

**GROUNDWATER-BASED DRINKING WATER SYSTEMS ANALYSIS**

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## 1. Background

The Region of Peel is responsible for the provision of municipal water supply and collection of wastewater for the Town of Caledon, the City of Brampton and the City of Mississauga. The Region of Peel is part of the Greater Golden Horseshoe (GGH) area that continues to be one of the fastest growing regions of North America and is subject to Ontario's legislative growth Plan, Places to Grow.

Readily available and accessible public infrastructure is essential to the viability of existing and growing communities. However, the requirements to own, maintain and operate groundwater systems have become more rigorous over the years. There also continues to be other changing requirements impacting the sustainability of operating these systems such as source water protection. To balance the needs of growth with the protection and preservation of the natural environmental, agricultural land and heritage resources, the Region initiated the Caledon Groundwater-based drinking water system analysis.

The study provides an updated summary document linking the safe, sustainable production capacities of the groundwater systems, with the potential growth capacities of the communities, and a long term servicing strategy across the Town of Caledon. This water systems analysis combines all relevant studies with the data and system understanding to match community growth within reasonable system capacities and strategies.

## 2. Study Area

Currently, the Town of Caledon's villages, hamlets and rural service centres are serviced by four distinct groundwater-based municipal drinking water systems. The study area for this review includes the following communities grouped by water system (see Appendix I for map).

### **Alton-Caledon Village-Mono Mills System**

- Alton
- Caledon Village (McLeodville, Skywood Park)
- Mono Mills

### **Caledon East-Palgrave System**

- Albion
- Caledon East
- Mono Road
- Palgrave (Cedar Mills, Centreville)

### **Cheltenham-Terra Cotta System**

- Cheltenham
- Terra Cotta

### **Inglewood System**

- Inglewood

Within Caledon there are a number of significant geographic, geological and cultural landforms. Larger part of the Oak Ridges Moraine, the Peel Plain, and part of the Niagara escarpment are found within the Municipality. The Credit and the Humber Rivers, and their tributaries, flow through the area. Areas not serviced by municipal water systems are dependent on individual private wells.

## 3. Study Approach

Regional staff consulted with Town of Caledon to determine servicing requirements and confirm population projections and approach.

Also, the provincial Growth Plan has given the Region a more active role in determining allocation of growth through the MCR process and as such, information available at this time from these sources was considered. Steps taken include:

- Population information was gathered from different sources, including the Town of Caledon's OPA 226 which allocates forecasted growth up to 2031 in addition to development applications/inquiries that could add further growth beyond 2031.
- Historical drinking water supply and demand data was evaluated and summarized to develop an accurate per capita consumption rate and to establish a 2018 starting point.
- Current supply capacities for each system were determined using Permit to Take Water (PTTW), pumping capacity and actual municipal well capacity assessments.
- Several risk scenarios were also considered, including declining municipal well capacity over time, a potential loss of one or more municipal wells, and interrupted supply.

A detailed analysis of each individual municipal groundwater-based system was undertaken to understand the unique needs of each community, confirm the ability to service current population within each system, and assess the capacity to service future population as these communities grow in accordance with Official Plan Amendments (OPA).

#### 4. Population and Employment Projections

In recent years, interest in development has started to move forward at a higher rate in several communities in the Town of Caledon. At the time of completing this analysis, the Village Studies and the Town's Official Plan have not been formalized. However, there have been a number of requests submitted by private landowners or developers to consider expansions to some of the villages and hamlets.

In addition to the settlement expansion policies that will apply to the villages and hamlets, availability of servicing will be another key factor considered when evaluating these requests. Staff will be working to evaluate each request over the course of this year. Since forecasts to date have considered growth within the existing boundaries of these hamlets and villages, potential expansions beyond the current boundaries have not been considered in the forecasts provided in groundwater-based analysis report.

Staff utilized the Town of Caledon's growth projections in addition to development applications/inquiries for the villages as the basis for projecting future growth in this study.

The table below shows the existing equivalent population and the potential future equivalent population considered under this analysis.

**Table 1 – Population Projections**

<b>Municipal Drinking Water System</b>	<b>Existing Equivalent Service Population<sup>1</sup></b>	<b>Potential Projected Population</b>
Alton - Caledon Village	4,635	4,990
Caledon East - Palgrave	12,187	14,184
Cheltenham - Terra Cotta	938	1,046
Inglewood	1,416	1,416
<sup>1</sup> Existing Equivalent Service Population estimated based on residential and ICI water billing records from 2018. <sup>2</sup> Potential Projected Population includes current development applications approved but not yet serviced, as well as future potential growth based on inquiries/pre-consultation		

## 5. Groundwater-Based Drinking Water Systems Analysis

In order to better estimate future water demands, historical demands and consumption data were reviewed in each of the systems. In most communities the per capita consumption demands show a slight decreasing trend over the last 20+ years. The reduction in consumption provides some potential capacity for growth.

Establishing a capacity baseline provides the ability to estimate the population that can be serviced with the existing municipal groundwater system.

As part of regular operations and maintenance, staff regularly test municipal well performance and rehabilitate wells as required. However, despite regular maintenance, the rate at which water may be drawn from a well may decrease with age.

Other factors that affect the supply capacity of a municipal well include the provincial Permit to Take Water (PTTW), maximum pumping capacity, aquifer sustainability, and other restrictions which may be imposed by the Ministry. These factors were considered in identifying capacity limitations for each municipal well and drinking water system.

The following table summarizes the current limiting capacities and the projected maximum day drinking water demands for each municipal drinking water system.

**Table 2 – System Summary**

<b>Municipal Drinking Water System</b>	<b>Wells</b>	<b>Existing System Capacity (m<sup>3</sup>/d) *</b>	<b>Projected Maximum Day Demands (m<sup>3</sup>/d)</b>
Alton - Caledon Village	AL3, AL4A, CV3, CV3B, CV4	7,595	3,724
Caledon East - Palgrave	CE3, CE4, CE4A, PA2, PA3, PA4	17,418	13,263
Cheltenham - Terra Cotta	CH1, CH2	1,468	885
Inglewood	IW3, IW4	1,296	1,287
* Capacity of each system based on combination of PTTW, well / pump capacity, etc.			

### Caledon East-Palgrave System

The existing water systems in the communities of Caledon East, Mono Road, Albion, Centreville, Cedar Mills, Palgrave and Palgrave Estates are supplied by the Caledon East – Palgrave System. The system is comprised of the Caledon East Drinking Water System and the Palgrave Drinking Water System and include a total of six (6) municipal wells. Three (3) are in Caledon East and the other three (3) are in Palgrave. Caledon East-Palgrave is an integrated drinking water system connected via a watermain along Old Church Road.

The efficiency of Caledon East Wells 4 and 4A has been declining over the last 7 years due to changes in the aquifer pressure, and the municipal wells in Palgrave have a greater combined supply capacity than those in Caledon East. The capacity of the Palgrave wells enhances capacity of the overall interconnected system.

Based on current capacity and an assessment of risk for the system staff identified that additional water supply is needed to ensure demand is met for the projected growth, as per the work discussed in Section 4. On this basis, staff have commenced an action plan to undertake works in this system to mitigate these risks which includes the following:

1. Exploration works for an additional municipal water supply in Caledon East was initiated in early spring of 2019 and a preferred site was identified.
2. Drilling of the new well was completed in early 2020
3. A Class EA will also be initiated in the summer 2020 and construction is planned to start in 2021
4. Pumping tests at Palgrave Well 4 proved the ability to increase production capacity in this well
5. Staff is moving forward to amend the PTTW, adjust Well Head Protection Areas and update the Source Protection plan to reflect this increased capacity in Palgrave Well 4 and the new well in Caledon East
6. Planning the upgrades to the water treatment facility (at Palgrave Well 4) to accommodate the additional capacity. Budget is in place to complete this work.

Upon completion of the new well in Caledon East and the capacity increase in Palgrave the long-term growth projections of the Town can be serviced by the groundwater system.

### Alton – Caledon Village System

The existing urban water systems in the communities of Alton, Caledon Village, Mono Mills, McCleodville and Skywood Park are supplied water from the Alton-Caledon Village Well System. The system is comprised of the Alton Drinking Water System and the Caledon Village Drinking Water System which are interconnected with a watermain along Beach Grove Sideroad. The system has a total of five (5) municipal wells. Three (3) wells are located in Caledon Village and two (2) wells are located in Alton.

As per the work described in Section 4, some potential for growth has been identified in the communities of Alton and Caledon Village. There has been a recent decline in well production at Alton Well 4 due to high turbidity as a result of aging well casing. Staff have addressed this

## Appendix II Servicing Update of Groundwater-Based Drinking Water Systems

issue by drilling a new well to replace Alton Well 4. The set of wells in Caledon Village have a greater combined capacity than those in Alton however the interconnected system has sufficient capacity to meet current demands and growth projection. Based on the analysis undertaken, staff did not identify any additional works required in the near future.

### Cheltenham – Terra Cotta System

Municipal water servicing to Cheltenham and Terra Cotta is provided by two wells located in Cheltenham. The water system also services approximately 100 units in the community of Poltawa which is located west of Heritage Rd, outside the urban boundary of Terra Cotta. The Cheltenham system has an elaborate iron removal treatment facility which services the system.

Based on work discussed in Section 4, there is limited potential for growth in Cheltenham and Terra Cotta. The existing PTTW is limited but is sufficient to service current needs. Based on the analysis undertaken, staff have identified the potential risk of lack of redundancy in the system however staff did not identify any additional works required in the near future.

### Inglewood System

The Village of Inglewood is serviced by two municipal wells.

As per planning work described in Section 4, there is some interest in development in Inglewood. Based on the analysis and Table 1 data, the existing system is already operating very close to its limiting water supply capacity and there is limited system redundancy. Therefore, budget for exploration works for an additional source of drinking water and the potential for a consolidated treatment facility were included in the 2020 budget.

A new well has been completed (IW4) to replace an existing well (IW2). The new well was recently completed. Long-term testing is currently underway to verify the impacts to the existing aquifer and the well is expected to be completed by Fall 2020.

Staff have also begun a review to look at options for interconnection to other adjacent groundwater municipal systems.

## 6. Conclusion

The groundwater-based systems analysis was undertaken to evaluate existing municipal groundwater-based systems in the Town of Caledon and identify any servicing gaps and system improvements. The results show that the existing groundwater-based systems in Caledon have the ability to service existing, and potential population growth.

However, servicing of any growth must also consider the groundwater resources that may be impacted by the construction of new septic systems due to this growth. New drinking water sources and upgrades to water treatment facilities are required to support the future needs of the communities.