
Appendix G

Municipality of Casselman
Sewage Treatment System
Uncommitted Hydraulic
Reserve Capacity – 2022
(September 21, 2023)

September 21, 2023
Our File: 16953-120

VIA E-MAIL ppbeauchamp@casselman.ca

Pierre-Paul Beauchamp
Director of Public Works
The Corporation of the Municipality of Casselman
751 St. Jean Street
PO Box 710
Casselman, ON K0A 1M0

Dear Mr. Beauchamp:

**Re: Municipality of Casselman Sewage Treatment System
Uncommitted Hydraulic Reserve Capacity - as of December 2022 (REV 4)**

This letter report summarizes the methodology and calculations used to determine the Uncommitted Hydraulic Reserve Capacity for the Municipality of Casselman Sewage Treatment System, as of December 2022.

BACKGROUND

J.L. Richards & Associates Limited (JLR) was retained by the Municipality of Casselman (the Municipality) to update calculations for uncommitted hydraulic reserve capacity of their existing lagoon-based sewage treatment system, in order to determine treatment capacity constraints on future development.

The Casselman Sewage Treatment System (Casselman STS) consists of two (2) facultative lagoon cells (Cells 'A' and 'B'), an aerated lagoon cell (Cell 'C'), an aeration system, a phosphorous removal system, a wetwell and pumping system to supply two Moving Bed Biofilm Reactor (MBBR) process tanks, a Disc Filter, and a flow measurement system. The system also includes a main sewage pumping station and a forcemain. The Casselman STS has an average rated flow capacity of 2,110 m³/day. This facility operated under the Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) No. 2712-6RVNRB from August 24, 2006, until October 2, 2018. On October 3rd, 2018, the ECA was amended, and as a result, this facility was operating under ECA No. 8225-B3HSD4. The ECA was further amended in 2019 to improve the performance of the lagoon sewage treatment system and ECA No. 8160-BAHPRF dated April 29, 2019, was issued. ECA No. 8160-BAHPRF came into effect prior to the fall discharge in 2020, upon completion of the modifications to the sewage treatment system identified within this approval.

The following establishes the theoretical uncommitted hydraulic reserve capacity based on the most recent ECA, draft approved development information reported, and existing usage.

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METHODOLOGY

The methodology used to determine the Uncommitted Hydraulic Reserve Capacity is based on the MECP document titled “Procedure D-5-1: Calculating and Reporting Uncommitted Reserve Capacity at Sewage and Water Treatment Plants” (March 1995). The uncommitted reserve capacity is calculated by subtracting the total average daily flow (raw sewage flows), and the potential daily sewage flow predicted for draft approved developments (committed hydraulic reserve capacity) from the Casselman STS rated capacity. Additionally, a 5% intensification of existing dwellings was included as part of the committed reserve flow calculation based on feedback provided by the Municipality.

TOTAL AVERAGE DAILY FLOW

The average annual daily flows for the Casselman STS for the past five years (2018-2022) were obtained from the Municipality. A 3- and 5-year average were calculated using the average annual daily flows of the past five years. Table 1 below summarizes the calculated total average daily flow. MECP Procedure D-5-1 allows for the use of either a 3-year average or a 5-year average of the average daily flow. The 3-year average was used for this review since the total average daily flow was slightly more conservative with this approach.

Table 1: Total Average Daily Flow (2018-2022)

Year	Average Annual Daily Flow (m³/day)
2018	1,331
2019	1,354
2020	1,468
2021	1,310
2022	1,442
3-Year Average (2020-2022)	1,407
5-Year Average (2018-2022)	1,381

HYDRAULIC RESERVE CAPACITY

According to ECA No. 8160-BAHPRF the Casselman STS has a rated raw sewage influent capacity of 2,110 m³/day. The hydraulic reserve capacity may be obtained by subtracting the total average daily flow from the rated capacity. Based on the above, the hydraulic reserve capacity of the Casselman STS as of 2022 is 2,110 m³/d – 1,407 m³/d = 703 m³/day.

COMMITTED HYDRAULIC RESERVE CAPACITY

Committed development information used within this report is based on information provided by the Municipality. The amount of flow attributed to approved and draft approved developments and inclusion of existing dwellings intensification units is summarized in Table 2 below.

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Table 2: Committed Reserve Capacity

Development	Units	Equivalent Population ¹
New Construction – Vacant ²	N/A	N/A
Casselman Developments Limited		
Phase 1 (M-Plan Approved)	6	14
Phase 2 A (M-Plan Approved)	6	14
Phase 2B (Draft Plan Approved Only - Committed)	144	342
Phase 2C (Draft Plan Approved Only - Committed)	37	88
Phase 3 (Draft Plan Approved Only - Committed)	230	546
West of Sarah		
Phase 1 (M-Plan Approved)	26	62
Phase 2 (Draft Plan Approved Only - Committed)	36	86
Phase 3 (Draft Plan Approved Only - Committed)	16	38
Phase 4 (Draft Plan Approved Only - Committed)	37	88
821 Principale St. (Building permit issued - Committed)	9	21
825 Principale St. (Building permit issued - Committed)	9	21
17 Aquatria St. (Senior Housing) (Draft Plan approved only – Committed) ³	50	100
720-722 St. Joseph St. (Building permit issued - Committed)	6	14
Intensification of Existing Units		
Existing Dwellings (1,337 units per 2021 Census) ⁴	67	159
Total		1,593
Average Committed Reserve Flow (m³/day) ⁵		558

¹ Assumes 2.375 people per unit (DC Bylaw Schedule 5, Municipality of Casselman, Mid-2023 to Mid-2046)

² The Municipality confirmed that no vacant units are to be considered in this review

³ Assumes 2.00 people per unit for Senior Housing

⁴ Assume 5% intensification for existing dwelling units

⁵ Based on an average day per capita usage of 0.35 m³/d/cap

As shown in Table 2, using the total equivalent population and an average day per person usage of 0.35 m³/d/cap (MECP Design Guidelines for Sewer Works 2008), the “committed” hydraulic reserve capacity is calculated as 1,593 persons x 0.35 m³/d/person = 558 m³/d.

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UNCOMMITTED HYDRAULIC RESERVE CAPACITY

Based on MECP Procedure D-5-1, the “uncommitted” hydraulic reserve capacity is calculated by subtracting the hydraulic reserve capacity from the “committed” hydraulic reserve capacity. The “uncommitted” hydraulic reserve capacity is $703 \text{ m}^3/\text{day} - 558 \text{ m}^3/\text{d} = 145 \text{ m}^3/\text{d}$.

As such, based on MECP Procedure D-5-1 and reported approved/draft approved development information, the Municipality has allocated approximately 93% of the entire hydraulic reserve capacity of the Casselman STS. The remaining residual capacity would be available to support an additional 175 residential units above the developments noted in Table 2.

PROJECTED TIMING FOR CASSELMAN STS EXPANSION

Based on the wastewater demands presented in this report and growth development timelines confirmed by the Municipality, a graph representing the projected average daily wastewater demands of the Casselman STS and anticipated timing to reach 80%, 90%, and 100% of the rated capacity was prepared.

This graph indicates that based on the Municipality’s anticipated growth numbers (as further refined during the master planning study), 80% of the STS rated capacity will be reached by the end of 2023, 90% STS rated capacity will be reached sometime in 2025, and the rated capacity of the STS will be reached sometime in 2026.

SUMMARY

Based on the current wastewater generated within the Municipality and the number of draft approved developments, the calculations presented in this report indicate that there is sufficient hydraulic reserve capacity available at the Casselman STS to service all draft approved developments, including 5% intensification of existing lots.

However, as stated in the MECP ECA No. 8160-BAHPRF, once 80% of the rated capacity limit is reached a summary of efforts made to achieve the design objectives in the Approval, including an assessment of the issues and recommendations for pro-active actions to prevent flow exceedances and operational issues, should be completed by the Municipality.

The Municipality has proactively taken steps to review their overall infrastructure needs as they are currently working with J.L. Richards & Associates on a master planning study to assess various options to improve the performance and reliability of the water and wastewater treatment and sewage collection systems to ensure they can be relied upon to accommodate current and future flows generated within the Municipality.

Since the Municipality is currently experiencing high development pressures, it is recommended that an uncommitted reserve capacity calculation is undertaken on an annual basis to review any changes to the assumptions and impact on the projected timelines and to determine the need to initiate the planning process (i.e., Class Environmental Assessment) for a Casselman STS expansion.

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Yours very truly,

J.L. RICHARDS & ASSOCIATES LIMITED



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**Municipality of Casselman Sewage Treatment System
Uncommitted Hydraulic Reserve Capacity – as of December 2022
(REV 4)**

Appendix A

Casselman STS Flow Projection – Master Plan Growth

