PREPARED FOR THE TOWNSHIP OF CAVAN MONAGHAN

Water Storage Update

Water Storage Municipal Class Environmental Assessment

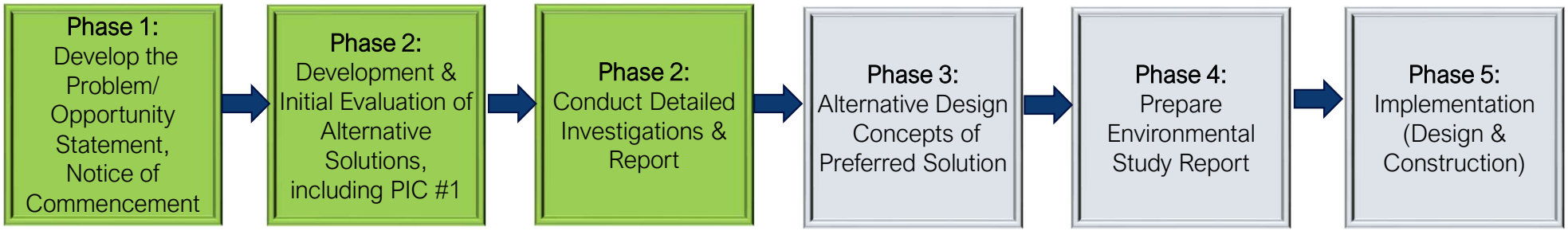
March 17, 2025.

AGENDA

1. Municipal Class EA Planning Process
2. Schedule
3. Review Past Findings
4. Drinking Water Storage Types
5. Shortlisted Locations for Proposed Storage Facility
6. Proposed Hydraulic Grade Lines
7. Project Fact Sheet Comparison

MUNICIPAL CLASS EA PLANNING PROCESS

This Schedule B Class EA project will complete **Phase 1** and **Phase 2** of the environmental assessment process.



We are here!

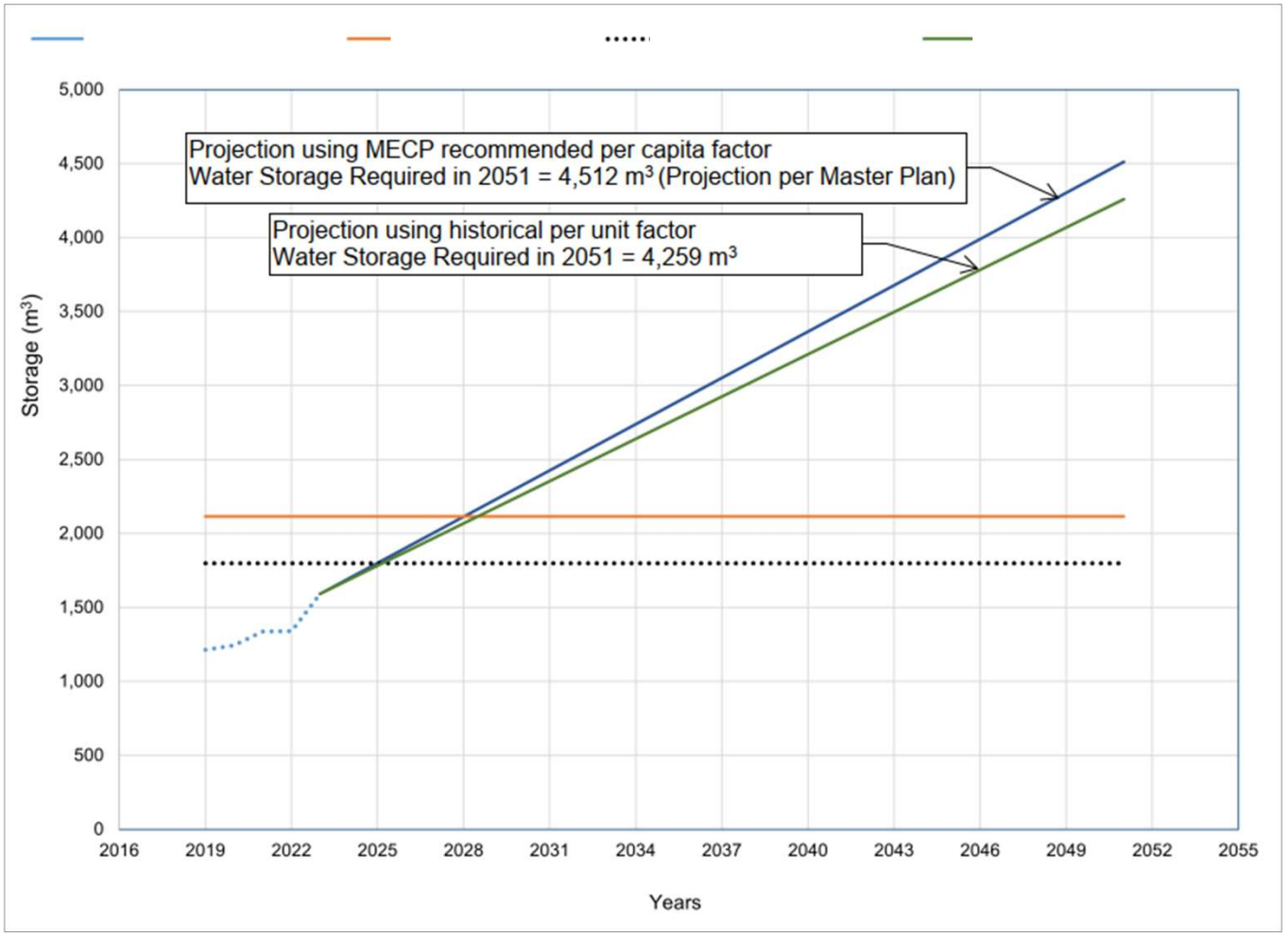
Millbrook Water Storage Class Environmental Assessment

The purpose of the study is to take the next step after the Master Servicing Study (MSS) with a Class Environmental Assessment to confirm the location, capacity, and storage type for the new water storage solution (i.e. standpipe, elevated tank or storage reservoir) which will service the anticipated growth in the Millbrook Settlement Area as identified in the previously completed Growth Management Study and Master Servicing Study (MSS).

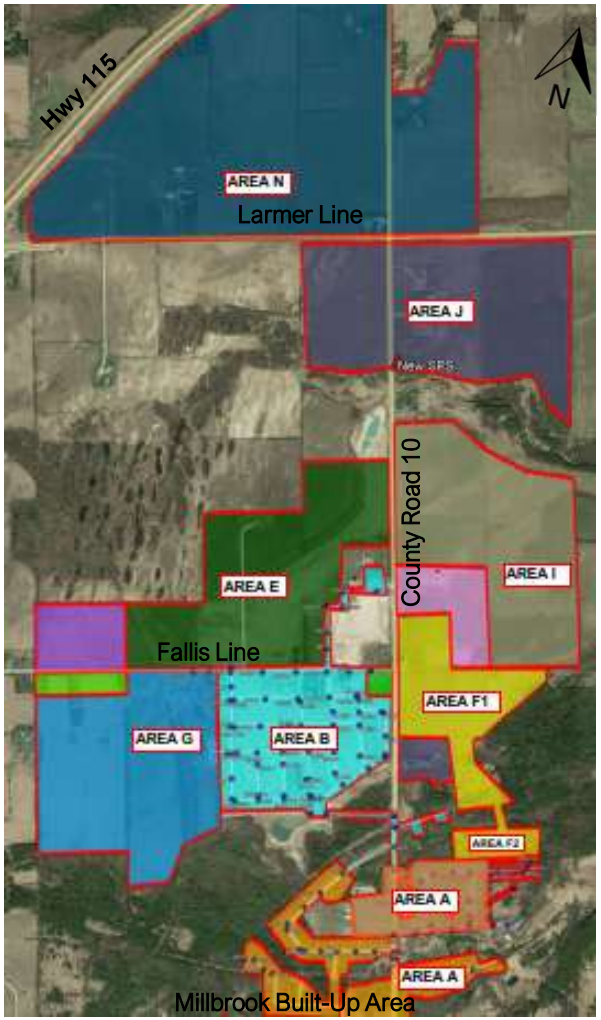
SCHEDULE


Project Kickoff Meeting
- August 22, 2024
- Sent Draft Notice of Commencement
TM#1 Submission
- September 18, 2024
- Review Period and Meeting
Council Meeting
- March 17th, 2025
We are here!
Draft TM#2 Submission
- March 28, 2025
- Review Period and Meeting
Public Information Centre
To Be Confirmed
Draft Project File Report Submission
- Q2 2025
Final Project File Report Submission
- Q2/Q3 2025
- Notice of Completion Submission

TM#1 FINDINGS – FORCASTED STORAGE REQUIREMENTS TO 2051



TM#1 FINDINGS – COMMITTED DEVELOPMENT AREAS



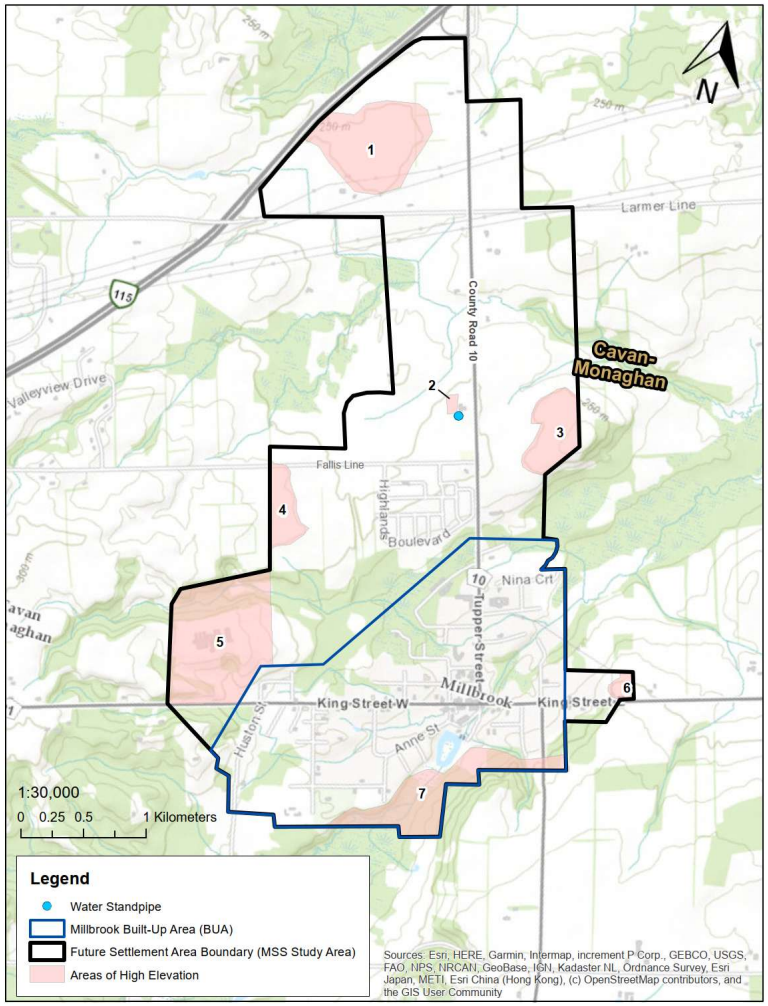
The depicted areas were considered for future water demands and need connection to the new water storage.

TM#1 FINDINGS – DESIGN CRITERIA

- Consider maintaining separation between new water storage facility and residential areas or other non-compatible land uses.
- Consider suitability of subsurface and soil conditions.
- Consider adequacy for future expansion.
- Consider functional aspects of new water storage reservoir layout including access roads, site grading, and site drainage.
- Location on the highest point of the serviced (study) area is preferred to help provide a portion of the height needed to provide the required pressure.
- Storage tanks spaced apart in the distribution system creating system resiliency is preferred, but not on the extreme ends of the distribution system.
- The elevation of the water storage tower (or equivalent output of a reservoir plus booster pumping station) should be selected to maintain the following pressures in the distribution system:
  - >14 m (20 PSI) for Maximum Day Demand + Fire Flow
  - > 28 m (40 PSI) for Peak Hour Demand
  - 35m to 56m (50 PSI to 80 PSI) under Normal Conditions
  - <70m (100 PSI) under All conditions.

SHORTLISTED LOCATIONS FOR PROPOSED STORAGE FACILITY

- Location 1: Shortlisted
- Location 2: Screened out
- Location 3: Shortlisted
- Location 4: Screened out
- Location 5: Screened out
- Location 6: Screened out
- Location 7: Screened out



Note: Reusing old decommissioned Standpipe at the southeast end of King St (volume =1,527 m^3) is **not** a viable solution:

- Is in poor condition and will likely require complete structural rehabilitation;
- It is at the edge of the distribution network far from the new growth areas that need the water; and
- Located at a lower elevation compared to other viable locations. This will require a dedicated high-pressure transmission main through the low-lying downtown core to get to new growth areas located at higher elevation.

SHORTLISTED LOCATIONS FOR PROPOSED STORAGE FACILITY

- Location 1: Shortlisted
  - Located at far part of settlement area to provide storage in future employment area. Property acquisition required.
- Location 3: Shortlisted
  - Non-residential area, close to the existing distribution network, and close to immediate development areas. Property acquisition required.

SHORTLISTED LOCATIONS FOR PROPOSED STORAGE FACILITY

- Location 2: Screened Out
  - Not enough property for a second storage facility within Township owned property.
- Location 4: Screened Out
  - Not centralized to the future anticipated commercial, residential, and industrial areas. May not have enough space for water storage tank/reservoir. Property acquisition required.
- Location 5: Screened Out
  - Within Millbrook's Natural Heritage System which will be impacted by construction, may require extensive environmental investigations and mitigations, and may have several construction limitations imposed to protect the natural area. Property acquisition required.
- Location 6: Screened Out
  - Not centralized to the future anticipated commercial, residential, and industrial areas. Will require a dedicated high-pressure transmission main to get the boosted water to the growth areas. May not have enough space for water storage tank/reservoir. Property acquisition required.
- Location 7: Screened Out
  - At a much lower elevation than the areas north of the Millbrook Built-Up area and, therefore, cannot provide the high ground elevation needed for a gravity-based system.
  - Has Natural Core Areas as part of the Millbrook Natural Heritage System within its delineated boundary which will be impacted by construction.

SHORTLISTED LOCATIONS FOR PROPOSED STORAGE FACILITY

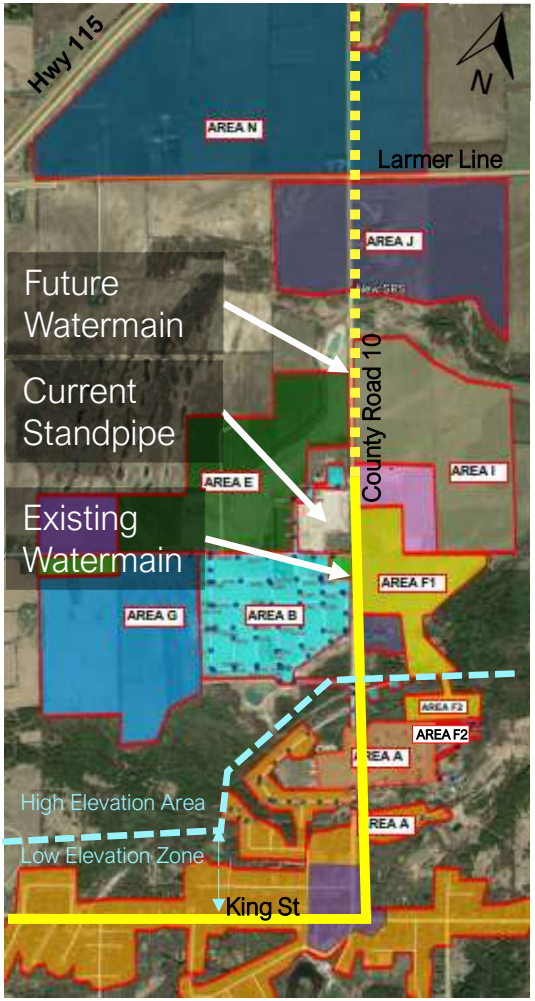
	Location 1	Location 3
Advantages	1. Aesthetic advantage, as a water tower showing the Township's name may be visible from the highway. 2. Having storage on opposite end of water distribution network allows for better redundancy coverage via the different storage tanks in case there is a key watermain break in the network.	1. Reduced **short-mid term** costs from shorter watermain route from the BPS than Location 1; 2. Near the immediate development areas; 3. Provides options for in-ground reservoir with BPS, new standpipe or elevated tank. These options will be explored further in Class EA.
Disadvantages	Growth to this immediate area not anticipated until well after the need for additional storage. Township will have to front end the cost for extending distribution network to this location before development occurs here.	As Millbrook continuous to grow beyond 2051, further boundary expansions may occur in the northwest and northeast areas, in which case Location 1 may become more centralized than Location 3.

Therefore, shortlisted strategies are:

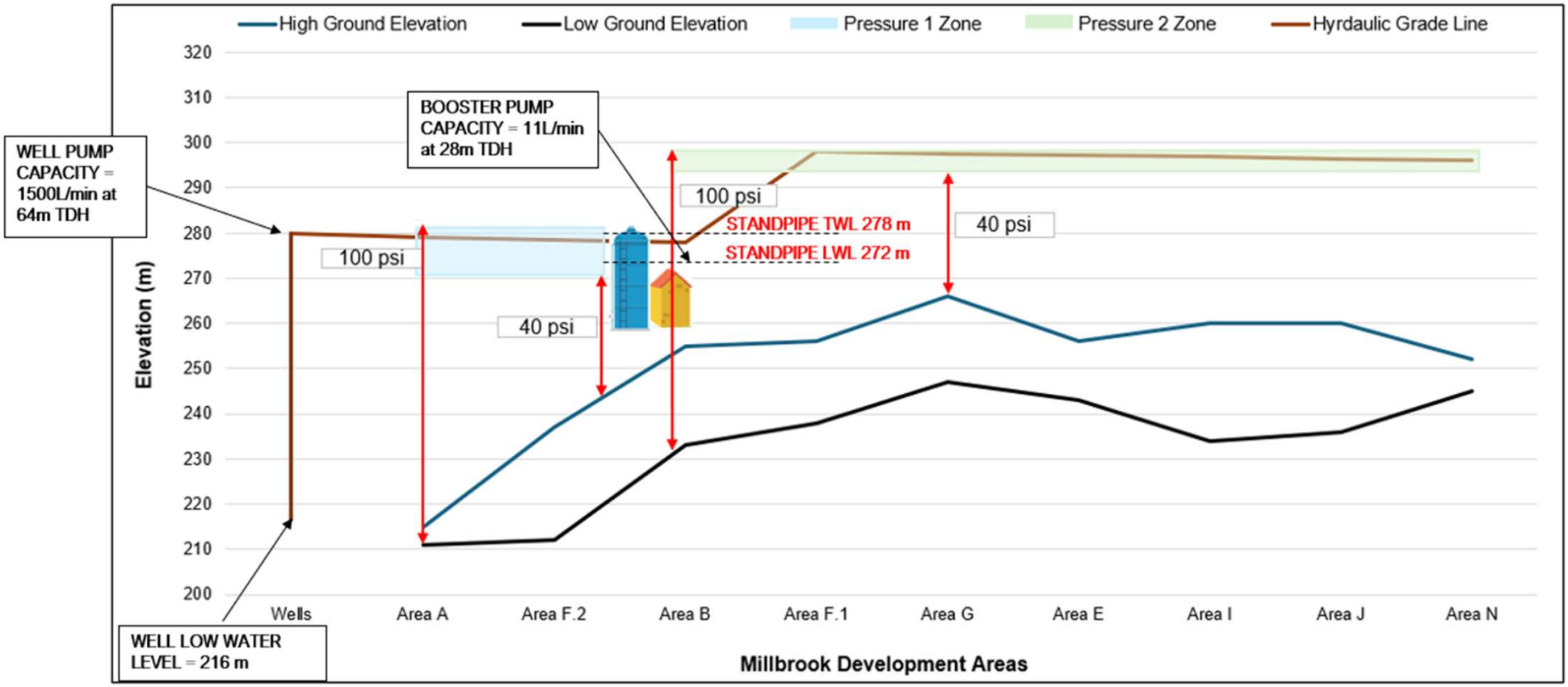
1. Elevated Tank at Location 1;
2. In-Ground Reservoir and new separate BPS at Location 3; and
3. Standpipe at Location 3 (with upgrades at existing BPS)
4. Elevated Tank at Location 3 (with upgrades at existing BPS)

HYDRAULIC GRADE LINE - METHODOLOGY

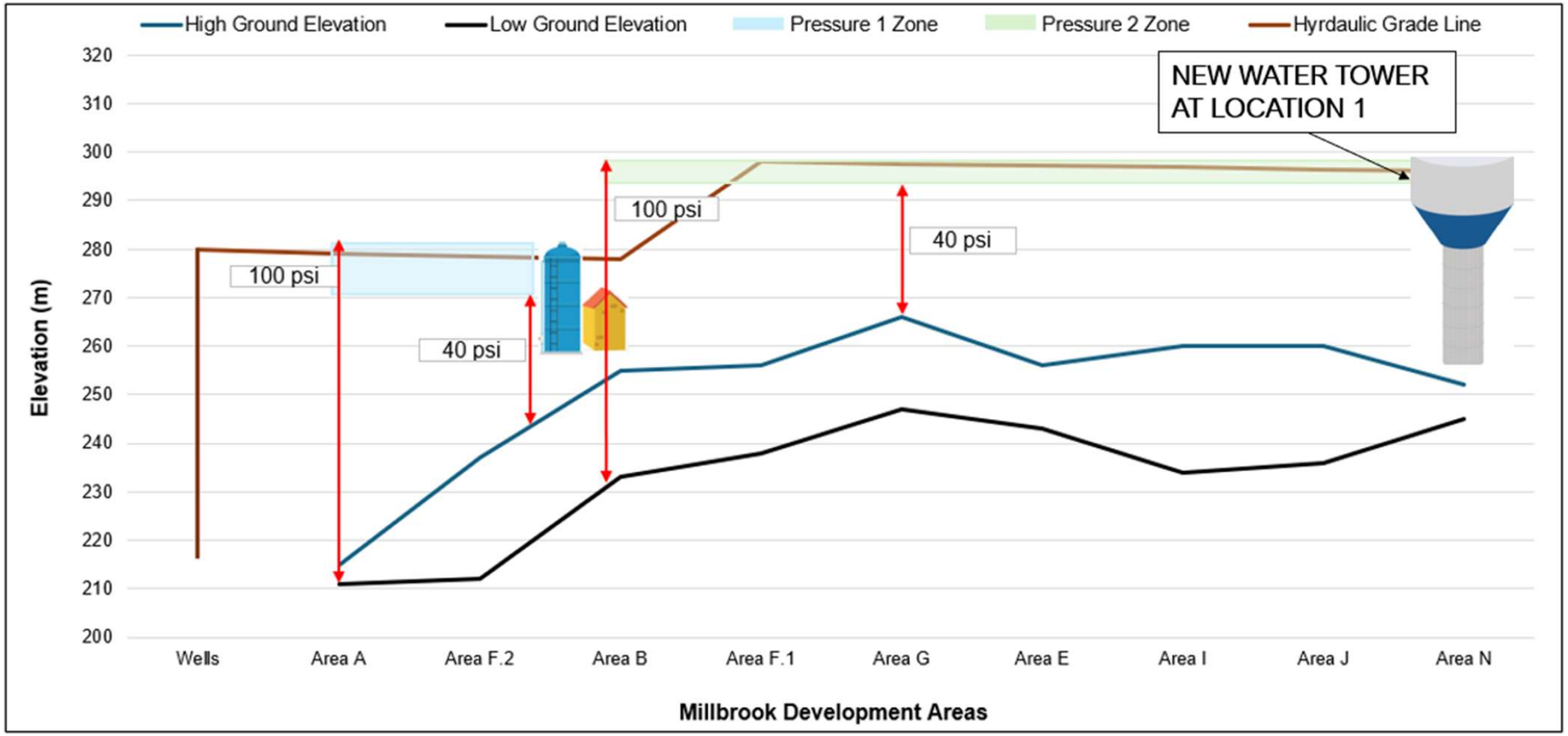
- The existing 250 mm watermain from the supply wells to the current Standpipe (at Township Office property) travels along King Street and County Road 10. To service future developments north of (new) Highlands Boulevard up to the Hwy 115, it is assumed that the watermain will be extended along Tupper Street as shown in the map.
- The Millbrook Drinking Water System (DWS) has two pressure zones: a low elevation area in the existing urban built area and a high elevation area that is supplied by the BPS.
- The water supply Hydraulic Grade Line (HGL) for the existing and future development areas were developed and graphed as shown in the following slides.
- To maintain the existing two pressure zones, the graphs in the following slides show that the existing high-elevation zone maintained by the existing BPS maybe sufficient to service all these future areas.
- However, the hydraulic water model to be completed as part of this project will confirm the above analysis.



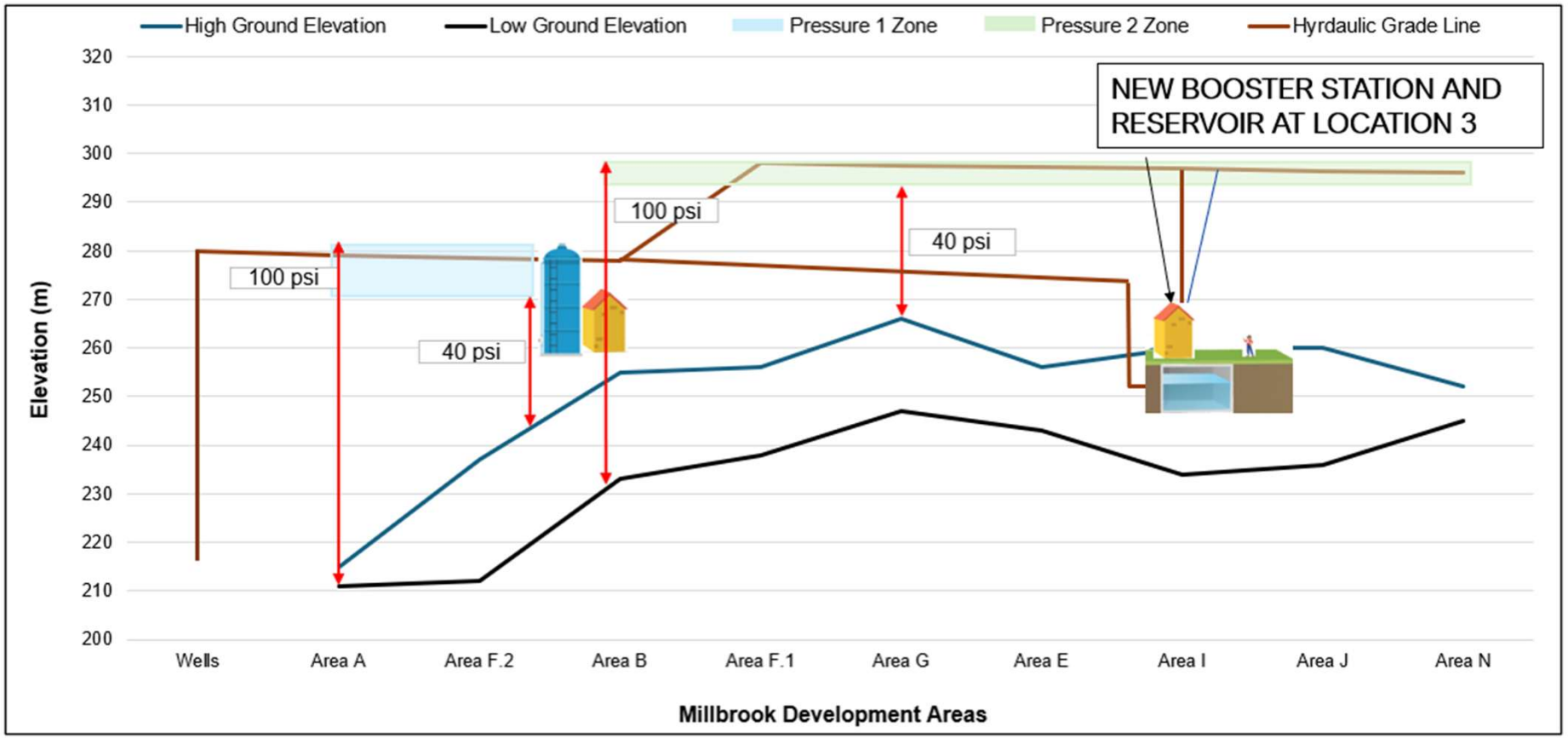
HYDRAULIC PRESSURE ZONE IN EXISTING AND NEW AREAS



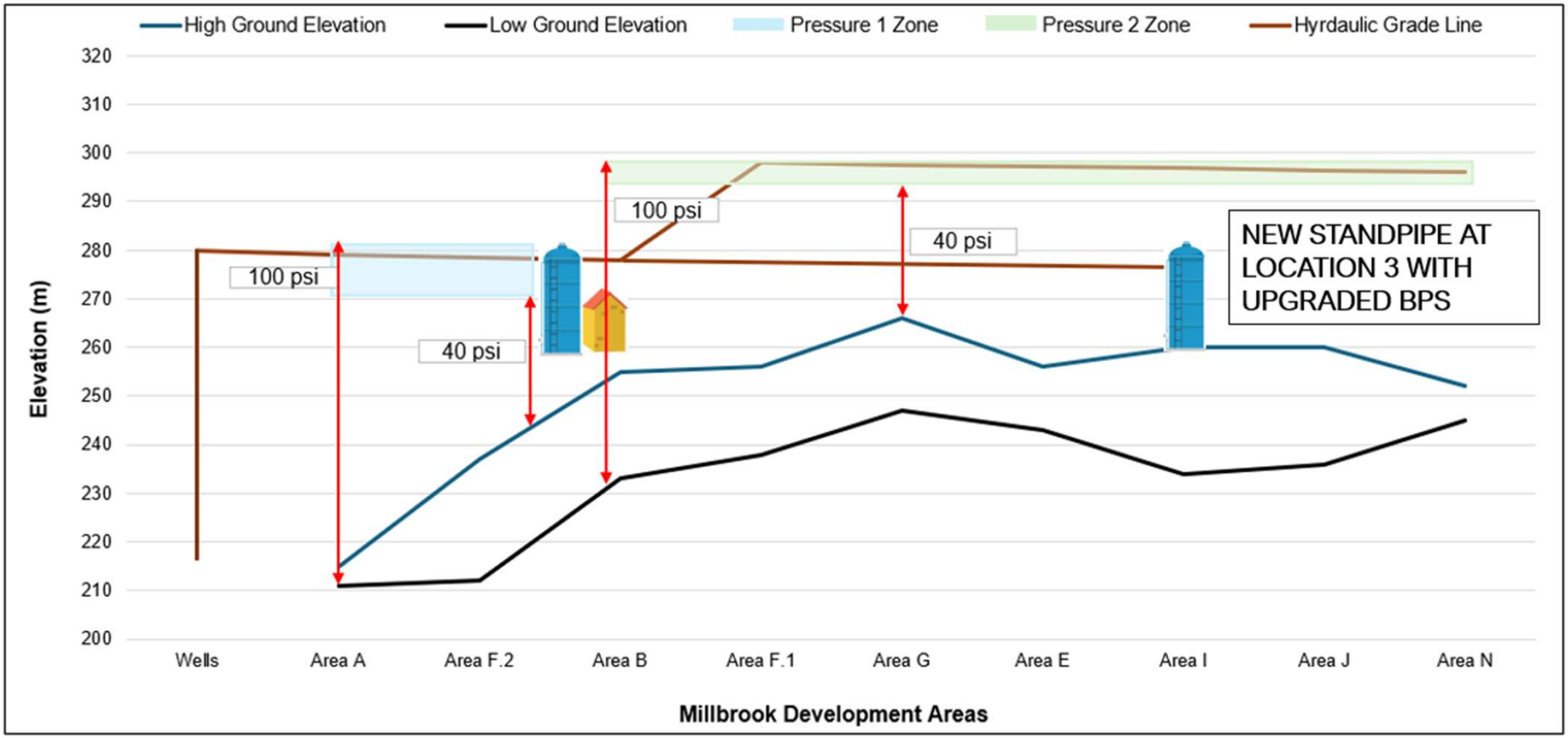
HYDRAULIC GRAPH: ALTERNATIVE STRATEGY 1



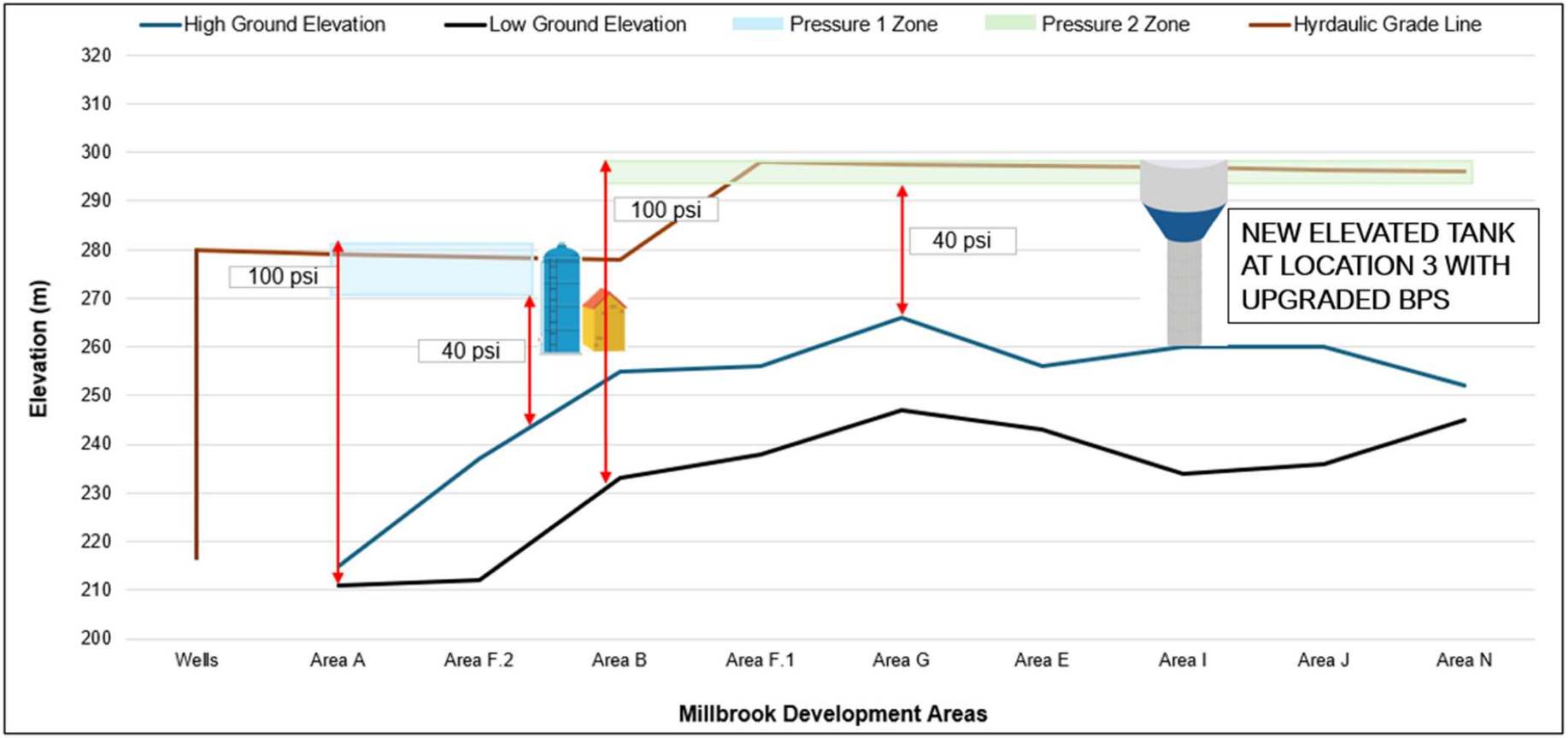
HYDRAULIC GRAPH: ALTERNATIVE STRATEGY 2



HYDRAULIC GRAPH: ALTERNATIVE STRATEGY 3



HYDRAULIC GRAPH: ALTERNATIVE STRATEGY 4



PROJECT FACT SHEET COMPARISON

Alt. #	Project Title	Project Description	Cost (Construction only)
1	Elevated Tank at Location 1 with Ex. BPS Upgrades	➢ Watermain (300mm) from existing BPS to Location 1 (distance is approx. 2,250 m); ➢ Elevated Tank (quote obtained in 2024). Geotech/hydrogeo investigations needed to confirm price for site works ➢ Upsizing of pumps at existing BPS;	Storage & Watermain: $11,000,000 Booster Station: $900,000 Contingency (50%): $5,950,000 **Total approximate: $17,850,000**
2	New Booster Pump Station and In-Ground Reservoir at Location 3	➢ Watermain from County Road 10 to Location 3 and new BPS to Pressure Zone 2 distribution system (distance is 800 m); ➢ Watermain from new BPS to Area N (this is a delayed cost and not included, as the watermain extension to that area will only be required when development in that area commences). ➢ New in-ground reservoir. Geotech/hydrogeo investigations needed to confirm price for site works ➢ New BPS building with dedicated high flow pumps for fire, and regular booster pumps, piping and appurtenances; associated architectural and structural works, operating in conjunction with existing BPS by Municipal Office.	Storage & Watermain: $3,000,000 Booster Station: $2,400,000 Contingency (50%): $2,700,000 **Total approximate: $8,100,000**
3	New Standpipe at Location 3 with Existing BPS Upgrades	➢ Watermain from County Road 10 to Location 3 (distance is 400 m); ➢ Watermain to Area N (this is a delayed cost and not included, as the watermain extension to that area will only be required when development in that area commences). ➢ New Standpipe (quote obtained in 2024). Geotech/hydrogeo investigations needed to confirm price for site works ➢ Upgrades to existing Booster Pumping Station (by Municipal Office)	Storage & Watermain: $3,700,000 Booster Station: $900,000 Contingency (50%): $2,250,000 **Total approximate: $6,850,000**
4	New Elevated Tank at Location 3 with Ex. BPS Upgrades	➢ Watermain from existing BPS to Location 3 (distance is 550 m), and Elevated Tank to Pressure Zone 2 (400m); ➢ Watermain to Area N (this is a delayed cost and not included, as the watermain extension to that area will only be required when development in that area commences). ➢ New Elevated Tank (quote obtained in 2024). Geotech/hydrogeo investigations needed to confirm price for site works ➢ Upgrades to existing Booster Pumping Station (by Municipal Office)	Storage & Watermain: $9,200,000 Booster Station: $900,000 Contingency (50%): $5,000,000 **Total approximate: $15,100,000**

Notes: 1. Land acquisition costs not included in any of construction cost estimates
2. Contingency at 50% to account for economic and tariff uncertainties

NEXT STEPS

1. Identify and evaluate water storage options with the technical, economical, environmental, social and cultural criteria
2. Water model updates
3. Continue with sending out project notices, undertake public consultation and Indigenous engagement
4. Prepare and conduct a Public Information Centre (PIC)
5. Prepare and finalize Project File Report