August 18, 2022 File: 10063.02

Attention: John Thompson

Township of Adjala-Tosorontio
7855 30th Sideroad, R.R. #1
Alliston, ON L9R 1V1

Re: Servicing Options Study
Subdivision Plan for the Barzo Lands
Everett, Township of Adjala-Tosorontio

1. Introduction

PEARSON Engineering Ltd. (PEARSON) has been retained by Farsight Homes (Client) to prepare a Servicing Options Study in support of the proposed Barzo Lands Residential Subdivision (Project) located on Part of Lot 13, Concession 5 and Part of Lot 14, Concession 5 in the Hamlett of Everett (Everett), Township of Adjala-Tosorontio (Township), Simcoe County (County)

The Project lands are located within Everett on lands subject to Official Plan Amendment No. 8 and are approximately 96.6 hectares in size with a developable area of 61 hectares. The Project lands currently consist of a farmed area and open space conservation lands with a farmhouse and farming buildings located near the center of the property immediately to the north of the draft plan approved Farsight Subdivision, formerly known as the R&M Subdivision. The Project is proposed to be developed into 1,238 residential lots consisting of 823 single family detached lots, 415 townhouse lots, and park lands. An FSR was completed by Pearson and submitted in May 2021 in support of the Barzo Subdivision.

In addition to the Pearson FSR, Stantec completed a Water Distribution System Hydraulic Analysis report, dated April 8, 2019, which analyzed Everett's water distribution system including the Barzo development. Potable water requirements for the site are discussed in more detail in Section 2.

A Wastewater Treatment Plant (WWTP) servicing the Farsight Subdivision (1,955 people) as well as the proposed Barzo Subdivision (3,306 people) is proposed on a parcel of land east of the Project lands on the east side of Concession Road 6. A Stormwater Management (SWM) Pond is also proposed to be located on the same parcel as the WWTP as well as on the west side of Concession Road 6 as part of the Barzo Subdivision.

1.1. Supporting Documents

The following reports have been referenced in the preparation of this report:

- Golder Associates, 'Farsight Homes Everett Hydrogeological Study', March 2019
- Greenland International Consulting Ltd., 'Everett Secondary Plan Master Servicing Plan', January 2013, and Addendum #1 and #2 in 2016 and 2018, respectively.
- Greenland International Consulting Ltd., 'Schedule C Class Environmental Assessment (EA) - Everett Wastewater Treatment Plant & Surface Water Outfall Expansion', September 2014
- Stantec Consulting Inc., 'Everett WWTP – Design Brief', December 2017
- Stantec Consulting Inc., 'Water Distribution System Hydraulic Analysis', April 2019

2. DESIGN POPULATION

The proposed municipal infrastructure upgrades are planned to service the existing Everett residents and proposed Barzo development of 1,238 units, based on the following:

Proposed Barzo Residential lots:	1,238 units
Population Density:	2.67 ppl/unit
Proposed Barzo Population:	**3,306 people**

The total existing Everett and proposed Farsight and Barzo Population is:

Existing Everett Population:	1,929
Approved Farsight Development:	1,955
Proposed Barzo Population:	3,306
Total Proposed Everett Population:	**7,190 people**

3. WATER SUPPLY AND DISTRIBUTION

Stantec's Water Distribution System Hydraulic Analysis (Water Report) utilized an average day demand of 275 L/c/d for proposed development, and 167 L/c/d for existing Everett population. The existing Everett demand was calculated, "by dividing the total average day demand by the total equivalent population (Section 2.4, Demands, Stantec Water Report). The water demand for proposed development of 275 L/cap/day has been adopted for all proposed developments consistent with Greenland's Everett Secondary Plan Master Servicing Study.

The following Table 1 summarizes the calculated design flows taken from the Stantec report.

Table 1: Existing and Projected Water Demands (From Stantec Water Report)

Scenario	Population (People)	Average Day Demand (ADD)		Max Day Demand (MDD)		Peak Hour Demand (PHD)	
		m^3/day	L/s	m^3/day	L/s	m^3/day	L/s
1	3,834	846	9.79	1,692	19.58	2,538	29.38
2	7,158*	1,760	20.37	3,520	40.74	5,280	61.11
3	12,293	3,381	39.13	6,423	74.34	9,635	111.52

Note:

Scenario 1: Includes Existing Population and Farsight Subdivision.

Scenario 2: Includes Existing Population and Proposed Farsight, Barzo, and Cumac Subdivisions.

Scenario 3: Includes Existing Population and Proposed Farsight, Barzo, Cumac and Future Development Areas (proposed Walton Lands west of County Road 13)

The Barzo Project is part of Scenario 2 which utilizes a total equivalent population (EP) of 7,158 persons, requiring an ADD of 20.37 L/s, an MDD of 40.74 L/s, and a PHD of 61.11 L/s.

Our calculated total population of 7,190 at the top of the page is nominally different than Table 1 and does not impact the analysis and conclusions of this letter report or the Barzo FSR.

3.1. WELL CAPACITY

The Everett water supply system consists of three (3) active groundwater wells: the Ballpark Supply Well, the Grohal Supply Well, and the Grohal Stand-By Well. The wells have a combined hydraulic rated capacity of 4,870 m^3/day based on the facility's Permit-to-Take Water. The ESPMSP states that MECP requirements for the firm capacity of the system is the operating capacity when the largest pump is out of service. Therefore, the firm capacity for the water supply is 1,875 m^3/day. The following summary of the operating capacity of the current well systems in Everett was taken from the ESPMSP completed by Greenland.

Table 2: Everett Well Capacity (From Golder Hydrogeological Study)

Well Name	Operating Capacity (L/s)	Operating Capacity (m^3/d)
Grohal Supply Well	21.7	1,875
Grohal Stand-by Well	11	950
Ball Park Well	22.7	1,961
Total Capacity	**55.4**	**4,787**
Firm Capacity	**21.7**	**1,875**

From ESPMSP Vol. 3, Part 3 – 2.2, '*a new well and pump system would be required prior to the Town reaching a total equivalent population of 5,359 persons to satisfy maximum daily water demands.*' Therefore, since the combined Existing Population plus the Farsight Everett, Farsight Barzo, and Cumac subdivisions (Scenario 2 of the Stantec report) have a combined population of 7,190 people which exceeds the threshold population of 5,359, an additional production well will be required. The Stantec report estimates that this well will be required following completion of Phase 4 of the Farsight Everett subdivision. As per the ESPMSP and the Stantec report, this well is to be constructed within the Farsight Everett subdivision Park Land Block (adjacent to the Barzo Subdivision).

3.2. AQUIFER CAPACITY

From ESPMSP Vol. 3, Part 3 – 2.2, *'It should also be noted that the Golder Study concluded that the Existing Everett well system groundwater aquifer average day capacity is 2,500 m^3/d. As such, once the ADD exceeds 2,500 m^3/d, a new water source will need to be explored to supplement the existing facilities.'* Therefore, since the proposed ADD of 1,760 m^3/d for Scenario 2 is 30% less than the aquifer capacity of 2,500 m^3/d, the aquifer has sufficient capacity to supply water for the Barzo subdivision.

3.3. FIRE FLOW REQUIREMENTS

MECP Design Guidelines for Drinking Water Systems Section 8.4.2 states that Fire Flows shall meet a minimum of 123.3 L/s at 140 kPa residual pressure for a duration of 2 hours. This criteria was reviewed for the combined Existing Population plus Farsight Project Development (Everett + Barzo).

The Stantec analysis includes a fire flow model based on the Fire Underwriter Survey (FUS) method and included the Barzo subdivision assuming approximately 1,200 lots. While the actual number of proposed lots is nominally more at 1,238, this will not impact the current water model conclusions. The analysis concluded that under existing conditions, many of Everett's existing hydrants do not meet the required fire flow requirements.

The Stantec report proposes various water system upgrades to increase fire flow demands to meet current standards including:

- Provide an additional hydrant at the intersection of Street C of the Farsight Everett subdivision and Concession Road 6 until the future watermain is constructed.
- 300 mm diameter watermain to be constructed on Concession Road 6 following Phase 4 of the Farsight Everett subdivision.
- 150 mm diameter watermain to be constructed concurrent with the Barzo subdivision located on Concession Road 6, north of Street C, to provide sufficient fire flow to the Barzo subdivision.
- Future booster pumps to be investigated in further detail

As implemented, the upgraded water infrastructure will provide better water supply and fire storage for the existing residents and new developments. More detailed information regarding water system upgrades are available in Stantec's Water Report.

3.4. RESERVOIR CAPACITY

There is an existing water storage facility with a storage volume of 1,600 m^3 at the southeast corner of the Everett Secondary Plan Area on the west side of Concession Road 6, south of County Road 5, at 5976 Concession Road 6 behind an existing dwelling. The water from the three Everett wells is pumped to this elevated storage facility which then provides the Community of Everett with the required water pressure and fire protection volume.

According to the Stantec analysis, this storage will be increased from 1,600 m^3 to 3,500 m^3 to accommodate the proposed Barzo development. Timing of this expansion will be determined later including a cost shared agreement justified for all new developments, but current modeling shows that additional storage will be required prior to the completion of the Farsight Everett Project.

3.5. BARZO SUBDIVISION WATER USAGE SUMMARY

As per the above sections, a new well and a 300 mm diameter watermain on Concession Road 6 will be constructed after Phase 4 of the Farsight Subdivision. An additional 1,900 m^3 of fire storage is also proposed which will provide sufficient fire protection storage for the Barzo Subdivision. Timing of the additional storage is yet to be determined, and will be required prior to the completion of the Farsight Everett Subdivision. The following is a summary of the water demands utilized by the Farsight and Barzo Subdivisions:

Table 3: Farsight & Barzo Water Usage Summary

Scenario 1 (Existing Population and Farsight Subdivision)			
	Total Usage (1)	**Existing Usage (2)**	**Farsight Usage (1 – 2)**
ADD	846 m^3/day	323 m^3/day	523 m^3/day
MDD	1692 m^3/day	816 m^3/day	876 m^3/day
Reservoir	1,700 m^3	1,128 m^3	572 m^3
Scenario 2 (Existing Population and Proposed Farsight, Barzo, and Cumac Subdivisions)			
	Total Usage (1)	**Existing Usage (Including Farsight) (2)**	**Barzo/Cumac Usage (1 – 2)**
ADD	1,760 m^3/day	846 m^3/day	914 m^3/day
MDD	3,520 m^3/day	1,692 m^3/day	1,828 m^3/day
Reservoir	3,500 m^3	1,700 m^3	1,800 m^3

4. SANITARY SERVICING

Stantec Consulting Ltd. (Stantec) completed an Everett WWTP – Design Brief, dated December 21, 2017 which details the design of the proposed WWTP which will service the proposed Farsight Everett, Barzo, Cumac, and existing New Horizons developments. The following table details the ultimate service population for the WWTP as well as the Average Day Flow (ADF) for each population:

Table 4: Ultimate Service Population

	Farsight Everett Population	**New Horizons Population**	**Farsight Barzo Lands Population**	**Total Population**
Number of Units	800	100	1,200	2,100
Population	2,136	267	3,204	5,607
ADF (m^3/day)	726	80	1,089	1,895

Note: Equivalent population is based on 2.67 persons per unit. The Farsight Everett number of units was increased to 800 to account for the commercial development.

4.1. EXISTING AND FARSIGHT SANITARY FLOWS

Everett Schedule C Class EA Section 2.3 notes, '*The Everett MSP identified that the average daily flow rate of 340 litres per capita per day (L/c/d) should be used to estimate the average daily flow from the existing unserviced areas and the In-Process R&M (now Farsight) WWTP.'* This average daily flow was utilized in the Stantec design.

As per the Stantec Report, the WWTP is proposed to be constructed in two stages as the proposed developments are built out. The first stage was sized for an Annual Average Flow (AAF) of 850 m^3/day which can accommodate the New Horizons and Cumac flows as well as the Farsight Everett Subdivision. The second stage will add an additional 850 m^3/day for a total of 1,700 m^3/day, which will accommodate the Barzo Subdivision. The treatment capacity of the WWTP will be analysed as the Barzo project is developed, with potential upgrade to the plant being determined as the need arises.

4.2. FUTURE WWTP EXPANSION

The WWTP pump station, headworks, internal infrastructure and outlet forcemain have been designed to accommodate future sanitary flows from connecting existing Everett residents and flows from the former Walton Lands to the west, if these were to occur.

5. STORMWATER MANAGEMENT

5.1. SWM POND DESIGN

The proposed Farsight Barzo Lands will be serviced with a wet pond located in the southeast corner of the development. The SWM Pond was designed for the increased density of the subdivision, which had a nominal impact on the runoff coefficient for the site. The proposed wet SWM pond has been designed with internal side slopes of 5:1, with a 3.0 m wide 7:1 safety shelf on either side of the permanent pool. The pond will include a forebay designed to maximize the length to width ratio. A proposed culvert crossing Concession Road 6 will convey flow from the forebay to the main wet cell of the SWM Pond.

The outlet structure is located at the east section of the SWM pond, which will comprise of a reverse slope pipe complete with 200 mm and 300 mm diameter orifice plates to convey the 2 to 100 year storm events, as well as an overflow weir to convey the Regional Storm. The outlet structure will be designed to ensure 0.30 m of freeboard will be available.

The MECP Storm Drainage Manual indicates the drawdown time for the 25 mm storm is to be between 24 and 48 hours for erosion control. The SWM facility has been designed with a drawdown time of 43 hours for the 25 mm storm event.

5.2. SWM POND OUTLET CHANNEL

Pearson completed a SWM Pond & Outlet Report in November 2016 for the Farsight Everett Project which outlined various alternatives for the development's outlet through the wetland to the east of Concession Road 6. We expect the outlet for the Barzo to adopt the same recommendations from this report and resemble the outlet channel for the Farsight Everett subdivision. The proposed SWM Pond outlet channel will be examined in more detail during detailed design.

5.3. QUALITY CONTROL

The SWM Pond's quality control volume is designed to meet the MECP Preferred Criteria guidelines for Enhanced Control (80% long-term total suspended solid removal). Approximately 57 hectares of the proposed Developed Lands will be directed to the proposed SWM Pond. Utilizing Table 3.2 of the MECP Manual (Water Quality Storage Requirements based on Receiving Waters) and a site imperviousness of 60% for the proposed development, the SWM Pond permanent pool volume required is approximately 9,171 m^3. It is proposed to set the permanent pool to an elevation of 234.75, resulting in about 9,200 m^3 of volume for quality control.

5.4. LOW IMPACT DEVELOPMENT

Modern Stormwater Management practices have evolved to incorporate Low Impact Development (LID) techniques where appropriate. When properly implemented, LID techniques enhance runoff infiltration into the shallow soil regime. However, these techniques when implemented may cause future problems such as saturated ground that does not dry up in a reasonable timeframe. Under these circumstances, future remediation may be required. It is proposed that LID techniques be implemented in only portions of the Project Lands where appropriate soil conditions will exist after completion of all grading.

Similar to the Farsight Everett project to the south, the Barzo project has soils suitable for LID SWM design as per the Soils Report by Terraprobe. Due to the similarity between the two projects, the LID implementation for the Barzo project is expected to resemble the previous design for the Farsight Everett project which included French drains located on every lot to provide infiltration to meet water balance requirements. Phosphorous levels will be reduced with the French drains, quality wet pond, and the downstream vegetated outlet. LID alternatives will be examined in more detail at the detailed design stage.

6. CONCLUSIONS

The proposed Farsight Barzo Development can be adequately serviced through the implementation of the proposed municipal infrastructure and upgrades to Everett's existing water infrastructure, including:

- Construct new supply well, 300mm watermain on Concession Road 6 (following completion of Phase 4 of the Farsight Everett Subdivision) and additional 1,900m^3 of water storage to provide improved water supply and fire protection volume for existing residents, and the Farsight Everett, Cumac, New Horizons and the Barzo Subdivision.
- WWTP stage 1 will service the New Horizons, Cumac and Farsight Everett Subdivision WWTP stage 2 will service the Barzo Subdivision. In addition, headworks and infrastructure will be constructed to allow for connection of existing Everett residents and the former Walton Group lands.
- Construct new SWM Pond and outlet to provide quantity and quality control and LID techniques to provide Water and Phosphorous balancing where conditions allow.

The analysis and conceptual designs outlined in this report demonstrate that the servicing is feasible to provide sound infrastructure for the proposed subdivision developments and the existing Everett residents.

All of which is respectfully submitted,

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