





Jp2g No. 19-5031B

July 4th, 2023  
Village of Merrickville-Wolford  
Chief Building Official  
317 Brock Street West  
Merrickville, ON K0G 1N0

Attention: Mr. Doug Robertson, MBA  
CAO/Clerk/Director, Economic Development  
Village of Merrickville-Wolford

Re: Merrickville STP Capacity Calculation – R1

Jp2g has performed a review of the capacity of the Merrickville Wastewater Treatment Plant in accordance with MOE Procedure D-5-1 "Calculating and Reporting Uncommitted Reserve Capacity at Sewage and Water Treatment Plants."

This procedure addresses how to determine the uncommitted capacity in municipal sewer and water plants for the purpose of approving new lots within settlement areas. The rationale is that an approved lot constitutes a commitment to provide municipal services and that approved future developments should not result in the depletion of the existing uncommitted hydraulic reserve capacity. The approval authority should ensure that appropriate services are available before approving new lots.

The reserve calculations can also provide a planning horizon for long term capital works upgrades, improvements, and/or replacement. Jp2g's review has been restricted to the past reported flows and rated capacity of the plant and does not consider other factors identified in the procedure such as limitations in collection systems and pumping stations, condition of the plant systems, or strength of the plant influent.

The current average day flow of the plant is calculated as the average of the past 5 years as follows:

Year	Average Influent	Peak Influent
	(m3/day)	(m3/day)
2014	625	2706
2015	516	1403
2016	556	1783
2017	810	3058
2018	590	1830
2019	577	2257
2020	606	1724
2021	473	1635
2022	440	1692
<b>5year Average</b>	<b>537.2</b>	<b>1827.6</b>





The average flow of 537.2 m<sup>3</sup>/day is compared to the rated plant capacity of 800 m<sup>3</sup>/day to yield a hydraulic reserve capacity of **262.8 m<sup>3</sup>/day**.

Committed flows were determined on the basis of “connected” and “approved and/or unconnected” lots. “Approved” refers to lots within draft approved subdivisions that have not received final approval. “Unconnected” refers to lots that have private septic disposal services, but would be permitted to connect to municipal sewer services. “Connected” lot counts for each year were obtained from municipal counts of individuals receiving municipal sewer services. “Approved” lot counts were obtained from the Municipality.

Currently it is reported that:

- There are **397<sup>1</sup>** municipal sewer connections
- There are **29** equivalent connections in draft approved subdivisions and/or unconnected lots, and lots that are currently on septic that are to be connected to sanitary per by-law. The Merrickville Grove Development will add 85 connections (84 Townhouses and 1 – 15 Unit Apartment, to this for a total of **114**.
- The current serviced population is **767**.
- Based on the current average flow rate of **537.2 m<sup>3</sup>/day**, the per capita flow rate is an average of **0.700 m<sup>3</sup>/day** (537.2/767=0.700).

Calculation of the total uncommitted hydraulic reserve capacity is as follows:

#### Calculation of Uncommitted Hydraulic Reserve Capacity

$$C_u = C_r - \left( \frac{L \times F_{STP} \times P}{H} \right)$$

$$C_u = 262.8 - \left( \frac{(114 \times 0.700 \times 767)}{397} \right) > 0$$

$$C_u = 109 \text{ m}^3/\text{day} > 0$$

Where:

$F_{STP}$	average daily flow (m <sup>3</sup> /day/capita)
$L$	number of unconnected and/or approved lots (dimensionless)
$H$	number of connected lots (dimensionless)
$P$	population (dimensionless)

Based on the above calculation the uncommitted hydraulic reserve capacity is **109 m<sup>3</sup>/day**. The average use per connection is 1.35 m<sup>3</sup>/day/connection (537.2 m<sup>3</sup>/day / 397 connections). An additional, (approximately) 80 connections could be supported by the plant, at the current water usage rate per lot, to fully commit all the plant capacity to existing and proposed lots.

It is noted that in 2017 very high infiltration and inflow occurred during wet weather periods, that raised the average day flow above the plant’s rated capacity. The May 15, 2018 MOE Plant Inspection Report # 1-196OE highlighted this issue and recommended “*that the Municipality of Merrickville-Wolford review and update any/all of its current Water and Sewer use by-laws to provide an enforceable prohibition of un-authorized connections to its sewage collection system.*” We understand the Municipality is acting on this recommendation. This action will assist with the reduction of long-term inflow due to illegal stormwater connections to the sanitary collection system. The Village also initiated a sanitary sewer grouting program in 2019 and has continued with further grouting in 2020 through 2022, with the aim to reduce direct infiltration into the sanitary sewer system.

<sup>1</sup> Existing population and approved lots and connections per discussions with Village and OCWA staff



In addition to the above actions, an Infiltration and Inflow (I&I) Study has been performed to establish flows in various catchment areas using flow monitors. The results of the individual wet weather and dry weather flow analysis in each catchment area has aided in quantifying and isolating infiltration and inflow and will provide supporting information for ongoing regular CCTV inspection, infrastructure repair prioritization, inspection of sump pump and roof drain connections to the system, and installation of stormwater collection infrastructure.

Sincerely,

**Jp2g Consultants Inc.**  
ENGINEERS · PLANNERS · PROJECT MANAGERS

A handwritten signature in black ink, appearing to read 'A MacDonald', written in a cursive style.

Andrew MacDonald, P.Eng.,  
Mechanical Engineer  
Jp2g Consultants Inc.

cc. Neil Caldwell, Jp2g Consultants Inc.