lagoons:</b></p> <ul style="list-style-type: none"> <li>➤ Alternative 5B-1: New Facultative Lagoon</li> <li>➤ Alternative 5B-2: Mechanical Treatment Facility</li> </ul> <p>Will require land acquisition, high capital costs, permit and other requirements. Therefore, not evaluated further.</p>

## 8.6 Post-Screening Results

Based on the screening above, the following alternatives did not meet the PaP statement, or were not feasible against the evaluation criteria and were not considered further:

- Alternative 1 – Do Nothing
- Alternative 2 – Limit Community Growth
- Alternative 3 – Infiltration and Inflow Control and Reduction
- Alternative 5 – Expansion of the Wastewater System

Based on the screening criteria in Section 8.5, Only Alternative 4 – *Upgrade Existing Wastewater Collection and Treatment Facilities* met the PaP statement and were determined to be feasible against the evaluation criteria.

For the wastewater collection system, the only strategy under Alternative 4 is 4A: Upgrading the Existing SPS. As such, this is proceeded with as the preferred strategy.

The strategies considered under Alternative 4 for the wastewater treatment system (lagoons) are evaluated per the MCEA based criteria established in 6.0 to determine the preferred strategy that addresses the identified constraints.

## 8.7 Detailed Evaluation of Post-Screened Alternative Strategies

### 8.7.1 Alternative 4B-1: Treatment Optimization via Technology

This alternative strategy is based on the assumption that the ACS results will require HCR discharge with more stringent effluent limits, allowing to retain the existing lagoons for storage of the flows during low flow periods in the receiving drain. This strategy comprises of upgrading the existing lagoons with wastewater treatment technologies aimed to enhance biological treatment and nutrient removal within the reduced treatment times and lower effluent limits. Two types of technologies that operate differently are assessed in the following subsections. However, additional technologies that have similar functions can be explored in the Class EA study that will have to be undertaken for approval of the WWTS's capacity expansion.

The common advantages of this alternative, irrespective of the technology used, is:

- The use of the existing lagoons is maximized and no land acquisition is needed for the upgrades; and
- Lower capital, operational (energy), and maintenance costs compared to converting to a mechanical treatment plant.



Irrespective of the effluent limits established in the new ECA, a tertiary filter system will highly likely be needed to address the existing TSS issue, especially for fall discharge due to the increased algae growth during summer months. As such, either of the technologies below will be followed by a tertiary (filter) treatment system. The recommended filter technology for the Moose Creek Lagoons is Cloth Media Surface Filtration technology which can meet effluent TP limits of 0.3 mg/L or less with low capital cost, low operational cost and complexity, and small footprint to satisfy spatial constraints. However, the actual required technology will depend on the ACS results. The estimated cost of the cloth media filters including associated facility building is approximately \$2 Million.

#### 8.7.1.1 INTEGRATED FIXED-FILM ACTIVATED SLUDGE (IFAS)

IFAS is a type of attached growth treatment system that can be installed within the existing lagoons itself. Although several types of technologies for this treatment type exist, Entex Technologies was used to assess this option for this Master Plan. Entex's offers the WavTex EmTexile second generation moving media sheets complete with an integral aeration system. Attached biomass on the flex media sheets can treat double the effective MLSS concentration and the independently moving sheets allow for excellent oxygen and substrate transfer. Entex's Octopus floating aeration system provides fine bubble aeration for biological treatment and nutrient removal.

Advantages of this strategy includes:

- Minimal to no maintenance requirements for 20+ years of operation, except for replacement of the fine bubble disc diffusers in the aeration system;
- Ease of operation and maintenance as the system is designed to be removed from the top;
- Can increase the lagoon treatment capacity as required beyond 2051 by increasing the number of units; and
- Low carbon footprint, resilient to climate change, and low impact on environment since no additional site space is needed.

To prevent clogging of the aeration system, pre-treatment (screening removal) is recommended. Retrofitting of the influent distribution chamber to a preliminary treatment unit (housed with a bar screen) can be explored to save costs on the headworks structure.

Although fixed film technologies with much lower capital and operational costs exist, the ability of these technologies to meet both capacity deficit and effluent limits may be difficult. However, those are recommended to be explored in the Class EA if this alternative is selected as the preferred strategy for the Moose Creek WWTS upgrades.

The system is estimated to cost approximately \$2 million for the IFAS system alone. The headworks unit cost estimate is \$300,000.

### 8.7.1.2 SUSPENDED ATTACHED GROWTH REACTOR (SAGR)

SAGR is a patented process designed to provide nitrification (ammonia removal) in cold to moderate climates. The SAGR is a clean gravel bed with evenly distributed wastewater flow across the width of the cell, and a horizontal collection chamber at the end of the treatment zone. Linear aeration throughout the floor of the SAGR provides aerobic conditions that are required for nitrification. The gravel bed is covered with a layer of wood chips or shredded rubber tires for insulation. The SAGR system is designed based on the assumption that the discharge window is flexible to be changed from 15 days in April to more than 60 days starting in May or anytime in Fall. This is due to the fact that starting the discharge period in April reduces the SAGR efficiency due to low growth rate of nitrifiers during the cold season.

The proposed system would consist of the following processes and technologies:

- Converting the existing mechanically aerated facultative lagoons to facultative lagoons; thereby saving costs of aeration system which is typically 60% of the operational cost of lagoons.
- Retain the existing two (2) cell lagoon system for BOD and TSS removal operated in parallel. The existing alum system is to be retained for phosphorus removal.
- Implement two (2) SAGR cell for nitrification (ammonia removal), BOD, and TSS polishing following the lagoon cells. The SAGR process will also provide significant reductions in Fecal and Total Coliform; and
- Implement a new blower building to accommodate SAGR blowers.

A quotation was obtained from Nexom for the SAGR system including the potential location for the treatment cells. The cells can be installed in the area between the lagoons and Concession 8<sup>th</sup> road. Instead of a blower building, the PD blowers with weather-proof enclosures can be installed outside adjacent to the cells. The quote for the SAGR unit is \$2,300,000, which does not include construction of the basins and associated piping to and from the lagoons, upgrades to the blower building (if required), and engineering fees.

### 8.7.2 Alternative 4B-2: Modified Lagoon Operation

This strategy comprises of modified the lagoon's operation by incorporating conventional extended-aeration treatment (CEA) which is a type of conventional activated sludge treatment. The proposed strategy comprises of adding an extended aeration tank prior to the lagoons for biological treatment and nutrient removal. The proposed concrete tank is to

be sized to provide a minimum hydraulic retention time of 15 hours which will require a storage volume of 300 m<sup>3</sup>. The tank itself can be placed between the two lagoons at the influent side such that treated effluent can gravity discharge to the lagoons with minimal conveyance infrastructure.

This configuration will require the following unit processes:

- New headworks facility to protect the downstream aeration equipment;
- Fine bubble diffusers in the tank and associated blower(s);
- Return activated sludge (RAS) pump(s) for recycling of activated sludge from the lagoons to the tank; and
- Tertiary treatment provided by cloth media filtration prior to discharge.









Since the existing lagoons have the capacity to treat the loadings, they can be operated as facultative lagoons with no mechanical aeration treatment. This will save operational costs as aeration systems typically account for 60% of the cost in a lagoon treatment system.

Cost efficient strategies for the unit processes can include:

- The existing blower building can house one positive displacement (PD) blower and the RAS pump. Only one blower and one RAS pump may be sufficient, as the CEA treatment can be brought offline for a short duration (less than a month) if the two equipment need to be shutdown for maintenance reasons; and
- The headworks facility can comprise of a screening unit inside an FRP enclosure instead of a building.

The estimated cost for this strategy is \$6 Million. This alternative strategy scores neutral to high in all categories because it is an effective and robust solution to addressing the capacity deficit issue as it not only provides significant capacity increase but also provides flexibility for treating increased flows well beyond the study horizon of 2051. Packaged CEA systems can be implemented which reduces technical requirements of the project and may also reduce the capital cost. Use of the existing assets on site (no decommissioning required) and no additional land acquisition while meeting anticipated stringent ECA effluent criteria are additional advantages of this option. Although the mechanical operation of the proposed unit processes generally has higher energy consumption relative to natural systems, the energy consumption is anticipated to be similar to Alternative 4B-1.

Table 8.9: Detailed Evaluation of Wastewater Treatment Alternatives

Evaluation Criteria	Alternative 4B-1: Upgrade Existing Lagoons	Rating	Alternative 4B-2: Modified Lagoon Operation	Rating
Technical	<ul style="list-style-type: none"> <li>• New proposed technology requires operator training and replacements after its useful life</li> <li>• Further capacity expansion is possible through addition of more units of the type of technology selected</li> <li>• Technologies generally have more complex operational and maintenance requirements as compared to conventional treatment systems</li> <li>• Modifications are required within the lagoon cells which can pose construction (implementation) difficulties with large room for errors and risks.</li> </ul>		<ul style="list-style-type: none"> <li>• Ease of construction</li> <li>• No complex technology/relatively simple operation</li> <li>• Ample capacity for bypass for maintenance requirements</li> <li>• Additional unit processes and flow cycling (RAS) that can pose operational difficulties</li> </ul>	
Social and Cultural	All proposed upgrades can possibly fit within the municipal property and no land acquisition is anticipated. However, potential impacts to cultural heritage resources is unknown and should be assessed per Section 6.2			
Environment	<ul style="list-style-type: none"> <li>• Depending on the technology selected, environmental impacts are anticipated if additional land is required (for e.g. areas for SAGR cells)</li> <li>• However, generally the technologies proposed can be implemented within the existing municipal site.</li> </ul>		<ul style="list-style-type: none"> <li>• No land acquisition required</li> <li>• Impacts due to construction can be addressed by industry recommended construction practices</li> </ul>	
Economic	Capital costs lower than Alternative 4B-2		Larger capital costs but can be offset by lifecycle costs of Alternative 4B-1	
Overall Score and Summary	At the Master Planning stage, both options are viable and can meet the long-term goals of the Township. Both options will require a Class B study that must include an Assimilative Capacity Study which can then assist further in selecting the preferred strategy between the two.			

## 8.8 Preferred Wastewater Servicing Strategy

### 8.8.1 Wastewater Collection System

The proposed works include replacing the existing pumps with two larger pumps that are sized for the 2051 peak flows. The pumps are to be operated in duty/standby mode so that the firm capacity of the SPSs will equal the design peak flows which aligns with MECP guidelines. The following methodology was used to check the SPS's existing wet well configuration to ensure it can be modified for the increased rated capacity:

- A system curve from the SPS to its destination (transition manhole for Finch and lagoons for Chrysler) was generated for the forecasted peaks;
- Maximum velocity in the existing discharge forcemains were checked to ensure it is below 3.0 m/s; and
- The control elevation details of the pumps obtained from SPS drawings was used to estimate the required active volume of the wet well to limit the pump start frequency to a maximum of 10 times an hour. Although the MECP Guidelines recommend wet well active volumes to be sized for 6 pump starts an hour only, pump motors below 50hp can accommodate 15 starts/hour per most well-known pump manufacturers including Xylem Inc. and Sulzer. Operating levels under the following two scenarios were created:
  - › Scenario 1: using the *Lag Pump Start* level as the duty pump start level and the *Low Water Level Alarm* level as the duty pump stop level; and
  - › Scenario 2: Using the *Lead Pump Start* level as the duty pump start level and the *Stop All Pumps* level as the duty pump stop level.

An example of the two scenarios is depicted in Figure 8.7. It must be noted that both scenarios above consider only constant speed pumps. With VFD pumps, it maybe possible to further increase the rated capacity of the SPS to accommodate peak flows beyond the study horizon of 2051 of this Master Plan.

For both scenarios above, the analysis shows that both SPSs have the capacity to provide the active working volume with the current pumps operating levels while maintaining the maximum pump start frequency to 10 times an hour for the future peak flows. Therefore, this strategy allows the SPS to be re-rated to service future growth (and possibly beyond) with minimal capital costs (only related to pumps upgrades) while improving operation and maintenance conditions. Additionally, this project is classified as Exempt under MCEA Process. As such, this strategy scores high in all four categories and is proceeded with as the preferred strategy for the collection system.

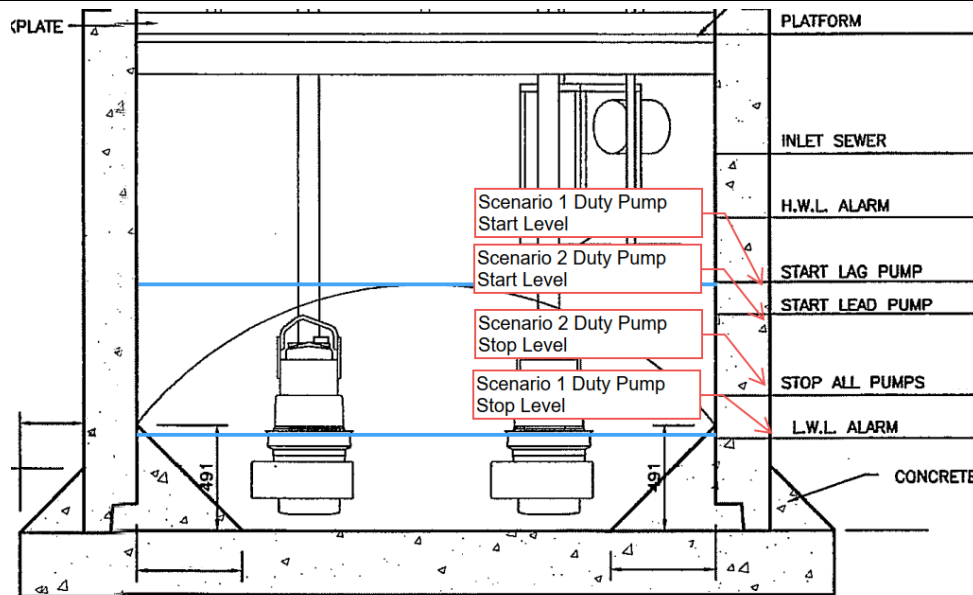


Figure 8.7: SPS Pump Layout and Operating Level

The evaluation above shows that the preferred water supply expansion strategy is Alternative 4A-1: *Upgrade Existing SPS* via retrofitting the existing layout and equipment.

However, due to the large flow variation between minimum and maximum flows (average dry weather flow is 1.2 L/s and average peak flow is 8 L/s), sizing constant speed pumps and optimizing the wet well for the 2051 peak flows will increase the residence time of the wastewater in the mains and wet well during low flow periods. This will increase the H<sub>2</sub>S issues that are causing structural deterioration in the transition chamber and its connecting upstream pipes. Additionally, average pump life is 15 years, therefore, it should be sized for the flow range forecasted within its lifespan. As such, the following two options can be implemented:

- Installing VFD pumps which can be sized to operate for a wide range of flows while minimizing the active volume (storage volume) within the wet well and subsequently the discharge pipes and downstream infrastructure. VFD pumps can meet the 10 starts per hour within a smaller active volume than constant speed pumps which will prevent stagnant flows; OR
- Size constant speed pumps for up to year 2040 (approximately 16L/s), after which they can be replaced with upsized pumps.

### 8.8.2 Wastewater Treatment System

The preferred strategy shows that Alternative 4B-1: *Treatment Optimization via Technology* is the preferred strategy for the for Moose Creek lagoon capacity expansion. However, it

must be noted that both alternatives are viable options and the preferred strategy will greatly depend on the Class EA study and the ACS results. This is because Alternative 4B-2: *Modified Lagoon Operation* is a conservative approach that uses tried-and-tested wastewater treatment processes, with ample flexibility and experience in modifying for further expansion. Having one semi-mechanical plant within North Stormont also gives the Township flexibility in the future for communal wastewater treatment.

Evaluation of both technologies (SAGR vs IFAS) to select one best suited for the Township's needs is to be completed in the required Class EA study. Figure 8.8 provides the configuration of the wastewater treatment system for both technology options.

The timeline of the upgrades (post tertiary filtration installation) can possibly be delayed if flow per capita is reduced as detailed in Section 8.5.2 (which will reduce the growth rate of the flows). A phased approach to the upgrades can be implemented, with the installation of the tertiary filter system as the first upgrade to address the existing TSS issues. The subsequent upgrades will depend on the ACS results, following which the long-list alternative strategies can be re-assessed and the costs re-estimated in the Schedule C Class EA based on the updated information. As part of the Class EA, a technical cultural heritage study is to be undertaken to assess the impact of the increased effluent discharge volumes, as detailed in Section 6.2.

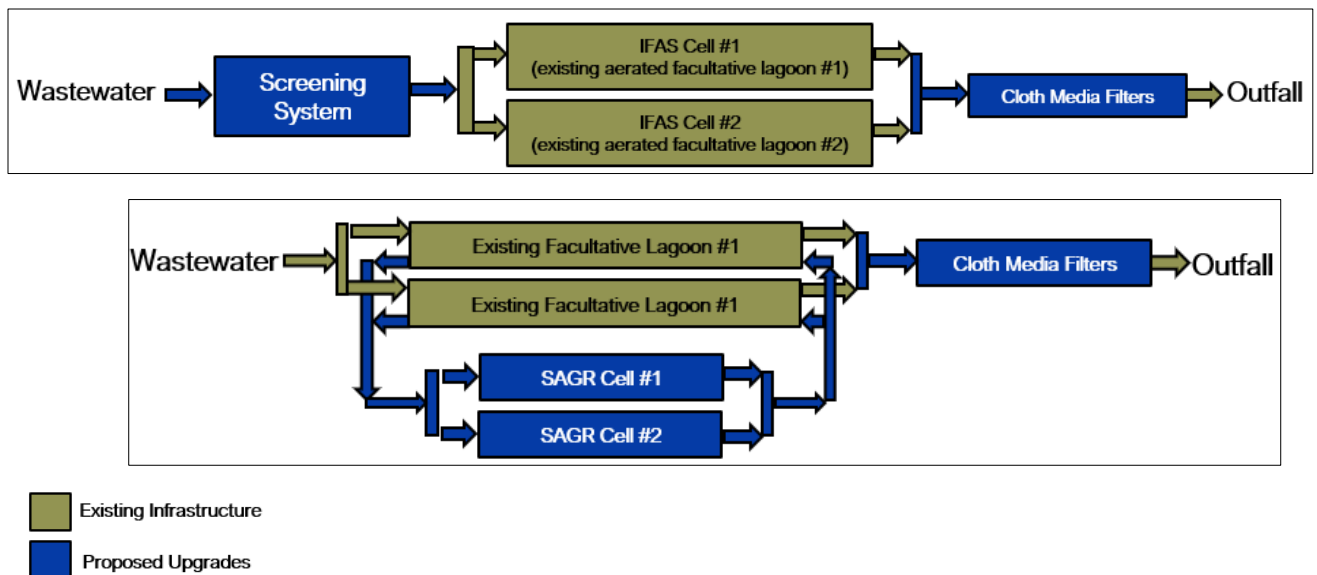


Figure 8.8: Technology Options for Proposed Moose Creek Wastewater Lagoon Upgrades

### 8.8.3 Implementation Timeline

At the current wastewater flow growth rate, the anticipated timeline required for the recommendations is provided in Table 8.10.

Table 8.10: Wastewater Master Plan Recommendations Implementation Timeline

Work	0 – 5 years (2025 – 2030)	5 – 10 years (2030- 2035)	10 – 15 years (2035- 2040)	15-20 years (2040- 2045)	20-25 years (2045- 2050)
SPS Upgrades (Design and Construction)	<ul style="list-style-type: none"> <li>• Chrysler</li> <li>• Moose Creek</li> </ul>	Finch			
Lagoons Expansion ECA (and ACS)	Moose Creek				
Lagoons Expansion Design	Moose Creek				
Lagoons Expansion Construction		Moose Creek			

1: Assuming that hydrogeological investigation for Replacement Well #3 will incorporate the recommendations in Section 7.8.4, such that firm capacity of DWS can meet the projected MDD to 2051.

### 8.8.4 Chrysler Sensitivity Analysis

Figure 8.1 is developed following the same methodology from Section 7.8.6 and illustrates the population growth under the proposed rate in the planned development. As seen, at the growth rate of 30 housing units annually, Chrysler’s lagoon capacity will be exceeded by year 2040. Capacity expansion (80% of rated capacity) will be triggered by year 2030 (within next 5 years).

### 8.8.5 Climate Change Resiliency

Since all calculations followed the MECP guidelines which provide a conservative analysis that account for possible scenarios of larger flows due to climate change, the recommendations provided in the Wastewater Master Plan account incorporate the safety factors needed to accommodate the larger flows. Wastewater collection and treatment systems are vulnerable to excessive infiltration and inflows that can occur due to climate change and, as such, are recommended to upsized when flows reach 80% of its rated capacity limit.



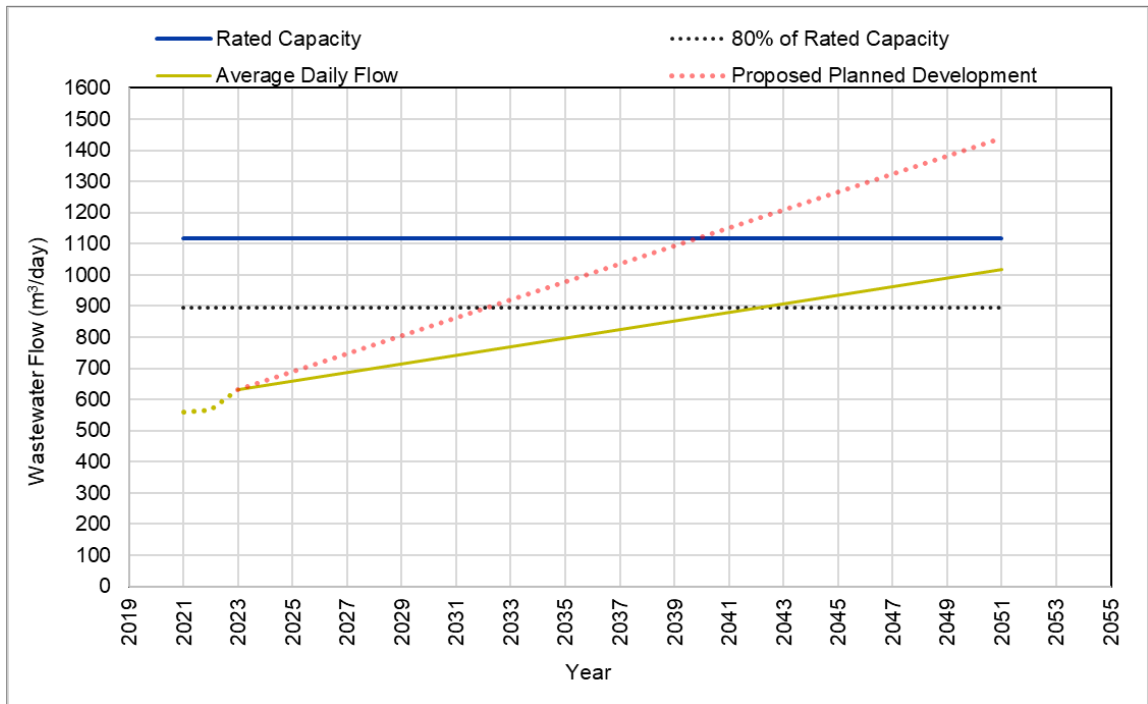


Figure 8.1: Crysler Projected ADF under Proposed Planned Development Population Growth Rate Scenario

## 9.0 CAPITAL PLAN

The following capital plan provides a breakdown of the recommended projects, the corresponding MCEA schedule and the estimated Level 5 cost analysis in 2024 dollar figures (not accounting for future inflation).

Note: All \$ values are a reflection of the 2024 CAD \$ valuation

Project Title/Description	Project Schedule	2025-2030	2030-2035	2035-2040	2040-2045	2045-2051
<b>Finch</b>						
<b>Water</b>						
Water Meters		\$ 250,000				
New Well in Same Wellfield	Schedule B					
Well Exploration (Incl. Hydrogeological Investigation)		\$ 500,000				
Project Implementation				\$ 700,000		
New Water Storage Reservoir	Exempt				\$ 2,000,000	
<b>Wastewater</b>						
Upgrade Existing Sewage Pumping Station	Exempt			\$ 140,000		\$ 200,000
	Total	\$ 750,000		\$ 840,000	\$ 2,000,000	\$ 200,000
<b>Crysler</b>						
<b>Water</b>						
		\$ 450,000				
New Well in Same Wellfield	Schedule B					
Well Exploration (Incl. Hydrogeological Investigation)			\$ 600,000			
Project Implementation				\$ 1,300,000		
New Above-Grade Storage Tank	Exempt			\$ 810,000		
<b>Wastewater</b>						
Upgrade Existing Sewage Pumping Stations	Exempt	\$ 140,000			\$ 250,000	
	Total	\$ 590,000	\$ 600,000	\$ 2,110,000	\$ 250,000	
<b>Moose Creek</b>						
<b>Water</b>						
Water Meters		\$ 260,000				
New Water Storage Reservoir	Exempt		\$ 1,500,000			
<b>Wastewater</b>						
Upgrade Existing Sewage Pumping Station	Exempt	\$ 140,000			\$ 250,000	
Lagoon Capacity Expansion (IFAS)	Schedule C					
Class EA		\$ 210,000				
Engineering Design and Contract Administration		\$ 850,000				
Construction		\$ 5,700,000				
	Total	\$ 7,160,000	\$ 1,500,000		\$ 250,000	
	Total	\$ 8,500,000	\$ 2,100,000	\$ 3,000,000	\$ 2,500,000	\$ 200,000

## 10.0 REFERENCES

- Metcalf & Eddy. (2014). *Wastewater Engineering Treatment and Resource Recovery*. New York: McGraw-Hill Education.
- Ontario Ministry of Environment, Conservation and Parks. (2023, Nov 30). Design Guidelines for Sewage Works. Ontario, Canada.
- Ontario Ministry of Environment, Conservation and Parks. (2023, May 11). Design Guidelines for Drinking-Water Systems. Ontario, Canada.
- The Counties of SDG. (2018). *Official Plan for United Counties of Stormont, Dundas and Glengarry*. The Counties of SDG.
- R. V. Anderson Associates Limited. (2022, May 16). *Villages of Crysler, Finch and Moose Creek – Water & Sewage Reserve Study Update*. R. V. Anderson Associates Limited.
- Watson & Associates Economists Ltd. (2023). *United Counties of Stormont, Dundas and Glengarry Growth Management Strategy Report*. Watson & Associates Economists Ltd.

## **APPENDIX A**

### Referenced Legislation and Policies



## 1.0 PROVINCIAL ACTS AND POLICIES

### 1.1 Provincial Acts and Regulations

#### 1.1.1 Environmental Assessment Act (EAA)

The EAA is the legislation which allows the MCEA process to be followed by municipalities so that they can plan, design, construct, maintain, rehabilitate, and/or retire municipal road, water, wastewater, and transit projects. This allows these projects to proceed without having to obtain project-specific approval under the EAA provided that the MEA Class EA process is followed.

#### 1.1.2 Environmental Protection Act (EPA)

The intent of the EPA is to protect the Ontario environment from an “adverse effect” which is defined as the following:

- Impairment of quality of the natural environment for any use that can be made of it;
- Injury or damage to property or to plant or animal life;
- Harm or material discomfort to any person;
- An adverse effect on the health of any person;
- Impairment of the safety of any person;
- Rendering any property or plant or animal life unfit for human use;
- Loss of enjoyment of normal use of property; and
- Interference with the normal conduct of business.

Regulations from the Act which may impact or have bearing on the operation or construction of water and wastewater systems are shown below in Table 1.1.

Table 1.1: EPA Regulations Impacting Water, Wastewater and Stormwater Systems

Regulation	Title
O. Reg. 53/24	General and Transitional Matters
O. Reg. 406/19	On-Site and Excess Soil Management
O. Reg. 208/19	Environmental Compliance Approval in Respect of Sewage Works
O. Reg. 1/17	Registrations Under Part ii.2 of the Act - Activities Requiring Assessment of Air Emissions

O. Reg. 351/12	Registrations Under Part ii.2 of the Act - Waste Management Systems
O. Reg. 255/11	Applications for Environmental Compliance Approvals
O. Reg. 224/07	Spill Prevention and Contingency Plans
O. Reg. 222/07	Environmental Penalties
O. Reg. 153/04	Records of Site Condition - Part xv.1 of the Act
O. Reg. 675/98	Classification And Exemption of Spills and Reporting of Discharges
O. Reg. 524/98	Environmental Compliance Approvals - Exemptions from Section 9 of the Act
O. Reg. 232/98	Landfilling Sites
O. Reg. 206/97	Waste Disposal Sites, Waste Management Systems And Sewage Works Subject to Approval Under or Exempt from the Environmental Assessment
O. Reg. 101/94	Recycling and Composting of Municipal Waste
R.R.O. 1990, Reg. 360	Spills

### 1.1.3 Ontario Water Resources Act (OWRA)

The purpose of this Act is to provide for the conservation, protection, and management of Ontario's waters and for their efficient and sustainable use, to promote Ontario's long-term environmental, social, and economic well-being.

### 1.1.4 Water Opportunities and Water Conservation Act (WCA)

The 2010 WCA under the Water Taking and Transfer (OWRA) Regulation (O. Reg 387/04) is one of the various provincial land use planning statutes, policies, and plans that set out direction relating to water conservation and efficiency best management practices. The Act aims to conserve and sustain water resources for present and future generations by:

- a) Foster innovative water, wastewater and stormwater technologies, services and practices in the private and public sectors; and
- b) Create opportunities for economic development and clean-technology jobs in Ontario.

One measure managed by the regulation comprises of the *Province of Ontario – 2021 Water Conservation and Efficiency Program* which assesses water conservation measures in accordance with best water management standards and practices. Ontario has a range of programs to manage water supply and demand, such as establishing water efficiency

standards, and requires local planning authorities to protect water quality and promote green infrastructure. Water takers are required to monitor and report data annually.

### **1.1.5 Nutrient Management Act (NMA)**

The General Regulation Ontario Regulation (O. Reg.) 267/03 made under the Nutrient Management Act governs the requirements for land application of biosolids, e.g., seasonal storage requirement. For wastewater treatment plants (WWTP) which were not phased in under the *Nutrient Management Act*, requirements are set out in the Environmental Compliance Approval (ECA), based on the MECP and the Ministry of Agriculture, Food and Rural Affairs (OMAFRA) Guidelines for the Utilization of Biosolids and Other Wastes on Agricultural Land, 1996. Part II of the NMA requires the Municipality to ensure that their biosolids land application program meets the requirements of the Act and complies with the requirements for land application for non-agricultural source materials (NASM).

### **1.1.6 Safe Drinking Water Act (SDWA)**

The *Safe Drinking Water Act* was implemented following the Walkerton Water Crisis (2000), at which time there was no formal regulation of drinking water treatment, operation, record taking, and remedial actions for unsafe drinking water in Ontario. Ontario Regulation 170 (O. Reg 170) under the SDWA provides the requirement for municipal water supply systems which includes reference to the Ten State Standards and the MECP document titled *Procedure for Disinfection of Drinking Water*. The MECP *Design Guidelines for Drinking-Water Systems* (Water Guidelines) is used for the analysis of the Municipality's supply and distribution systems; but it is understood that the guidelines do allow some individual municipal discretion on items such as municipal fire protection. The guidelines will be the foundational basis for risk assessments, supply and distribution planning, fire flow determination, design system pressures and calculation of future water supply.

Schedule 22 and Section 11 of O. Reg 170/03 under the Act requires that an annual status summary report on the performance of the Municipality's Drinking Water System (DWS) be provided to the Council and be reviewed per the guidelines established by the MECP.

The sampling, testing, monitoring, and pumping of the water supplied by the wells must follow the requirements set by Permits to Take Water (PTTW), the Municipal Drinking Water License, and Drinking Water Works Permit for the subject systems. The Sustainable Water and Sewage Systems Act (SWSS) (2002) indicates that regulated entities are required to submit a report detailing the provision of water services and wastewater services including an inventory of and management plan for the associated infrastructure.

### **1.1.7 Clean Water Act (CWA)**

The CWA is a law enacted by the Legislative Assembly of Ontario, Canada to protect existing and future sources of drinking water. The CWA (2006) is a major part of the Ontario government's commitment to ensuring that every Ontarian has access to safe drinking water. Key regulations enabling the work and authority for Source Water Protection are:

- O. Reg. 284/07 Source Protection Areas and Regions delineates source water protection areas within the province;
- O. Reg. 287/07 General mandates the terms of reference and requirements for source water protection plans; and
- O. Reg. 288/07 Source Protection Committees under the CWA constitutes and mandates Source Projection Committees.

When municipal raw water demonstrates an exceedance of an Ontario Drinking Water Quality standard or increasing trend of a contaminant of concern, the CWA allows local Source Protection Authorities (SPAs) to designate municipal wellhead protection areas as Issues Contributing Areas (ICA). An ICA delineates an area where certain current or past land use have or are likely inferred to contribute to the elevated contaminant concentration in raw water supplies.

### **1.1.8 Sustainable Water and Sewage Systems Act**

The *Sustainable Water and Sewage Systems Act* (SWSSA) mandates that all municipalities (regulated entity) operate their water and wastewater systems on a full cost recovery basis where the system cost is borne by the system users. Every municipality that provides water services to the public has to prepare and approve a plan describing how the entity intends to pay the full cost of providing those services. This Act has no enabling regulations and was implemented following the Walkerton Water Crisis which occurred in 2000.

### **1.1.9 Provincial Policy Statement 2020**

The Provincial Policy Statement (PPS), 2020 (Ministry of Municipal Affairs and Housing [MMAH], 2020) sets out the Provincial policy direction for land use planning in Ontario, including managing growth, using and managing natural resources, protecting the environment, and ensuring public health and safety.

The vision of the policy recognizes that Ontario's long-term prosperity, environmental health and social well-being depend on promoting efficient land use and development patterns. Efficient development patterns also optimize the use of land, resources and public investment in infrastructure and public service facilities and support sustainability by



promoting strong, liveable, healthy and resilient communities, protecting the environment and public health and safety, and facilitating economic growth.

The policies indicate that settlement areas shall be the focus of growth and development, and that municipalities plan for a full range of and mix of land uses and housing options to meet current and future needs over a 25 year planning horizon. Land use patterns within settlement areas shall be based on densities and a mix of land uses which:

- Efficiently use land and resources;
- Are appropriate for, and efficiently use, the infrastructure and public service facilities which are planned or available; and
- Avoid the need for their unjustified and/or uneconomical expansion.

In addition, the importance of intensification and redevelopment is noted as follows:

- a) *“Maintain at all times the ability to accommodate residential growth for a minimum of 15 years through residential intensification and redevelopment and, if necessary, lands which are designated and available for residential development; and*
- b) *Maintain at all times where new development is to occur, land with servicing capacity sufficient to provide at least a three-year supply of residential units available through lands suitably zoned to facilitate residential intensification and redevelopment, and land in draft approved and registered plans.”*

The PPS policies require that planning for sewage and water services shall:

- c) Accommodate forecasted growth in a manner that promotes the efficient use and optimization of:
  - i. Existing municipal sewage services and municipal water services,
  - ii. Existing private communal sewage services and private communal water services, where municipal sewage services and municipal water services are not available or feasible;
- d) Ensure these systems are provided in a manner that:
  - i. Can be sustained by the water resources upon which such services rely,
  - ii. Prepares for the impacts of a changing climate,
  - iii. Is feasible, affordable and financially viable over their lifecycle,
  - iv. Protects human health and safety, and the natural environment;
- e) Promote water conservation and water use efficiency;
- f) Integrate servicing and land use considerations at all stages of the planning process; and

g) Be in accordance with the servicing hierarchy in the policies

All planning decisions and Official Plan policies (including those related to infrastructure) are required to be 'consistent with' the policies of the PPS (2020). As such, the North Stormont W WW Master Plan will be developed on the premises of the above described PPS policies.

### **1.1.10 Ontario Heritage Act**

The *Ontario Heritage Act* mandates the criteria and process for identifying provincial heritage properties and the standards for their protection, maintenance, use and disposal. The Act is generated through consultation with the affected public and ministries.

Provincial Heritage Property examples:

- Courthouses and jails
- Monuments and cemeteries
- Historic gardens and forts
- Provincial parks and cultural heritage landscapes
- Power generating stations and provincial mental health facilities
- Bridges, museums and historic houses

## **1.2 Federal Acts and Regulations**

### **1.2.1 Federal Fisheries Act**

The *Fisheries Act* (Government of Canada 1985) is administered by Fisheries and Oceans Canada (DFO) and provides a framework for the proper management and control of fisheries as well as the conservation and protection of fish and fish habitat, including the prevention of pollution. In June of 2019, Canada modernized the *Fisheries Act*; the new provisions and stronger protections aim to better support the sustainability of Canada's fish and fish habitat for future generations. In particular, Section 34.4 prohibits any work, undertaking or activity (other than fishing) that results in the death of fish; Section 35.1 prohibits the harmful alteration, disruption, or destruction of fish habitat (HADD); and Section 36 prohibits the deposit of deleterious substances.

The *Fisheries Act* requires that projects avoid causing death of fish or HADD of fish habitat unless authorized by DFO or a designated representative. Proponents are responsible for planning and implementing works, undertakings or activities in a manner that avoids harmful impacts to fish and fish habitat. Should proponents believe that their work, undertaking or activity will result in harmful impacts to fish and fish habitat, a Request for Review (RFR)

must be submitted, and the DFO will work with them to assess the risk and provide advice and guidance on how to comply with the *Fisheries Act*.

### **1.2.2 Species at Risk Act**

At a federal level, Species at Risk (SAR) designations for species occurring in Canada are initiated by the completion of a comprehensive Status Report by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If approved by the federal Minister of the Environment, species are added to the federal List of Wildlife Species at Risk (Government of Canada 2002).

Species that are included on Schedule 1 as Endangered or Threatened are afforded both individual and critical habitat protection on federal lands under the Species at Risk Act (SARA). On private or provincially owned lands, only aquatic species listed as Endangered, Threatened or Extirpated are protected under SARA, unless ordered by the Governor in Council.

### **1.2.3 Endangered Species Act**

At the provincial level, SAR and their habitats are protected under the *Endangered Species Act* (ESA, Government of Ontario 2007) which is administered by the Ministry of Environment, Conservation and Parks (MECP). SAR designations for species in Ontario are initiated by the completion of a comprehensive Status Report by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial Minister of the Environment, Conservation and Parks, species are added to the Species at Risk in Ontario (SARO) List (O. Reg. 230/08) under the ESA. Section 9(1) of the ESA, 2007 prohibits the killing, harming, harassment, capture, taking, possession, transport, collection, buying, selling, leasing, trading, or offering to buy, sell, lease or trade species listed as Extirpated, Endangered, or Threatened on the SARO List. Section 10(1) prohibits damaging or destroying habitat of Endangered or Threatened species on the SARO List and may apply to Extirpated species through special regulations. General habitat protection applies to all Endangered and Threatened species, with some species having 'categorized habitat', which protects areas within specific distances from known records. Some SAR are afforded a more precise habitat protection through a habitat regulation (regulated habitat), as identified in Ontario Regulation 242/08. Species designated as Special Concern are not protected under the Act.

The ESA, 2007 includes provisions for permits under Section 17(2)(c) that would otherwise contravene the Act. Projects which propose impacts to SAR or their habitat would require a permit or other process (e.g., registration) to proceed without contravening the Act.

**APPENDIX B**

Stakeholder Consultation Log



Appendix B-1

# Public Contact Register





Appendix B-2

# Public Contact Notices





TOWNSHIP OF  
**NORTH  
STORMONT**   
A good place to grow

## **NOTICE OF STUDY COMMENCEMENT**

### **VILLAGES OF CRYSLER, FINCH, AND MOOSE CREEK, WATER AND WASTEWATER MASTER SERVICING PLAN FOR THE TOWNSHIP OF NORTH STORMONT**

The Township of North Stormont has initiated a Water and Wastewater Master Servicing Plan (MSP) for the future growth in the villages of Crysler, Finch, and Moose Creek. The Township of North Stormont is completing this Water and Wastewater MSP to identify high level strategies for existing and future water and wastewater servicing in the Township.

The preferred servicing strategies will:

- Support service area growth to 2051 while considering opportunities for operational flexibility and redundancy, as well as for optimization and improvement of the existing systems;
- Provide resiliency to potential future changes to regulatory and climatic conditions;
- Balance environmental, social, technical, and economic considerations.

The project is being completed as an **Approach No. 1 Master Plan** project under the framework of the **Municipal Class Environmental Assessment** (October 2000, amended in 2007, 2011, 2015, & 2023), which is approved under the Ontario Environmental Assessment Act. The study will address the requirements of Phase 1 and part of Phase 2 of the Municipal Class EA process.

Consultation with the public, Indigenous Communities, regulator agencies, and stakeholder groups is a key element of a Municipal Class EA study. To facilitate this, a Public Information Centre (PIC) is planned over the course of the study to gather input on potential servicing solutions and provide an opportunity to discuss concerns and issues with the project team. Interested stakeholders are encouraged to bring comments and concerns to the Township at any time during this process.

If you have any questions or comments regarding the study, or wish to be added to the project contact list to receive notices, please contact a member of the project team:

**Craig Calder**  
CAO/Clerk  
Township of North Stormont  
15 Union Street  
Berwick, ON K0C 1G0  
613-984-2821 ext. 223  
ccalder@northstormont.ca

**Natasha Lee, P.Eng.**  
Project Manager  
R.V. Anderson Associates Limited  
2001 Sheppard Avenue East, Suite 300  
Toronto, ON M2J 4Z8  
416-497-8600 ext. 1231  
nlee@rvanderson.com

This notice first issued May 24, 2024





Outlook

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**R226348-20240530-Notice of Commencement & PIC- W-WW MSP for the Township of North Stormont**

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**From** Carol Derrick <cderrick@rvanderson.com>

**Date** Thu 5/30/2024 1:25 PM

**Cc** Natasha Lee <NLee@rvanderson.com>; Samson Tso <stso@rvanderson.com>

**Bcc** abrisson@northstormont.ca <abrisson@northstormont.ca>; cshane@northstormont.ca <cshane@northstormont.ca>; abugelli@northstormont.ca <abugelli@northstormont.ca>; amcdonald@northstormont.ca <amcdonald@northstormont.ca>; sdenham@northstormont.ca <sdenham@northstormont.ca>; firechief@northstormont.ca <firechief@northstormont.ca>; flandry@northstormont.ca <flandry@northstormont.ca>; planning@northstormont.ca <planning@northstormont.ca>; bhenderson@northstormont.ca <bhenderson@northstormont.ca>; ekeller@northstormont.ca <ekeller@northstormont.ca>; nolan.quinn@pc.ola.org <nolan.quinn@pc.ola.org>; aadnc.infopubs.aandc@canada.ca <aadnc.infopubs.aandc@canada.ca>; ec.enviroinfo.ec@canada.ca <ec.enviroinfo.ec@canada.ca>; EnviroOnt@tc.gc.ca <EnviroOnt@tc.gc.ca>; eanotification.ereqion@onlario.ca <eanotification.ereqion@onlario.ca>; Barboza, Karla (MHSTCI) <karla.barboza@ontario.ca>; deborah.cope@ontario.ca <deborah.cope@ontario.ca>; shipra.vyas@ontario.ca <shipra.vyas@ontario.ca>; kemptville-kingston.mnrf@ontario.ca <kemptville-kingston.mnrf@ontario.ca>; adam.worth@ontario.ca <adam.worth@ontario.ca>

 1 attachment (515 KB)

R226348-20240530- Notice of Study Commencement.pdf;

On behalf of the Township of North Stormont, please see enclosed the Notice of Commencement and Public Information Centre for a Water and Wastewater Master Servicing Plan to service the future growth of Moose Creek, Finch and Crysler.

This notice is sent to your attention as it was deemed that you may be an interested stakeholder.

Should you wish to stop receiving notices pertaining to this project or would like to direct it to an alternate recipient, please advise the undersigned.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

Natasha Lee, P. Eng  
Project Manager  
[NLee@rvanderson.com](mailto:NLee@rvanderson.com)  
(416) 497-8600 ext. 1231

Encls: Notice of Commencement



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**R226348-20240530-Region-Notice of Commencement & PIC- W-WW MSP for the Township of North Stormont**

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**From** Carol Derrick <cderrick@rvanderson.com>

**Date** Thu 5/30/2024 3:12 PM

**To** eanotification.eregion@ontario.ca <eanotification.eregion@ontario.ca>

2 attachments (637 KB)

R226348-20240530- Notice of Study Commencement.pdf; Project Initiation Form (PIF).xlsx;

On behalf of the Township of North Stormont, please see enclosed the Notice of Commencement and Public Information Centre for a Water and Wastewater Master Servicing Plan to service the future growth of Moose Creek, Finch and Crysler.

This notice is sent to your attention as it was deemed that you may be an interested stakeholder.

Should you wish to stop receiving notices pertaining to this project or would like to direct it to an alternate recipient, please advise the undersigned.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

Natasha Lee, P. Eng

Project Manager

[NLee@rvanderson.com](mailto:NLee@rvanderson.com)

(416) 497-8600 ext. 1231

Encls: Notice of Commencement



# NOTICE OF PUBLIC INFORMATION CENTRE #1

## VILLAGES OF CRYSLER, FINCH, AND MOOSE CREEK WATER AND WASTEWATER MASTER SERVICING PLAN FOR THE TOWNSHIP OF NORTH STORMONT

The Township of North Stormont has initiated a Water and Wastewater Master Servicing Plan (MSP) for the future growth in the villages of Crysler, Finch, and Moose Creek. The Township of North Stormont is completing this Water and Wastewater MSP to identify high level strategies for existing and future water and wastewater servicing in the Township.

The preferred servicing strategies will:

- Support service area growth to 2051 while considering opportunities for operational flexibility and redundancy, as well as for optimization and improvement of the existing systems;
- Provide resiliency to potential future changes to regulatory and climatic conditions;
- Balance environmental, social, technical, and economic considerations.

The project is being completed as an **Approach No. 1 Master Plan** project under the framework of the **Municipal Class Environmental Assessment** (October 2000, amended in 2007, 2011, 2015, & 2023), which is approved under the Ontario Environmental Assessment Act. The study will address the requirements of Phase 1 and part of Phase 2 of the Municipal Class EA process.

### How do I Participate?

We are hosting Public Information Centre #1 to report on the progress of the study and provide members of the public with an opportunity to provide comments prior to its finalization. The Public Information Centre will be hosted in person and will include presentation boards and the opportunity for the public to ask questions of the project team.

**When:** Tuesday, September 17, 2024, from 6:00 – 9:00 p.m.

**Where:** Moose Creek Recreational Hall

**How:** In-person.

The presentation boards from the meeting will be posted on the project webpage following the meeting: <https://www.northstormont.ca/>.

If you have any questions or comments regarding the study, or wish to be added to the project contact list to receive notices, please contact a member of the project team:

<p><b>Craig Calder</b> CAO/Clerk Township of North Stormont 15 Union Street Berwick, ON K0C 1G0 613-984-2821 ext. 223 ccalder@northstormont.ca</p>	<p><b>Trevor Kealey, P.Eng.</b> Project Director R.V. Anderson Associates Limited 2001 Sheppard Avenue East, Suite 300 Toronto, ON M2J 4Z8 613-226-1844 ext. 3230 tkealey@rvanderson.com</p>
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## R226348-20240905-Notice of Public Information Centre #1 - W-WW MSP for the Township of North Stormont

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**From** Carol Derrick <cderrick@rvanderson.com>

**Date** Thu 9/5/2024 10:09 AM

**Cc** Trevor Kealey <tkealey@rvanderson.com>; Darika Sharma <DSharma@rvanderson.com>; Samson Tso <stso@rvanderson.com>; Sarah Molnarova <smolnarova@rvanderson.com>

 1 attachment (92 KB)

226348-20240828-North Stormont MSP-Notice of PIC - Final.pdf;

On behalf of the Township of North Stormont, please see attached Notice of Public Information Centre for a Water and Wastewater Master Servicing Plan to service the future growth of Moose Creek, Finch and Crysler.

This notice is sent to your attention as it was deemed that you may be an interested stakeholder.

Should you wish to stop receiving notices pertaining to this project or would like to direct it to an alternate recipient, please advise the undersigned.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

Trevor Kealey, P.Eng.  
Project Director  
[tkealey@rvanderson.com](mailto:tkealey@rvanderson.com)  
(416) 497-8600 ext. 3230

Encls: Notice of Public Information Centre #1

Appendix B-3

# Public Information Centre





# Public Information Centre

## North Stormont Water and Wastewater Master Plan

Township of North Stormont Municipal Office  
15 Rue Union St., P.O. Box 99 Berwick, ON. K0C

Tuesday, September 17, 2024  
Open House from 6:00 – 9:00 P.M.



# Welcome!

The Township of North Stormont welcomes you to this Public Information Centre (PIC) so that we can share study objectives, findings to date, alternative solutions and next steps.

Please review the material and provide us with any comments you may have. Your input is important to the Class Environmental Assessment process. Staff are available to answer your questions and receive your comments. Comment sheets are also available for you to fill out.

Thank you for attending this Public Information Centre

Please sign in





# What is the purpose of this Public Information Centre?



To present an overview of the North Stormont Water and Wastewater Master Plan (WWWMP)



To provide an overview of the:

- MSS and Municipal Class Environmental Assessment (Class EA) Process.
- Existing and forecasted populations & demands in the Study Area.



To present and gather your feedback on:

- Problem and Opportunity Statement;
- List of alternatives;
- Evaluation of alternatives; and
- Next steps in the process.



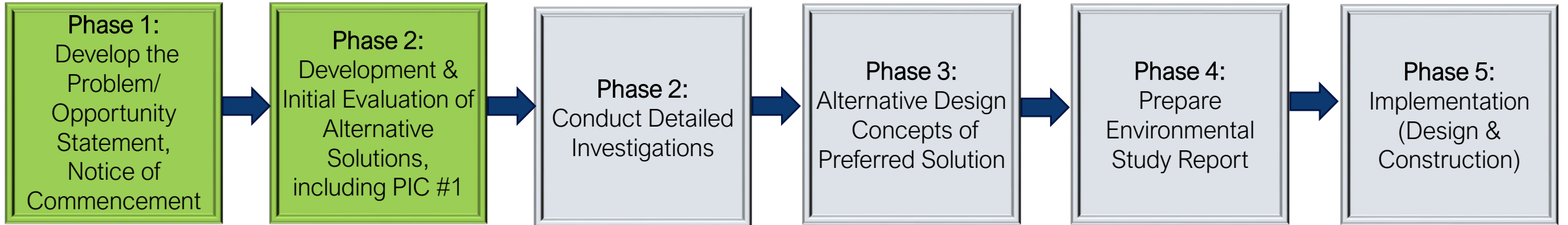
# What is the purpose of this Master Servicing Study?

- The Township is undertaking the Master Plan study under the Municipal Class Environmental Assessment (Class EA) framework, as approved under the Ontario Environmental Assessment Act.
- The WWWMP will follow Approach #1 (high level study) under the master planning framework of the Municipal Class EA process. Certain projects may require additional study in the future to comply with environmental assessment requirements.
- This study focuses on municipal services in the villages of Finch, Crysler, and Moose Creek, in line with the Township's Growth Management Strategy (GMS).
- The objectives of the WWWMP are to:
  - Determine the water and wastewater infrastructure needs;
  - Develop immediate and long-term servicing strategies to meet those needs; and
  - Establish an MCEA based criteria to evaluate the strategies and select one that meets the Township's long-term goals.



# Municipal Class EA Process

This WWWMP will complete **Phase 1** and a portion of **Phase 2** of the environmental assessment process. Any Schedule B or C projects resulting from this Master Plan will require additional investigations or study to fulfill Class EA requirements.



We are here!

Current WWWMP Project

Schedule B Class EA  
(e.g. water storage, pumping station, etc.)

Schedule C Class EA  
(e.g. wastewater treatment plant capacity increase, etc.)



# Problem and Opportunity Statement

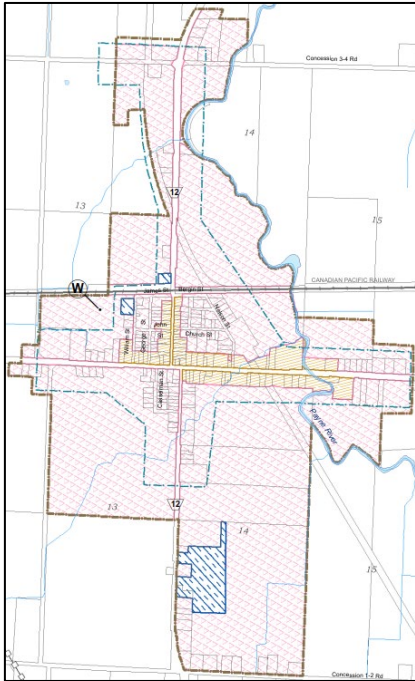
*To accommodate growth to the year of 2051, the Water & Wastewater Master Plan will identify key improvements to the existing water and wastewater infrastructure to service its current and future serviced population.*

The study will analyze existing infrastructure and determine how best to accommodate the future needs of the community. The Township is prioritizing solutions that comply with regulations and planning policies, while taking into consideration feedback from stakeholders.

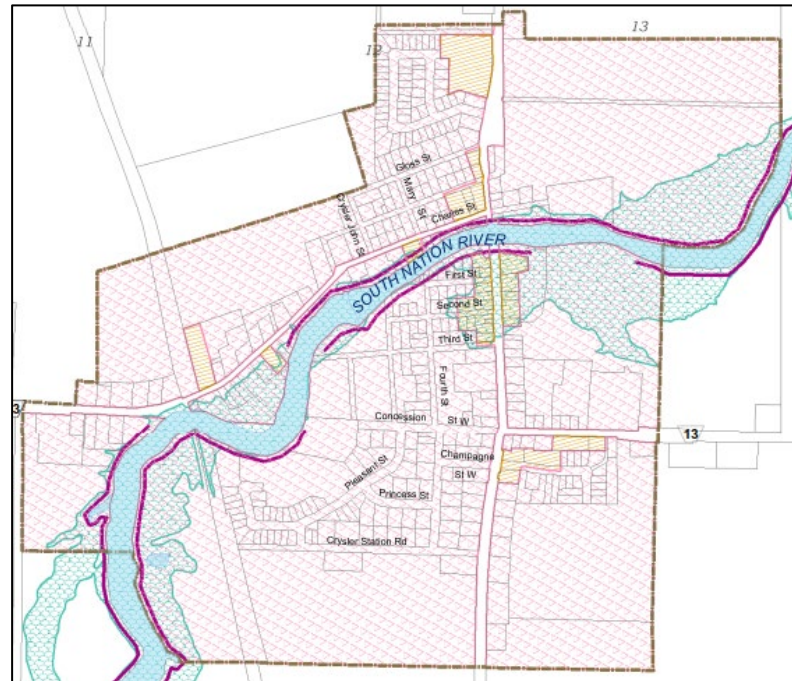
Financial viability, technical feasibility and social and environmental responsibility will also be considered. The plan will be implemented to address immediate, intermediate and long-term goals.



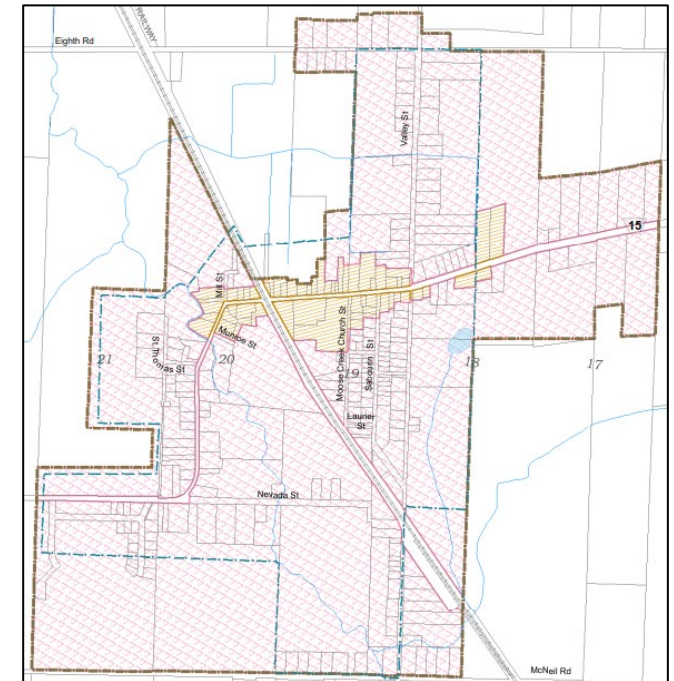
# Study Areas and Population Forecast per GMS Report



Finch



Crysler



Moose Creek

Population Growth (2023 – 2051)	Village Year	Finch	Crysler	Moose Creek
	2023	671	1,215	680
2051	1,119	2,120	1,128	



# Approach to Development and Evaluation of Alternatives

Alternative solutions were developed for each of the system components listed below.



## Water System:

- Water Supply
- Water Storage



## Wastewater System:

- Wastewater Collection
- Wastewater Treatment

- When planning for future infrastructure needs, it is important to start planning ahead of reaching 100% of capacity. In this case, planning and implementation of the expansion should occur when the demand reaches 80% of capacity.
- For each system component, a long list of alternative solutions were first screened to establish a short list of reasonable and feasible alternatives.
- The shortlisted alternatives were then evaluated in greater detail to identify the recommended solution.



# Long List Screening Criteria

The long list of alternatives identified for each system component was screened against pass or fail criteria to confirm feasibility before proceeding to a detailed evaluation.

An alternative must pass all three (3) criteria to proceed to detailed evaluation.

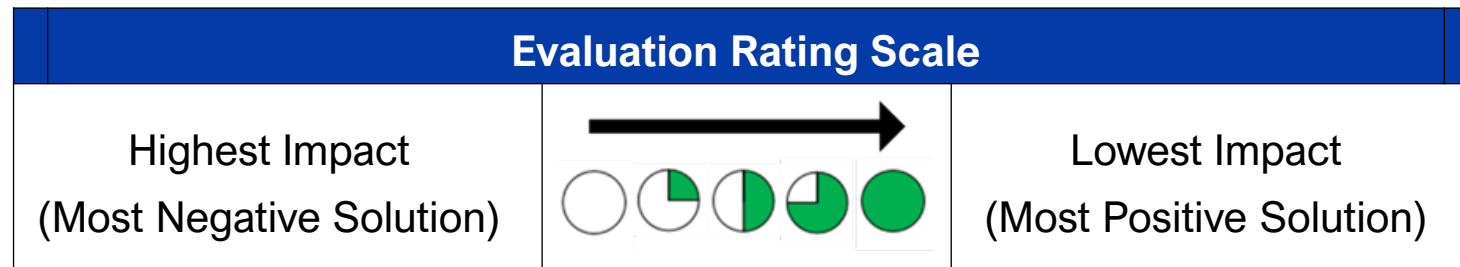
Screening Criteria	Example Considerations
Does the Alternative Address the Problem and Opportunity Statement?	<ul style="list-style-type: none"><li>• Does the alternative address the considerations listed in the Problem and Opportunity Statement?</li><li>• Does the alternative support planned growth to 2051?</li><li>• Does the alternative meet local, regional, and provincial planning policies?</li></ul>
Is the Alternative Feasible and Reasonable?	<ul style="list-style-type: none"><li>• Is the alternative technically feasible and reasonable?</li><li>• Can the alternative be constructed for a reasonable cost?</li><li>• Does the alternative provide a long-term solution?</li></ul>
Can the Alternative be implemented without significant impacts?	<ul style="list-style-type: none"><li>• Are the ecological, social, or other impacts anticipated to be unreasonably high relative to other alternatives?</li></ul>



# Short List Evaluation Approach and Criteria

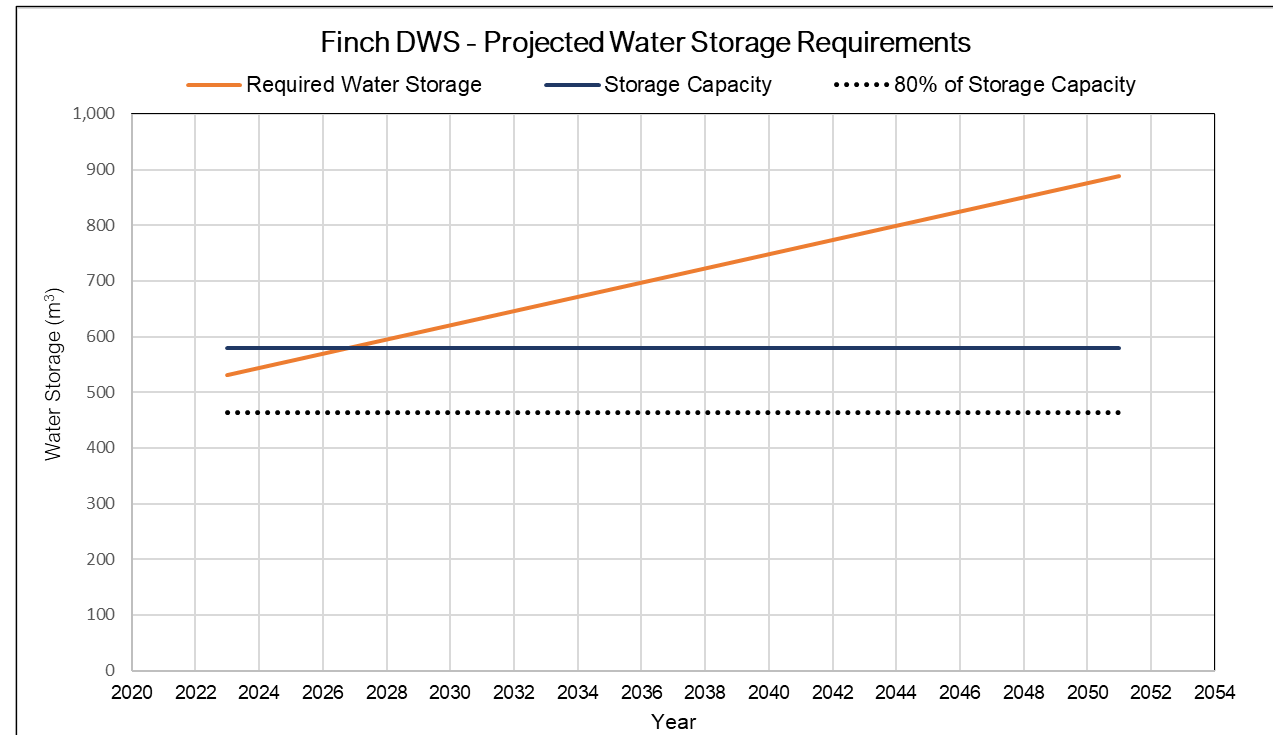
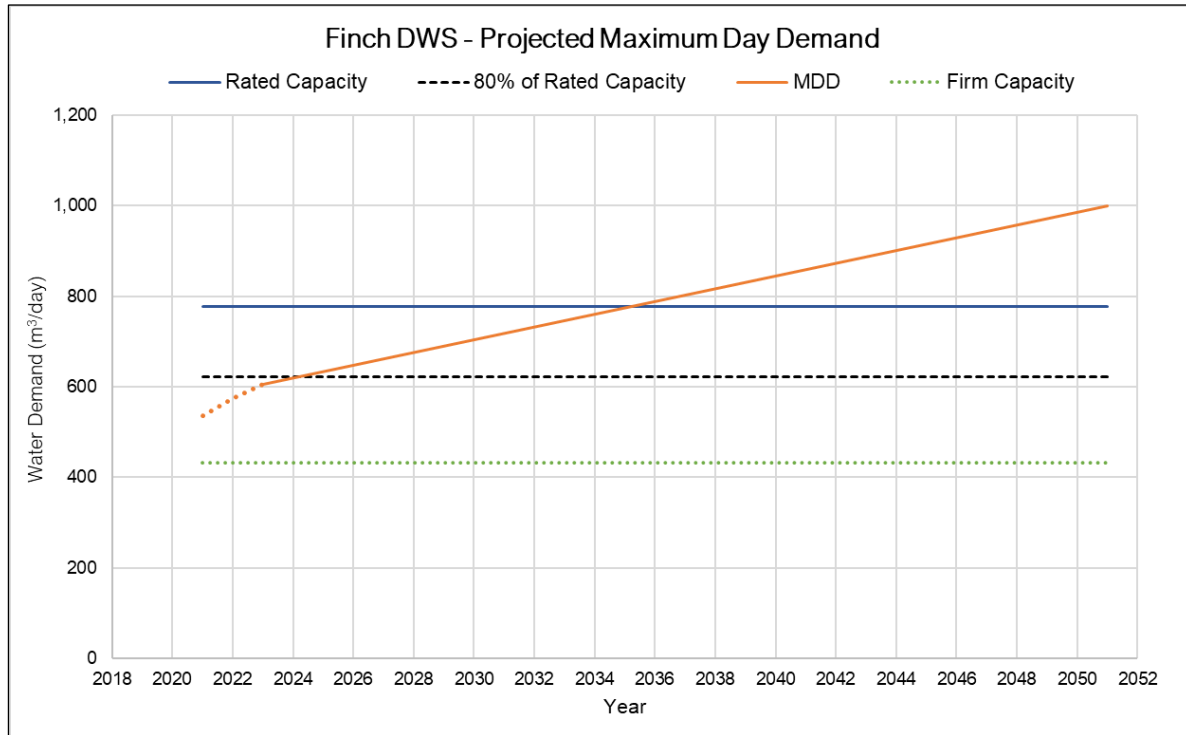
The alternatives for each system component were evaluated using the criteria and rating scale below.

Category	General Criteria to Assess Impact	
<b>Technical</b>	<ul style="list-style-type: none"> <li>• Constructability</li> <li>• Improvements to operation</li> </ul>	<ul style="list-style-type: none"> <li>• Infrastructure required</li> <li>• Approval requirements</li> </ul>
<b>Social and Cultural</b>	<ul style="list-style-type: none"> <li>• Public requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Impact to build heritage and cultural heritage landscapes</li> </ul>
<b>Environmental</b>	<ul style="list-style-type: none"> <li>• Impact to aquatic and terrestrial species and habitat</li> <li>• Impact to surface water quantity and quality</li> </ul>	<ul style="list-style-type: none"> <li>• Climate change resiliency</li> </ul>
<b>Economic</b>	<ul style="list-style-type: none"> <li>• Capital costs</li> <li>• Operational and maintenance costs</li> </ul>	<ul style="list-style-type: none"> <li>• User value</li> </ul>





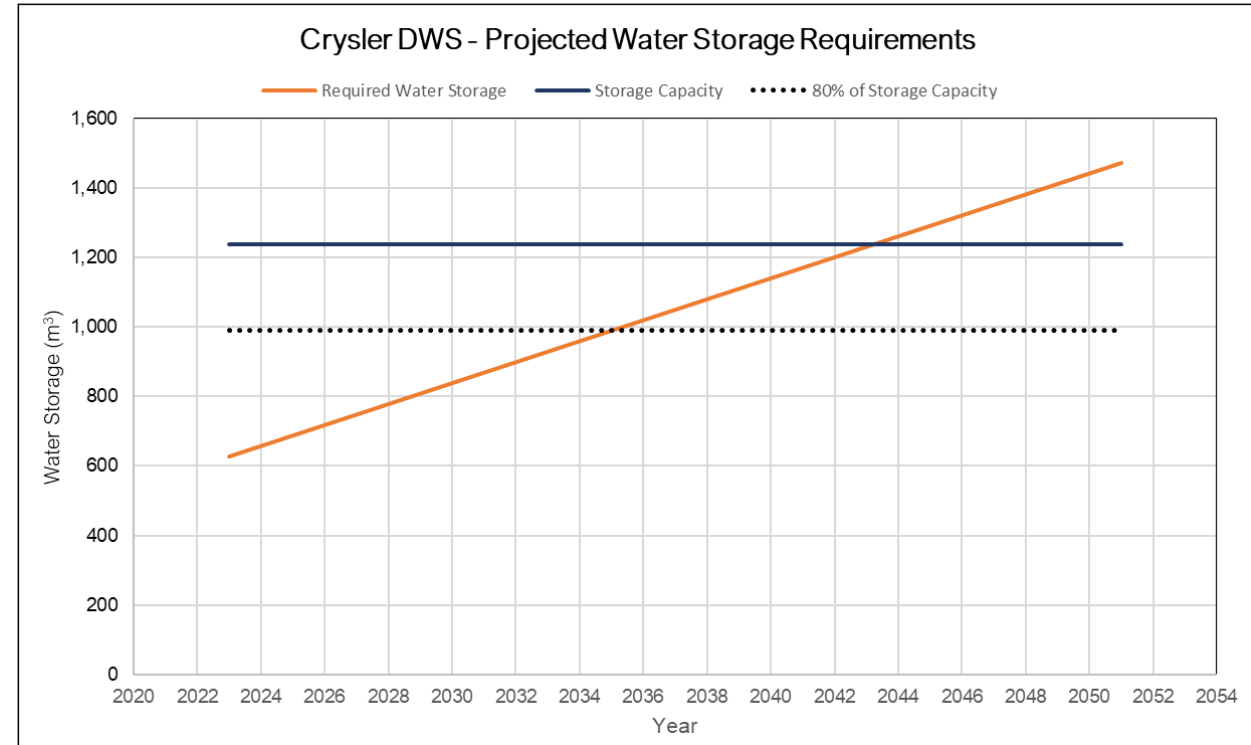
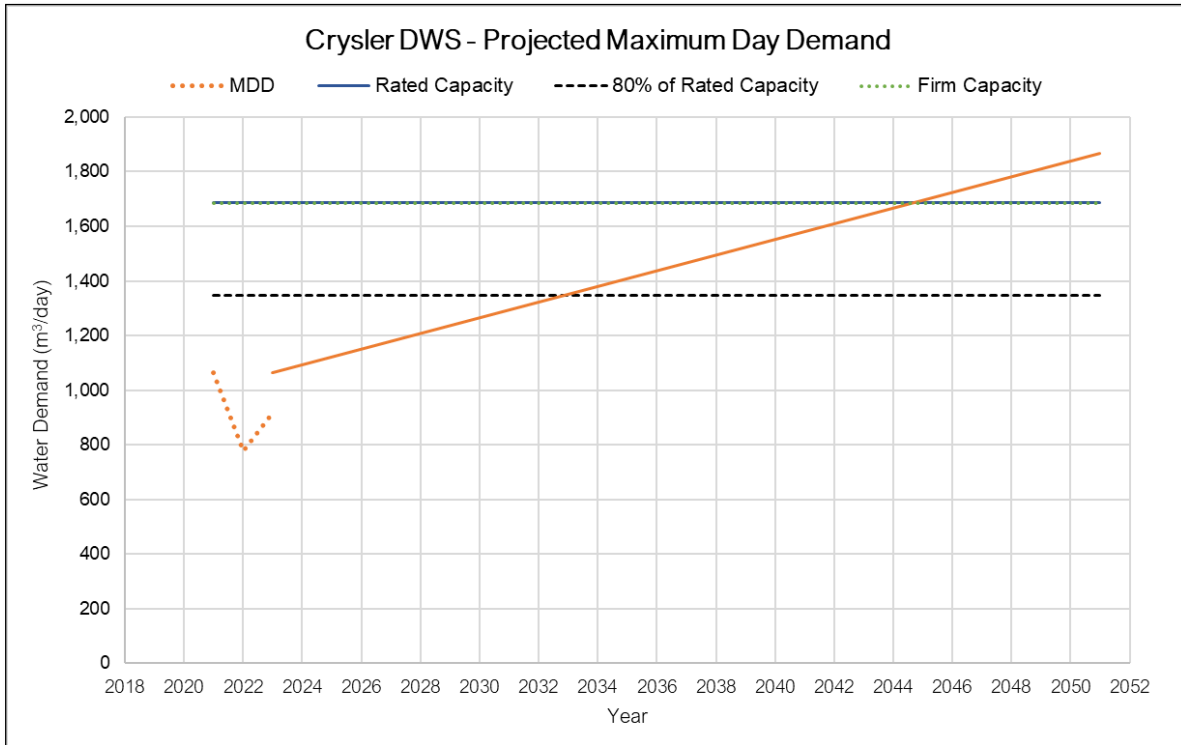
# Finch Water System: Current and Future Capacity Requirements



**Water Supply:** The current rated capacity of the water supply system is 778 m<sup>3</sup>/day. Water demand will reach 80% of system's rated capacity by approximately 2024. By 2051, a capacity of approximately 1,000 m<sup>3</sup>/day would be required. Additional water supply capacity would be required to service growth beyond 2035.

**Water Storage:** The current rated capacity of the elevated water storage tank is 580 m<sup>3</sup>. As of 2024, storage required is already beyond 80% of its rated capacity. By 2051, a capacity of approximately 888 m<sup>3</sup> would be required. Additional water storage capacity would be required to service growth beyond 2027.

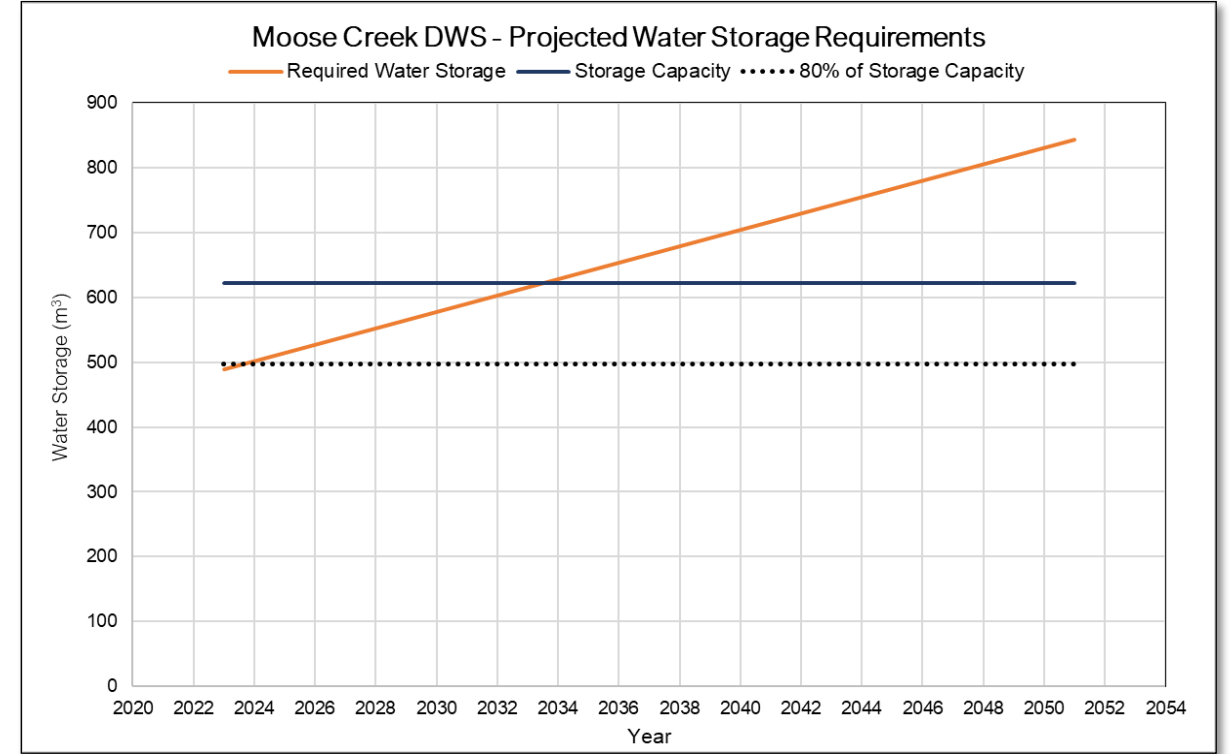
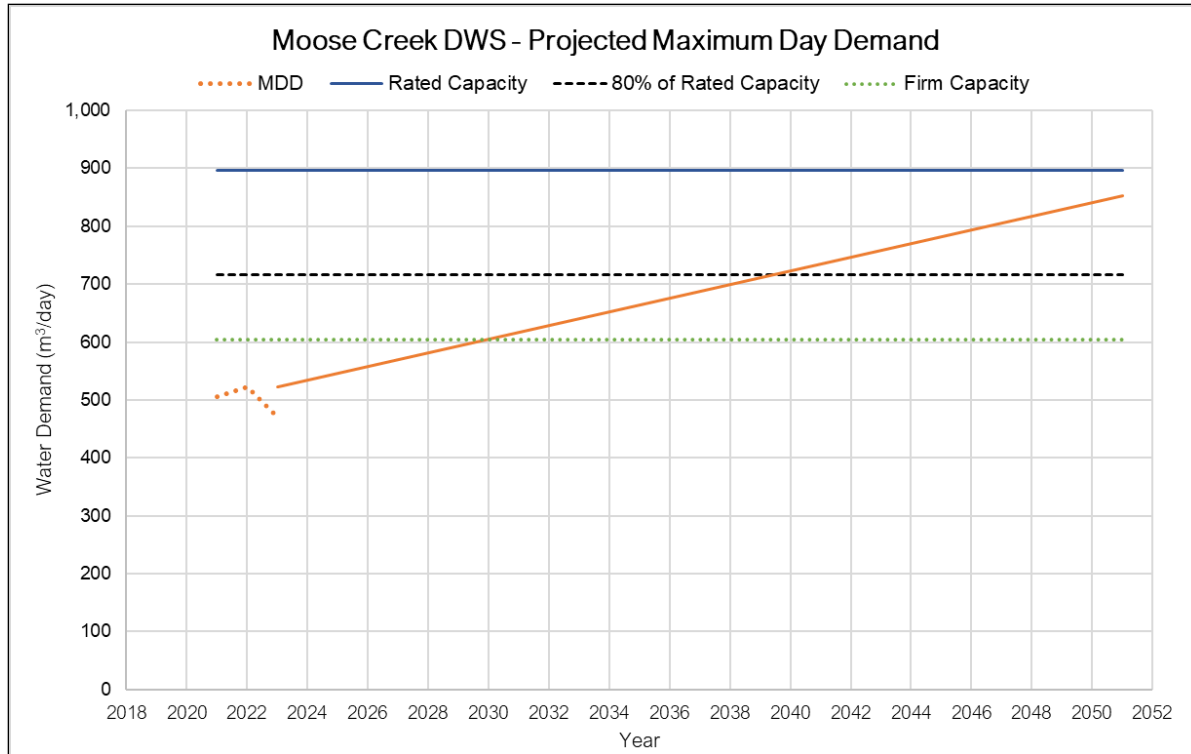
# Crysler Water System: Current and Future Capacity Requirements



**Water Supply:** The current rated capacity of the water supply system is 1,685 m<sup>3</sup>/day. Water demand will reach 80% of system's rated capacity by approximately 2033. By 2051, a capacity of approximately 1,867 m<sup>3</sup>/day would be required. Additional water supply capacity would be required to service growth beyond 2044.

**Water Storage:** The current rated capacity of the elevated water storage tank is 1,238 m<sup>3</sup>. The water storage tank would reach 80% of its rated capacity by approximately 2035. By 2051, a capacity of approximately 1,473 m<sup>3</sup> would be required. Additional water storage capacity would be required to service growth beyond 2042.

# Moose Creek Water System: Current and Future Capacity Requirements













**Water Supply:** The current firm capacity of the water supply system is 600 m<sup>3</sup>/day. Water demand will reach 80% of system rated capacity by approximately 2039. By 2051, a capacity of approximately 853 m<sup>3</sup>/day would be required. Additional water supply capacity would be required to ensure water security by 2030.

**Water Storage:** The current rated capacity of the elevated water storage tank is 622 m<sup>3</sup>. As of 2024, storage required is already beyond 80% of its rated capacity. By 2051, a capacity of approximately 842 m<sup>3</sup> would be required. Additional water storage capacity would be required to service growth beyond 2033.

# Water Supply and Storage: Long List of Alternatives and Screening

Alternatives		Does the alternative address the Problem & Opportunity Statement?	Is the alternative technical and economically feasible?	Can the alternative be implemented without significant impacts?	Summary
1	Do Nothing	X	X	X	Not an acceptable solution and is not evaluated further.
2	Limit Growth	X	✓	X	Not an acceptable solution and is not evaluated further.
3	Reduce Water Demand (Increase Water Conservation)	X	✓	✓	This alternative on its own is not acceptable as a complete solution. It will be recommended as a general sustainability goal.
4	Expand Existing Water Supply and Storage System	✓	✓	✓	<p><b>Water Supply:</b></p> <ul style="list-style-type: none"> <li>➤ Alternative 4A-1: A new well to be drilled at the same location as the existing wells; or</li> <li>➤ Alternative 4A-2: A new well in a new wellfield.</li> </ul> <p><b>Water Storage:</b></p> <ul style="list-style-type: none"> <li>➤ Alternative 4B-1: New water storage tower/standpipe in addition to the existing storage facility; or</li> <li>➤ Alternative 4B-2: New at-grade water storage tank at the WTP in addition to the existing storage facility</li> </ul>
5	Obtain Water from Another Source	✓	X	X	Will require land acquisition, high capital costs, permit and other requirements. Therefore, not evaluated further.

## Water Supply: Short List and Detailed Evaluation Summary

Evaluation Criteria	Alternative 4A-1: New Well in Same Wellfield	Rating	Alternative 4A -2: New Well in New Wellfield	Rating
<b>Technical</b>	<ul style="list-style-type: none"> <li>Allows reduction in the hydrogeological investigations needed</li> <li>Current treatment processes can be upsized within the same building</li> <li>Schedule B Class EA study required</li> </ul>		<ul style="list-style-type: none"> <li>New WTP required at new wellfield location</li> <li>New trunk main to be installed up to the connection point of the existing watermain</li> <li>Schedule C Class EA study required</li> </ul>	
<b>Social and Cultural</b>	<ul style="list-style-type: none"> <li>Would not require land acquisition</li> <li>Potential impacts</li> <li>Known archaeological and cultural conditions</li> </ul>		<ul style="list-style-type: none"> <li>Would require land acquisition</li> <li>Ensures water security and redundancy</li> </ul>	
<b>Environment</b>	<ul style="list-style-type: none"> <li>Implementation within known and previously investigated environmental conditions</li> </ul>		<ul style="list-style-type: none"> <li>Unknown environmental conditions until specific site is selected</li> </ul>	
<b>Economic</b>	<ul style="list-style-type: none"> <li>Minimizes cost of conveying raw water to WTP</li> <li>Lower capital cost than Alternative 4A-2</li> </ul>		<ul style="list-style-type: none"> <li>Large capital cost (cost associated with additional infrastructure and complexity of investigation prior to construction)</li> </ul>	
<b>Overall Score and Summary</b>	<b>Recommended Alternative</b>		Not recommended due to large capital cost and complex implementation	

# Water Supply Recommended Solution

Preferred water supply expansion strategy is Alternative 4A: *New Well in the Same Wellfield*.











- **Finch:**
  - Firm capacity expansion from 777 m<sup>3</sup>/day (existing) to 1000 m<sup>3</sup>/day (year 2051).
  - Recommended timeline:
    - Well Exploration: 2023-2030;
    - Project Implementation: 2031-2036
- **Crysler:**
  - Firm capacity expansion from 1,685 m<sup>3</sup>/day to 1,760 m<sup>3</sup>/day.
  - Recommended timeline:
    - Well Exploration: 2037-2042;
    - Project Implementation: 2043-2048
- **Moose Creek:**
  - Firm capacity expansion from 600 m<sup>3</sup>/day to 850 m<sup>3</sup>/day.
  - Recommended timeline: 2025-2030

## Next Steps:

- Hydrogeological investigations required to confirm water quantity & quality, and to confirm ability to supply required future capacity;
- Preparation of a mitigation procedure or plan to address ss identified water security risks in the investigation; and
- Implement water meters to ensure sustainable water usage that may significantly impact timeline of the capacity exceedances.



## Water Storage: Short List and Detailed Evaluation Summary

Evaluation Criteria	4B-1: New Elevated Storage Facility	Rating	4B-2: New At-Grade Storage Facility	Rating
<b>Technical</b>	<ul style="list-style-type: none"> <li>Requires construction of a new booster pumping station</li> <li>Re-chlorination required</li> <li>Reduced pumping requirements in distribution system due to head from standpipe</li> </ul>		<ul style="list-style-type: none"> <li>Recirculation of water through tank to prevent unused water residual</li> <li>Potential for increased chlorine contact time</li> <li>Relocation of high lift pumps</li> </ul>	
<b>Social and Cultural</b>	<ul style="list-style-type: none"> <li>Requires land acquisition</li> <li>Ensures water security and redundancy</li> <li>Aesthetic impacts to surrounding properties</li> <li>Schedule B Study required</li> </ul>		<ul style="list-style-type: none"> <li>No land acquisition required</li> <li>Prevent unused water residual</li> <li>Known archaeological and cultural conditions</li> </ul>	
<b>Environment</b>	<ul style="list-style-type: none"> <li>Unknown environmental conditions until specific site is selected</li> </ul>		<ul style="list-style-type: none"> <li>Construction on known site</li> </ul>	
<b>Economic</b>	<ul style="list-style-type: none"> <li>Large capital cost (entirely new standpipe)</li> </ul>		<ul style="list-style-type: none"> <li>Lower capital cost (underground storage tank) than Alternative 4B-1</li> </ul>	
<b>Overall Score and Summary</b>	Not recommended due to large capital cost, requirement for land acquisition and		<b>Recommended Alternative</b>	

# Water Storage Recommended Solution

Preferred water storage expansion strategy is Alternative 4B-2: *New At-Grade Storage Facility*.

- **Finch:**
  - Storage volume expansion from 580 m<sup>3</sup> (existing) to 900 m<sup>3</sup> (year 2051).
  - Recommended timeline: 2025-2030
- **Crysler:**
  - Storage volume expansion from 1,238 m<sup>3</sup> to 1,500 m<sup>3</sup>.
  - Recommended timeline: 2037-2042
- **Moose Creek:**
  - Storage volume expansion from 622 m<sup>3</sup> to 842 m<sup>3</sup>.
  - Recommended timeline: 2031-2036

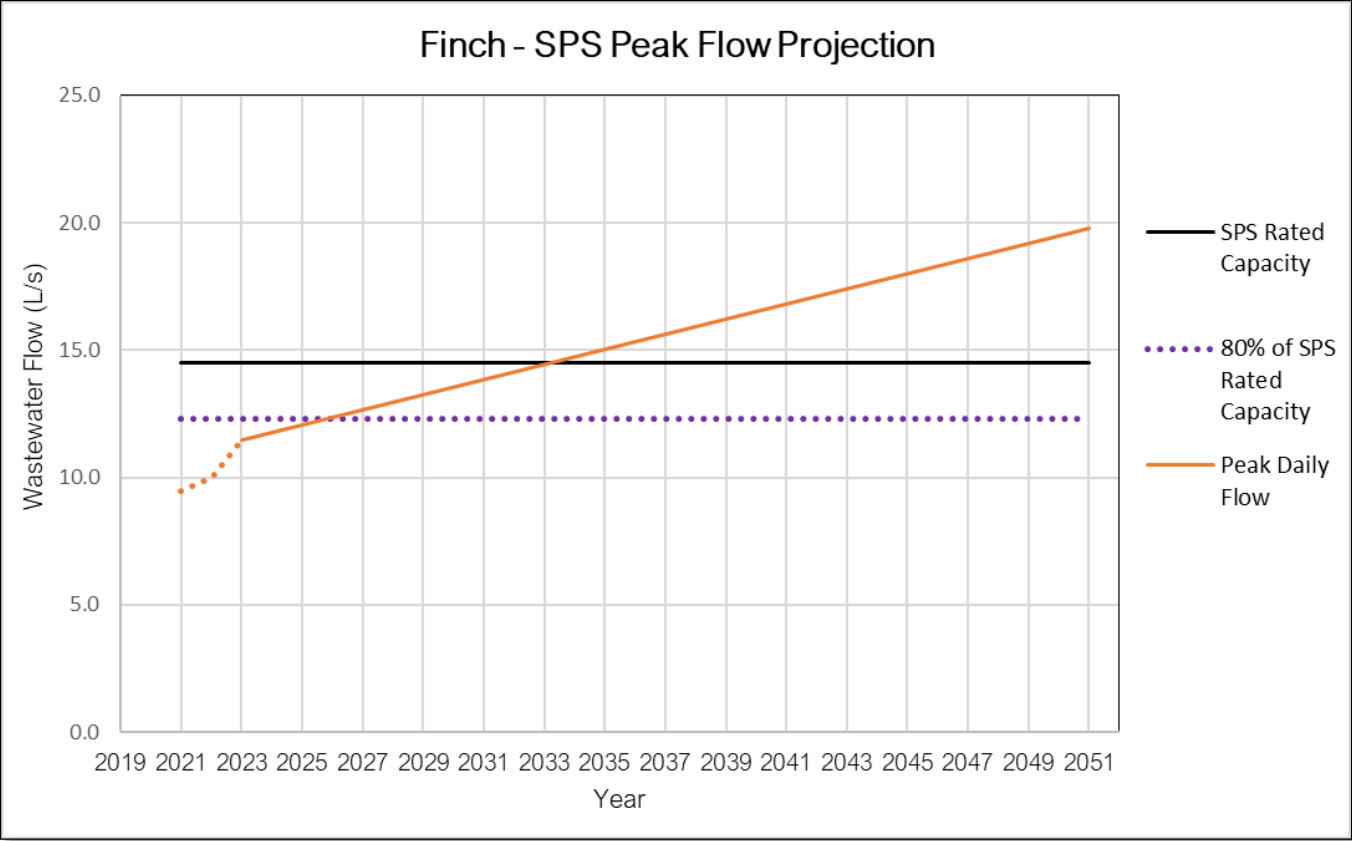
## Next Steps:

- Proceed to detailed design; and
- Implementation of selected strategy within the recommended timeline.





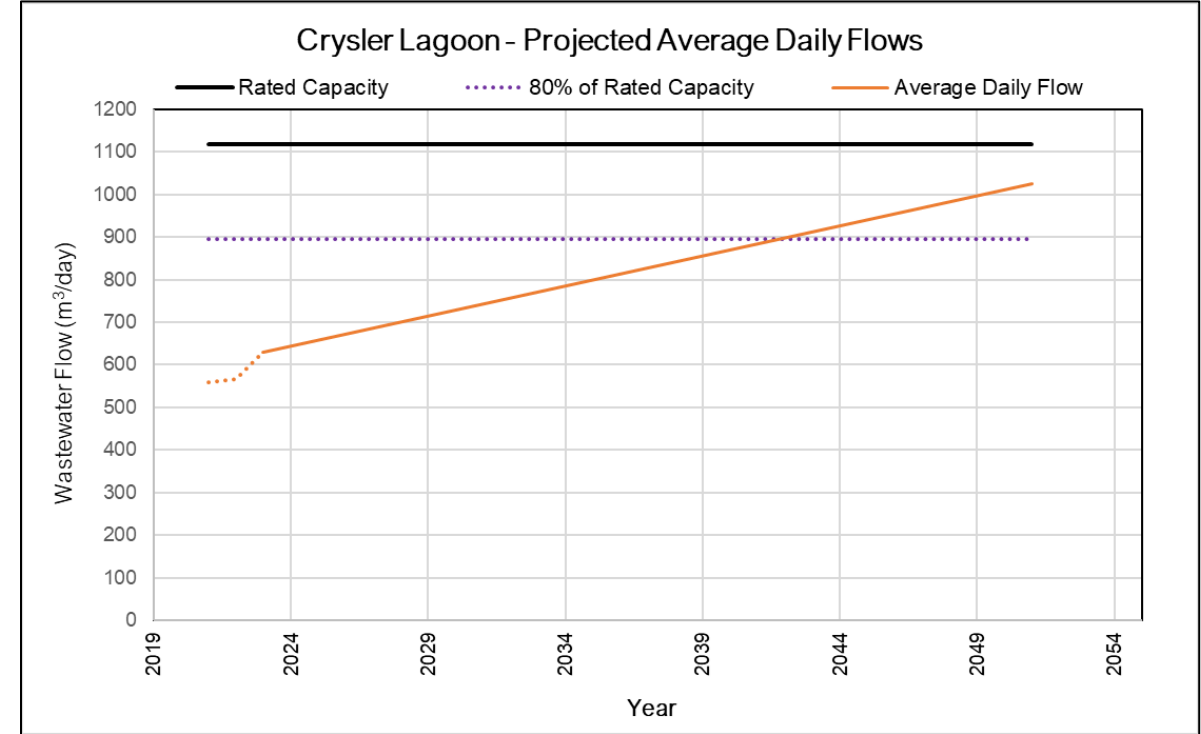
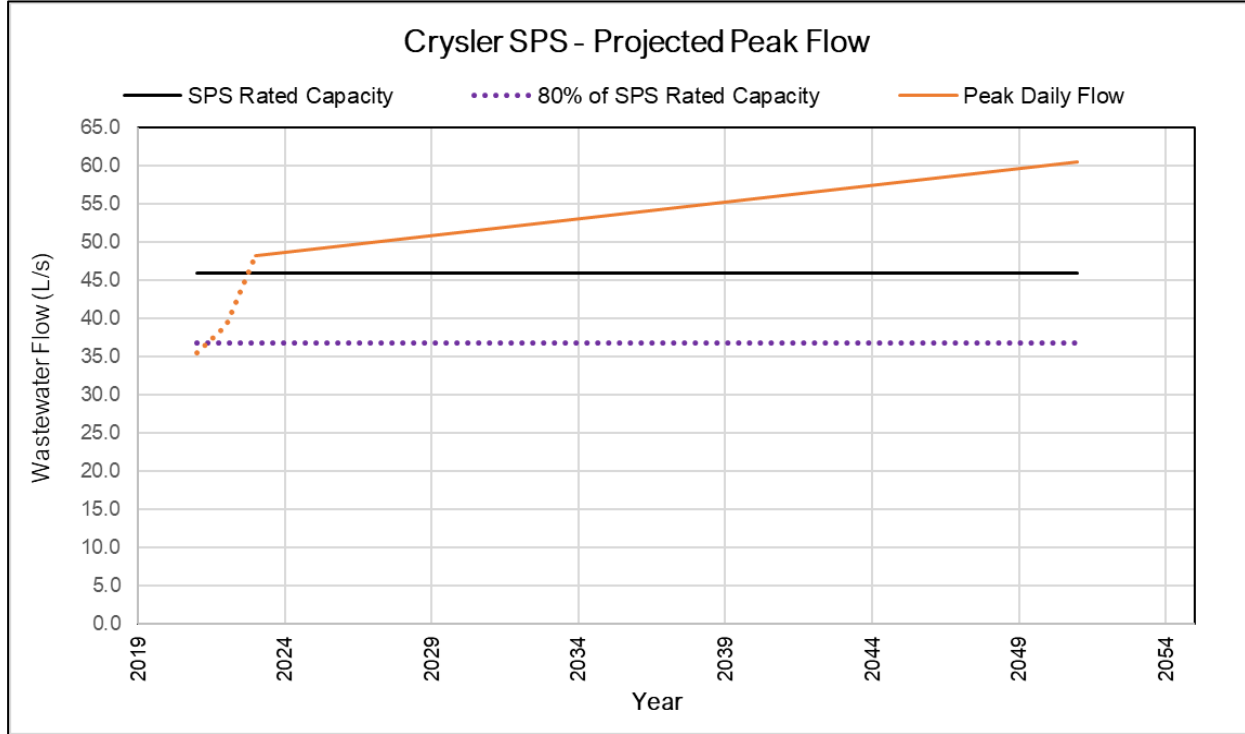
# Finch Wastewater System: Current and Future Capacity Requirements



**Wastewater Collection System (SPS):** Finch's wastewater peak flow projected to 2051 is estimated at 20 L/s. Rated capacity of Sewage Pumping Station (SPS) is estimated to be exceeded by year 2033.



# Crysler Wastewater System: Current and Future Capacity Requirements

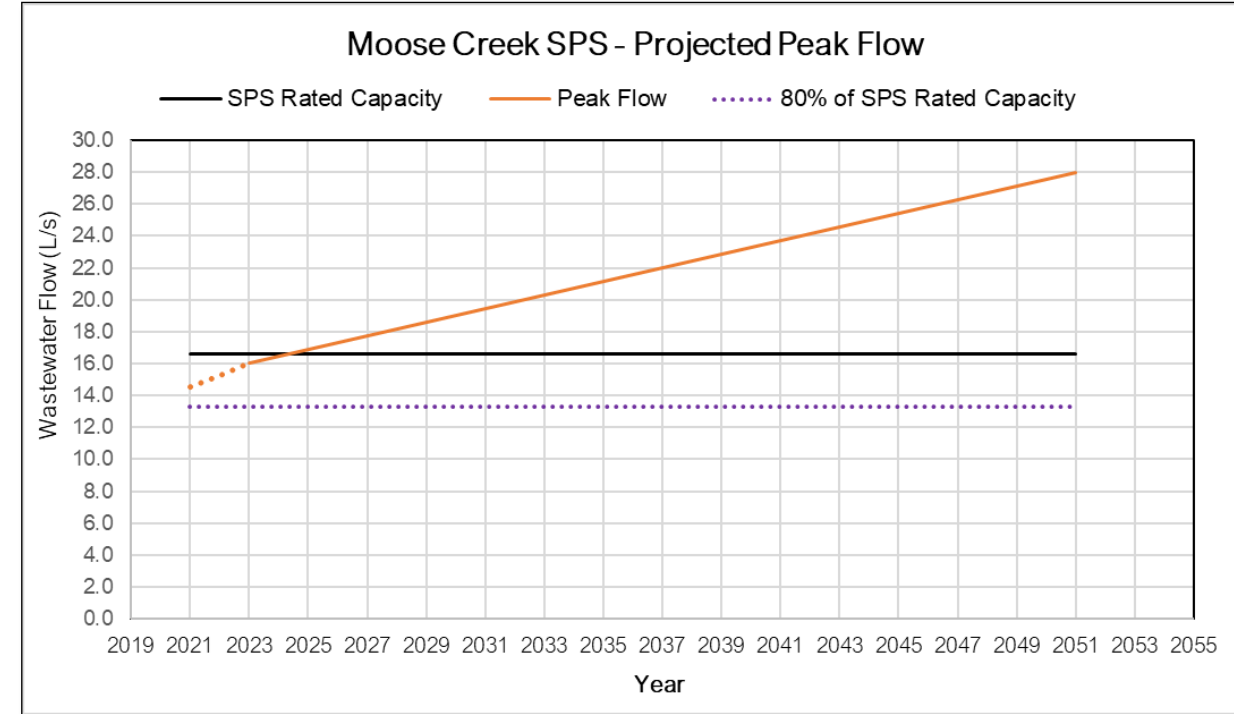
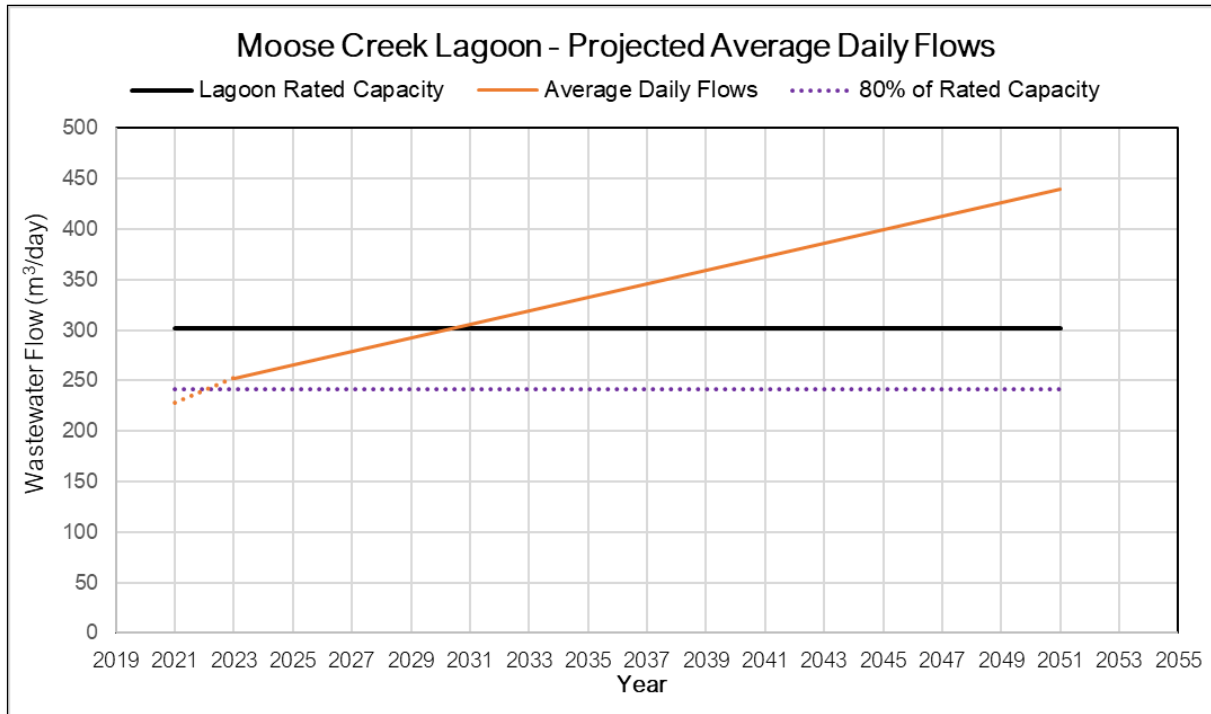


**Wastewater Collection System (SPS):** Chrysler's wastewater peak flow projected to 2051 is estimated at 60.6 L/s. The SPS's rated capacity is already in exceedance as of 2024. With the G&E Subdivision development, the committed capacity of the Chrysler WWTS is at 81% as of 2023.

**Wastewater Treatment Lagoons:** Existing lagoons have capacity to provide treatment up to 2051. However, 80% of rated capacity is reached by year 2040.



# Moose Creek Wastewater System: Current and Future Capacity Requirements



**Wastewater Collection System (SPS):** Moose Creek's wastewater peak flow projected to 2051 is estimated at 29 L/s. The SPS's rated capacity is already in exceedance as of 2024.

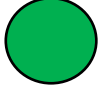

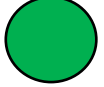

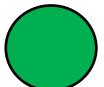



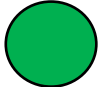

**Wastewater Treatment Lagoons:** Average Daily Flow (ADF) in 2051 is 439 m<sup>3</sup>/day. Lagoon capacity will be exceeded by year 2030. The ADF is already beyond 80% of the rated capacity as of 2024. Effluent TSS concentration has exceeded the permit limit in 2021 and 2022.



## Wastewater Collection and Treatment: Long List of Alternatives and Screening

Alternatives		Does the alternative address the Problem & Opportunity Statement?	Is the alternative technical and economically feasible?	Can the alternative be implemented without significant impacts?	Summary
1	Do Nothing	✗	✗	✗	Not an acceptable solution and is not evaluated further.
2	Limit Growth	✗	✓	✗	Not an acceptable solution and is not evaluated further.
3	Infiltration and Inflow Control and Reduction;	✗	✓	✓	This alternative on its own is not acceptable as a complete solution. It will be recommended as a general sustainability goal.
4	Upgrade Existing WWTS	✓	✓	✓	<p><b>Wastewater Collection System:</b></p> <ul style="list-style-type: none"> <li>➤ Alternative 4A: Upgrade Existing SPS</li> </ul> <p><b>Wastewater Treatment Lagoons:</b></p> <ul style="list-style-type: none"> <li>➤ Alternative 4B-1: Lagoon Treatment Optimization</li> <li>➤ Alternative 4B-2: Modified Lagoon Operation</li> </ul>
5	Expand the Existing WWTS	✓	✗	✗	<p><b>Wastewater Collection System:</b></p> <ul style="list-style-type: none"> <li>➤ Alternative 5A: New SPS (replace existing)</li> </ul> <p><b>Wastewater Treatment Lagoons:</b></p> <ul style="list-style-type: none"> <li>➤ Alternative 5B-1: New Facultative Lagoon</li> <li>➤ Alternative 5B-2: Mechanical Treatment Facility</li> </ul> <p>Will require land acquisition, high capital costs, permit and other requirements. Therefore, not evaluated further.</p>

## Wastewater Collection System: Short List and Detailed Evaluation Summary

Evaluation Criteria	4: Upgrade Existing SPS	Rating	5: Construct a New SPS	Rating
<b>Technical</b>	<ul style="list-style-type: none"> <li>Replacement of existing pumps with larger ones</li> <li>Converting pumps from lead/lag to duty/standby</li> </ul>		<ul style="list-style-type: none"> <li>Construction of new sewage pumping station</li> <li>Existing SPS decommissioned after completed construction</li> </ul>	
<b>Social and Cultural</b>	<ul style="list-style-type: none"> <li>Exempt under MCEA Process; no further study required</li> </ul>		<ul style="list-style-type: none"> <li>Requires land acquisition</li> <li>Schedule B Study required</li> </ul>	
<b>Environment</b>	<ul style="list-style-type: none"> <li>Replacement within existing building</li> </ul>		<ul style="list-style-type: none"> <li>Unknown environmental conditions until specific site is selected</li> </ul>	
<b>Economic</b>	<ul style="list-style-type: none"> <li>Minimal capital costs (only related to pump upgrades)</li> </ul>		<ul style="list-style-type: none"> <li>Large capital costs (entirely new sewage pumping station with new pumps)</li> </ul>	
<b>Overall Score and Summary</b>	<b>Recommended Alternative</b>		Not recommended due to large capital costs	

# Wastewater Collection System: Recommended Solution

Collection System: Preferred SPS rated capacity expansion strategy is *Alternative 4A: Upgrade Existing SPS*











- **Finch:**
  - Rated Capacity expansion from 14.5 L/s (existing) to 20.0 L/s (year 2051).
  - Recommended timeline: 2031-2036
- **Crysler:**
  - Rated Capacity expansion from 46.0 L/s to 60.6 L/s.
  - Recommended timeline: 2025-2030
- **Moose Creek:**
  - Rated Capacity expansion from 16.6 L/s to 28.0 L/s.
  - Recommended timeline: 2025-2030

## Next Steps:

- Detailed condition assessment of the SPS to determine refurbishment needs as concerns regarding deteriorating conditions (concrete pitting, odor, deteriorated ladders due to corrosion etc.) have been raised.
- If SPS are beyond rehabilitation, undertake a SPS Replacement project and update capital plan with a phased approach.



# Moose Creek Wastewater Treatment Lagoons: Short List and Detailed Evaluation Summary

Evaluation Criteria	Alternative 4B-1: Upgrade Existing Lagoons	Rating	Alternative 4B-2: Modified Lagoon Operation	Rating
Technical	<ul style="list-style-type: none"> <li>New proposed technology requiring operator training</li> <li>Potential for optimization of process units and further capacity expansion</li> </ul>		<ul style="list-style-type: none"> <li>Ease of construction</li> <li>No complex technology/relatively simple operation</li> <li>Ample capacity for bypass for maintenance requirements</li> <li>Preliminary treatment and RAS processes required</li> </ul>	
Social and Cultural	<ul style="list-style-type: none"> <li>All proposed upgrades can possibly fit within the municipal property and no land acquisition is anticipated</li> </ul>		<ul style="list-style-type: none"> <li>All proposed upgrades can possibly fit within the municipal property and no land acquisition is anticipated</li> </ul>	
Environment	<ul style="list-style-type: none"> <li>Land modifications required for the SAGR system</li> </ul>		<ul style="list-style-type: none"> <li>No land acquisition required</li> <li>Impacts due to construction can be addressed by industry recommended construction practices</li> </ul>	
Economic	<ul style="list-style-type: none"> <li>Capital costs lower than Alternative 4B-2</li> </ul>		<ul style="list-style-type: none"> <li>Large capital costs</li> </ul>	
Overall Score and Summary	<b>Recommended Alternative</b>		Not recommended due to large capital costs	

# Wastewater Treatment Lagoons: Recommended Solution

Preferred strategy for Moose Creek lagoon rated capacity expansion is *Alternative 4B-1: Upgrade Existing Lagoons*

- Rated Capacity expansion from 302 m<sup>3</sup>/day (existing) to 450 m<sup>3</sup>/day (year 2051).
- Recommended timeline:
  - Class EA, Design and Construction: 2025 - 2030

## Next Steps for Moose Creek Lagoon Expansion:

- An assimilative capacity study is required to confirm effluent discharge capacity, and to confirm if this would support the required future capacity.
- Additional investigation (environmental, archaeological, cultural heritage) required in the future to fulfill requirements of a Schedule C Class EA process.
- Future Schedule C Class EA would confirm preferred solution including technology and footprint requirements.





# Next Steps

Following this Public Information Centre (PIC), the Project Team will receive and consider comments from PIC participants and other interested parties.

Feedback received will be considered in finalizing the recommended solutions and will be documented through the Master Servicing Study Report.

The next opportunities for public notification and input will include:

Opportunity	Anticipated Date
Notice of Study Completion Published	Late 2024
Final Report Available for 30-Day Public Review and Comment	Late 2024



# Thank you for Attending!

## Questions or Comments ?

- Complete a comment sheet this evening or submit comments to a member of the project team.
- More information including copies of project notices and PIC materials can be found at:

<https://www.northstormont.ca/>

### Craig Calder

CAO/Clerk  
Township of North Stormont  
15 Union Street  
Berwick, ON K0C 1G0  
613-984-2821 ext. 223  
ccalder@northstormont.ca

### Trevor Kealey, P.Eng.

Project Director  
R.V. Anderson Associates Limited  
2001 Sheppard Avenue East, Suite  
300  
Toronto, ON M2J 4Z8  
613-226-1844 ext. 3230  
tkealey@rvanderson.com

Please Provide your comments by October 2024  
Include Subject Line: North Stormont MSS PIC





THE TOWNSHIP OF NORTH STORMONT  
VILLAGES OF CRYSLER, FINCH, AND MOOSE CREEK  
WATER AND WASTEWATER MASTER SERVICING PLAN  
Public Information Session # 1  
September 17, 2024

**COMMENT SHEET**

If you have any comments/questions that you would like to provide the Study Team, please fill out this form and your comments will be reviewed, and you will receive a response.

<b>Name:</b>	
<b>Contact Information:</b> (to provide a reply)	(Please include one of email address, phone number, address)

**COMMENTS:**


(Additional room on the back of the page to continue comments)

Please submit comments in comment box at meeting or else forward your comments to the following members of the study team below:

**Craig Calder**  
CAO/Clerk  
Township of North Stormont  
15 Union Street  
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ccalder@northstormont.ca

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Name:	
Contact Information: (to provide a reply)	(Please include one of email address, phone number, address)

### COMMENTS:

<i>Very informative Very glad system can be upgraded and not enlarged.</i>

(Additional room on the back of the page to continue comments)

Please submit comments in comment box at meeting or else forward your comments to the following members of the study team below:

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# NOTICE OF PUBLIC INFORMATION CENTRE #1

## VILLAGES OF CRYSLER, FINCH, AND MOOSE CREEK WATER AND WASTEWATER MASTER SERVICING PLAN FOR THE TOWNSHIP OF NORTH STORMONT

The Township of North Stormont has initiated a Water and Wastewater Master Servicing Plan (MSP) for the future growth in the villages of Crysler, Finch, and Moose Creek. The Township of North Stormont is completing this Water and Wastewater MSP to identify high level strategies for existing and future water and wastewater servicing in the Township.

The preferred servicing strategies will:

- Support service area growth to 2051 while considering opportunities for operational flexibility and redundancy, as well as for optimization and improvement of the existing systems;
- Provide resiliency to potential future changes to regulatory and climatic conditions;
- Balance environmental, social, technical, and economic considerations.

The project is being completed as an **Approach No. 1 Master Plan** project under the framework of the **Municipal Class Environmental Assessment** (October 2000, amended in 2007, 2011, 2015, & 2023), which is approved under the Ontario Environmental Assessment Act. The study will address the requirements of Phase 1 and part of Phase 2 of the Municipal Class EA process.

### How do I Participate?

We are hosting Public Information Centre #1 to report on the progress of the study and provide members of the public with an opportunity to provide comments prior to its finalization. The Public Information Centre will be hosted in person and will include presentation boards and the opportunity for the public to ask questions of the project team.

**When:** Tuesday, September 17, 2024, from 6:00 – 9:00 p.m.

**Where:** Moose Creek Recreational Hall

**How:** In-person.

The presentation boards from the meeting will be posted on the project webpage following the meeting: <https://www.northstormont.ca/>.

If you have any questions or comments regarding the study, or wish to be added to the project contact list to receive notices, please contact a member of the project team:

<p><b>Craig Calder</b> CAO/Clerk Township of North Stormont 15 Union Street Berwick, ON K0C 1G0 613-984-2821 ext. 223 ccalder@northstormont.ca</p>	<p><b>Trevor Kealey, P.Eng.</b> Project Director R.V. Anderson Associates Limited 2001 Sheppard Avenue East, Suite 300 Toronto, ON M2J 4Z8 613-226-1844 ext. 3230 tkealey@rvanderson.com</p>
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## Copilot

Here are some questions you might consider posing at a public forum focused on drinking water and sewage water management over the next 30 years:

### Drinking Water

#### 1. Quality and Safety

- What measures are being taken to ensure the long-term safety and quality of our drinking water?
- How are emerging contaminants, such as pharmaceuticals and microplastics, being addressed?
- What are the plans for upgrading aging infrastructure to prevent contamination?

#### 2. Sustainability and Conservation

- What strategies are in place to promote water conservation among residents and businesses?
- How is climate change expected to impact our water supply, and what are the plans to mitigate these effects?
- Are there any initiatives to recycle or reuse water to reduce overall consumption?

#### 3. Public Health and Education

- How is the community being educated about the importance of water conservation and safe water practices?
- What steps are being taken to ensure vulnerable populations have access to safe drinking water?
- How are water quality issues communicated to the public, and what is the protocol for addressing public concerns?

### Sewage Water

#### 4. Treatment and Management

- What advancements in sewage treatment technology are being considered to improve efficiency and reduce environmental impact?

- How are stormwater and sewage overflows being managed to prevent contamination of local water bodies?
- What are the plans for handling increased sewage loads due to population growth?

### 5. Environmental Impact

- How is the impact of sewage discharge on local ecosystems being monitored and mitigated?
- What measures are in place to reduce the release of harmful substances, such as heavy metals and endocrine disruptors, into the environment?
- Are there any initiatives to use treated sewage water for non-potable purposes, such as irrigation or industrial use?

### 6. Regulation and Compliance

- How are local regulations evolving to address new challenges in sewage management?
- What are the penalties for non-compliance with sewage treatment standards, and how are they enforced?
- How is the community involved in decision-making processes regarding sewage management projects?

These questions can help ensure a comprehensive discussion on the future of drinking water and sewage water management, addressing both immediate concerns and long-term strategies<sup>123</sup>.

Is there a specific aspect of water management you're particularly interested in?

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#### Source(s)

1. [Overview of the Microbiological Aspects of Drinking Water Quality](#)
2. [Science assessment of the impacts of municipal wastewater effluent ...](#)
3. [Taking Care of Your Drinking Water: A Guide for Members of Municipal ...](#)



## Copilot

Aging infrastructure poses several risks, particularly when it comes to drinking water and sewage systems. Here are some key concerns:

### Drinking Water

#### 1. Contamination

- **Leaky Pipes:** Old pipes can develop leaks, allowing contaminants to enter the water supply.
- **Corrosion:** Corroded pipes can release harmful metals like lead and copper into the drinking water.

#### 2. Service Interruptions

- **Breakages:** Aging pipes are more prone to breaking, which can disrupt water supply and require costly repairs.
- **Pressure Issues:** Old infrastructure can lead to inconsistent water pressure, affecting the delivery of water to homes and businesses.

#### 3. Inefficiency

- **Water Loss:** Leaks and breaks in old pipes can result in significant water loss, reducing the efficiency of the water supply system.
- **High Maintenance Costs:** Older systems often require more frequent and expensive maintenance.

### Sewage Water

#### 4. Environmental Contamination

- **Sewage Overflows:** Aging sewage systems are more likely to overflow during heavy rains, leading to contamination of local water bodies.
- **Inadequate Treatment:** Old treatment plants may not be equipped to handle modern pollutants, resulting in untreated or inadequately treated sewage being released into the environment.

#### 5. Health Risks

Powered by AI

- **Exposure to Pathogens:** Leaks and overflows can expose the public to harmful pathogens, increasing the risk of waterborne diseases.
- **Chemical Contaminants:** Aging infrastructure may not effectively remove newer chemical contaminants, posing health risks to the community.

## 6. Operational Challenges

- **Frequent Breakdowns:** Old equipment is more prone to breakdowns, leading to service interruptions and increased repair costs.
- **Capacity Issues:** Aging systems may not be able to handle increased loads due to population growth, leading to inefficiencies and potential failures.

Addressing these risks typically involves significant investment in upgrading and maintaining infrastructure to ensure safe, reliable, and efficient water and sewage systems.

Are there any specific aspects of aging infrastructure you're particularly concerned about?



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**VILLAGES OF CRYSLER, FINCH, AND MOOSE CREEK**  
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 September 17, 2024

**COMMENT SHEET**

If you have any comments/questions that you would like to provide the Study Team, please fill out this form and your comments will be reviewed, and you will receive a response.

<b>Name:</b>	François Lafleur - EVB Engineering
<b>Contact Information: (to provide a reply)</b>	francois.lafleur@evbengineering.com, 613-935-3775 (Please include one of email address, phone number, address)

**COMMENTS:**

We wish to make the following comments on the PIC boards and information provided:
- further to discussions with G&E Reno, we anticipate a shortfall of Chrysler water allocations sometime between 2029 and 2030 when considering only the McBain Land Subdivision, much earlier than shown on slide #12. This is based on a sales target of ~30 units per year. We respectfully request that calculations be updated to reflect G&E's expected timelines, and that the Township prioritize the implementation of upgrades to the water system to not delay development and growth. Additional information will follow shortly in a technical memorandum.
- with regards to wastewater, we understand the capacity of the existing Chrysler pumping station is the ultimate limiting factor as noted in the Reserve Capacity Study Update (April 12, 2024).

(Additional room on the back of the page to continue comments)

Please submit comments in comment box at meeting or else forward your comments to the following members of the study team below:

**Craig Calder**  
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COMMENT SHEET

ADDITIONAL COMMENTS:

However, it should be noted that G&E's subdivision does not discharge into the existing Cryslar
pumping station, hence the limiting factor for the G&E subdivision is the lagoon capacity which is
much greater (600 lots as per the Reserve Capacity Study Update). Furthermore, sewage from
90 units (Flagstone Meadows) will be redirected from the existing Cryslar pumping station into the
new G&E pumping station as discussed in our Servicing Report for the subdivision, which will
result in a reduction in flow at the existing pumping station. We respectfully request that
calculations be updated to reflect the above, and that the Township increase its uncommitted
allocations for sewage for the G&E subdivision to match the lagoon capacity rather than the
capacity of the existing pumping station.
We appreciate the opportunity to review & comment on the above, and we remain available for
discussion should you require any further information.

Appendix B-4

# Responses Received



RE: R226348-20240530-Notice of Commencement & Public Information Centre for the Water and Wastewater Master Servicing Plan for the Township of North Stormont

<b>FROM:</b>	Doug Renaud	<b>SENT:</b>	2024-05-30 6:42:55 PM UTC
<b>TO:</b>	"NLee@rvanderson.com" <NLee@rvanderson.com>		
<b>CC:</b>	Danielle Ward <dward@northdundas.com>		
<b>ATTACHMENTS:</b>			

**[CAUTION EXTERNAL EMAIL]** Make Sure that it is legitimate **before** Replying or Clicking on any links

Hi Natasha,

Thank you for the information page, could you please send any further notices or information to my attention and Danielle Ward in cc of this email on behalf of the Township of North Dundas.

Thanks,



**Doug Renaud**

Infrastructure Coordinator  
Township of North Dundas  
636 St. Lawrence Street, P.O. Box 489, Winchester, ON K0C 2K0  
P: (613) 774-2105 x 269  
F: (613) 774-5699  
E: [drenaud@northdundas.com](mailto:drenaud@northdundas.com)  
W: [www.northdundas.com](http://www.northdundas.com)



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---

**From:** info <[info@northdundas.com](mailto:info@northdundas.com)>  
**Sent:** Thursday, May 30, 2024 1:32 PM  
**To:** Danielle Ward <[dward@northdundas.com](mailto:dward@northdundas.com)>  
**Cc:** Doug Renaud <[drenaud@northdundas.com](mailto:drenaud@northdundas.com)>  
**Subject:** FW: R226348-20240530-Notice of Commencement & Public Information Centre for the Water and Wastewater Master Servicing Plan for the Township of North Stormont

---

**From:** Carol Derrick <[cderrick@rvanderson.com](mailto:cderrick@rvanderson.com)>  
**Sent:** Thursday, May 30, 2024 1:26 PM  
**Cc:** Natasha Lee <[NLee@rvanderson.com](mailto:NLee@rvanderson.com)>; Samson Tso <[stso@rvanderson.com](mailto:stso@rvanderson.com)>

**Subject:** R226348-20240530-Notice of Commencement & Public Information Centre for the Water and Wastewater Master Servicing Plan for the Township of North Stormont

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

On behalf of the Township of North Stormont, please see enclosed the Notice of Commencement and Public Information Centre for a Water and Wastewater Master Servicing Plan to service the future growth of Moose Creek, Finch and Crysler.

This notice is sent to your attention as it was deemed that you may be an interested stakeholder.

Should you wish to stop receiving notices pertaining to this project or would like to direct it to an alternate recipient, please advise the undersigned.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

Natasha Lee, P. Eng  
Project Manager  
[NLee@rvanderson.com](mailto:NLee@rvanderson.com)  
(416) 497-8600 ext. 1231

Encls: Notice of Commencement

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**FW: 2024-05-30-MNRFcomment-NoC-WandWWmasterplan-NorthStormontTwp**

---

**From** Natasha Lee <NLee@rvanderson.com>  
**Date** Tue 6/4/2024 1:59 PM  
**To** Samson Tso <stso@rvanderson.com>  
**Cc** Darika Sharma <DSharma@rvanderson.com>

2 attachments (741 KB)

R226348-20240530- Notice of Study Commencement.pdf; 2024-05-30-MNRFcomments-NoC-WandWWmasterplan-NorthStormontTwp.pdf;

Hi Samson,

Please file this email on the network and log in the comments log.

Thanks,  
Natasha

---

**From:** Kennedy, Adam (MNRF) <Adam.Kennedy@ontario.ca>  
**Sent:** Thursday, May 30, 2024 4:04 PM  
**To:** Natasha Lee <NLee@rvanderson.com>; ccalders <ccalders@northstormont.ca>  
**Cc:** Kennedy, Adam (MNRF) <Adam.Kennedy@ontario.ca>  
**Subject:** 2024-05-30-MNRFcomment-NoC-WandWWmasterplan-NorthStormontTwp

**[CAUTION EXTERNAL EMAIL]** Make Sure that it is legitimate **before** Replying or Clicking on any links

Hi Natasha and Craig,

Please find Ministry of Natural Resources and Forestry comments attached per the attached Notice of Commencement circulation – Twp of North Stormont Water and Wastewater Master Servicing Plan – Villages of Crysler, Finch and Moose Creek.

If you have any questions please let me know.

Regards,  
Adam

**Adam Kennedy**  
Regional Planner | LUPSI  
Southern Region | ROD  
Ontario Ministry of Natural Resources and Forestry | Ontario Public Service  
[Adam.Kennedy@Ontario.ca](mailto:Adam.Kennedy@Ontario.ca) | (705) 761-3374





*Taking pride in strengthening Ontario, its places and its people*

---

**From:** Carol Derrick <[cderrick@rvanderson.com](mailto:cderrick@rvanderson.com)>

**Sent:** Thursday, May 30, 2024 1:26 PM

**Cc:** Natasha Lee <[NLee@rvanderson.com](mailto:NLee@rvanderson.com)>; Samson Tso <[stso@rvanderson.com](mailto:stso@rvanderson.com)>

**Subject:** R226348-20240530-Notice of Commencement & Public Information Centre for the Water and Wastewater Master Servicing Plan for the Township of North Stormont

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

On behalf of the Township of North Stormont, please see enclosed the Notice of Commencement and Public Information Centre for a Water and Wastewater Master Servicing Plan to service the future growth of Moose Creek, Finch and Crysler.

This notice is sent to your attention as it was deemed that you may be an interested stakeholder.

Should you wish to stop receiving notices pertaining to this project or would like to direct it to an alternate recipient, please advise the undersigned.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

Natasha Lee, P. Eng  
Project Manager  
[NLee@rvanderson.com](mailto:NLee@rvanderson.com)  
(416) 497-8600 ext. 1231

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**Ministry of Natural Resources and Forestry**

Land Use Planning and Strategic Issues  
Section  
Southern Region

Regional Operations Division  
300 Water Street  
Peterborough, ON K9J 3C7  
Tel.: 705 761-4839

**Ministère des Richesses naturelles et des Forêts**

Section de l'aménagement du territoire et  
des questions stratégiques  
Région du Sud

Division des opérations  
régionales 300, rue Water  
Peterborough (ON) K9J 3C7  
Tél. : 705 761-4839



May 30, 2024

To Craig Calder and Natasha Lee

**SUBJECT: Notice of Study Commencement – Villages of Crysler, Finch and Moose Creek – Water and Wastewater Master Servicing Plan for the Township of North Stormont**

The Ministry of Natural Resources and Forestry (MNRF) received the Notice of Project Commencement on May 30, 2024. Thank you for circulating this to our office. Please note that we have not completed a screening of natural heritage or other resource values for the project at this time. This response, however, does provide information to guide you in identifying and assessing natural features and resources as required by applicable policies and legislation, as well as engaging with the Ministry for advice as needed.

Please also note that it is the proponent's responsibility to be aware of, and comply with, all relevant federal or provincial legislation, municipal by-laws or other agency approvals.

**Natural Heritage**

MNRF's natural heritage and natural resources GIS data layers can be obtained through the Ministry's [Land Information Ontario \(LIO\)](#) website. You may also view natural heritage information online (e.g., Provincially Significant Wetlands, ANSI's, woodlands, etc.) using the [Make a Map: Natural Heritage Areas](#) tool.

We recommend that you use the above-noted sources of information during the review of your project proposal.

**Natural Hazards**

A series of natural hazard technical guides developed by MNRF are available to support municipalities and conservation authorities implement the natural hazard policies in the Provincial Policy Statement (PPS). For example, standards to address flood risks and the potential impacts and costs from riverine flooding are addressed in the *Technical Guide River and Stream Systems: Flooding Hazard Limit (2002)*. We recommend that you consider these technical guides as you assess specific improvement projects that can be undertaken to reduce the risk of flooding.

## **Petroleum Wells & Oil, Gas and Salt Resources Act**

There may be petroleum wells within the proposed project area. Please consult the Ontario Oil, Gas and Salt Resources Library website ([www.ogsrlibrary.com](http://www.ogsrlibrary.com)) for the best-known data on any wells recorded by MNR. Please reference the 'Definitions and Terminology Guide' listed in the publications on the library website to better understand the well information available. Any oil and gas wells in your project area are regulated by the *Oil, Gas and Salt Resource Act*, and the supporting regulations and operating standards. If any unanticipated wells are encountered during development of the project, or if the proponent has questions regarding petroleum operations, the proponent should contact the Petroleum Operations Section at [POSRecords@ontario.ca](mailto:POSRecords@ontario.ca) or 519-873-4634.

## **Fish and Wildlife Conservation Act**

Please note, that should the project require:

- The relocation of fish outside of the work area, a Licence to Collect Fish for Scientific Purposes under the *Fish and Wildlife Conservation Act* will be required.
- The relocation of wildlife outside of the work area (including amphibians, reptiles, and small mammals), a Wildlife Collector's Authorization under the *Fish and Wildlife Conservation Act* will be required.

## **Public Lands Act & Lakes and Rivers Improvement Act**

Some Projects may be subject to the provisions of the *Public Lands Act* or *Lakes and River Improvement Act*. Please review the information on MNR's web pages provided below regarding when an approval is, or is not, required.

- For more information about the *Public Lands Act*: <https://www.ontario.ca/page/crown-land-work-permits>
- For more information about the *Lakes and Rivers Improvement Act*: <https://www.ontario.ca/page/lakes-and-rivers-improvement-act-administrative-guide>

After reviewing the information provided, if you have not identified any of MNR's interests stated above, there is no need to circulate any subsequent notices to our office. If you have identified any of MNR's interests and/or may require permit(s) or further technical advice, please direct your specific questions to the undersigned.

If you have any questions or concerns, please feel free to contact me.

Best Regards,

*Adam Kennedy*

**Adam Kennedy**

Regional Planner | LUPSI

Southern Region | ROD

Ontario Ministry of Natural Resources and Forestry | Ontario Public Service

[Adam.Kennedy@Ontario.ca](mailto:Adam.Kennedy@Ontario.ca) | (705) 761-3374

MCM Response - Notice of Commencement & Public Information Centre for the Water and Wastewater Master Servicing Plan for the Township of North Stormont

<b>FROM:</b>	Leclerc, Erika (MCM)	<b>SENT:</b>	2024-06-20 8:12:01 PM UTC
<b>TO:</b>	Natasha Lee		
<b>CC:</b>	Carol Derrick; Samson Tso; ccalder; Barboza, Karla (She/Her) (MCM)		
<b>ATTACHMENTS:</b>	2024-05-30 WWMP_NofCommencement.pdf; 2024-06-20 WWMP_NorthStormont_MCMInitialLetter.pdf;		

**[CAUTION EXTERNAL EMAIL]** Make Sure that it is legitimate **before** Replying or Clicking on any links

Dear Natasha Lee,

Thank you for sending the Notice of Study Commencement for the above-referenced project to the Ministry of Citizenship and Multiculturalism (MCM). Please find attached MCM's initial letter on this project.

Please do not hesitate to reach out if you have any questions.

Best regards,

**Erika Leclerc**

Heritage Planner | Heritage Branch | Citizenship, Inclusion and Heritage Division  
Ministry of Citizenship and Multiculturalism | Ontario Public Service  
416-305-0757 | [erika.leclerc@ontario.ca](mailto:erika.leclerc@ontario.ca)



*Taking pride in strengthening Ontario, its places and its people*

---

**From:** Carol Derrick <[cderrick@rvanderson.com](mailto:cderrick@rvanderson.com)>

**Sent:** Thursday, May 30, 2024 1:26 PM

**Cc:** Natasha Lee <[NLee@rvanderson.com](mailto:NLee@rvanderson.com)>; Samson Tso <[stso@rvanderson.com](mailto:stso@rvanderson.com)>

**Subject:** R226348-20240530-Notice of Commencement & Public Information Centre for the Water and Wastewater Master Servicing Plan for the Township of North Stormont

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

On behalf of the Township of North Stormont, please see enclosed the Notice of Commencement and Public Information Centre for a Water and Wastewater Master Servicing Plan to service the future growth of Moose Creek, Finch and Crysler.

This notice is sent to your attention as it was deemed that you may be an interested stakeholder.

Should you wish to stop receiving notices pertaining to this project or would like to direct it to an alternate recipient, please advise the undersigned.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

Natasha Lee, P. Eng  
Project Manager  
[NLee@rvanderson.com](mailto:NLee@rvanderson.com)  
(416) 497-8600 ext. 1231

Encls: Notice of Commencement

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**Ministry of Citizenship  
and Multiculturalism**

Heritage Planning Unit  
Heritage Branch  
Citizenship, Inclusion and  
Heritage Division  
5th Flr, 400 University Ave  
Tel.: 416-305-0757

**Ministère des Affaires civiques  
et du Multiculturalisme**

Unité de la planification relative au  
patrimoine  
Direction du patrimoine  
Division des affaires civiques, de  
l'inclusion et du patrimoine  
Tél.: 416-305-0757



June 20, 2024

EMAIL ONLY

Natasha Lee, P. Eng  
Project Manager  
R.V. Anderson and Associates Limited  
2001 Sheppard Avenue East, Suite 300  
Toronto, ON M2J 4Z8  
[NLee@rvanderson.com](mailto:NLee@rvanderson.com)

**MCM File** : **0021812**  
**Proponent** : **Township of North Stormont**  
**Subject** : **Municipal Class Environmental Assessment – Notice of Study  
Commencement – Master Plan Approach #1**  
**Project** : **Villages of Crysler, Finch, and Moose Creek, Water and Wastewater  
Master Servicing Plan**  
**Location** : **Township of North Stormont, United Counties of Stormont, Dundas  
and Glengarry**

---

Dear Natasha Lee:

Thank you for providing the Ministry of Citizenship and Multiculturalism (MCM) with the Notice of Study Commencement for the above-referenced project.

MCM's interest in this master plan relates to its mandate of conserving Ontario's cultural heritage, which includes archaeological resources, built heritage resources, and cultural heritage landscapes.

MCM understands that master plans are long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. The Municipal Class Environmental Assessment (MCEA) outlines a framework for master plans and associated studies which should recognize the planning and design Process of this Class EA and should incorporate the key principles of successful environmental assessment planning identified in Section A.1.1. The master planning process will, at minimum, address Phases 1 and 2 of the Planning and Design Process of the MCEA.

This letter provides advice on how to incorporate consideration of cultural heritage in the above-mentioned master planning process by outlining the technical cultural heritage studies and the level of detail required to address cultural heritage in master plans. In accordance with the MCEA, cultural heritage resources should be identified early in the process in order to determine known and potential resources and potential impacts.

## **Master Plan Summary**

The Township of North Stormont has initiated a Water and Wastewater Master Servicing Plan (MSP) for the future growth in the villages of Crysler, Finch, and Moose Creek. The Township of North Stormont is completing this Water and Wastewater MSP to identify high level strategies for existing and future water and wastewater servicing in the Township. The project is being completed as an Approach No. 1 Master Plan project under the framework of the MCEA.

## **Identifying Cultural Heritage Resources**

MCM understands that the master plan would typically be done at a broad level of assessment thereby requiring more detailed investigations at the project-specific level. Therefore, a description of the existing conditions related to cultural heritage resources needs to be included in the master plan document.

## **Archaeological Resources**

The existing conditions sub-section should indicate if the master plan includes areas of archaeological potential or not and acknowledge that archaeological assessments will be required for future project-specific projects. The proponents should refer to an archaeological management plan or a data sharing agreement, should they exist. In their absence, the Ministry's screening checklists can help determine whether archaeological assessments will be needed for subsequent project undertakings: [Criteria for Evaluating Archaeological Potential](#) and [Criteria for Evaluating Marine Archaeological Potential](#) (if shoreline or in-water works are proposed).

A statement should be included that archaeological assessments are to be undertaken by an archaeologist licensed under the Ontario Heritage Act and that archaeological assessment reports must be submitted for MCM review prior to the completion of the environmental assessment and prior to any ground disturbance. Some municipalities may also elect to have a Stage 1 archaeological assessment undertaken for a master plan area.

## **Built Heritage Resources and Cultural Heritage Landscapes**

MCM recommends that an Existing Conditions Report be undertaken by a qualified person, which will include a historical summary of the study area's development, identifying all known or potential built heritage resources and cultural heritage landscapes within the study area. The findings of the existing conditions report should be included in the existing conditions subsection of the master plan document.

Community input should be sought to identify locally recognized and potential cultural heritage resources. Sources include, but are not limited to, Municipal Heritage Committees, community heritage registers, historical societies, and other local heritage organizations.

Cultural heritage resources are often of critical importance to Indigenous communities. Indigenous communities may have knowledge that can contribute to the identification of cultural heritage resources, and any engagement with Indigenous communities should include a discussion about known or potential cultural heritage resources that are of value to them.

## **Subsequent Municipal Class EA Undertakings**

The recommendations outlined above can be used in support of any future technical cultural heritage studies required for any Schedule B and C MCEA undertakings identified within the master planning area. Technical cultural heritage studies are to be undertaken by a qualified person who has expertise, recent experience, and knowledge relevant to the type of cultural heritage resources being considered and the nature of the activity being proposed. Please advise MCM whether any technical cultural heritage studies will be completed for this master plan and provide them to MCM before issuing a Notice of Completion.

Please note that the responsibility for administration of the *Ontario Heritage Act* and matters related to cultural heritage have been transferred from the Ministry of Tourism, Culture and Sport (MTCS) to the Ministry of Citizenship and Multiculturalism (MCM). Individual staff roles and contact information remain unchanged. Please continue to send any notices, report and/or documentation to both Karla Barboza and myself.

- Karla Barboza, Team Lead - Heritage | Heritage Planning Unit (Citizenship and Multiculturalism) | 416-660-1027 | [karla.barboza@ontario.ca](mailto:karla.barboza@ontario.ca)
- Erika Leclerc, Heritage Planner | Heritage Planning Unit (Citizenship and Multiculturalism) | 416-305-0757 | [erika.leclerc@ontario.ca](mailto:erika.leclerc@ontario.ca)

Thank you for consulting MCM on this project. Please continue to do so through the master plan process and contact me for any questions or clarification.

Sincerely,

Erika Leclerc  
Heritage Planner  
[Erika.leclerc@ontario.ca](mailto:Erika.leclerc@ontario.ca)

Copied to: Craig Calder, CAO/Clerk, Township of North Stormont  
Carrol Derrick, R.V. Anderson and Associates Limited  
Samson Tso, R.V. Anderson and Associates Limited  
Karla Barboza, Team Lead – Heritage Planning Unit, MCM

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. The Ministry of Citizenship and Multiculturalism (MCM) makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MCM be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*.

The *Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33* requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with *Ontario Regulation 30/11* the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at [archaeology@ontario.ca](mailto:archaeology@ontario.ca)) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.





Outlook

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**FW: Master Service Plan - Hydro One Response**

---

**From** Natasha Lee <NLee@rvanderson.com>

**Date** Wed 6/5/2024 11:01 AM

**To** Samson Tso <stso@rvanderson.com>

**Cc** Darika Sharma <DSharma@rvanderson.com>; Trevor Kealey <tkealey@rvanderson.com>

 2 attachments (321 KB)

20240605-NoticeOfCommence-Water and Wastewater Master Servicing Plan.pdf; 19817.pdf;

Please review, file, log.

Thanks,  
Natasha

-----Original Message-----

**From:** Craig Calder <ccalder@northstormont.ca>

**Sent:** Wednesday, June 5, 2024 11:00 AM

**To:** Trevor Kealey <tkealey@rvanderson.com>; Natasha Lee <NLee@rvanderson.com>

**Cc:** Blake Henderson <bhenderson@northstormont.ca>; Dawn Crump <DCrump@ocwa.com>; Francois Landry <flandry@northstormont.ca>

**Subject:** Master Service Plan - Hydro One Response

[CAUTION EXTERNAL EMAIL] Make Sure that it is legitimate before Replying or Clicking on any links

Hi Trevor and Natasha:

Please see the response from Hydro. Should the report produce significant infrastructure installation/expansion requirements this may require Hydro works and include an expansion or transmission line replacement and/or relocation. The letter indicates this would trigger an Environmental Assessment (EA) that would require a minimum of 6 months to complete.

(or up to 18 months if a Full Class EA were to be required) to be completed. The Hydro letter clearly outlines all associated costs will be allocated and recovered from proponents in accordance with the Transmission System Code.

-----Original Message-----

**From:** SUN Hongxia <Susan.SUN@HydroOne.com> On Behalf Of SECONDARY LAND USE Department

**Sent:** Wednesday, June 5, 2024 9:39 AM

**To:** Craig Calder <ccalder@northstormont.ca>

**Cc:** SECONDARY LAND USE Department <Department.SecondaryLandUse@hydroone.com>

**Subject:** Hydro One Response: 20240605-NoticeOfCommence-Water and Wastewater Master Servicing Plan

Please see the attached for Hydro One's Response.

Hydro One Networks Inc

SecondaryLandUse@HydroOne.com



Hydro One Networks Inc.

483 Bay Street  
8th Floor South Tower  
Toronto, Ontario M5G 2P5

[HydroOne.com](http://HydroOne.com)

June 05, 2024

Re: Water and Wastewater Master Servicing Plan

Attention:  
Craig Calder CAO/Clerk  
Township of North Stormont

Thank you for sending us notification regarding Water and Wastewater Master Servicing Plan. In our preliminary assessment, we have confirmed that Hydro One has existing high voltage Transmission facilities within your study area. At this time we do not have sufficient information to comment on the potential resulting impacts that your project may have on our infrastructure. As such, we must stay informed as more information becomes available so that we can advise if any of the alternative solutions present actual conflicts with our assets, and if so; what resulting measures and costs could be incurred by the proponent. Note that this response does not constitute approval for your plans and is being sent to you as a courtesy to inform you that we must continue to be consulted on your project.

In addition to the existing infrastructure mentioned above, the applicable transmission corridor may have provisions for future lines or already contain secondary land uses (e.g., pipelines, watermains, parking). Please take this into consideration in your planning.

Also, we would like to bring to your attention that should Water and Wastewater Master Servicing Plan result in a Hydro One station expansion or transmission line replacement and/or relocation, an Environmental Assessment (EA) will be required as described under the Class Environmental Assessment for Minor Transmission Facilities (Hydro One, 2016). This EA process would require a minimum of 6 months for a Class EA Screening Process (or up to 18 months if a Full Class EA were to be required) to be completed. Associated costs will be allocated and recovered from proponents in accordance with the Transmission System Code. If triggered, Hydro One will rely on studies completed as part of the EA you are current undertaking.

Consulting with Hydro One on such matters during your project's EA process is critical to avoiding conflicts where possible or, where not possible, to streamlining processes (e.g., ensuring study coverage of expansion/relocation areas within the current EA). Once in receipt of more specific project information regarding the potential for conflicts (e.g., siting, routing), Hydro One will be in a better position to communicate objections or not objections to alternatives proposed.

If possible at this stage, please formally confirm that Hydro One infrastructure and associated rights-of-way will be completely avoided, or if not possible, allocate appropriate lead-time in your project schedule to collaboratively work through potential conflicts with Hydro One, which ultimately could result in timelines identified above.

In planning, note that developments should not reduce line clearances or limit access to our infrastructure at any time. Any construction activities must maintain the electrical clearance from the transmission line conductors as specified in the Ontario Health and Safety Act for the respective line voltage.

Be advised that any changes to lot grading or drainage within, or in proximity to Hydro One transmission corridor lands must be controlled and directed away from the transmission corridor.

Please note that the proponent will be held responsible for all costs associated with modifications or relocations of Hydro One infrastructure that result from your project, as well as any added costs that may be incurred due to increased efforts to maintain said infrastructure.

We reiterate that this message does not constitute any form of approval for your project. Hydro One must be consulted during all stages of your project. Please ensure that all future communications about this and future project(s) are sent to us electronically to [secondarylanduse@hydroone.com](mailto:secondarylanduse@hydroone.com)

Sent on behalf of,

***Secondary Land Use  
Asset Optimization  
Strategy & Integrated Planning  
Hydro One Networks Inc.***

Allard Martin- Auto Reply-R226348-20240530-Notice of Commencement & PIC

<b>FROM:</b>	Josée Brizard	<b>SENT:</b>	2024-05-30 5:25:58 PM UTC
<b>TO:</b>	Carol Derrick		
<b>CC:</b>			
<b>ATTACHMENTS:</b>			

**[CAUTION EXTERNAL EMAIL]** Make Sure that it is legitimate **before** Replying or Clicking on any links

Mrs. Josée Brizard has retired as of May 3rd, 2024.

For business related to the clerk's office, please send an email to [clerk@nationmun.ca](mailto:clerk@nationmun.ca).

For business addressed to the Chief Administrative Officer, please send an email to [pleroux@nationmun.ca](mailto:pleroux@nationmun.ca).

Thank you,

Mme Josée Brizard a pris sa retraite le 3 mai 2024.

Pour toute question portant sur le Bureau de la Greffe, veuillez envoyer un courriel à [clerk@nationmun.ca](mailto:clerk@nationmun.ca).

Pour toute question pour le Directeur général, veuillez envoyer un courriel à [pleroux@nationmun.ca](mailto:pleroux@nationmun.ca).

Merci

Danielle Ward - Auto Reply-R226348-20240530-Notice of Commencement & PIC

<b>FROM:</b>	Danielle Ward	<b>SENT:</b>	2024-05-30 5:26:21 PM UTC
<b>TO:</b>	Carol Derrick		
<b>CC:</b>			
<b>ATTACHMENTS:</b>			

**[CAUTION EXTERNAL EMAIL]** Make Sure that it is legitimate **before** Replying or Clicking on any links

Hello;

Thank you for your email, I am currently out of the office on maternity leave and will be returning Monday November 4th 2024.

During this time I will be periodically checking and responding to emails.

For urgent matters related to infrastructure- water, sewer, stormwater, flooding, water/sewer connections- please call 613-774-2105 for immediate assistance, or contact [drenaud@northdundas.com](mailto:drenaud@northdundas.com).

For urgent matters related to landfill operations such as hours, household hazardous waste dates, accepted materials, collection delays, and requests for new pick ups please call 613-774-5157 or contact [rdurant@northdundas.com](mailto:rdurant@northdundas.com)

For all invoicing, billing, or other enquiries I will return your email as soon as possible.

Thank you for your patience during this time.

Danielle Ward  
Director of Environmental Services  
Township of North Dundas  
[dward@northdundas.com](mailto:dward@northdundas.com)  
613-774-2105

Josh Mesman- Auto Reply-R226348-20240530-Notice of Commencement & PIC

<b>FROM:</b>	John Mesman	<b>SENT:</b>	2024-05-30 6:07:23 PM UTC
<b>TO:</b>	Carol Derrick		
<b>CC:</b>	Natasha Lee; Samson Tso; Leadership; Laura Crites; Erin Thorne		
<b>ATTACHMENTS:</b>	R226348-20240530- Notice of Study Commencement.pdf;		

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Hello,

Thanks for sharing this notice with us, confirming receipt from South Nation Conservation.

I'll share the information with our team. Please keep us posted on engagement opportunities!

Best,  
John

---

**From:** Carol Derrick <cderrick@rvanderson.com>

**Sent:** Thursday, May 30, 2024 1:26 PM

**Cc:** Natasha Lee <NLee@rvanderson.com>; Samson Tso <stso@rvanderson.com>

**Subject:** R226348-20240530-Notice of Commencement & Public Information Centre for the Water and Wastewater Master Servicing Plan for the Township of North Stormont

**External email - if you don't know or can't confirm the identity of the sender, please exercise caution and do not open links or attachments.**

On behalf of the Township of North Stormont, please see enclosed the Notice of Commencement and Public Information Centre for a Water and Wastewater Master Servicing Plan to service the future growth of Moose Creek, Finch and Crysler.

This notice is sent to your attention as it was deemed that you may be an interested stakeholder.

Should you wish to stop receiving notices pertaining to this project or would like to direct it to an alternate recipient, please advise the undersigned.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

Natasha Lee, P. Eng  
Project Manager

[NLee@rvanderson.com](mailto:NLee@rvanderson.com)

(416) 497-8600 ext. 1231

## Encls: Notice of Commencement

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### **John Mesman | Managing Director, Property, Conservation Lands, and Community Outreach**

38 Victoria Street, Box 29, Finch, ON K0C 1K0

Tel: 613-984-2948 or 1-877-984-2948 | Fax: 613-984-2872

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Josh Mesman- Response-R226348-20240530-Notice of Commencement & PIC

<b>FROM:</b>	Sandra Mancini	<b>SENT:</b>	2024-05-30 6:31:10 PM UTC
<b>TO:</b>	Carol Derrick		
<b>CC:</b>	Natasha Lee; Samson Tso; Ronda Boutz; ccalder@northstormont.ca		
<b>ATTACHMENTS:</b>			

**[CAUTION EXTERNAL EMAIL]** Make Sure that it is legitimate **before** Replying or Clicking on any links

Good afternoon Carol,

Thank you for sending us the notice. The contacts for this project will be Ronda Boutz and myself (Sandra Mancini).

Best,

Sandra

---

**From:** John Mesman <jmesman@nation.on.ca>

**Sent:** Thursday, May 30, 2024 2:07 PM

**To:** Carol Derrick <cderrick@rvanderson.com>

**Cc:** Natasha Lee <NLee@rvanderson.com>; Samson Tso <stso@rvanderson.com>; Leadership <leadership@nation.on.ca>; Laura Crites <lcrites@nation.on.ca>; Erin Thorne <ethorne@nation.on.ca>

**Subject:** RE: R226348-20240530-Notice of Commencement & Public Information Centre for the Water and Wastewater Master Servicing Plan for the Township of North Stormont

Hello,

Thanks for sharing this notice with us, confirming receipt from South Nation Conservation.

I'll share the information with our team. Please keep us posted on engagement opportunities!

Best,

John

---

**From:** Carol Derrick <cderrick@rvanderson.com>

**Sent:** Thursday, May 30, 2024 1:26 PM

**Cc:** Natasha Lee <NLee@rvanderson.com>; Samson Tso <stso@rvanderson.com>

**Subject:** R226348-20240530-Notice of Commencement & Public Information Centre for the Water and Wastewater Master Servicing Plan for the Township of North Stormont

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On behalf of the Township of North Stormont, please see enclosed the Notice of Commencement and Public Information Centre for a Water and Wastewater Master Servicing Plan to service the future growth of Moose



Creek, Finch and Crysler.

This notice is sent to your attention as it was deemed that you may be an interested stakeholder.

Should you wish to stop receiving notices pertaining to this project or would like to direct it to an alternate recipient, please advise the undersigned.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

Natasha Lee, P. Eng  
Project Manager  
[NLee@rvanderson.com](mailto:NLee@rvanderson.com)  
(416) 497-8600 ext. 1231

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**Sandra Mancini | Managing Director, Natural Hazards and Infrastructure**

38 Victoria Street, Box 29, Finch, ON K0C 1K0  
Tel: 613-984-2948 or 1-877-984-2948 | Fax: 613-984-2872

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Sean Fraser - Reply-R226348-20240530-Notice of Commencement & PIC

<b>FROM:</b>	Ryder, Kevin (He/Him) (MMAH)	<b>SENT:</b>	2024-05-30 5:56:39 PM UTC
<b>TO:</b>	Carol Derrick		
<b>CC:</b>			
<b>ATTACHMENTS:</b>	R226348-20240530- Notice of Study Commencement.pdf;		

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Hi Carol,

I have reached out on a couple of occasions to request that ADM Sean Fraser be removed from different email circulations that your organization generates – I was wondering if global change can be made to swap out ADM Fraser for [laurie.miller@ontario.ca](mailto:laurie.miller@ontario.ca)? Laurie is now in the role (Regional Director, Municipal Services Division) that ADM Fraser once occupied and is better positioned to receive your updates. I think this would be the easiest solution – please let me know if this would be possible.

Thanks in advance,  
Kevin

**Kevin Ryder**

Issues Coordinator | Assistant Deputy Minister's Office/Planning and Growth Division  
Ministry of Municipal Affairs and Housing  
647-273/7581 | [kevin.ryder@ontario.ca](mailto:kevin.ryder@ontario.ca)



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---

**From:** Carol Derrick <[cderrick@rvanderson.com](mailto:cderrick@rvanderson.com)>

**Sent:** Thursday, May 30, 2024 1:26 PM

**Cc:** Natasha Lee <[NLee@rvanderson.com](mailto:NLee@rvanderson.com)>; Samson Tso <[stso@rvanderson.com](mailto:stso@rvanderson.com)>

**Subject:** R226348-20240530-Notice of Commencement & Public Information Centre for the Water and Wastewater Master Servicing Plan for the Township of North Stormont

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

On behalf of the Township of North Stormont, please see enclosed the Notice of Commencement and Public Information Centre for a Water and Wastewater Master Servicing Plan to service the future growth of Moose Creek, Finch and Crysler.

This notice is sent to your attention as it was deemed that you may be an interested stakeholder.

Should you wish to stop receiving notices pertaining to this project or would like to direct it to an alternate recipient, please advise the undersigned.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

Natasha Lee, P. Eng  
Project Manager  
[NLee@rvanderson.com](mailto:NLee@rvanderson.com)  
(416) 497-8600 ext. 1231

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## FW: R226348-20240905-Notice of Public Information Centre #1 - W-WW MSP for the Township of North Stormont

---

**From** Land ROW East <landroweast@tnpi.ca>  
**Date** Fri 9/6/2024 9:48 AM  
**To** Carol Derrick <cderrick@rvanderson.com>

 1 attachment (87 KB)

226348-20240828-North Stormont MSP-Notice of PIC - Final.pdf;

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Good morning,  
Thank you for contacting Trans-Northern Pipelines Inc. (TNPI)  
We can confirm that TNPI has NO infrastructure in the mentioned villages of Chrysler, Finch, and Moose Creek.

Kind Regards,

**Renée Flowerday**

*Property and Right of Way Administrator/ Administratrice de propriété et de droit de passage*

Trans-Northern Pipelines Inc. | 45 Vogell Road, Suite 310, Richmond Hill, ON L4B 3P6 |

**Landroweast@tnpi.ca**



Make it Home!!



---

**From:** info <info@tnpi.ca>

**Sent:** September 5, 2024 11:17 AM

**To:** Land ROW East <landroweast@tnpi.ca>

**Subject:** FW: R226348-20240905-Notice of Public Information Centre #1 - W-WW MSP for the Township of North Stormont

---

**From:** Carol Derrick <cderrick@rvanderson.com>

**Sent:** September 5, 2024 8:10 AM

**Cc:** Trevor Kealey <tkealey@rvanderson.com>; Darika Sharma <DSharma@rvanderson.com>; Samson Tso <stso@rvanderson.com>; Sarah Molnarova <smolnarova@rvanderson.com>

**Subject:** R226348-20240905-Notice of Public Information Centre #1 - W-WW MSP for the Township of North Stormont

**CAUTION:** This email originated from outside of the TNPI organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

On behalf of the Township of North Stormont, please see attached Notice of Public Information Centre for a Water and Wastewater Master Servicing Plan to service the future growth of Moose Creek, Finch and Crysler.

This notice is sent to your attention as it was deemed that you may be an interested stakeholder.

Should you wish to stop receiving notices pertaining to this project or would like to direct it to an alternate recipient, please advise the undersigned.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

Trevor Kealey, P.Eng.  
Project Director  
[tkealey@rvanderson.com](mailto:tkealey@rvanderson.com)  
(416) 497-8600 ext. 3230

Encls: Notice of Public Information Centre #1

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Appendix B-5

# 30-Day Review Responses and Comments



## Sarah Molnarova

---

**From:** Laura Crites <lcrites@nation.on.ca>  
**Sent:** February 3, 2025 11:46 AM  
**To:** Trevor Kealey; Craig Calder CAO - North Stormont Township  
(ccalder@northstormont.ca)  
**Cc:** Darika Sharma; Sarah Molnarova; Blake Henderson  
**Subject:** RE: Villages of Finch, Crylser, and Moose Creek Water and Wastewater Master Plan - Final Report for 30-day review

**Categories:** Filed by Newforma

**[CAUTION EXTERNAL EMAIL]** Make Sure that it is legitimate **before** Replying or Clicking on any links

Good morning Trevor and Craig,

Thank you for sending the Water and Wastewater Master Plan to South Nation Conservation.

We are available to discuss any items related to Municipal drinking water source protection, as required under the *Clean Water Act*. Also, if the wastewater expansion results in an increased phosphorus discharge, we can provide info on the Total Phosphorus Management Program if needed.

Please include us on future circulations.

Kind regards,  
Laura

---

**From:** Darika Sharma <DSharma@rvanderson.com>  
**Sent:** January 4, 2025 1:18 AM  
**To:** Craig Calder <ccalder@northstormont.ca>  
**Cc:** Sarah Molnarova <smolnarova@rvanderson.com>; Trevor Kealey <tkealey@rvanderson.com>; Blake Henderson <bhenderson@northstormont.ca>  
**Subject:** Villages of Finch, Crylser, and Moose Creek Water and Wastewater Master Plan - Final Report for 30-day review

**External email** - if you don't know or can't confirm the identity of the sender, please exercise caution and do not open links or attachments.

Hello All,

Please see the Final compiled ***Villages of Finch, Crylser, and Moose Creek Water and Wastewater Master Plan*** completed for the Township of North Stormont by R.V. Anderson Associates in the following weblink: <https://www.northstormont.ca/masterplanwater>

This email is being sent to all stakeholders identified as part of the Municipal Class EA – Master Plan process. This email commences the **30-day review period** for the the Master Plan.

## Sarah Molnarova

---

**From:** Leclerc, Erika (MCM) <erika.leclerc@ontario.ca>  
**Sent:** February 4, 2025 5:22 PM  
**To:** ccalder; Trevor Kealey  
**Cc:** Barboza, Karla (She/Her) (MCM); Darika Sharma; Sarah Molnarova; Trevor Kealey; Blake Henderson; EA Notices to ERegion (MECP)  
**Subject:** MCM Response - Villages of Finch, Crylser, and Moose Creek Water and Wastewater Master Plan - Final Report for 30-day review  
**Attachments:** 2025-02-04 WWMP\_NorthStormont\_MCMComments.pdf  
**Categories:** Filed by Newforma

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Good afternoon,

Thank you for providing the Notice of Completion for the above-referenced project to the Ministry of Citizenship and Multiculturalism (MCM). Apologies for the delay in replying.

Please find attached MCM's comments on the Master Plan.

If you have any questions or require clarification, please do not hesitate to contact me.

Kind regards,

**Erika Leclerc**

Heritage Planner | Heritage Branch | Citizenship, Inclusion and Heritage Division  
Ministry of Citizenship and Multiculturalism | Ontario Public Service  
416-305-0757 | [erika.leclerc@ontario.ca](mailto:erika.leclerc@ontario.ca)



*Taking pride in strengthening Ontario, its places and its people*

---

**From:** Darika Sharma <[DSharma@rvanderson.com](mailto:DSharma@rvanderson.com)>  
**Sent:** Saturday, January 4, 2025 1:18 AM  
**To:** ccalder <[ccalder@northstormont.ca](mailto:ccalder@northstormont.ca)>  
**Cc:** Sarah Molnarova <[smolnarova@rvanderson.com](mailto:smolnarova@rvanderson.com)>; Trevor Kealey <[tkealey@rvanderson.com](mailto:tkealey@rvanderson.com)>; Blake Henderson <[bhenderson@northstormont.ca](mailto:bhenderson@northstormont.ca)>  
**Subject:** Villages of Finch, Crylser, and Moose Creek Water and Wastewater Master Plan - Final Report for 30-day review

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hello All,

Please see the Final compiled ***Villages of Finch, Crylser, and Moose Creek Water and Wastewater Master Plan*** completed for the Township of North Stormont by R.V. Anderson Associates in the following weblink:  
<https://www.northstormont.ca/masterplanwater>



**Ministry of Citizenship  
and Multiculturalism**

Heritage Planning Unit  
Heritage Operations Branch  
Citizenship, Inclusion and  
Heritage Division  
5th Flr, 400 University Ave  
Toronto, ON M5G 1S7  
Tel.: 416-305-0757

**Ministère des Affaires civiques  
et du Multiculturalisme**

Planification relative au patrimoine  
Opérations relatives au patrimoine  
Division des affaires civiques, de  
l'inclusion et du patrimoine  
5e étage, 400, av. University  
Toronto, ON M5G 1S7  
Tél.: 416-305-0757



February 4, 2025

EMAIL ONLY

Trevor Kealey  
Principal Regional Manager Ottawa  
R.V. Anderson Associates Limited  
1750 Courtwood Crescent, Suite 220  
Ottawa ON, K2C 2B5  
[tkealey@rvanderson.com](mailto:tkealey@rvanderson.com)

**MCM File** : **0021812**  
**Proponent** : **Township of North Stormont**  
**Subject** : **Municipal Class Environmental Assessment – Notice of Completion  
– Master Plan Approach #1**  
**Project** : **Villages of Crysler, Finch, and Moose Creek, Water and Wastewater  
Master Servicing Plan**  
**Location** : **Township of North Stormont, United Counties of Stormont, Dundas  
and Glengarry**

---

Dear Trevor Kealey:

Thank you for providing the Ministry of Citizenship and Multiculturalism (MCM) with the Notice of Completion for the above-referenced project.

MCM's interest in this Master Plan relates to its mandate of conserving Ontario's cultural heritage, which includes archaeological resources, built heritage resources (BHRs), and cultural heritage landscapes (CHLs).

**Master Plan Summary**

The Township of North Stormont is responsible for the provision of water and wastewater services to its serviced communities and has undertaken this study to develop, evaluate, and select preferred long-term water and wastewater servicing strategies to support existing servicing needs and accommodate future projected population and employment growth to the year 2051.

The study was conducted in accordance with the Master Planning process following "Approach No. 1" as outlines in the Municipal Class Environmental Assessment (MCEA).

**Comments**

MCM previously provided comments on this project in an initial letter dated June 20, 2024.

We have reviewed the Master Plan (dated December 24, 2024, from R.V. Anderson Associates Limited) and find that cultural heritage due diligence has yet to be fully documented for this project. We have the following comments and recommendations:

### **Identifying Cultural Heritage Resources**

As noted in our above-referenced initial letter on this project, MCM understands that master plans are typically done at a broad level of assessment thereby requiring more detailed investigations at the project-specific level.

We continue to recommend that a description of the existing conditions related to cultural heritage resources be included in the Master Plan. This includes archaeological resources, as well as BHRs and CHLs.

The Master Plan refers to “cultural and archaeological conditions” as well as “socio-cultural criteria,” however it is not clear whether the study area has been previously screened or assessed.

### **Archaeological Resources**

We continue to recommend that the existing conditions sub-section indicate whether the Master Plan includes areas of archaeological potential and acknowledge that archaeological assessments will be required for future project-specific projects. The proponent should refer to an archaeological management plan or a data sharing agreement, should they exist. In their absence, the Ministry’s screening checklists can help determine whether archaeological assessments will be needed for subsequent project undertakings: [Criteria for Evaluating Archaeological Potential](#) and [Criteria for Evaluating Marine Archaeological Potential](#) (if shoreline or in-water works are proposed).

Please note that archaeological assessments are to be undertaken by an archaeologist licensed under the *Ontario Heritage Act* and that archaeological assessment reports must be submitted for MCM review prior to the completion of the environmental assessment and prior to any ground disturbance.

### **Built Heritage Resources and Cultural Heritage Landscapes**

Future undertakings may impact known and potential BHRs and CHLs. MCM’s [Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes](#) screening checklist should be completed for future undertakings under the Master Plan. If there is potential for BHRs and/or CHLs on the property or within the project area, then technical cultural heritage studies (e.g., Cultural Heritage Evaluation Report, Heritage Impact Assessment) should be undertaken by a qualified person as required.

### **Subsequent Municipal Class EA Undertakings**

The preferred water servicing strategy and wastewater servicing strategy include Schedule B and C undertakings. The Master Plan should include a clear commitment to completing technical cultural heritage studies, as required, for future undertakings identified under the Master Plan, as outlined above.

Technical cultural heritage studies are to be undertaken by a qualified person who has expertise, recent experience, and knowledge relevant to the type of cultural heritage resources being considered and the nature of the activity being proposed.

We have attached a table with additional comments and recommended revisions to support the documentation of due diligence and alignment with the legislative framework.

Thank you for consulting MCM on this project. If you have any questions or require clarification, please do not hesitate to contact me.

Sincerely,

Erika Leclerc  
Heritage Planner  
[Erika.leclerc@ontario.ca](mailto:Erika.leclerc@ontario.ca)

Copied to: Craig Calder, CAO/Clerk, Township of North Stormont  
Darika Sharma, R.V. Anderson and Associates Limited  
Sarah Molnarova, R.V. Anderson and Associates Limited  
Blake Henderson, R.V. Anderson and Associates Limited  
Karla Barboza, Team Lead – Heritage Planning Unit, MCM  
EA Notices to East Region, MECP ([eanotification.eregion@ontario.ca](mailto:eanotification.eregion@ontario.ca))

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. The Ministry of Citizenship and Multiculturalism (MCM) makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MCM be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*.

The *Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33* requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with *Ontario Regulation 30/11* the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery and Procurement, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at [archaeology@ontario.ca](mailto:archaeology@ontario.ca)) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

Comment #	Reference to Document	MCM Comments	Proposed Action/Solution
1.	Throughout the Master Plan.	Cultural heritage resources include archaeological resources, built heritage resources (BHRs), and cultural heritage landscapes (CHLs). Please use the correct term when referring to each type, and the term “cultural heritage resources” when referring to all three. We recommend revising the terminology throughout the Master Plan.	Revision to Master Plan.
2.	Proposed New Section: Existing Conditions	<p>Please see cover letter comments. The Master Plan should include a description of the existing conditions related to cultural heritage resources (including archaeological resources, BHRs, and CHLs).</p> <p>Recommendations specific to cultural heritage resources (e.g., required technical studies and timelines for their completion) could also be included under a different section, as appropriate.</p>	<p>Revision to Master Plan. MCM recommends including the following suggested text:</p> <p>[New Section - Existing Conditions: Cultural Heritage Resources]</p> <p>“[Describe existing conditions as they relate to archaeological resources, BHRs, and CHLs]. Future undertakings under the Master Plan may impact known or potential cultural heritage resources, which include archaeological resources, BHRs, and CHLs.</p> <p>For all future undertakings under the Master Plan, The Township shall complete the Ministry of Citizenship and Multiculturalism (MCM)’s <i>Criteria for Evaluating Archaeological Potential</i> screening checklist – and <i>Criteria for Evaluating Marine Archaeological Potential</i> (if shoreline or in-water works are proposed) – to determine whether an archaeological assessment is needed. If a project area exhibits archaeological potential, then an archaeological assessment shall be completed by a licensed archaeologist under the <i>Ontario Heritage Act</i>. Archaeological assessment reports are to be submitted to MCM for review as early as possible during the planning phase and prior to any ground disturbing activities.</p> <p>In addition, for all future undertakings under the Master Plan, the Township shall complete the MCM’s <i>Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage</i></p>

Comment #	Reference to Document	MCM Comments	Proposed Action/Solution
			<p><i>Landscapes</i> screening checklist to determine whether a Cultural Heritage Evaluation Report (CHER) and Heritage Impact Assessment (HIA) are needed. If a project area exhibits potential for BHRs and/or CHLs, then a CHER shall be completed. If the CHER concludes that the property/project area has cultural heritage value or interest, then a HIA will also be completed. The CHER (and HIA, if required) will be completed by a qualified person(s) and submitted for review and comment to MCM, Indigenous communities, and other interested parties, as early as possible during the planning phase and prior to any ground disturbing activities.”</p>
3.	6.0 – Evaluation Methodology (p.19)	<p>Table 6.1 (MCEA Evaluation Criteria) includes a “Social and Cultural” category, which includes “impact to build [sic] heritage and cultural heritage landscapes” among the criteria. Please see comment #1. The table should include impacts to all three types of cultural heritage resources, and the terminology should be revised to align with the legislative framework.</p> <p>In addition, it is not clear how impacts to cultural heritage resources were determined in the evaluation. Please see cover letter comments. We recommend indicating whether the study area has been previous screened/assessed.</p>	<p>Revision to Master Plan. We recommend the following revisions to Table 6.1:</p> <ul style="list-style-type: none"> <li>• “Impacts to <b>known and potential built-heritage resources</b> and cultural heritage landscapes</li> <li>• <b>Impacts to archaeological resources and areas of archaeological potential</b>”</li> </ul>
4.	7.7.1 – Water Supply, Table 7.9 (p.39) and 7.7.2 – Water Storage, Table 7.10 (p.47)	<p>See comments #1 and 3, as well as cover letter comments.</p> <p>Table 7.9 (Detailed Evaluation of Water Supply Alternatives) refers to “known archaeological and cultural conditions” and “unknown archaeological and cultural conditions.” We recommend revising the terminology to refer to archaeological resources, BHRs, and CHLs. We also recommend that the Master Plan clarify how these conditions were determined.</p>	<p>Revision to Master Plan. Please see suggested wording in comment #3 above and revise accordingly.</p>

Comment #	Reference to Document	MCM Comments	Proposed Action/Solution
		Table 7.10 (Detailed Evaluation of Water Storage Alternatives) should also identify whether there could be potential impacts to all three types of cultural heritage resources.	
5.	7.8 – Preferred Water Servicing Strategy (p.48-53)	The preferred water servicing strategy includes Schedule B and C undertakings. The Master Plan should include a clear commitment to completing technical cultural heritage studies for future undertakings identified under the Master Plan, as outlined in the cover letter and comment #2.	Revision to Master Plan.
6.	8.5.4.3 – Alternative 5B-1: New Facultative Lagoon (p.67)	<p>The Master Plan states that “under the MCEA, this project will require a Schedule C Class EA with architectural and cultural-heritage studies due to the large area of additional land requirement” (p.67).</p> <p>As indicated in our cover letter, MCM recommends that proponents complete the <i>Criteria for Evaluating Archaeological Potential</i> screening checklist (and <i>Criteria for Evaluation Marine Archaeological Potential</i>, as appropriate) for all future undertakings under the Master Plan to determine if an archaeological assessment is required.</p> <p>In addition, future undertakings under the Master Plan should be screened using MCM’s <i>Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes</i> screening checklist to determine whether a CHER – and HIA, if recommended – is/are required.</p> <p>Revision recommended. Please see suggested text under comment #2.</p>	Revision to Master Plan.

Comment #	Reference to Document	MCM Comments	Proposed Action/Solution
7.	8.7 – Detailed Evaluation of Post-Screening Alternative Strategies, Table 8.9 (p.74)	Under the “Evaluation Criteria” row, Table 8.9 (Detailed Evaluation of Wastewater Treatment Alternatives) indicates that “all proposed upgrades can possibly fit within the municipal property and no land acquisition is anticipated.” Please see comment #4. It is not clear whether there could be potential impacts to archaeological resources, areas of archaeological potential, and/or known and potential BHRs and CHLs.	Revision to Master Plan.
8.	8.8 - Preferred Wastewater Servicing Strategy (p.75-79)	Please see comment #5. The preferred wastewater servicing strategy include Schedule C undertakings. The Master Plan should include a clear commitment to completing technical cultural heritage studies for future undertakings identified under the Master Plan, as outlined in the cover letter and comment #2.	Revision to Master Plan.
9.	Appendix A – Referenced Legislation and Policies	The <i>Ontario Heritage Act</i> should also be included in the list of Provincial Acts and Policies.	Revision to Master Plan.

**APPENDIX C**  
Population Analysis





## 1.1 Reserve Capacity Study

The 2022 and 2024 RCS was undertaken by the Township to allocate and track capacity available for future development in the Villages of Crysler, Finch and Moose Creek. Recorded usage, serviced connections, and existing and planned development information was obtained from the Township staff and the 2013 Crysler and Finch Wastewater Servicing Master Plan (RVA, 2013). The capacity calculations were then completed in accordance with Ministry of Environment and Conservation of Parks (MECP) Procedure D-5-1.

The report provides the number of units connected to each DWS and WWTS. For the Crysler SPS And Wastewater Treatment Lagoons, the total serviced units in both Finch and Crysler are provided. To estimate the serviced units in Crysler alone, this total number of serviced units is subtracted from the units serviced by the Finch SPS alone.

Table 1 provides the results and also summarizes the connected-units information provided in each of the reports. Note that it is assumed that the serviced-units data corresponds to the year prior to the report year (that is, 2022 report covers units serviced in 2021 and 2024 report covers units serviced in 2023).

The 2024 RCS report only covered the WWTS and was used to obtain the units serviced by the WWTSs in 2023. To determine the 2023 DWS serviced units, the growth in the WWTS serviced units from 2021 to 2023 was taken as the same growth for the DWS serviced units. That is, the 2024 report showed that an additional 10 units were connected in both Finch and Moose Creek, while Crysler saw a growth of 31 units, to their corresponding WWTSs. These numbers were added the DWS serviced units reported in the 2022 RCS report to determine the total serviced units in 2023.

Table 1: Total Units Serviced by Municipal System in 2022 and 2024

Parameter	2021 Serviced Units	2023 Serviced Units	2021-2023 Additional Units
<b>Drinking Water System</b>			
Finch	249	259	10
Crysler	440	471	31
Moose Creek	262	272	10
<b>Wastewater Treatment System</b>			
Finch – Crysler Combined	658	699	41

Parameter	2021 Serviced Units	2023 Serviced Units	2021-2023 Additional Units
Finch	228	238	10
Crysler	430	461	31
Moose Creek	222	232	10

1: Crysler Serviced units = Finch-Crysler Combined – Finch Serviced Units

The RCS analyzed capacity requirements on a per-unit basis. However, water use and wastewater discharge can significantly vary among households. At a Master Plan level, capacity is analysed on a per-capita basis to obtain consistent and accurate projection data.

This information is used to obtain the serviced population from 2021 to 2023, which is then used to estimate the historical per person (capita) water consumption and wastewater discharge factors. These factors are then used to project the future water demand and wastewater flows based on the assumption that the services used per capita will remain the same. This is a conservative assumption, as overall trends across Ontario show a decline in per capita water use and wastewater flow (*Potable water use by sector and average daily use*, Statistics Canada).

## 1.2 Growth Management Strategy

### 1.2.1 Overview

The Growth Management Strategy (GMS) report provided a long-term forecast for population, housing, and employment requirements as well as the corresponding urban land requirements. The study was conducted to provide consideration for residential and non-residential development across the County up to year 2051.

Population and employment growth in the County is linked to the economic growth opportunities available in the surrounding commuter shed, particularly Ottawa and Cornwall. The following subsections provides details on the forecasted residential and employment growth that will impact the municipal drinking water and wastewater treatment systems.

### 1.2.2 Historical Serviced Population

The GMS report provided the Population-Per-Unit (P.P.U.) from 2021 to 2051, which is used to estimate the historical serviced population (2021-2023) from the serviced units

provided in the RCS studies. The results are shown in Table 2. PPU used for 2021 to 2023 is 2.59.

**Table 2: Historical Serviced Population**

Parameter	2021	2022	2023
<b>Drinking Water System</b>			
Finch	645	658	671
Crysler	1,140	1,180	1,220
Moose Creek	679	692	704
<b>Wastewater Treatment System</b>			
Finch	591	603	616
Crysler	1,114	1,154	1,194
Moose Creek	575	588	601

Historical employment population is not considered as neither of the urban settlements have large industries. Therefore, it is assumed that all municipal services are currently used by the residential population. This is a conservative assumption and leads to larger per-capita factors.

### **1.2.3 Residential Population Growth**

#### **1.2.3.1 OVERVIEW**

As of 2021, the Township shares approximately 11% of the total population in the County. Historically, the Township has grown by 0.4% from 2001 – 2021 with an average annual housing growth rate of 27 units.

Three long-term growth scenarios were developed for the County as follows:

- Low Growth Scenario with an average annual rate of 0.5% per year;
- Medium Growth Scenario with an average annual rate of 0.7% per year; and
- High Growth Scenario with an average annual rate of 0.9% per year.

The Medium Growth Scenario was selected as the recommended scenario for long-range planning purposes, as it was conservatively larger than the historic growth rate of 0.1% recorded in the County from 2001 to 2006. The following growth in population and housing, and resulting remaining housing supply is forecasted under this scenario for each urban settlement. All units are to be directed to either of the three urban settlements of Finch,

Crysler or Moose Creek. Additional housing and population growth is from baseline year 2021 to study horizon of 2051

- Finch
  - › Household growth 130 houses, of which 80 are low density, 20 are medium density and 30 are high density units. The corresponding population growth is 290 additional people. Finch is expected to have a surplus of 940 housing supply by 2048.
- Crysler
  - › Household growth is 440 houses, of which 330 are low density, 40 are medium density and 70 are high density units. The corresponding population is 980. Crysler is expected to have a surplus of 40 housing units supply by 2048.
- Moose Creek
  - › Household growth is 220 houses, of which 150 are low density, 30 are medium density and 40 are high density units. The corresponding population is 490. Moose Creek is expected to have a surplus of 260 housing units supply by 2048.

The remaining housing supply on vacant residential designated greenfield lands as of 2023, not including units in any current development approvals process, is 1,840 units in all of North Stormont. This represents 20% of the total vacant supply in the County.

Table 3 provides the population in 2051 calculated using the above data. It is assumed that all future growth (resulting from new developments, intensification of existing serviced areas etc.) will be connected to municipal services. If the Township desires to connect the existing non-serviced lots, an updated *Reserve Capacity* study is recommended to determine the required capacity of municipal services.

**Table 3: Residential Population Forecast**

Urban Settlement	2023 Serviced Population	A = 2021 Serviced Population	B = 2021 – 2051 Additional Population	A + B = 2051 Population
<b>Drinking Water System</b>				
Finch	671	645	290	935
Crysler	1,220	1,140	980	2,120
Moose Creek	704	679	490	1,169

Urban Settlement	2023 Serviced Population	A = 2021 Serviced Population	B = 2021 – 2051 Additional Population	A + B = 2051 Population
<b>Wastewater Treatment System</b>				
Finch	616	591	290	881
Crysler	1,194	1,114	980	2,094
Moose Creek	601	575	490	1,065

### 1.2.3.2 POPULATION GROWTH SENSITIVITY ANALYSIS

During the preparation of this Master Plan, development plans for a total of 1,062 units (that can accommodate 3,030 people) was submitted by G&E Reno Construction in a Servicing & Stormwater Management Report prepared by EVB Engineering. The units are to be constructed in four phases, of which only Phase 1 comprising of 329 units which can accommodate 875 people is currently approved.

As summarized in Section 1.2.3.1, the total additional population from 2021 to 2051 projected for Crysler was 980. The G&E Reno Phase 1, that is currently under construction, is about 89% of this total growth (875/980). Additionally, the GMS report also noted that the remaining years of available housing supply available in Crysler is 22 years (which does not include the G&E development). As such, with the currently approved G&E Reno development, Crysler has a remaining supply capacity of 111 additional units only (440 units – 329 units).

As such, the need for a sensitivity analysis on Crysler’s population growth was identified. The sensitivity analysis analyzed the High-Growth scenario for Crysler to determine capacity of municipal services that can be needed to support larger than anticipated growth.

The High-Growth scenario is based on a 0.2% higher growth rate (0.9% versus 0.7%). Applying the increased growth rate to Crysler is shown in Table 4 and illustrated graphically in Figure 1. **This scenario will be checked in the water and wastewater forecast analysis.** However, this Master Plan will rely on the population forecast provided in the GMS Report, under the assumption that although approved, the time taken to fully populate the G&E Reno developments cannot be confirmed and can follow the Medium-Growth scenario trendline.

Table 4: Crysler High Growth Scenario

Parameter	Value	Note/Methodology
Additional Population Growth 2021 - 2051	980	Refer to Table 3 1.2.3.1
% Increased Growth Rate under High – Growth scenario.	0.2%	
Additional Population Growth 2021 – 2051 under High Growth Scenario <sup>1</sup>	1,040	Rounded to nearest 10 <sup>th</sup>
2051 Population under High Growth Scenario – DWS	2,180	= 1,140 + 1,040
2051 Population under High Growth Scenario - WWTS	2,155	= 1,114 + 1,040 Rounded to nearest 10 <sup>th</sup> digit

1: Value calculated using typical growth rate formula:  $POP_{.FUTURE} = POP_{.PRESENT} \times (1+i)^n$ , where  $i$  = growth rate and  $n$  = number of years.

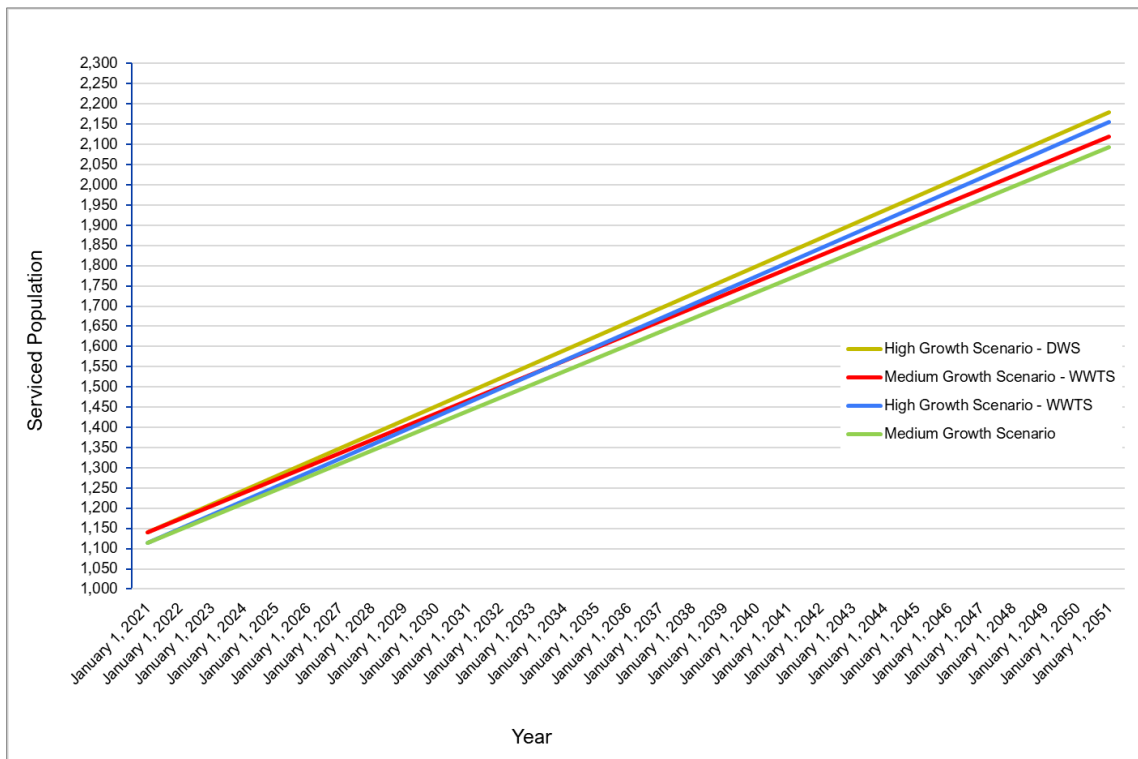


Figure 1: Crysler Medium and high Growth Scenario Comparison

## 1.2.4 Employment Population Growth

### 1.2.4.1 OVERVIEW

The County’s highest share of employment is in manufacturing, health care, and social assistance sector, followed by retail trade and construction sectors. About 45% of the total

employed residents work within the County. Of the total employment base in the County, only 9% is located in North Stormont.

As of 2023, North Stormont does not have additional vacant industrial lands. This analyses also considered adjustments made for sites that are unlikely to be developed due to odd/small lot sizes and poor configuration, underutilized employment sites, and sites that may have long-term development constraints. As such, any new industry will require expansion boundaries.

Three long-term growth scenarios were developed for the County as follows:

- Low Growth Scenario with an average annual rate of 0.7% per year;
- Medium Growth Scenario with an average annual rate of 0.9% per year; and
- High Growth Scenario with an average annual rate of 1.1% per year.

The Medium Growth Scenario was selected as the recommended scenario for long-range planning purposes. Under this scenario, North Stormont will see 10% of the total employment growth forecasted to 2051 in the County, equating to 710 additional jobs (2016 – 2051) as detailed below. Of this, employees that are likely not residents of the urban settlements and only use municipal services for 8 hours in a day (typical working hours assumed to be 8 AM to 5 PM), or 1/3 of the day are those that work in the designated urban employment lands. This is typically referred to as employment-land employment (ELE) population.

- Finch
  - › Urban employment growth is 110 jobs, of which only 10 are industrial jobs. Total employment on Urban Employment Lands is only 12 people.
- Chrysler
  - › Urban employment growth is 380 jobs, of which only 70 are industrial jobs. Total employment on Urban Employment Lands is only 68 people.
- Moose Creek
  - › Urban employment growth is 130 jobs, of which only 20 are industrial jobs. Total employment on Urban Employment Lands is only 22 people.

The remaining jobs fall within work at home, commercial (population related), institutional and N.F.P.O.W.

### 1.2.4.2 IMPLEMENTATION

Daily water usage and wastewater generation in addition to the existing residential population can be expected to only be contributed from the ELE population. For projection calculations, an *equivalent-residential population* calculated as 1/3 of the total ELE population. Table 5 lists the equivalent residential population for each urban settlement.

Table 5: Employment Population Forecast

Urban Settlement	2021 – 2051 Additional ELE Population	2023 – 2051 Additional ELE Population	Equivalent Residential Population <sup>1</sup>
Finch	12	11	4
Chrysler	68	63	23
Moose Creek	22	21	7

1: Equivalent Residential Pop = 1/3 of Additional ELE Population

## 1.3 Projected Serviced Population

Table 6 provides the total serviced residential and employment combined population forecasted to year 2051, based on the data analysis from Section 1.1 to 1.3. **All values have been rounded to the nearest 10<sup>th</sup>.**

Table 6: 2051 Forecasted Serviced Population

Urban Settlement	Residential Population	Equivalent Residential Population	2051 Total Serviced Population	Rounded
<b>Drinking Water System</b>				
Finch	935	5	945	950
Chrysler – Medium Growth	2,120	25	2,145	2,150
Chrysler – High Growth	2,180	25	2,205	2,210
Moose Creek	1,170	10	1,180	1,180
<b>Wastewater Treatment System</b>				
Finch	880	5	885	890
Chrysler – Medium Growth	2,095	25	2,125	2,130



Urban Settlement	Residential Population	Equivalent Residential Population	2051 Total Served Population	Rounded
Crysler – High Growth	2,155	25	2,185	2,190
Moose Creek	1,065	10	1,080	1,080

## 1.4 Committed Population

Finch and Moose Creek’s committed units as of 2022 was emailed by the Township Planning Staff. Crysler’s committed population was obtained by *G&E Reno Construction in a Servicing & Stormwater Management Report* prepared by EVB Engineering. During the preparation of this Master Plan, development plans for a total of 1,062 units (that can accommodate 3,030 people) was submitted by G&E Reno. The units are to be constructed in four phases, of which only Phase 1 comprising of 329 units which can accommodate 875 people is currently approved.

Since the timeline of when the units will be populated is unclear, a PPU from a specific year provided in the GMS report (Figure 2 for reference) cannot be used. Instead, an average of the PPU from 2021 to 2051 is used instead.

Table 7: Committed Population

Urban Settlement	Units	PPU <sup>1</sup>	Population
Finch	14	2.55	36
Crysler <sup>1</sup>	328	-	875
Moose Creek	12	2.55	31

1: Average PPU from 2021 – 2051 is 2.55

### North Stormont

Year	Population (Excluding Census Undercount)	Population (Including Census Undercount) <sup>1</sup>	Households				Persons Per Unit (PPU)
			Low Density <sup>2</sup>	Medium Density <sup>3</sup>	High Density <sup>4</sup>	Total	
2016	6,873	7,078	2,480	40	120	2,640	2.60
2021	7,400	7,621	2,615	65	175	2,855	2.59
2026	7,779	8,011	2,739	77	199	3,016	2.58
2031	8,207	8,452	2,890	94	219	3,203	2.56
2036	8,571	8,826	3,005	109	241	3,355	2.55
2041	8,918	9,184	3,113	124	263	3,500	2.55
2046	9,189	9,463	3,211	139	285	3,636	2.53
2051	9,451	9,732	3,297	154	306	3,757	2.52
2021-2051	2,051	2,112	682	89	131	902	

Figure 2: Table Taken from 2023 Growth Management Study Report, Watson & Associates

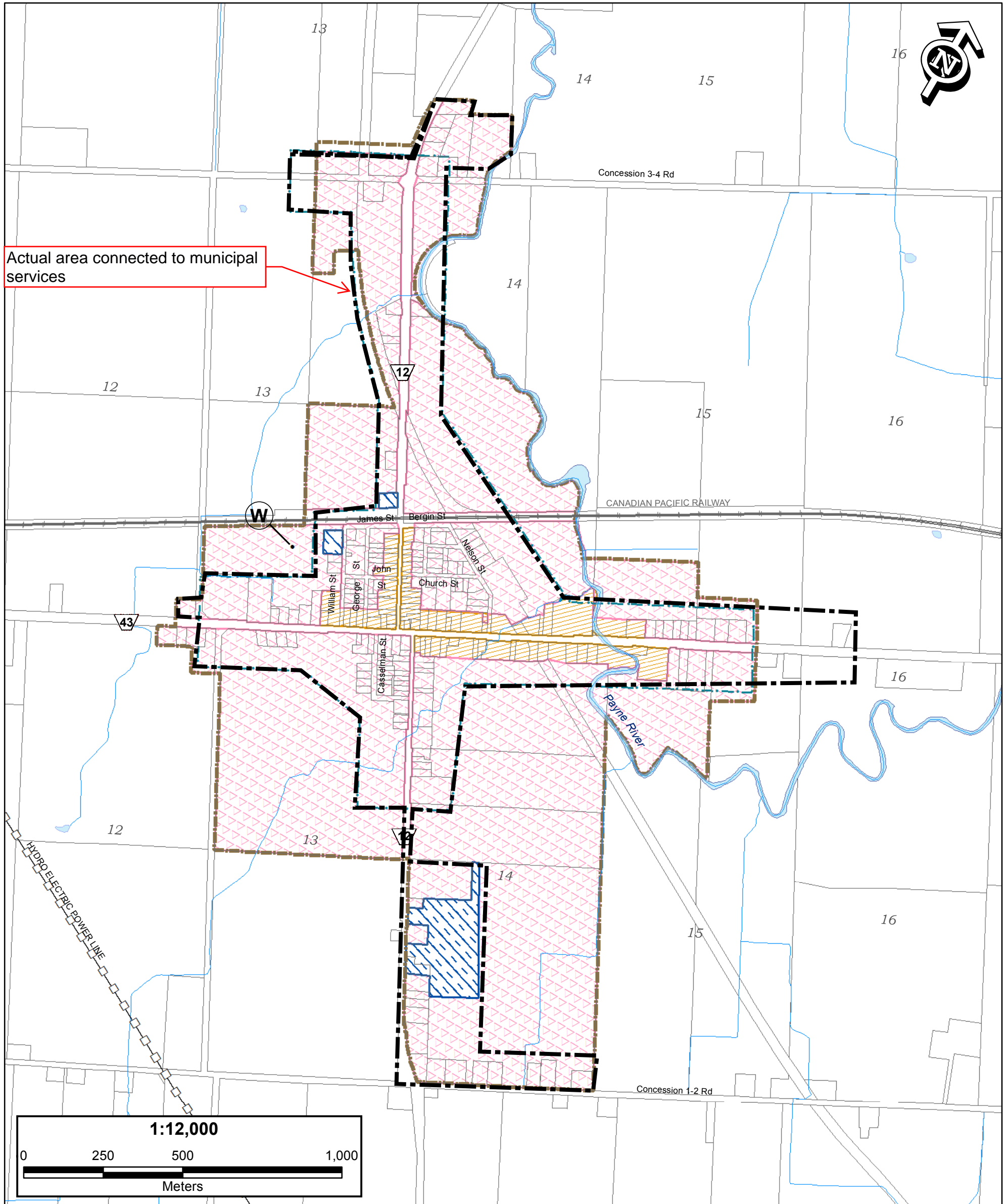
**APPENDIX D**

Boundary Maps

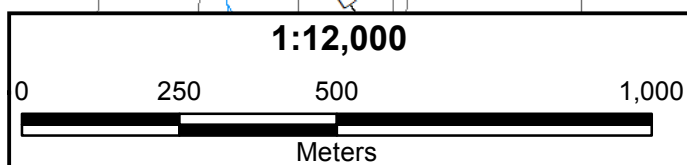


# SCHEDULE A3a

## Finch



Actual area connected to municipal services

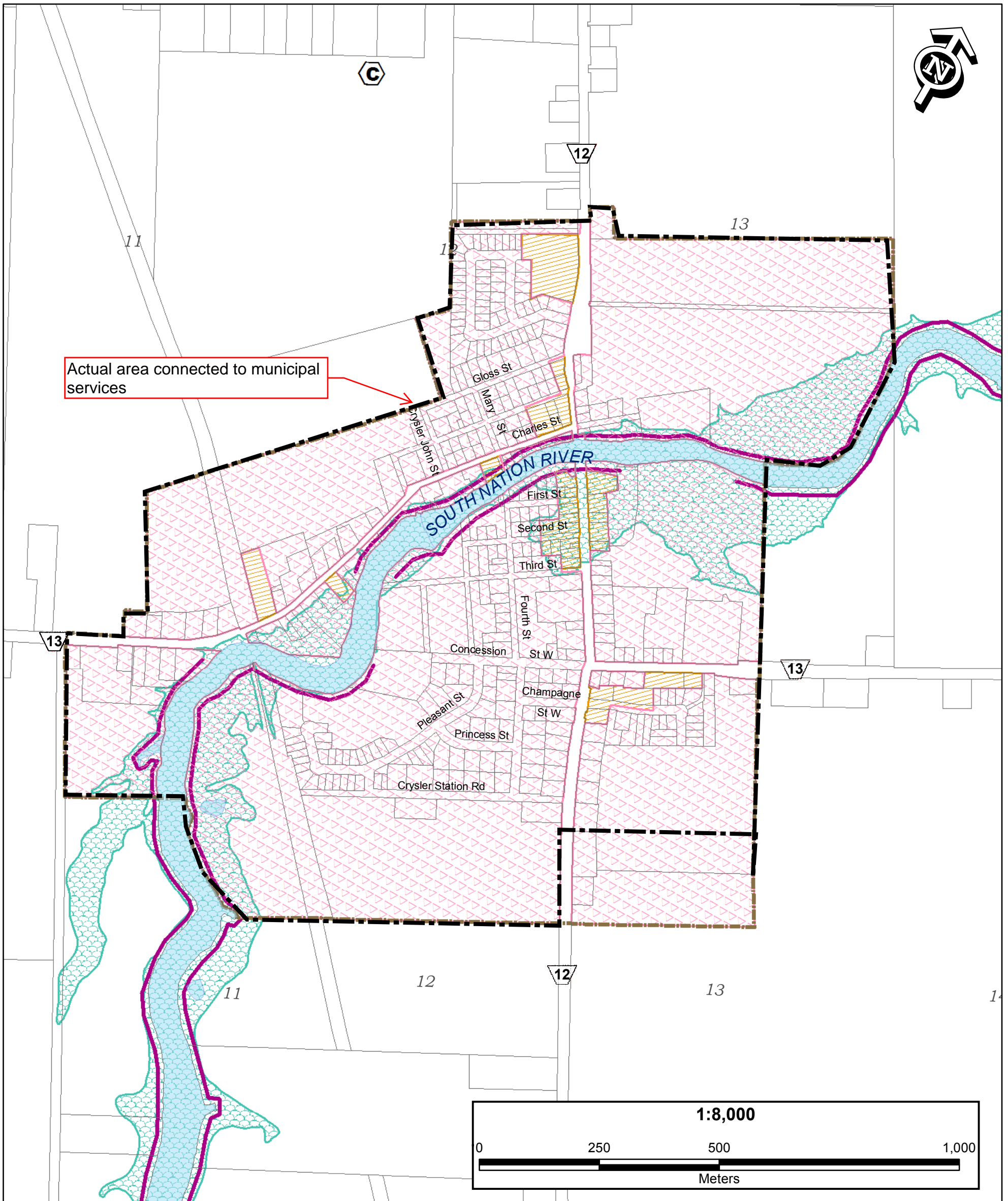


<b>LEGEND</b>		Updated Urban Service Limit	<b>Environmental Protection Lands (Constraint Overlay)</b>		<b>Infrastructure</b>	
Boundaries (Land Use Designation)	Urban Settlement Area	Urban Service Limit	Regulatory Floodline	Communal Well	Hospital	Sewage Lagoon
<b>Settlement Areas (Land Use Designation)</b>			Organic Soils	MOECC Identified Closed Waste Site (Approximate Location):		
Residential District	Salvage Yard District	Major Open Space	Unstable Slope	Closed Waste Site		
Commercial District	Airport District	Special Land Use District (See Table 9.1.2 of the OP Text)				
Employment District						
Provincially Significant Wetland						

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# SCHEDULE A3b

## Crysler



### LEGEND

#### Boundaries (Land Use Designation)

- Urban Settlement Area
- Urban Service Limit

#### Settlement Areas (Land Use Designation)

- Residential District
- Commercial District
- Employment District
- Provincially Significant Wetland
- Salvage Yard District
- Major Open Space
- Airport District
- Special Land Use District (See Table 9.1.2 of the OP Text)

#### Environmental Protection Lands (Constraint Overlay)

- Regulatory Floodline
- Organic Soils
- Unstable Slope

#### MOECC Identified Closed Waste Site (Approximate Location):

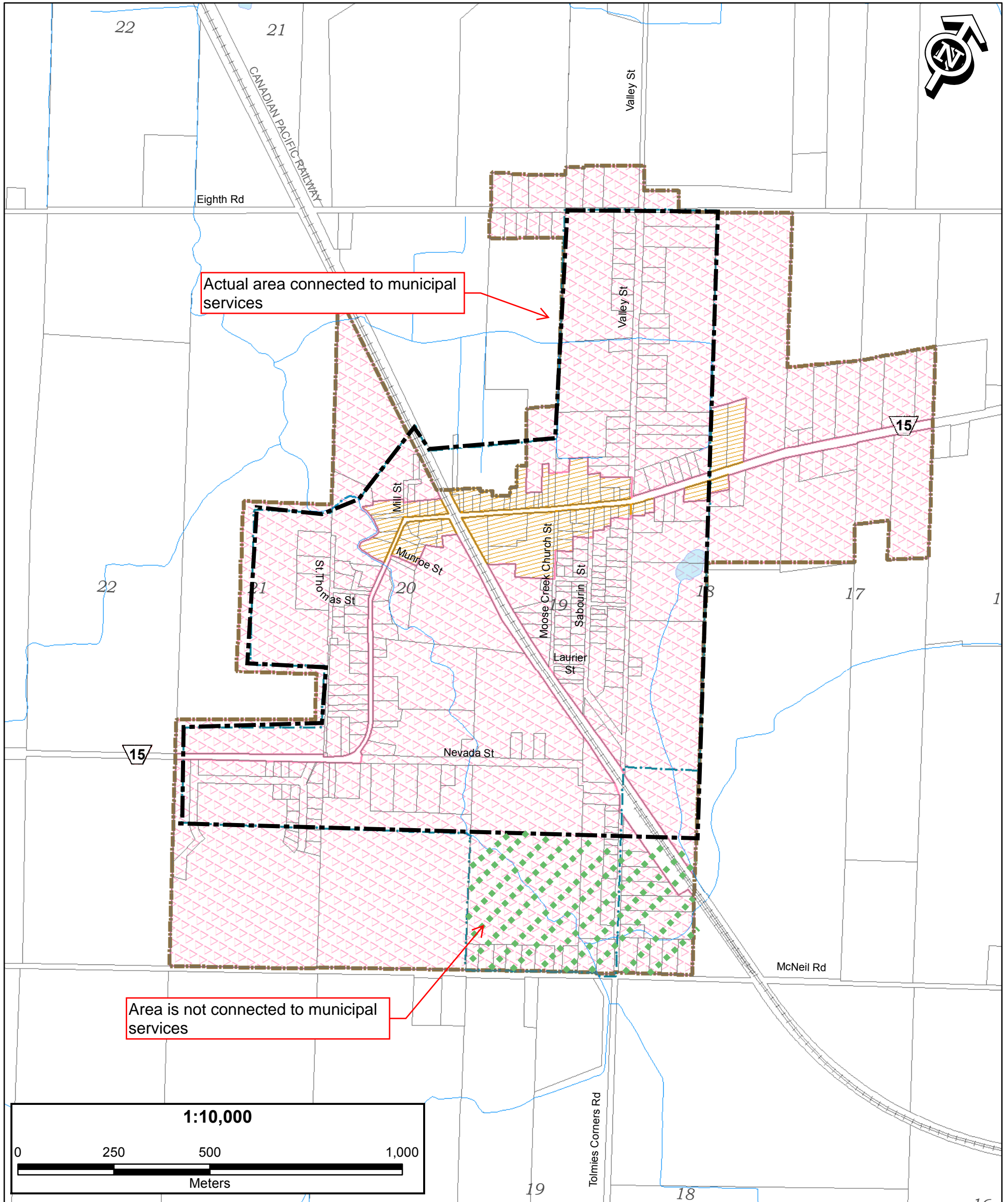
- Closed Waste Site

#### Infrastructure

- Communal Well
- Hospital
- Sewage Lagoon

# SCHEDULE A3c

## Moose Creek



**LEGEND**

**Boundaries (Land Use Designation)**

- Urban Settlement Area
- Urban Service Limit

**Settlement Areas (Land Use Designation)**

- Residential District
- Commercial District
- Employment District
- Provincially Significant Wetland
- Salvage Yard District
- Major Open Space
- Airport District
- Special Land Use District (See Table 9.1.2 of the OP Text)

**Environmental Protection Lands (Constraint Overlay)**

- Regulatory Floodline
- Organic Soils
- Unstable Slope

**MOECC Identified Closed Waste Site (Approximate Location):**

- Closed Waste Site

**Infrastructure**

- Communal Well
- Hospital
- Sewage Lagoon