

Memorandum

To: Brian Kavanaugh, P.Eng

Copies To: Khalid Rahman, P.Eng

From: Vardhini Parvatham, P.Eng

Date: November 10, 2025

Reference: Water System Analysis – Hillsburgh Development (Carson Reid & Thomasfield Homes) for Watermain Looping Requirement
Ainley File No. 123067

1. INTRODUCTION

As part of the Erin Urban Centre Water Servicing EA Addendum, two watermain connections were identified to support the Hillsburgh development area (Carson Reid & Thomasfield Homes):

1. A 300-mm watermain extension along Wellington Road, and
2. A second feed to the development via the Elora Cataract Trail corridor.

CVC subsequently requested an assessment of an alternative servicing option that would avoid constructing the Elora Cataract Trail watermain by instead twinning the watermain along Wellington Road.

This memo summarizes the modelling assessment conducted to compare the EA-planned configuration against alternative scenario, focusing on Maximum Day Demand (MDD) conditions with fire flow availability, redundancy, distribution balance, and potential water quality impacts.

2. ANALYSIS

Hydraulic modelling was completed using the updated Town of Erin system model. Three scenarios were developed:

Scenario 1 – EA-Planned Two Connections (Wellington Road + Elora Cataract Trail)

Represents the servicing strategy endorsed through the Class EA, with independent supply corridors on both the north and south sides of the development.

Scenario 2 – Twinning Along Wellington Road (No Elora Cataract Trail Connection)

Assesses performance if both feeds enter the system through the same corridor along Wellington Road. All planned EA upgrades remain in place.

Scenario 3 – Twinning Wellington Road with Additional Upgrades

Assesses whether additional capital works—specifically upsizing the existing Trafalgar Road watermain from Mill Street to Wellington Road to 400 mm—can compensate for removal of the Elora Cataract Trail connection.

The assessment also reviewed the following system-level impacts:

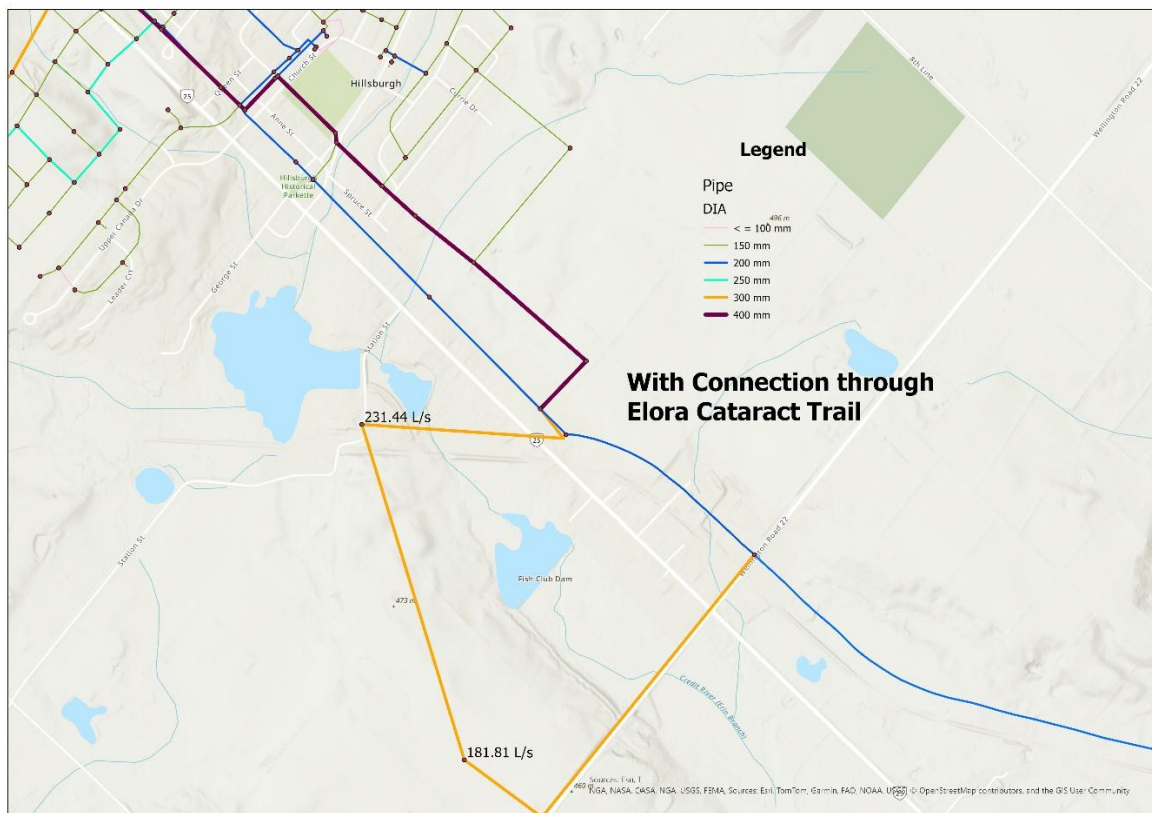
- Redundancy – Whether servicing remains operational if one corridor is offline.
- Distribution Balance & Headloss – Ability to share hydraulic load across multiple entry points.
- Water Quality – Impact of oversized pipes (e.g., increased water age and chlorine residual decay).
- Operational Reliability – Sensitivity to construction or emergency events along a single corridor.

3. RESULTS

Scenario 1 – EA-Planned Two Connections

The available fire flow under this scenario is 231 L/s at the north connection and 182 L/s at the south connection, representing the strongest overall hydraulic performance of all the servicing options reviewed. Because the development is supplied through two independent corridors, the system benefits from true redundancy, improved operational reliability, and optimized headloss distribution across the network. This configuration also meets the required fire flow targets with sufficient margin, ensuring both capacity and resiliency for the planned development. Results are shown in Figure 1.

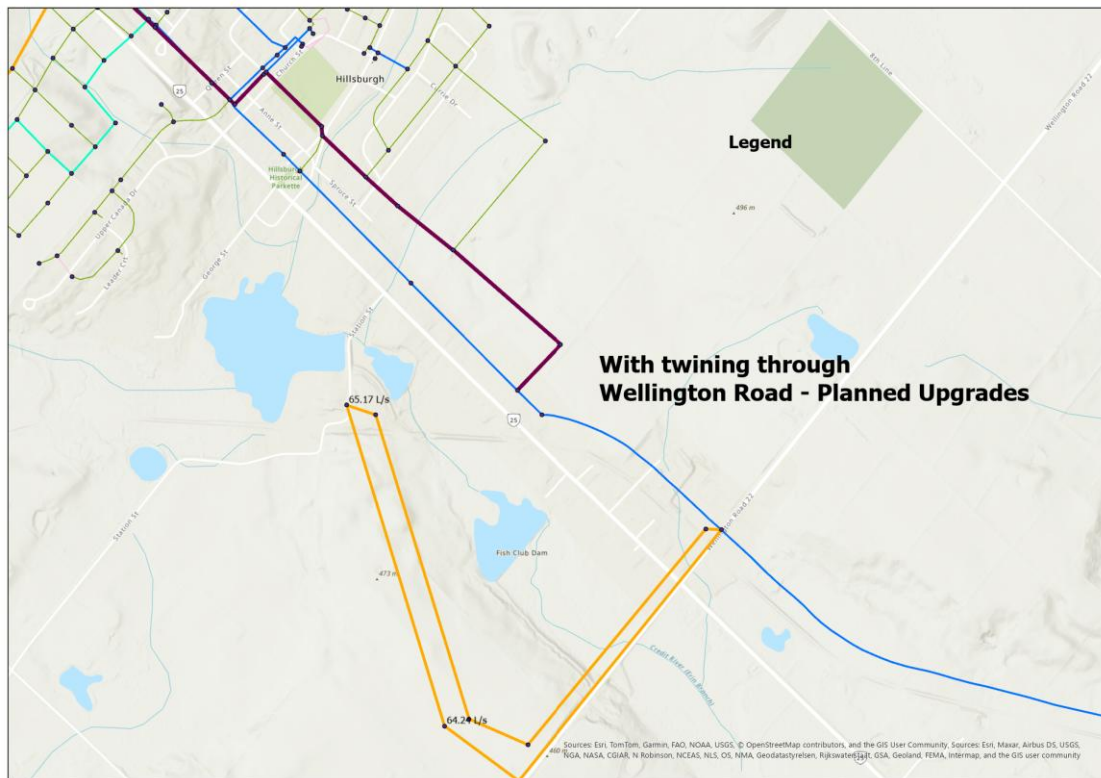
Figure 1 Scenario 1 – MDD+FF



Scenario 2 – Twinning Wellington Road Only

In this scenario, the available fire flow is approximately 65 L/s at both connections, representing a reduction of more than 70% compared to Scenario 1. This significant drop indicates that the system becomes hydraulically constrained and is unable to meet the required fire flow for the development. Because both feeds are routed through the same Wellington Road corridor, any break, planned construction, emergency repair, or contamination event along this route would simultaneously disrupt both supply paths, effectively eliminating redundancy and compromising system reliability. Results are shown in Figure 2.

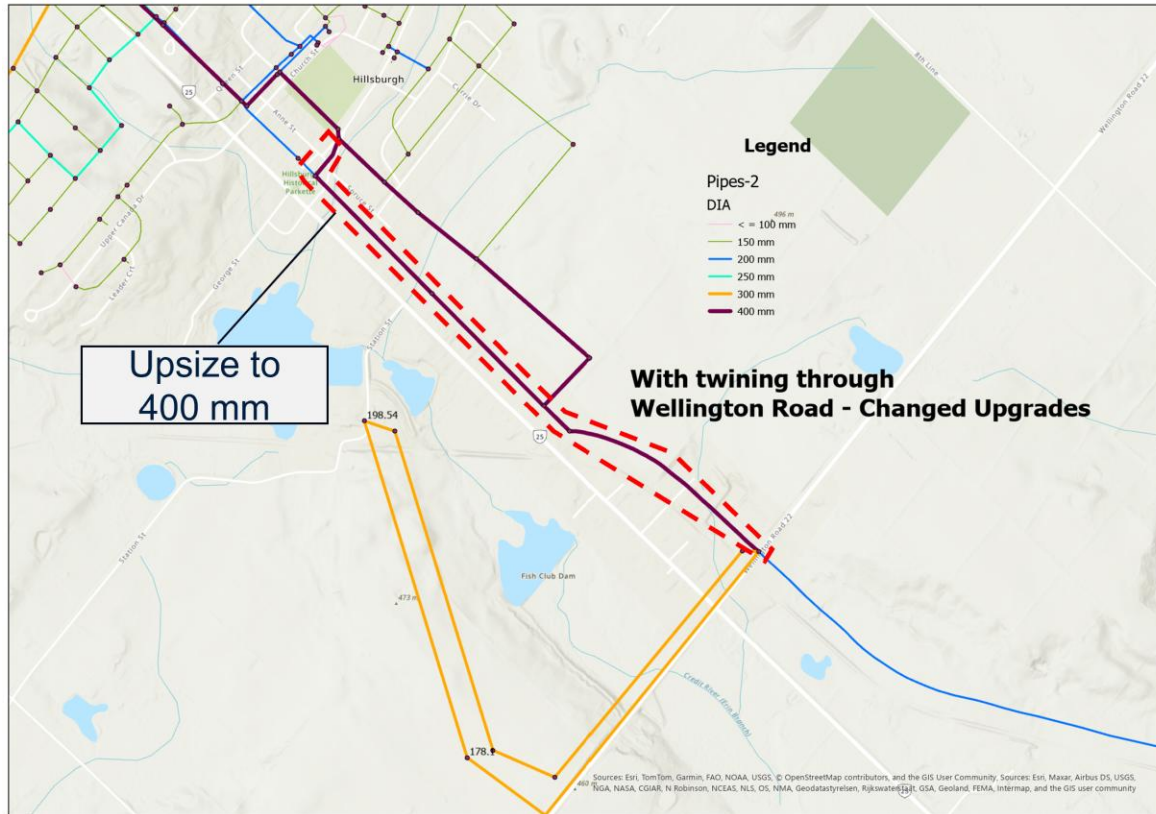
Figure 2 – Scenario 2 – MDD+FF



Scenario 3 – Twinning Wellington Road + 400 mm Upgrades

In this scenario, the available fire flow increases to 198 L/s at the north connection and 178 L/s at the south connection, showing a significant improvement over Scenario 2; however, performance still does not reach the level achieved under the EA-planned two-connection system. The required upsizing to 400 mm along Trafalgar Road introduces construction challenges, operational concerns, including higher water age, greater potential for chlorine residual decay, and other water quality risks unless substantial future demand materializes to maintain sufficient velocities. Even with these major capital upgrades, the system remains hydraulically inferior to Scenario 1, which continues to provide the most robust and reliable performance. Results are shown in Figure 3.

Figure 3 Scenario 3 MDD+FF



4. CONCLUSION

The modelling results clearly show that:

- Scenario 1 (two independent corridors) provides the best hydraulic performance, best redundancy, and highest fire flow availability (231 and 182 L/s).
- Scenario 2 (Wellington Road twinning only) cannot supply adequate fire flow (~65 L/s) and provides no real redundancy, as both feeds would be vulnerable to any event on Wellington Road.
- Scenario 3 (400 mm upgrades) improves capacity but still does not equal Scenario 1 and introduces water quality risks associated with oversized pipes.

Therefore, the second connection via the Elora Cataract Trail remains essential to:

- achieve true supply redundancy,
- optimize distribution balance and minimize headloss,
- maintain reliable fire flow,
- avoid operational or water quality concerns, and
- ensure the system remains functional during construction, maintenance, or emergency events on Wellington Road.

The EA-planned configuration continues to represent the most robust, reliable, and technically defensible servicing solution for the Hillsburgh development.