

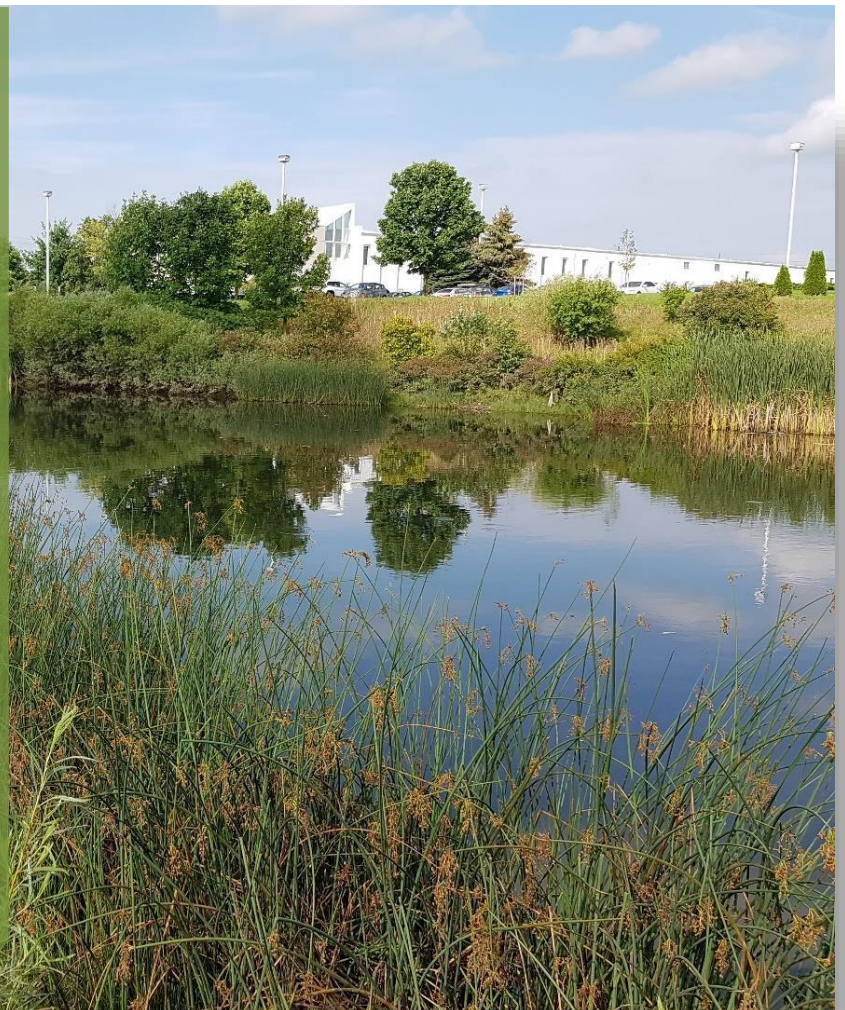
Stormwater Management Master Plan

Appendix Q: Identification of Preferred New End-of-Pipe Opportunities Alternatives and Conceptual Design

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1.0 Introduction

Aquafor Beech has been retained by the City of Guelph to update the 2012 Stormwater Master Plan (SWM-MP). As part of this update, Aquafor completed an assessment to identify opportunities for new end-of-pipe stormwater management (SWM) facilities. These facilities were identified at locations that were not already controlled through SWM facilities.

The information collected will help inform potential long-term and sustainable restoration approaches and the final prioritization of erosion sites.

This report follows from the investigations which have previously been reported in the New End-of-Pipe Opportunities Report (January 2023). This report identified sixteen (16) SWM opportunities were identified as feasible for the construction of new stormwater management facilities as part of park rehabilitations based on the four (4) phase technical assessment.

2.0 Description of Evaluation Criteria

Following the Environmental Assessment procedure, each of the SWM opportunity sites was evaluated for different SWM facility alternatives. The following should be noted:

- Oil and Grit separators (OGS) were not evaluated as the drainage areas far exceed the maximum contributing drainage area for an OGS.
- Low impact development (LID) solutions were only evaluated independently when the drainage areas were below the maximum feasible drainage area for this type of facility.
- To mitigate impacts as part of detailed design, to obtain necessary approvals and/or to mitigate impacts identified through community consultation, surface facilities may substitute for sub-surface facilities which provide equivalent function.
- Prior to implementation as part of detailed design of the preferred alternative, further consultation is required with all affected City departments, as well as the public.

Each of the alternatives is evaluated ranked using a list of relevant environmental, social, economic, and technical criteria, considering how the project will affect the environment and the surrounding community.

The following subsections provide general descriptions for each of these preliminary alternatives, followed by the evaluation of each preliminary alternative for each of the SWM opportunity sites.

2.1 Alternative 1 – “Do Nothing”

The “Do-Nothing” option is a mandatory concept that must be considered in the Class EA process, as it helps to justify the need to undertake construction of new stormwater management facility as part of park rehabilitations. It forms the basis of comparison against all other alternatives to determine whether the solutions provide better outcomes than just leaving the site alone, by identifying the existing and long-term environmental, social, economic, and technical outcomes associated with the current condition. The “Do Nothing” alternative would, as the name implies, involve no action, thereby leaving each site in its present state.

2.2 Alternative 2 – Wet Pond

The “Wet Pond” alternative would involve the construction of a stormwater quality control pond at each site. The wet pond is constructed with a forebay (typically 1.5 to 3m in depth) designed to remove

suspended sediment and a permanent pool (typically 1.5 to 3.5m in depth) to provide extended detention and continued pollutant removal. Wet ponds can be designed with extensive landscaping and associated recreational amenities, contributing to the character of the community and enhancing its potential for integration with the surrounding area. Wet ponds are particularly suitable for park settings and can be combined with adjacent trails, play structure, seating areas and lookouts.

2.3 Alternative 3 – Constructed Wetland

The wetland alternative would involve the construction of a large constructed wetland. Wetlands are one of the preferred stormwater management facilities for water quality enhancements, utilizing a shallow pool (0.15-0.3m) and a variety of aquatic and fringe vegetation to provide biological impacts and enhancements.

The benefits of constructed wetlands include:

- the performance does not depend on soil characteristics;
- the permanent pool minimizes re-suspension;
- the permanent pool minimizes blockage of the outlet;
- the biological removal of pollutants (enhanced nutrient removal) occurs; and
- the permanent pool provides extended settling.

2.4 Alternative 4 – Hybrid SWM Facility

The ‘Hybrid’ wet pond/ wetland option alternative, as the name implies, is a combination of wet pond element and a wetland element, connected in series. The system provides for the deep water component which will be least impacted by winter/spring conditions and the wetland component which provides enhanced biological removal during the summer months. In terms of land requirements, it falls between the amounts needed for wet ponds and wetlands.

2.5 Alternative 5 – Subsurface Storage Facility

Subsurface storage facilities capture and store stormwater collected from surrounding impervious areas. Storm sewers direct runoff to subsurface vaults or systems of large diameter interconnected storage pipes or chambers. Stored water is then released directly through an outlet pipe back into the storm sewer network or to natural waters at rates designed to reduce peak water flows during storms or to mimic pre-development conditions. In some cases, stored water can be allowed to infiltrate to recharge groundwater (if soil types are suitable, the groundwater table is located sufficiently below the water storage units, and no infiltration restrictions exist per the **Stormwater Infiltration Policy Recommendations (November 2022) - Appendix E**).

Subsurface storage facilities are typically employed where pipe depths exceed 5m, due to the excess excavation and facility footprint requirements for surface facilities (wet ponds, wetlands and hybrid facilities) at that depth; where surface facilities would impact existing park uses or community spaces; or where surface facilities would impact the floodplain.

3.0 Description of Evaluation Criteria

Evaluation of alternatives involves establishing alternative solutions based on the study objectives, technical considerations and criterion. The evaluation criteria considered in assessing overall applicability of each alternative are shown in **Table 3.1**. A score was then established through a multidisciplinary evaluation process for each alternative design for each criterion established. The intent

was to identify the preferred alternative to be carried forward to detailed design. **Table 3.1** to **Table 3.5** provide further information with respect to description of the criteria and the method uses in assigning a score to each criterion.

Table 3.1: Criteria used in Evaluation Process for selecting the Preferred Retrofit Options

Environmental Assessment Categories	Criteria
Physical/ Natural Environment (6)	<ul style="list-style-type: none"> • Potential Aquatic Habitat Benefit • Potential Water Quality Benefit • Potential to Reduce Erosion • Potential to Reduce Flooding • Potential to Improve Terrestrial Habitat • Integration with Existing Environment
Social/ Cultural (6)	<ul style="list-style-type: none"> • Aesthetic / Recreation • Integration with other City plans, policies and initiatives (programs) • Compatibility with Adjacent Land Use • Community Disruption • Public Health and Safety Objectives • Potential to Provide Public Safety Objectives – Physical Characteristics
Economic (4)	<ul style="list-style-type: none"> • Construction Costs • Long term Operation Maintenance Costs • Life Cycle Costs (Capital and O&M costs) • Infrastructure Protection
Technical/Engineering (4)	<ul style="list-style-type: none"> • Ease of Implementation • Agency Acceptance • Technical Feasibility • Integration with Existing Infrastructure

Table 3.2: Description of Physical/ Natural Environment Criteria used for Selection of the Preferred Alternative

Criteria	Description of Criteria	Measures for Assigning Scores
Potential Aquatic Habitat Benefit	Potential to improve aquatic habitats or systems. Scoring considers sensitivity of local receiving stream (fish type), stream order (size of stream) as well as quality and type of potential habitat created.	Scoring ranges from 10 if the SWM facility alternative provides reduced flows and improved thermal mitigation; to 1 if the alternative does not reduce flows and improve thermal mitigation.
Potential Water Quality Benefit	Potential for the SWM facility alternative to improve water quality based on existing water quality conditions and ability to provide enhanced water quality control (to the maximum extent possible based on available area) per the MECP requirements.	Scoring ranges from 10 if the SWM facility alternative provides an estimated 100% of the required enhanced water quality control volume; to 1 if the alternative provides less than an estimated 50% of the required enhanced water quality control volume. In this manner, each 5% increment between 50% and 100% is equal to an additional score of plus 1.
Potential to Reduce Erosion	Potential to reduce erosion in local receiving streams based on the potential ability to provide the required erosion control volumes (to the maximum extent possible based on available area) per the MECP requirements.	Scoring ranges from 10 if the SWM facility alternative has a high potential to provide the required 25mm of extended detention volume over 24 hours per the MECP; to 1 if the SWM facility alternative has a low potential to provide the required erosion control benefits.
Potential to Reduce Flooding	Potential to reduce the potential for flooding for properties adjacent to and / or downstream properties. Proposed alternative must maintain or improve existing flood control (if any).	Scoring ranges from 10 if the SWM facility alternative has a high potential to reduce flooding on adjacent and downstream properties; to 1 if the SWM facility alternative has the potential to increase flooding.
Potential to Improve Terrestrial Habitat	Potential for the SWM facility alternative to improve terrestrial habitat conditions for native species and/or to create new habitat	Scoring ranges from 10 if the proposed SWM facility alternative has a high potential to improve terrestrial habitat conditions and/or to create new habitat to 1 if there is limited or no potential.
Integration with Existing Environment	Potential to integrate the SWM facility alternative into the existing natural landscape. Scoring based on the potential impact to existing vegetation, watercourses, wetlands and associated habitats	Scoring ranges from 10 if the proposed SWM facility alternative does not impact existing vegetation, watercourses, wetlands and associated habitats; to 1 if significant impacts and loss of existing vegetation, watercourses, wetlands and associated habitats are anticipated.

Table 3.3: Description of Social/ Cultural Criteria used for Selection of the Preferred Alternative

Criteria	Description of Criteria	Measures for Assigning Scores
Aesthetic / Recreation	Potential for SWM facility alternative to become an asset to the community by integrating and improving the existing site activities (walking, jogging, cycling biking and hiking) and/or improve the site aesthetics.	Scoring ranges from 10 if the proposed SWM facility alternative has a high potential to integrate the facility into existing activities and/or improve aesthetics; to 1 if there is minimal potential and/or existing site uses will be lost to the community.
Integration with other City plans, policies and initiatives (programs)	Potential for SWM facility alternative to integrate with other City plans, policies and initiatives (programs) including but limited to: The Parks Master Plan (park planning, park rehabilitations and service levels), urban forestry objectives, cycling and trails master plans etc.	Scoring ranges from 10 if the proposed SWM facility alternative has a high potential to complement existing City plans, policies and initiatives (programs); to 1 if the proposed SWM facility alternative impedes existing City plans, policies and initiatives.
Compatibility with Adjacent Land Use	Potential for SWM facility alternative to integrate with the adjacent land uses in regards to aesthetics, community expectations. It includes consideration for existing site uses and the expectation that adjacent residents have in maintaining these uses.	Scoring ranges from 10 if the proposed SWM facility alternative has a high potential to integrate with land uses in regards to aesthetics, community expectations; to 1 if the proposed SWM facility alternative does not integrate well and as such would require a change to how the site is perceived and therefore used by adjacent land owners.
Community Disruption	The potential of the alternative to disrupt the community and or site uses (including businesses) during, or after the construction process.	Scoring ranges from 10 if the proposed SWM facility alternative has a low potential for community disruption or disruption to the site uses during, or after the construction process; to 1 if the potential for community disruption is high.
Public Health and Safety Objectives	Public health and safety include risks to the community including: west Nile virus, algae blooms, impacts to roads, footbridges, public trails, and existing critical infrastructure.	Scoring ranges from 10 if there is no health & safety risks associated with the proposed SWM facility alternative or risk can be appropriately mitigated to 1 if significant public health and safety risks exist or could exist. .

Criteria	Description of Criteria	Measures for Assigning Scores
Potential to Provide Public Safety Objectives – Physical Characteristics	Potential to meet public safety objectives. Scoring based on physical characteristics if the proposed SWM facility alternative and can be implemented with appropriate side slopes, open water depths, proximity to adjacent properties etc. to ensure agency, City and industry safety standards can be accommodated.	Scoring ranges from 10 if the proposed SWM facility alternative does not increase current safety considerations and all agency, City and industry safety standards can be accommodated; to 1 if the proposed SWM facility alternative cannot meet standards.

Table 3.4: Description of Economic Criteria used for Selection of the Preferred Alternative

Criteria	Description of Criteria	Measures for Assigning Scores
Construction Costs	The relative estimated cost as compared to the other alternatives of the proposed SWM facility alternative based on factors such as location, access/egress and disposal of excavated material based on most current O.Reg. and environmental policies	Scoring ranges from 10 if the relative capital cost, based on the identified factors, is low; to 1 if the relative capital cost is high.
Long term Operation Maintenance Costs	The relative cost of operating and maintaining the proposed SWM facility alternative based on factors such as access/ egress, sediment drying capability, ongoing cost, future permit requirements, maintenance access overall maintenance frequency and intensity.	Scoring ranges from 10 if the relative operation and maintenance cost, based on based on factors such as access/ egress, sediment drying capability, ongoing cost, future permit requirements, maintenance access overall maintenance frequency and intensity is low; to 1 if the relative operation and maintenance cost is high.
Life Cycle Costs (Capital and O&M costs)	The relative estimated life cycle cost as compared to the other alternatives of the SWM facility alternative based on the capital costs and operation and maintenance costs over the facility lifespan, including rehabilitation, refurbishment and or replacement at the end of the facility life expectancy.	Scoring ranges from 10 if the relative life cycle cost based on the capital costs and operation and maintenance costs over the facility lifespan, including rehabilitation, refurbishment and or replacement at the end of the facility life expectancy is low; to 1 if the relative life cycle cost is high.
Infrastructure Protection	Potential for the proposed SWM facility alternative to protect existing or future infrastructure including storm sewers and outfalls, especially in the context of climate change; as well as the protection of the facility function itself into the future (includes potential for damage based on proximity to erosion sites, migrating channels and or floodplains)	Scoring ranges from 10 if the alternative protects existing/proposed infrastructure thereby reducing risk; to 1 if existing/proposed infrastructure is left unprotected and represents a risk over the long term.

Table 3.5: Description of Technical/Engineering Considerations Criteria used for Selection of the Preferred Alternative

Criteria	Description of Criteria	Measures for Assigning Scores
Ease of Implementation	The relative ease with which the proposed SWM facility alternative can be implemented taking into consideration approvals, public consultation requirements (adjacent landowner acceptance) and length of time to implement (construction time).	Scoring ranges from 10 if the proposed SWM facility alternative can be implemented easily; to 1 if there are potential major hurdles associated with implementation.
Agency Acceptance	The willingness of representative agencies (City of Guelph, GRCA, DFO, MNRF, RMOW) to accept the proposed SWM facility alternative based on relevant policy constraints.	Scoring ranges from 10 if the proposed SWM facility alternative agrees all with existing policies; to 1 if the alternative contravenes all existing policies.
Technical Feasibility	The proposed SWM facility alternative is practical and can be feasibly implemented based on the existing infrastructure and available area etc. per the four (4) phase process.	Scoring ranges from 10 if the proposed SWM facility alternative is technically feasible based on the four (4) phase process; to 1 if the implementation of the alternative is faced with mounting difficulties.
Integration with Existing Infrastructure	Potential for the SWM facility alternative to be integrated into existing site infrastructure. Scoring based on integration with nearby watercourses, and infrastructure, pumping station, storm and sanitary sewers, roadways, park elements, surface walkways, trails and pedestrian bridges.	Scoring ranges from 10 if the proposed SWM facility alternative has the ability to integrate with the existing infrastructure including park infrastructure without removals; to 1 if the proposed SWM facility alternative would require removals or significant relocation of existing infrastructure.

4.0 Selection of Preferred Alternatives

The following sections details the evaluation process for each site, identifies the preferred alternative and presents a conceptual design based on the preferred alternatives.

Table 4.1 summarizes the preferred alternative for each of the sixteen (16) SWM opportunities.

Table 4.1: Preferred Alternative (Evaluation Process Summary)

Site ID	Location Name	Facility Type
1	Golfview Park	Subsurface storage
2	Waverley Park	Subsurface storage
3	Victoria Road Recreation Centre	Subsurface storage
4	Green Meadows Park	Do Nothing
5	Bailey Park	Subsurface storage
8	Exhibition Park	Subsurface storage
14	Dunhill Place Park	Subsurface storage
16	Margaret Greene Park	Surface facility
18	Centennial Park	Subsurface storage
26	L-13 Windsor Park	Subsurface storage
27	Stevenson / Guelph Junction Railway	Surface facility [◊]
28	Dawn Avenue	1) Low Impact Development 2) Surface facility
30	606 Massey Road	Surface Facility
31	Springdale Park	Subsurface storage
32	Oak Street Park	Subsurface storage
34	End of Industrial Street	Surface facility

[◊] subsurface facilities may also be designed to provide quantity control, as deemed necessary through modelling
























































The following sections present the existing conditions, evaluation results, preferred alternative, and accompanying conceptual design. The following should be noted:



















































- A score of ● indicates that the retrofit design alternative score high in satisfying the respective design criteria
- A score of ○ indicates the retrofit design option scored low in relation to the criteria.
- The accompanying conceptual design of each preferred alternative is a concept only and is intended to demonstrate ‘feasibility’ of the preferred option. At the detailed design stage, alternative SWM facility configurations and features, park feature and locations, trails integration, associated planting and forestry etc. must be considered and addressed appropriately.

4.1 Golfview Park (Site 1)

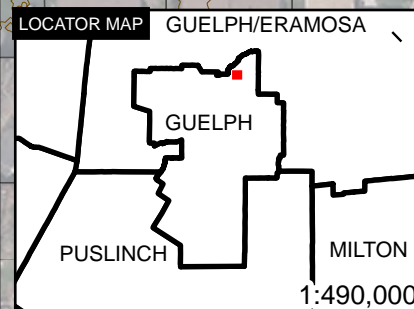
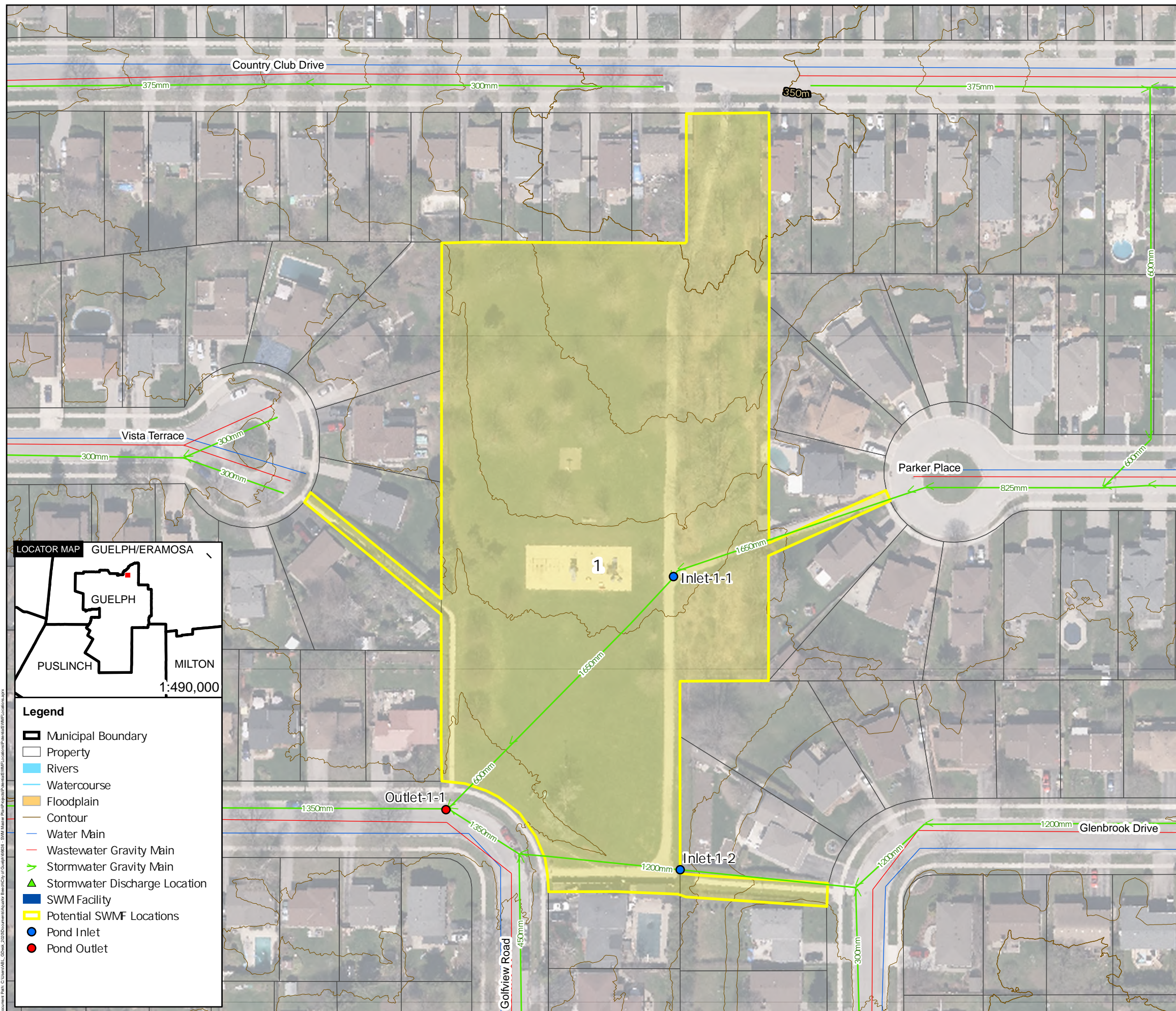
Owned by the City of Guelph, Golfview Park is located between Golfview Road and Country Club Drive, and is a 1.4 ha park characterised by a playground, basketball hoop, and wintertime ice rink. **Figure 4.1** presents the existing condition. The preferred alternative for Northfield Park is Alternative 5 - Subsurface Storage Facility (**Table 4.2**). A conceptual design is presented as **Figure 4.2**. LID was not considered as an alternative due to technical constraints.

Table 4.2: Golfview Park Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
Potential to Provide Public Safety Objectives – Physical Characteristics					
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

Possible SWM Facility Location 1: Golfview Park
 Ownership: City of Guelph
 Current Use: Park
 Total Area: 1.37ha
 Available Area: 1.4ha
 Drainage Area: 1) 5.25ha; 2) 41.51ha
 TIMP: 1) 46%; 2) 41%
 Inlets At: 1) 1650mm Ø storm sewer; 2) 1200mm Ø storm sewer
 Depth to Pipe Invert at Inlet: 1) 4.6m; 2) 4.1m
 Outlets To: 1350mm Ø storm sewer
 Depth to Pipe Invert at Outlet: 3.4m
 Floodplain Present: No
 Mature Trees: Yes
 Identified Conflicts: Hydro pole at ice rink
 Notes:
 • Playground and basketball hoop present on site with a community ice rink installed in winter.
 • Scattered mature trees in northern half of park.
 • Site has good access and potential for a surface pond.
 • Existing pathway system present.

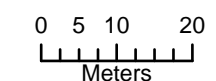


- Legend**
- Municipal Boundary
 - Property
 - Rivers
 - Watercourse
 - Floodplain
 - Contour
 - Water Main
 - Wastewater Gravity Main
 - Stormwater Gravity Main
 - Stormwater Discharge Location
 - SWM Facility
 - Potential SWMF Locations
 - Pond Inlet
 - Pond Outlet



End-of-Pipe Opportunities - Drainage Areas (1)

Date: 2021-10-14
 Projection: NAD83_UTM_Zone_17N
 Data Source: City of Guelph, GRCA
 Created by: A.V.



EXISTING CONDITIONS:

Park Ownership: City of Guelph
Current Use: Park
Total Area: 1.37ha
Available Area: 1.4ha
Drainage Area: 1) 5.25ha; 2) 41.51ha
TIMP: 46%; 41%
Inlets At: 1) 1650mm Ø storm sewer; 2) 1200mm Ø storm sewer
Outlets To: 1350mm Ø storm sewer
Depth to Pipe Invert at Inlet: 1) 4.6m; 2) 4.1m
Depth to Pipe Invert at Outlet: 3.4m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: Hydro pole at ice rink
Notes:

- Playground and basketball hoop present on site with a community ice rink installed in winter
- Scattered mature trees in northern half of park
- Site has good access and potential for a surface pond
- Existing pathway system present

PROPOSED CONDITIONS:

System: Subsurface Infiltration/Storage Facility
Facility Footprint: 3981.16m²
Total Facility Storage: 5494m³
Total Required Storage (enhanced water quality): 5494m³
Volume Reduction (%): 100%

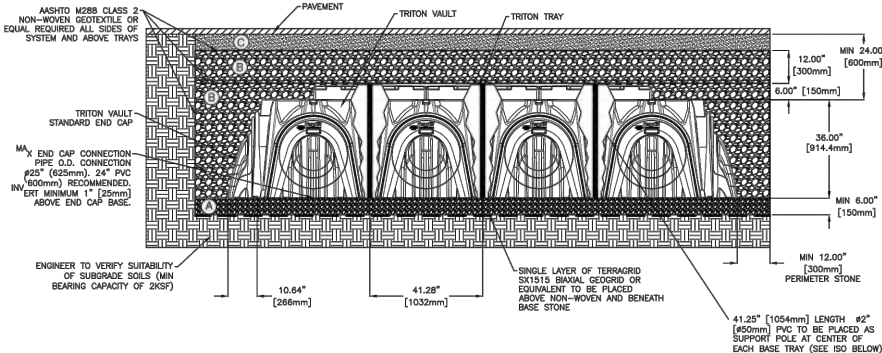
NOTES:

- Multiple inlets may be required to bring flow into proposed vault system
- WHPA Vulnerability Score: 8

Location 1: Golfview
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.

0 5 10 20
Meters



DTL
01 TYPICAL SUBSURFACE VAULT SYSTEM OR EQUIVALENT
PROFILE

PR SUB-SURFACE FACILITY
TOP VAULT ELEV: 343.47m
COVER: 2.52m
STONE DEPTH BELOW VAULT: 0.50m
EXCAVATION DEPTH: 4.39m

**PR EROSION CONTROL
FACILITY FOOTPRINT**

EX STORM SEWER
Parker Place

Inlet-1-1

PR OIL GRIT SEPARATOR

PR INLET INVERT: 342.49m

EX MH
INV: 342.58m
T/G: NA

PR OUTLET INVERT:
342.34m

Outlet-1-1

EX STORM SEWER

PR INLET INVERT: 342.34m

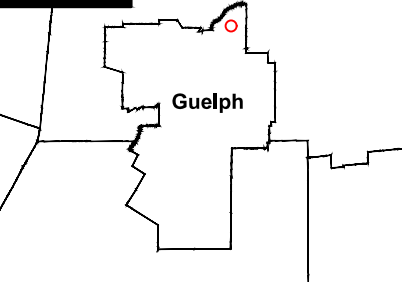
PR MH 1

Inlet-1-2

PR INLET STORM SEWER

EX MH
INV: 343.32m
T/G: NA

LOCATOR MAP



LEGEND:














































- EX. SAN MAIN
- EX. STM MAIN
- EX. WATER MAIN
- - - PR. STM MAIN
- [- - -] PR. ESC FOOT PRINT
- PR. SUB SURFACE FACILITY
- PR. BIOSWALE
- EX. MAINTENANCE HOLE

4.2 Waverley Park (Site 2)

Owned by the City of Guelph, Dunvegan Park is located between Waverley Drive and Balmoral Drive, and is next to Waverley Drive Public School. The site is characterized by an existing playground, soccer fields, splash pad, and winter ice rink. **Figure 4.3** presents the existing condition. The preferred alternative for Waverley Park is Alternative 5 - Subsurface Storage Facility (**Table 4.3**). A conceptual design is presented as **Figure 4.4**. LID was not considered as an alternative due to technical constraints.

Table 4.3: Waverley Park Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

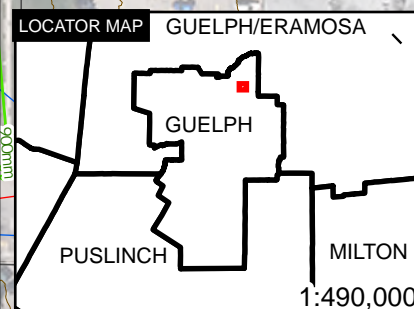
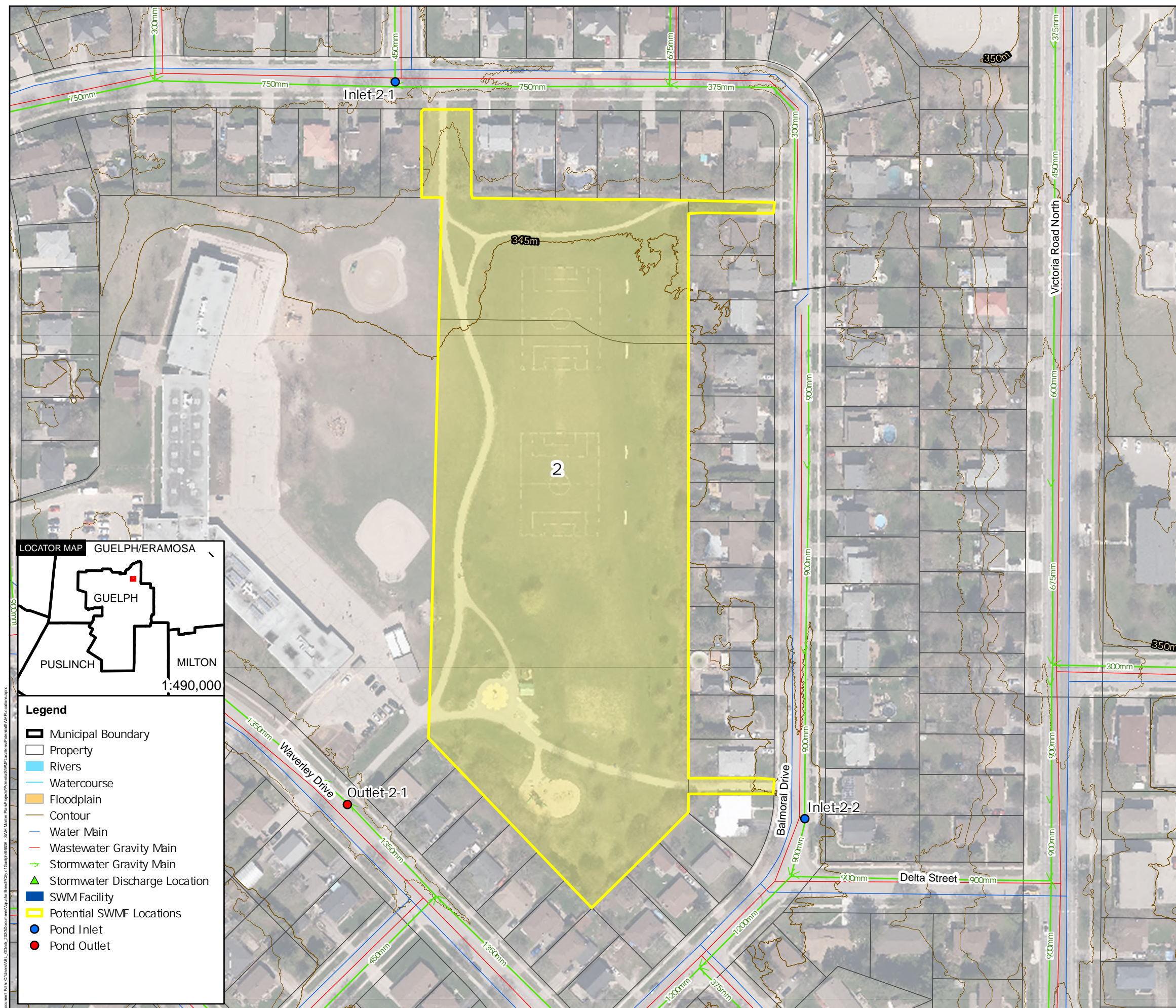
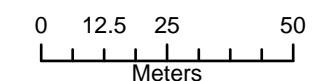
Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

Possible SWM Facility Location 2: Waverley Park
Ownership: City of Guelph
Current Use: Park
Total Area: 2.59ha
Available Area: 2.3ha
Drainage Area: 1) 5.48ha; 2) 1.81ha
TIMP: 1) 42%; 2) 37%
Inlets At: 1) 750mm Ø storm sewer; 2) 900mm Ø storm sewer
Depth to Pipe Invert at Inlet: 1) 2.8m; 2) 1.4m
Outlets To: 1350mm Ø storm sewer
Depth to Pipe Invert at Outlet: 2.3m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: Hydro
Notes:
• Splash pad, playground and ice rink at southern end of park. Soccer fields at northern end.
• Trails connect Balmoral Drive and Waverley Drive to Waverley Drive Public School.
• Easement would be required for outlet from park to Waverley Drive.
• Larger catchment is from Inlet # 1, but would require long distance of piping to reach outlet.



End-of-Pipe Opportunities - Drainage Areas (2)

Date: 2021-10-14
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



- Legend**
- Municipal Boundary
 - Property
 - Rivers
 - Watercourse
 - Floodplain
 - Contour
 - Water Main
 - Wastewater Gravity Main
 - Stormwater Gravity Main
 - Stormwater Discharge Location
 - SWM Facility
 - Potential SWMF Locations
 - Pond Inlet
 - Pond Outlet

EXISTING CONDITIONS:

Possible SWM Facility Location 2: Waverley Park
Ownership: City of Guelph
Current Use: Park
Total Area: 2.59ha
Available Area: 2.3ha
Drainage Area: 1) 5.48ha; 2) 1.81ha
TIMP: 1) 42%; 2) 37%
Inlets At: 1) 750mm Ø storm sewer; 2) 900mm Ø storm sewer
Depth to Pipe Invert at Inlet: 1) 2.8m; 2) 1.4m
Outlets To: 1350mm Ø storm sewer
Depth to Pipe Invert at Outlet: 2.3m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: Hydro
Notes: Splash pad, playground and ice rink at southern end of park.
Soccer fields at northern end.
• Trails connect Balmoral Drive and Waverley Drive to Waverley Drive Public School.
• Easement would be required for outlet from park to Waverley Drive. Larger catchment is from Inlet #1, but would require long distance of piping to reach outlet.

PROPOSED CONDITIONS:

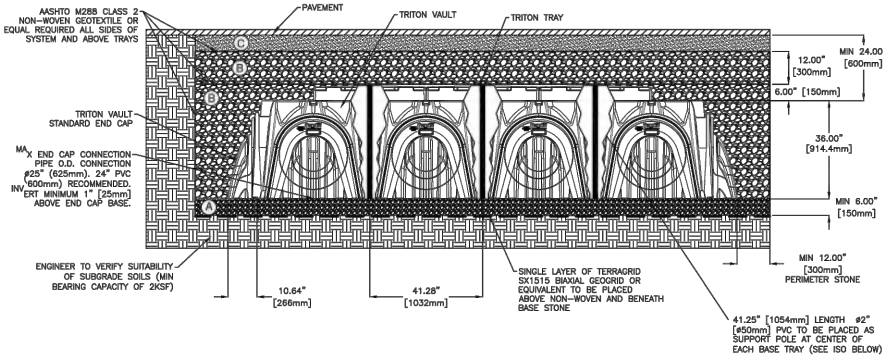
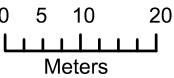
System: Subsurface Infiltration/Storage Facility
Facility Footprint: 611.59m²
Total Facility Storage: 844m³
Total Required Storage (enhanced water quality): 844m³
Volume Reduction (%): 100%

NOTES:

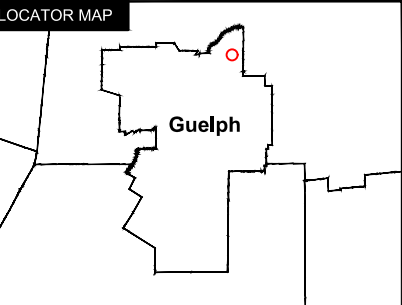
- Multiple inlets may be required to bring flow into proposed vault system
- WHPA Vulnerability Score: 8

Location 2: Waverley Park
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



DTL 01 TYPICAL SUBSURFACE VAULT SYSTEM OR EQUIVALENT PROFILE












































































































- LEGEND:**
- EX. SAN MAIN
 - EX. STM MAIN
 - EX. WATER MAIN
 - PR. STM MAIN
 - PR. ESC FOOT PRINT
 - PR. SUB SURFACE FACILITY
 - PR. BIOSWALE
 - EX. MAINTENANCE HOLE

4.3 Victoria Road Recreation Centre (Site 3)

Owned by the City of Guelph, Victoria Road Recreation Centre is located at the intersection of Victoria Road North and Hadati Road. The site is characterized by a recreation centre and associated parking lots. **Figure 4.5** presents the existing condition. The preferred alternative for Victoria Road Recreation Centre is Alternative 5 - Subsurface Storage Facility (**Table 4.4**). A conceptual design is presented as **Figure 4.6**. LID was not considered as an alternative due to technical constraints.

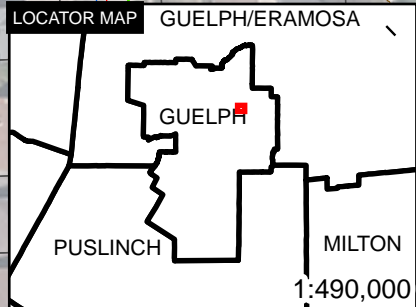
Table 4.4: Victoria Road Recreation Centre Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

Possible SWM Facility Location 3: Victoria Road Recreation Centre

Ownership: City of Guelph
Current Use: Community Centre, Arena and Pool
Total Area: 2.33ha
Available Area: 0.9ha
Drainage Area: 17.59ha
TIMP: 44%
Inlets At: 600mm Ø storm sewer
Depth to Pipe Invert at Inlet: 1.6m
Outlets To: 900mm Ø storm sewer
Depth to Pipe Invert at Outlet: 1.6m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: None
Notes:
• Opportunity for subsurface facility beneath the parking lot. Parking lot appears to have been recently repaved, so recommend installing facility at time of parking lot renewal.



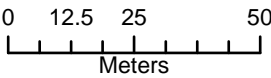
Legend

- Municipal Boundary
- Property
- Rivers
- Watercourse
- Floodplain
- Contour
- Water Main
- Wastewater Gravity Main
- Stormwater Gravity Main
- Stormwater Discharge Location
- SWM Facility
- Potential SWMF Locations
- Pond Inlet
- Pond Outlet



End-of-Pipe Opportunities - Drainage Areas (3)

Date: 2021-10-14
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



EXISTING CONDITIONS:

Possible SWM Facility Location 3: Victoria Road Recreation Centre

Ownership: City of Guelph

Current Use: Community Centre, Arena and Pool

Total Area: 2.33ha

Available Area: 0.9ha

Drainage Area: 17.59ha

TIMP: 44%

Inlets At: 600mm Ø storm sewer

Depth to Pipe Invert at Inlet: 1.6m

Outlets To: 900mm Ø storm sewer

Depth to Pipe Invert at Outlet: 1.6m

Floodplain Present: No

Mature Trees: Yes

Identified Conflicts: None

Notes:

- Opportunity for subsurface facility beneath the parking lot. Parking lot appears to have been recently repaved, so recommend installing facility at time of parking lot renewal

PROPOSED CONDITIONS:

System: Subsurface Infiltration/Storage Facility

Facility Footprint: 1567.39m²

Total Facility Storage: 2163m³

Total Required Storage (enhanced water quality): 2163m³

Volume Reduction (%): 100%

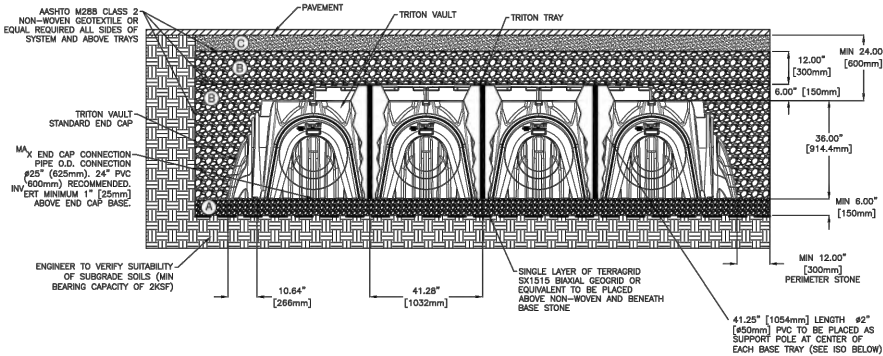
NOTES:

- Multiple inlets may be required to bring flow into proposed vault system
- WHPA Vulnerability Score: 8

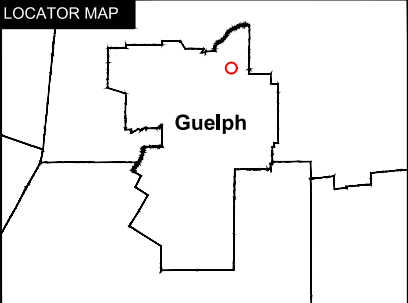
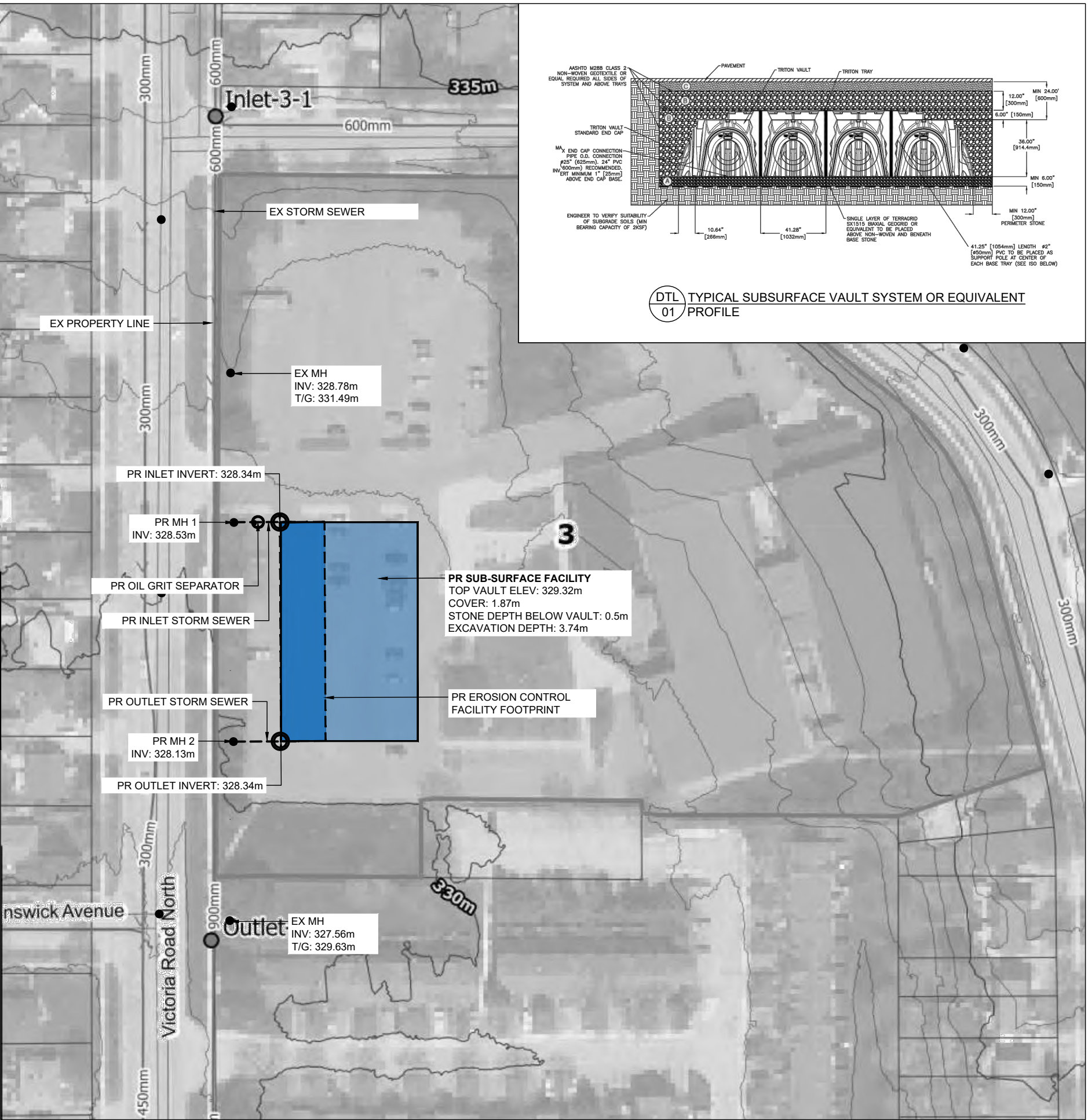
Location 3: Victoria Road Recreation Centre
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.

0 5 10 20
Meters



DTL 01 TYPICAL SUBSURFACE VAULT SYSTEM OR EQUIVALENT PROFILE












































































































- LEGEND:**
- EX. SAN MAIN
 - EX. STM MAIN
 - EX. WATER MAIN
 - - - PR. STM MAIN
 - [- - -] PR. ESC FOOT PRINT
 - [Blue Box] PR. SUB SURFACE FACILITY
 - [Dashed Blue Box] PR. BIOSWALE
 - EX. MAINTENANCE HOLE

4.4 Green Meadows Park (Site 4)

Owned by the City of Guelph, Green Meadows Park is located between Stevenson Street North and William Street. The site is characterized by a soccer field, baseball diamond, playground, and green space. **Figure 4.7** presents the existing condition. The preferred alternative for Green Meadows Park Alternative 5 – Do Nothing (**Table 4.5**), as it is within the catchment of both the Stevenson / Guelph Junction Railway (Site 27) and End of Industrial Street (Site 34). If one or neither of these sites is constructed, then Green Meadows Park should be re-evaluated.

Table 4.5: Green Meadows Park Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					



Possible SWM Facility Location 4: Green Meadows Park
Ownership: City of Guelph
Current Use: Park
Total Area: 2.1ha
Available Area: 2.09ha
Drainage Area: 81.53ha
TIMP: 47%
Inlets At: 975mm Ø storm sewer
Depth to Pipe Invert at Inlet: 3.6m
Outlets To: 1800mm Ø storm sewer
Depth to Pipe Invert at Outlet: 2.5m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: None
Notes:
• Mature trees along Stevenson Street North with parallel row of newly planted trees.
• Playground, baseball diamond and soccer field on site, with trail connecting Stevenson Street and William Street.
• Playground can be moved to create space for a surface pond.
• Stevenson Street North currently under construction.
• Park surface elevation is lower than road surface elevation.












































































































End-of-Pipe Opportunities - Drainage Areas (4)

4.5 Bailey Park (Site 5)

Owned by the City of Guelph, Bailey Park is located on Bailey Avenue. The site is characterized by a playground, soccer field and baseball diamond. **Figure 4.8** presents the existing condition. The preferred alternative for Bailey Park is Alternative 5 - Subsurface Storage Facility (**Table 4.6**). A conceptual design is presented as **Figure 4.9**.

Table 4.6: Bailey Park Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

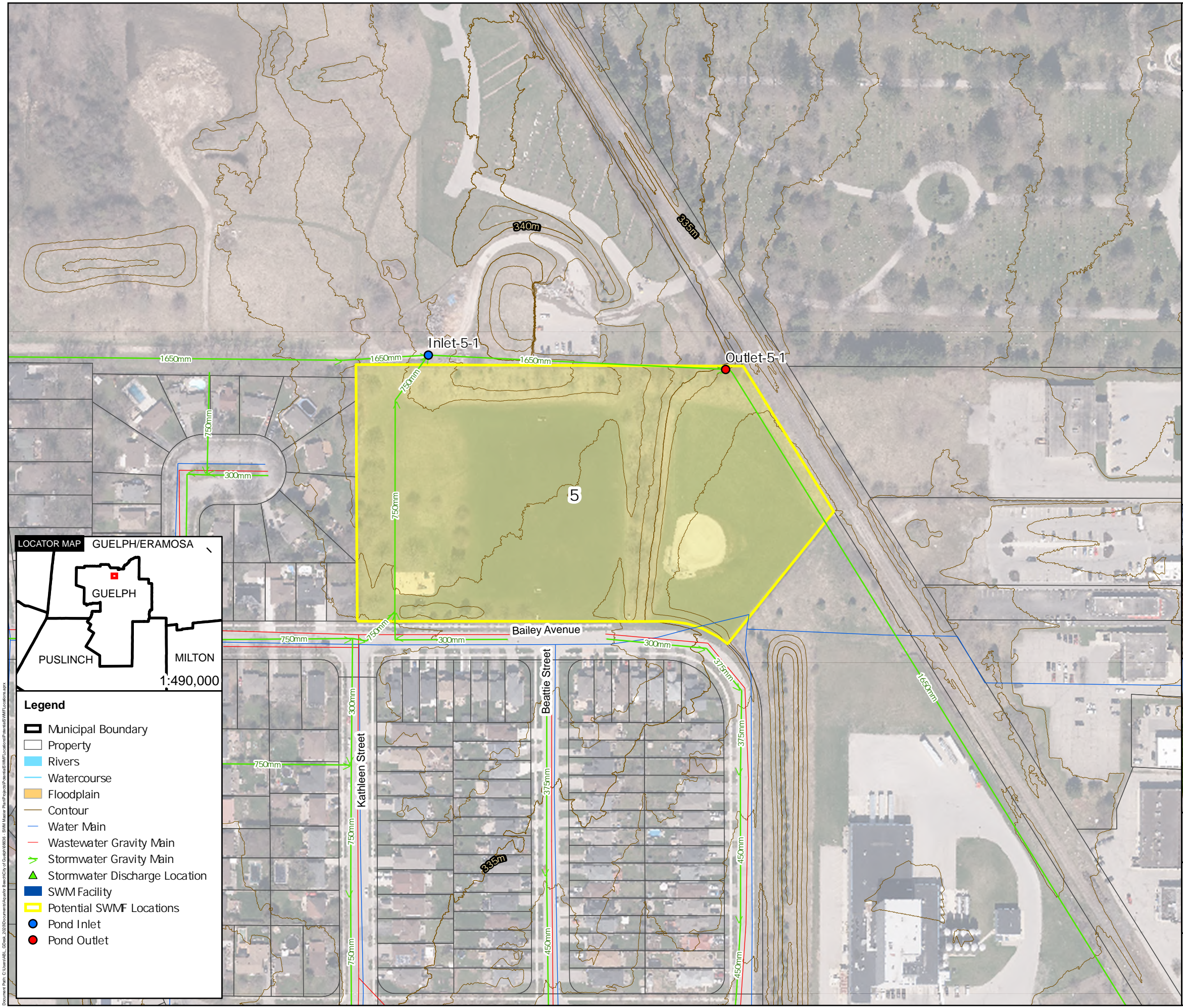
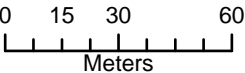
Possible SWM Facility Location 5: Bailey Park

Ownership: City of Guelph
Current Use: Park
Total Area: 3.05ha
Available Area: 3.05ha
Drainage Area: 23.81ha
TIMP: 43%
Inlets At: 1650mm Ø storm sewer
Depth to Pipe Invert at Inlet: 6.5m
Outlets To: 1650mm Ø storm sewer
Depth to Pipe Invert at Outlet: 1.1m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: None
Notes:
• Western park includes playground and soccer field. Eastern park is at lower elevation and is a baseball diamond.
• Informal trail along north side of park. Opportunity to tie into cemetery trails.
• Error within GIS identifies 300mm storm sewer along northern side of park. Drawing I-346 confirms this storm sewer is 1650mm.



End-of-Pipe Opportunities - Drainage Areas (5)

Date: 2021-10-14
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



EXISTING CONDITIONS:

Possible SWM Facility Location 5: Bailey Park

Ownership: City of Guelph

Current Use: Park

Total Area: 3.05ha

Available Area: 3.05ha

Drainage Area: 23.81ha

TIMP: 43%

Inlets At: 1650mm Ø storm sewer

Depth to Pipe Invert at Inlet: 6.5m

Outlets To: 1650mm Ø storm sewer

Depth to Pipe Invert at Outlet: 1.1m

Floodplain Present: No

Mature Trees: Yes

Identified Conflicts: None

Notes:

- Western park includes playground and soccer field. Eastern park is at lower elevation and is a baseball diamond.
- Informal trail along north side of park. Opportunity to tie into cemetery trails.
- Error within GIS identifies 300mm storm sewer along northern side of park. Drawing I-346 confirms this storm sewer is 1650mm

PROPOSED CONDITIONS:

System: Subsurface Infiltration/Storage Facility

Facility Footprint: 2081.16²

Total Facility Storage: 2872m³

Total Required Storage (enhanced water quality): 2872m³

Volume Reduction (%): 100%

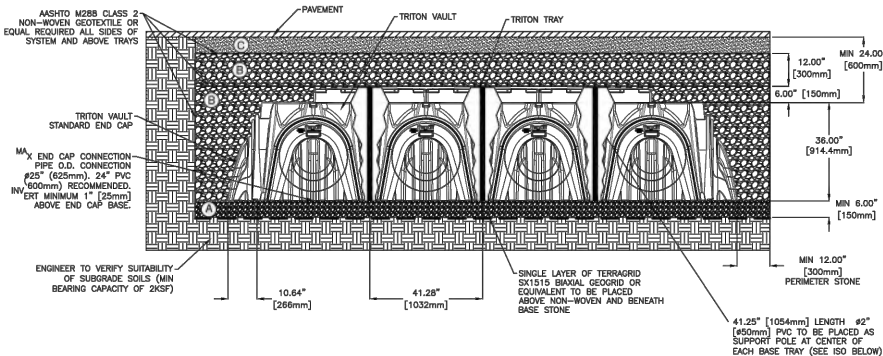
NOTES:

- Multiple inlets may be required to bring flow into proposed vault system
- Grading restrictions limit storm sewer slope to 0.1%
- WHPA Vulnerability Score: 8

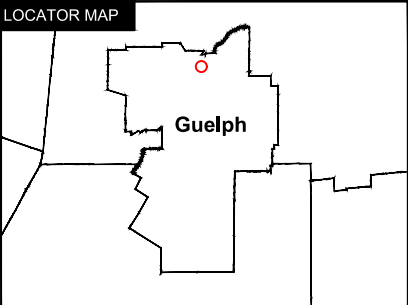
Location 5: Bailey Park
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.

0 5 10 20
Meters



DTL 01 TYPICAL SUBSURFACE VAULT SYSTEM OR EQUIVALENT PROFILE












































































































- LEGEND:**
- EX. SAN MAIN
 - EX. STM MAIN
 - EX. WATER MAIN
 - - - PR. STM MAIN
 - [- - -] PR. ESC FOOT PRINT
 - [] PR. SUB SURFACE FACILITY
 - [] PR. BIOSWALE
 - EX. MAINTENANCE HOLE

4.6 Exhibition Park (Site 8)

Owned by the City of Guelph, Exhibition Park is located between Exhibition Street, Division Street, Kathleen Street, and London Road West. The site is characterized by an existing playground, baseball diamonds, arena, and green space. **Figure 4.10** presents the existing condition. The preferred alternative for Exhibition Park is Alternative 5 - Subsurface Storage Facility (**Table 4.7**). A conceptual design is presented as **Figure 4.11**.

Table 4.7: Exhibition Park Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

Possible SWM Facility Location 8: Exhibition Park

Ownership: City of Guelph

Current Use: Park and Arena

Total Area: 13.55ha

Available Area: 0.86ha

Drainage Area: 39.57ha

TIMP: 44%

Inlets At: 1050mm Ø storm sewer

Depth to Pipe Invert at Inlet: 1.0m

Outlets To: 1050mm Ø storm sewer

Depth to Pipe Invert at Outlet: 1.1m

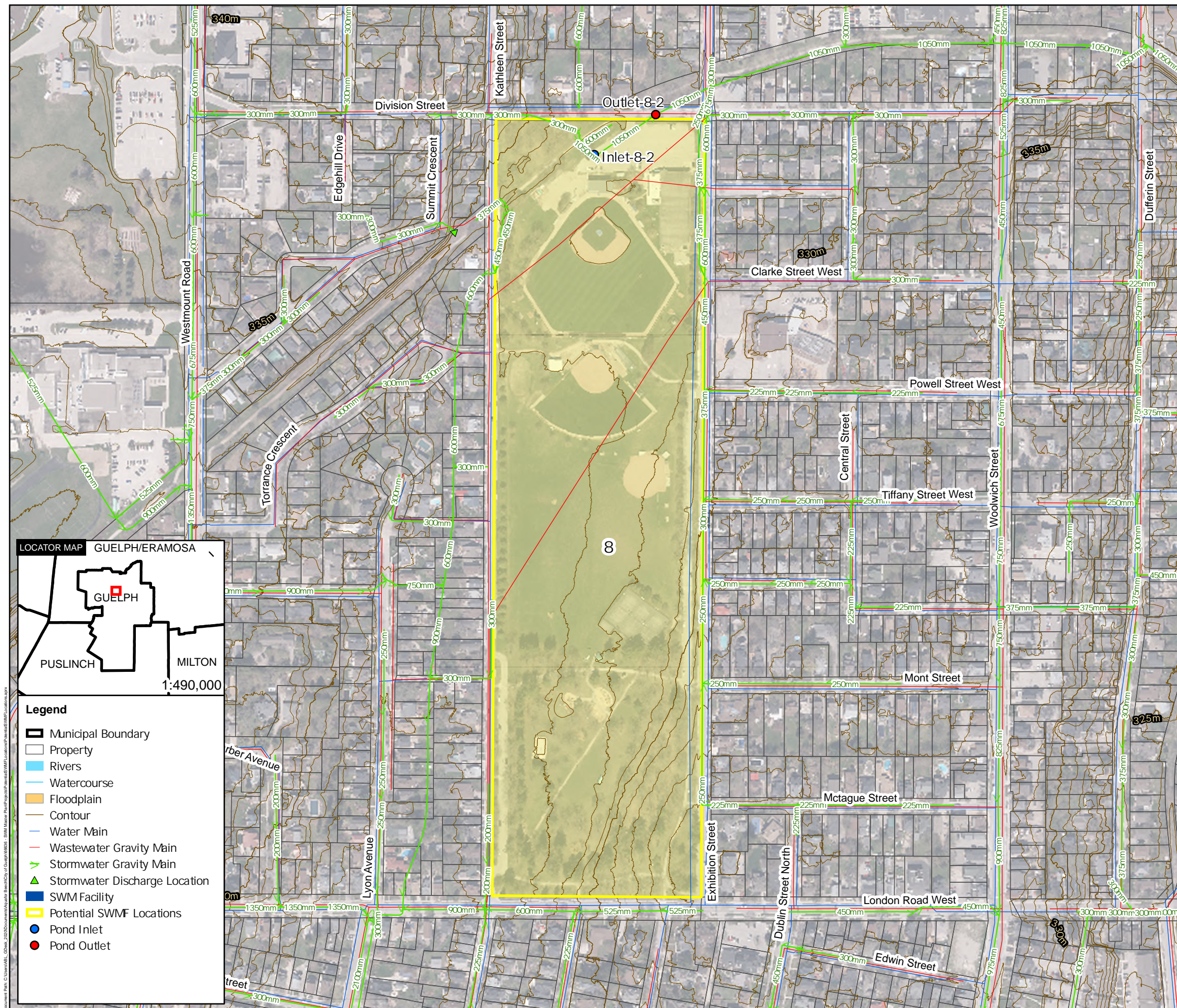
Floodplain Present: No

Mature Trees: Yes

Identified Conflicts: Sanitary Sewer

Notes:

- Known flooding issues in this area.
- Subsurface storage feasible beneath north parking lot.
- Limited available area in proximity to storm sewer. Storm sewer continues downstream along the CNR Spurline Trail, where superpipe storage may be an opportunity.



End-of-Pipe Opportunities - Drainage Areas (8)

Date: 2021-10-14
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.

0 30 60 120
Meters



CURRENT CONDITIONS:

Possible SWM Facility Location 8: Exhibition Park

Ownership: City of Guelph

Current Use: Park and Arena

Total Area: 13.55ha

Available Area: 0.86ha

Drainage Area: 39.57ha

TIMP: 44%

Inlets At: 1050mm Ø storm sewer

Depth to Pipe Invert at Inlet: 1.0m

Outlets To: 1050mm Ø storm sewer

Depth to Pipe Invert at Outlet: 1.1m

Floodplain Present: No

Mature Trees: Yes

Identified Conflicts: Sanitary Sewer

Notes:

- Known flooding issues in this area.
- Subsurface storage feasible beneath north parking lot.
- Limited available area in proximity to storm sewer. Storm sewer continues downstream along the CNR Spurline Trail, where superpipe storage may be an opportunity

PROPOSED CONDITIONS:

System: Subsurface Infiltration/Storage Facility

Facility Footprint: 3530m²

Total Facility Storage: 4866m³

Total Required Storage (enhanced water quality): 4866m³

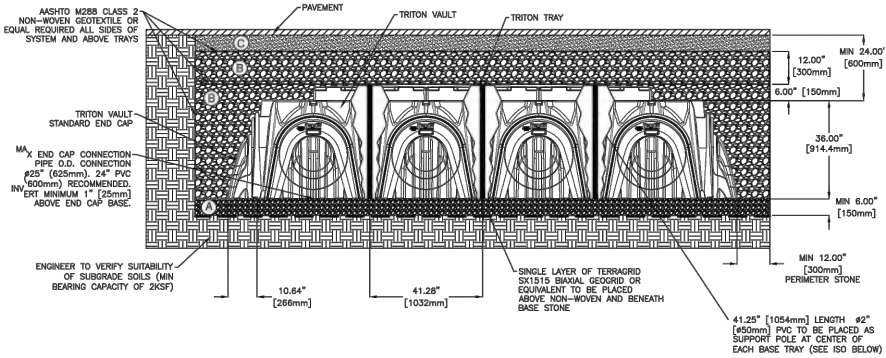
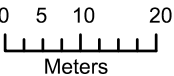
Volume Reduction (%): 100%

NOTES:

- Multiple inlets may be required to bring flow into proposed vault system
- WHPA Vulnerability Score: 8
- Full footprint was not feasible due to constraints with existing sanitary sewer

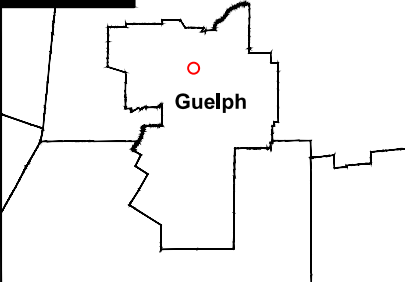
Location 8: Exhibition Park
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



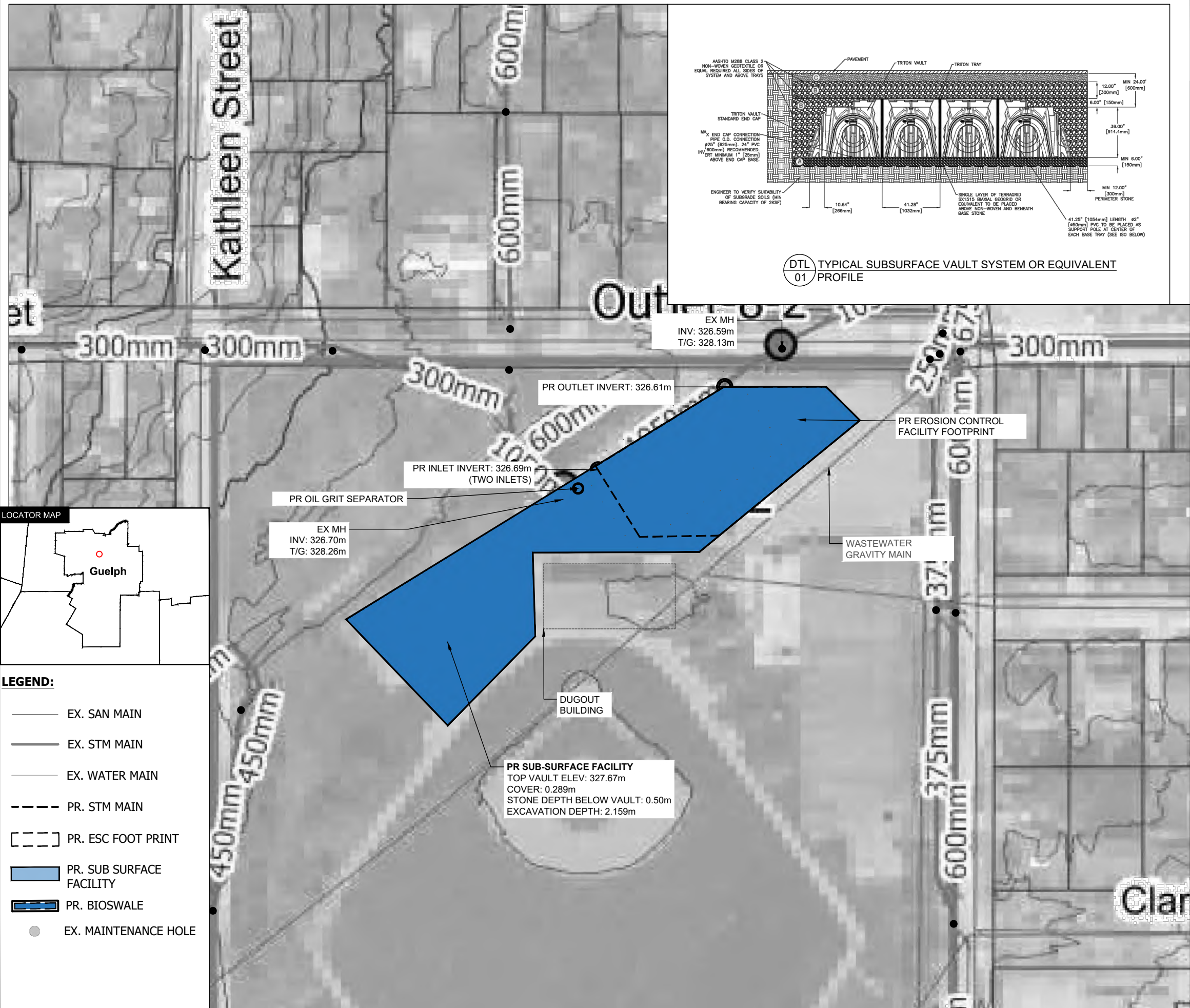
DTL 01 TYPICAL SUBSURFACE VAULT SYSTEM OR EQUIVALENT PROFILE

LOCATOR MAP



LEGEND:

- EX. SAN MAIN
- EX. STM MAIN
- EX. WATER MAIN
- - - PR. STM MAIN
- [- - -] PR. ESC FOOT PRINT
- [] PR. SUB SURFACE FACILITY
- [] PR. BIOSWALE
- EX. MAINTENANCE HOLE












































































































4.7 Dunhill Place Park (Site 14)

Owned by the City of Guelph, Dunhill Place Park is located at Kipling Avenue and Imperial Road North, and is adjacent to Willow West Drain.

Figure 4.12 presents the existing condition. The preferred alternative for Dunhill Place Park is Alternative 5 - Subsurface Storage Facility (**Table 4.8**). A conceptual design is presented as **Figure 4.13**.

Table 4.8: Dunhill Place Park Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

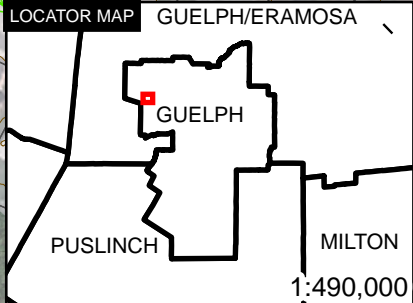
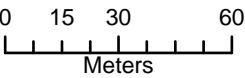
Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

Possible SWM Facility Location 14: Dunhill Place Park
Ownership: City of Guelph
Current Use: Park
Total Area: 1.51ha
Available Area: 0.7ha
Drainage Area: 9.85ha
TIMP: 47%
Inlets At: 675mm Ø storm sewer
Depth to Pipe Invert at Inlet: 4.3m
Outlets To: 675mm Ø storm sewer
Depth to Pipe Invert at Outlet: 3.8m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: Sanitary sewer parallel to storm sewer
Notes:
• Playground located next to storm sewer and raised maintenance hole.
Storm sewer discharges into adjacent watercourse.
• Trail located along top bank of watercourse.
• Play structure appears new, with young trees planted between playground and Kipling Avenue.
• Ditch inlet catch basin accepts runoff from the park and discharges it directly to watercourse.



End-of-Pipe Opportunities - Drainage Areas (14)

Date: 2021-10-14
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



Legend

- Municipal Boundary
- Property
- Rivers
- Watercourse
- Floodplain
- Significant Woodlands
- Contour
- Water Main
- Wastewater Gravity Main
- Stormwater Gravity Main
- Stormwater Discharge Location
- SWM Facility
- Potential SWMF Locations
- Pond Inlet
- Pond Outlet

CURRENT CONDITIONS:

Possible SWM Facility Location 14: Dunhill Place Park

Ownership: City of Guelph

Current Use: Park

Total Area: 1.51ha

Available Area: 0.7ha

Drainage Area: 9.85ha

TIMP: 47%

Inlets At: 675mm Ø storm sewer

Depth to Pipe Invert at Inlet: 4.3m

Outlets To: 675mm Ø storm sewer

Depth to Pipe Invert at Outlet: 3.8m

Floodplain Present: No

Mature Trees: Yes

Identified Conflicts: Sanitary sewer parallel to storm sewer

Notes:

- Playground located next to storm sewer and raised maintenance hole.
- Storm sewer discharges into adjacent watercourse.
- Trail located along top bank of watercourse.
- Play structure appears new, with young trees planted between playground and Kipling Avenue.
- Ditch inlet catch basin accepts runoff from the park and discharges it directly to watercourse

PROPOSED CONDITIONS:

System: Subsurface Infiltration/Storage Facility

Facility Footprint: 929.71m²

Total Facility Storage: 1283m³

Total Required Storage (enhanced water quality): 1283m³

Volume Reduction (%): 100%

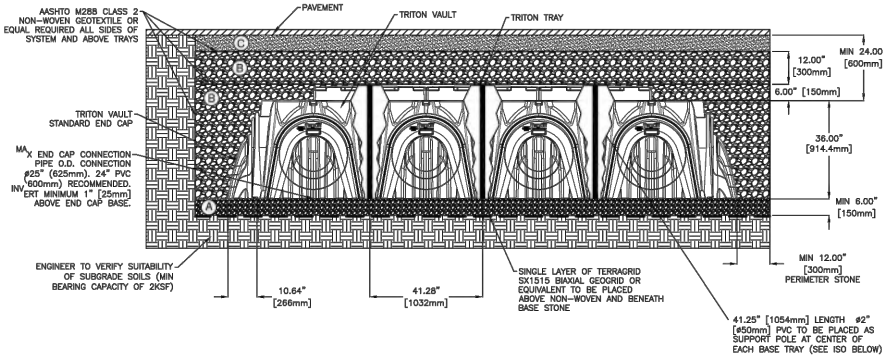
NOTES:

- Multiple inlets may be required to bring flow into proposed vault system
- WHPA Vulnerability Score: 10

Location 14: Dunhill Place Park
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.

0 5 10 20
Meters



DTL 01 TYPICAL SUBSURFACE VAULT SYSTEM OR EQUIVALENT PROFILE

PR SUB-SURFACE FACILITY
TOP VAULT ELEV: 326.59m
COVER: 4.12m
STONE DEPTH BELOW VAULT: 0.50m
EXCAVATION DEPTH: 5.99m

PR EROSION CONTROL FACILITY FOOTPRINT

EX MH
INV S: 326.08m
T/G: 331.00m

PR OIL GRIT SEPARATOR

PR INLET INVERT: 325.70m (TWO INLETS)

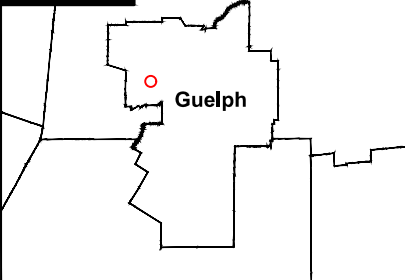
PR OUTLET INVERT: 325.46m

WASTEWATER GRAVITY MAIN

EX MH
INV N: 324.15m

EX PROPERTY LINE

LOCATOR MAP































































LEGEND:














































- EX. SAN MAIN
- EX. STM MAIN
- EX. WATER MAIN
- - - PR. STM MAIN
- [] PR. ESC FOOT PRINT
- [] PR. SUB SURFACE FACILITY
- [] PR. BIOSWALE
- EX. MAINTENANCE HOLE

4.8 Margaret Greene Park (Site 16)

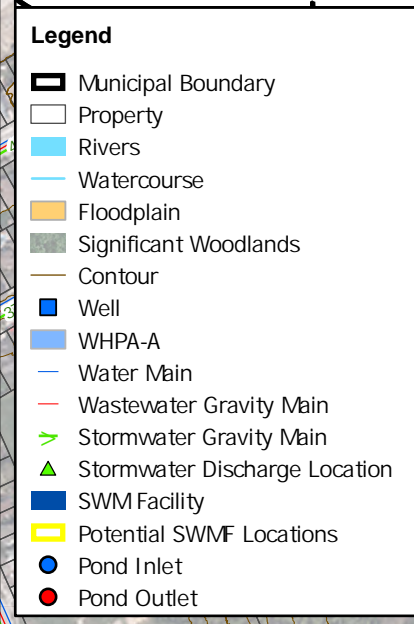
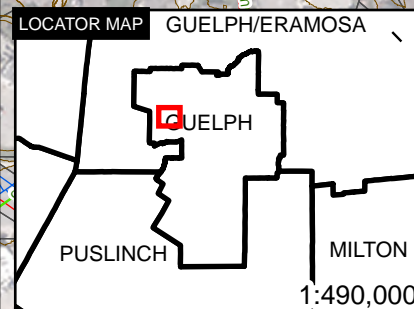
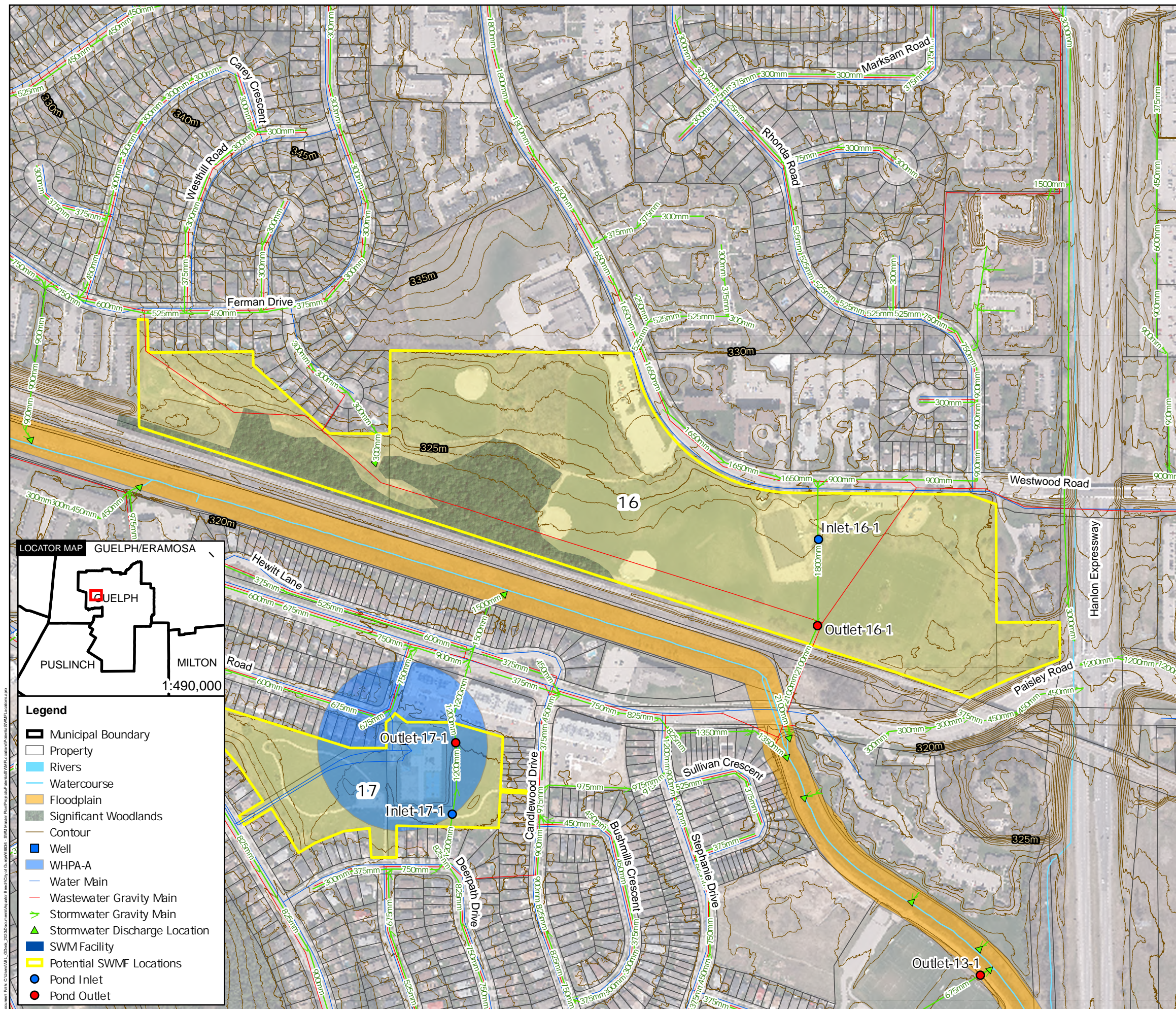
Owned by the City of Guelph, Margaret Greene Park is located on Westwood Road near the Hanlon Expressway. The site is characterized by an existing playground, tennis courts, baseball diamonds, soccer fields, and green space. A splash pad is also proposed for this park. **Figure 4.14** presents the existing condition. The preferred alternative for Margaret Greene Park is Alternative 2 – Wet Pond (**Table 4.9**). A conceptual design is presented as **Figure 4.15**.

Table 4.9: Margaret Greene Park Preferred Alternative Evaluation

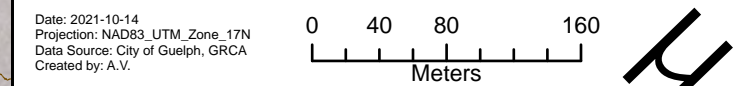
Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

Possible SWM Facility Location 16: Margaret Greene Park
 Ownership: City of Guelph
 Current Use: Park
 Total Area: 18.18ha
 Available Area: 11.1ha
 Drainage Area: 85.78ha
 TIMP: 45%
 Inlets At: 1800mm Ø storm sewer
 Depth to Pipe Invert at Inlet: 4.8m
 Outlets To: 2100mm Ø storm sewer
 Depth to Pipe Invert at Outlet: 4.3m
 Floodplain Present: No
 Mature Trees: Yes
 Identified Conflicts: Two sanitary sewers meet near proposed outlet.
 Hydro connected to tennis courts.
 Notes:
 • Park includes soccer fields, baseball diamonds, playground, washrooms, tennis courts, and parking. Tennis courts recently re-installed; aerial photo does not have new image.
 • Rail line and watercourse parallel southern park boundary. Outlet will be beneath train track.
 • Very active local community recently prevented Metrolinx from constructing traction power substation in the park.



End-of-Pipe Opportunities - Drainage Areas (16)



CURRENT CONDITIONS:

Ownership: City of Guelph
Current Use: Park
Total Area: 18.18ha
Available Area: 11.1ha
Drainage Area: 85.78ha
TIMP: 45%
Inlets At: 1800mm Ø storm sewer
Depth to Pipe Invert at Inlet: 4.8m
Outlets To: 2100mm Ø storm sewer
Depth to Pipe Invert at Outlet: 4.3m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: Two sanitary sewers meet near proposed outlet.
Hydro connected to tennis courts.
Notes: Park includes soccer fields, baseball diamonds, playground, washrooms, tennis courts, and parking. Tennis courts recently reinstalled; aerial photo does not have new image.
• Rail line and watercourse parallel southern park boundary. Outlet will be beneath train track.
• Very active local community recently prevented Metrolinx from constructing traction power substation in the park.

PROPOSED CONDITIONS:

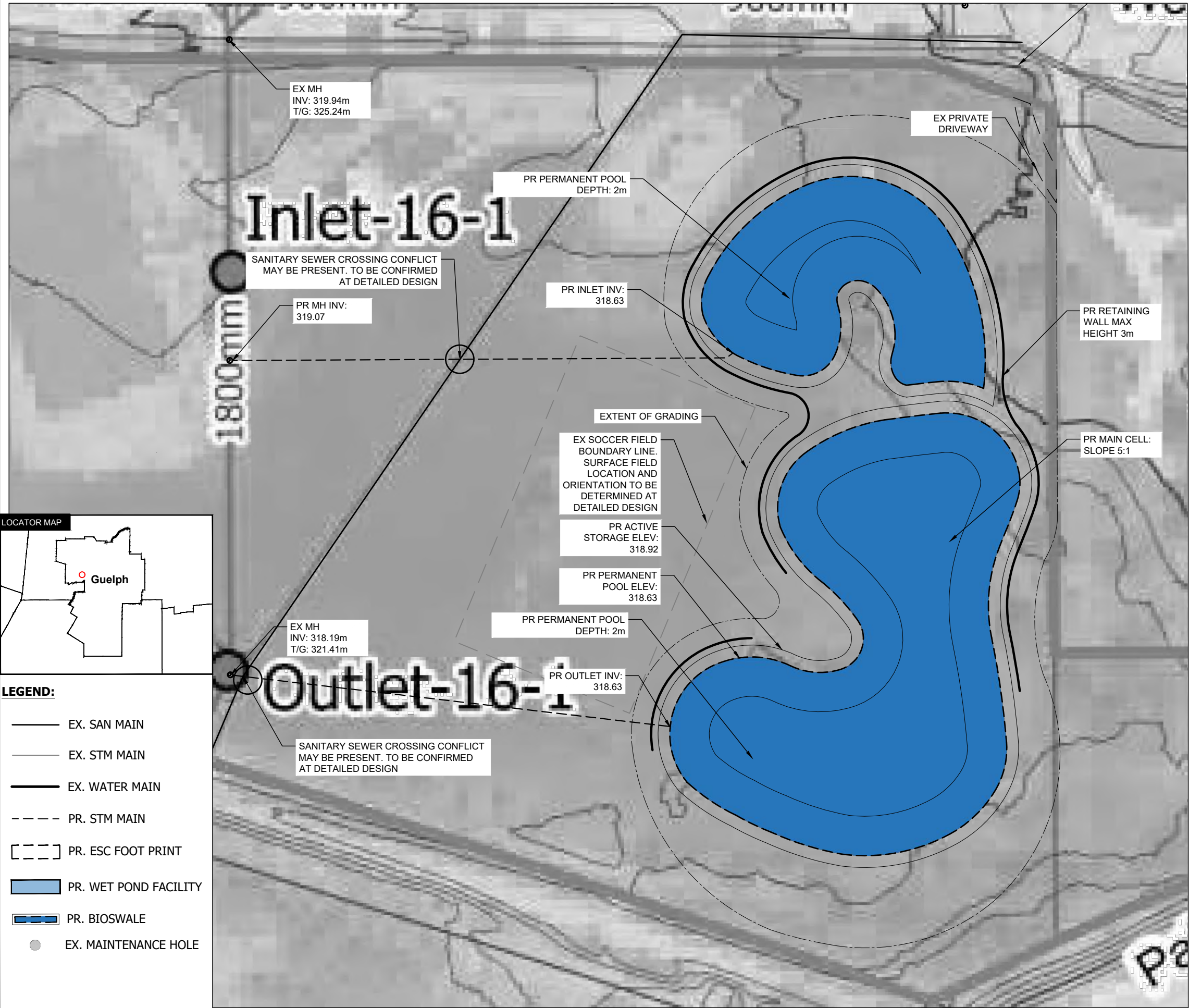
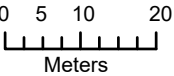
System: Wet Pond Facility
Total Water Quality Storage: 14167m³
Total Required Water Quality Storage: 14167m³
Water Quality Active Storage: 3432m³
Permanent Pool Storage: 10735m³

NOTES:

- WHPA Vulnerability Score: 8-10

Location 16: Margaret Green Park
End-of-Pipe Concept Design





























































Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.
















































4.9 Centennial Park (Site 18)

Owned by the City of Guelph, Centennial Park is located on Municipal Street, and extends west to the Hanlon Expressway. The site has many current uses, including a playground, baseball diamonds, soccer fields, parking lot, and hill that is popular for tobogganing. **Figure 4.16** presents the existing condition. The preferred alternative for Centennial Park is Alternative 5 - Subsurface Storage Facility (**Table 4.10**). A conceptual design is presented as **Figure 4.17**.

Table 4.10: Centennial Park Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

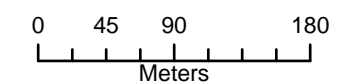
Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

Possible SWM Facility Location 18: Centennial Park
 Ownership: City of Guelph
 Current Use: Park
 Total Area: 21.67ha
 Available Area: 2.7ha
 Drainage Area: 15.73ha
 TIMP: 44%
 Inlets At: 900mm Ø storm sewer
 Depth to Pipe Invert at Inlet: 3.0m
 Outlets To: 1050mm Ø storm sewer
 Depth to Pipe Invert at Outlet: 2.0m
 Floodplain Present: No
 Mature Trees: Yes
 Identified Conflicts: Water and sanitary lines parallel to storm sewer
 Notes:
 • Extremely well-used tobogganing hill located adjacent to storm sewer. Ball diamonds, soccer fields, and playground also on site.
 • Gravel parking lot is a current source of sediment in runoff to Municipal Street. Opportunity to install subsurface storage beneath newly reconstructed parking lot.

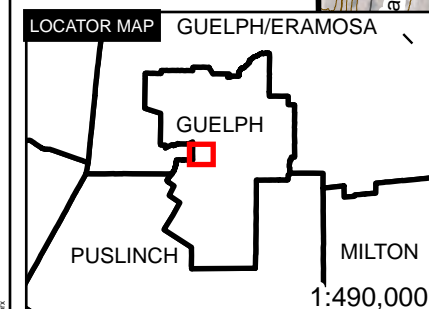


End-of-Pipe Opportunities - Drainage Areas (18)

Date: 2021-10-14
 Projection: NAD83_UTM_Zone_17N
 Data Source: City of Guelph, GRCA
 Created by: A.V.

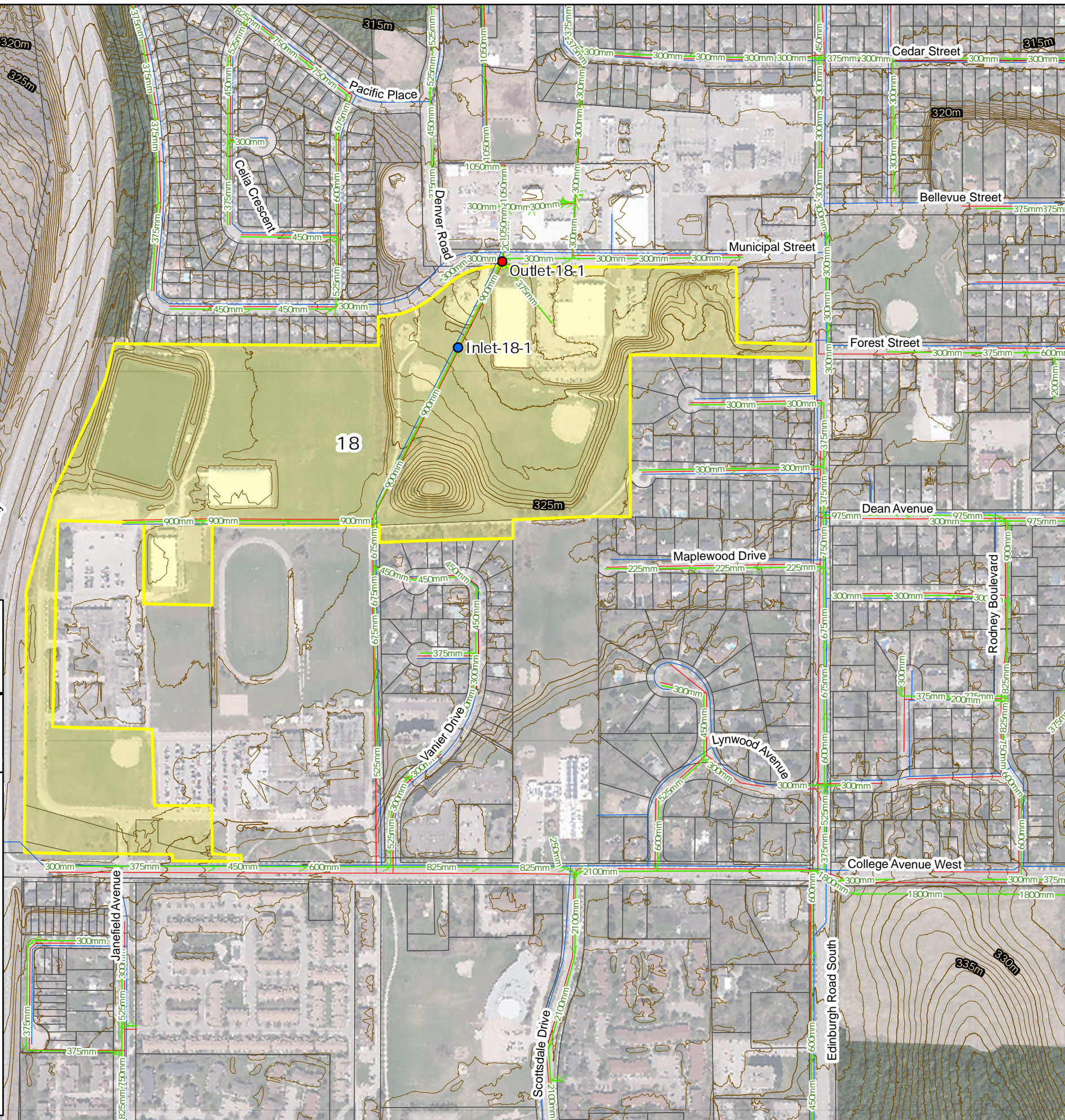


TOWNSHIP OF GUELPH/ERAMOSA



Legend

-  Municipal Boundary
-  Property
-  Rivers
-  Watercourse
-  Floodplain
-  Significant Woodlands
-  Contour
-  Water Main
-  Wastewater Gravity Main
-  Stormwater Gravity Main
-  Stormwater Discharge Location
-  SWM Facility
-  Potential SWMF Locations
-  Pond Inlet
-  Pond Outlet



CURRENT CONDITIONS:

Possible SWM Facility Location 18: Centennial Park
Ownership: City of Guelph
Current Use: Park
Total Area: 21.67ha
Available Area: 2.7ha
Drainage Area: 15.73ha
TIMP: 44%

Inlets At: 900mm Ø storm sewer
Depth to Pipe Invert at Inlet: 3.0m
Outlets To: 1050mm Ø storm sewer
Depth to Pipe Invert at Outlet: 2.0m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: Water and sanitary lines parallel to storm sewer
Notes:

- Extremely well-used tobogganing hill located adjacent to storm sewer.
- Ball diamonds, soccer fields, and playground also on site.
- Gravel parking lot is a current source of sediment in runoff to Municipal Street. Opportunity to install subsurface storage beneath newly reconstructed parking lot

PROPOSED CONDITIONS:

System: Subsurface Infiltration/Storage Facility
Facility Footprint: 1397.83m²
Total Facility Storage: 1929m³
Total Required Storage (enhanced water quality): 1929m³
Volume Reduction (%): 100%

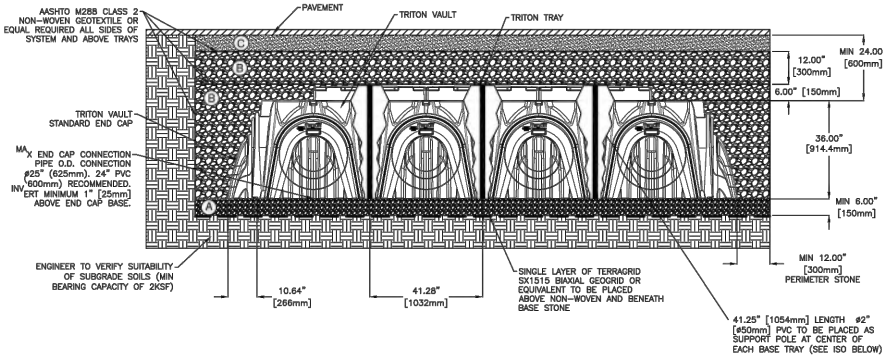
NOTES:

- Multiple inlets may be required to bring flow into proposed vault system
- WHPA Vulnerability Score: 8-10

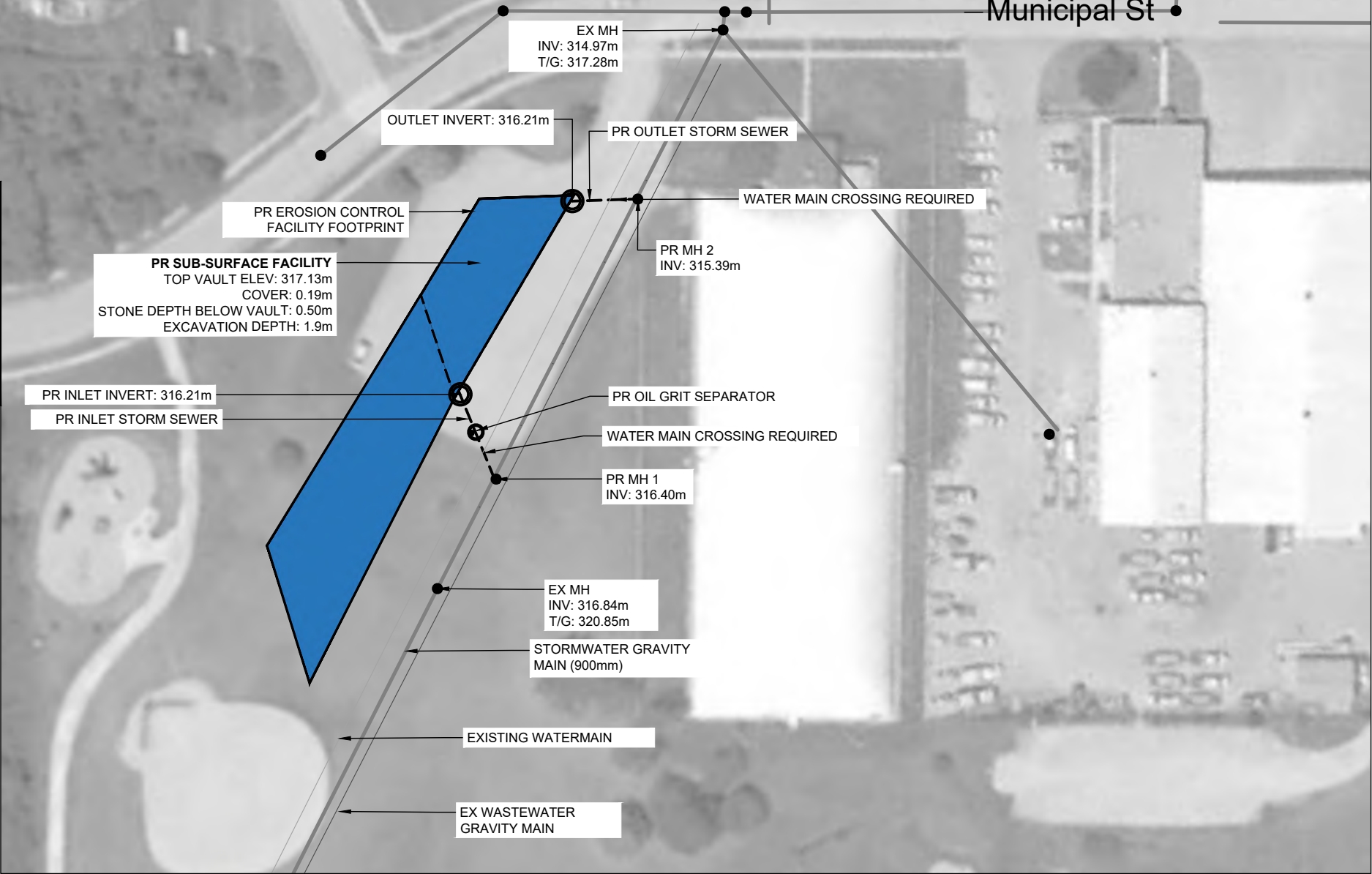
Location 18: Centennial Park
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.

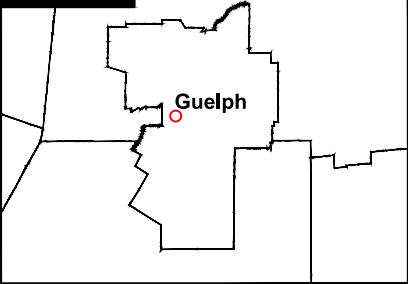
0 5 10 20
Meters



DTL 01 TYPICAL SUBSURFACE VAULT SYSTEM OR EQUIVALENT PROFILE



LOCATOR MAP



LEGEND:














































- EX. SAN MAIN
- EX. STM MAIN
- EX. WATER MAIN
- PR. STM MAIN
- PR. ESC FOOT PRINT
- PR. SUB SURFACE FACILITY
- PR. BIOSWALE
- EX. MAINTENANCE HOLE

4.10 L-13 Windsor Park (Site 26)

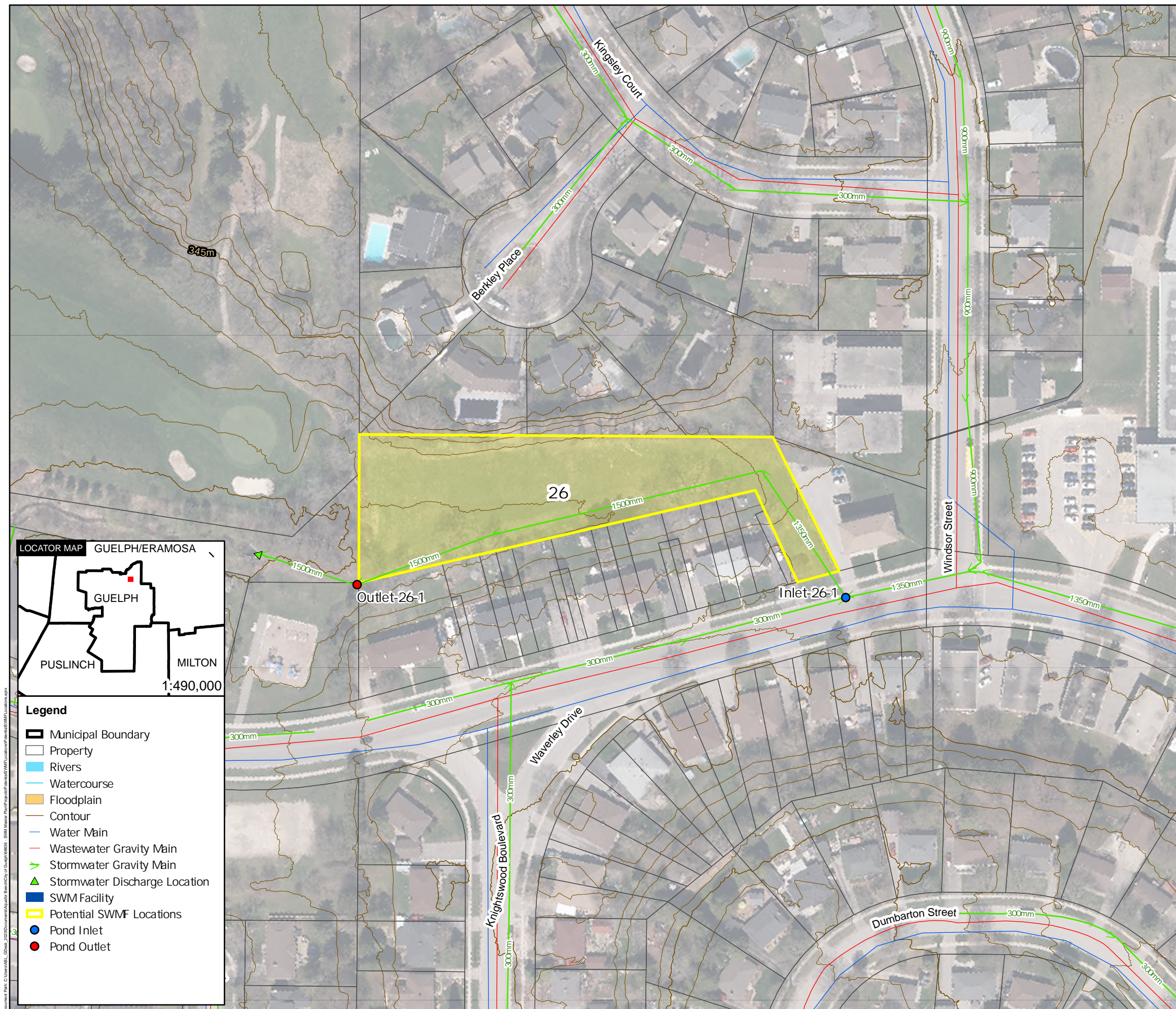
Owned by the City of Guelph, Windsor Park is located on Waverley Drive, near Windsor Street. The site does not currently have any active uses, and is green space. **Figure 4.18** presents the existing condition. The preferred alternative for Windsor Park is Alternative 5 - Subsurface Storage Facility (**Table 4.11**). A conceptual design is presented as **Figure 4.19**.

Table 4.11: Windsor Park Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

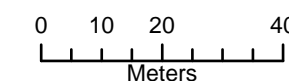
Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

Possible SWM Facility Location 26: L-13 Windsor Park
Ownership: City of Guelph
Current Use: Park
Total Area: 0.48ha
Available Area: 0.48ha
Drainage Area: 105.92ha
TIMP: 39%
Inlets At: 1500mm Ø storm sewer
Depth to Pipe Invert at Inlet: 3.2m
Outlets To: 1500mm Ø storm sewer
Depth to Pipe Invert at Outlet: 1.5m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: None
Notes:
• Two monitoring wells located at eastern end of parcel.
• Recommended retrofit in 2012 SWM-MP as site L-13. Playground relocated since 2012 and is no longer in proposed pond location.
• Some dumping occurring in treed area at western end of parcel.



End-of-Pipe Opportunities - Drainage Areas (26)

Date: 2021-10-14
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



CURRENT CONDITIONS:

Possible SWM Facility Location 26: L-13 Windsor Park

Ownership: City of Guelph

Current Use: Park

Total Area: 0.48ha

Available Area: 0.48ha

Drainage Area: 105.92ha

TIMP: 39%

Inlets At: 1500mm Ø storm sewer

Depth to Pipe Invert at Inlet: 3.2m

Outlets To: 1500mm Ø storm sewer

Depth to Pipe Invert at Outlet: 1.5m

Floodplain Present: No

Mature Trees: Yes

Identified Conflicts: None

Notes:

- Two monitoring wells located at eastern end of parcel.
- Recommended retrofit in 2012 SWM-MP as site L-13. Playground relocated since 2012 and is no longer in proposed pond location.
- Some dumping occurring in treed area at western end of parcel.

PROPOSED CONDITIONS:

System: Subsurface Infiltration/Storage Facility

Facility Footprint: 3070.14m²

Total Facility Storage: 4236.80m³

Total Required Storage (enhanced water quality): 11836m³

Volume Reduction (%): 36%

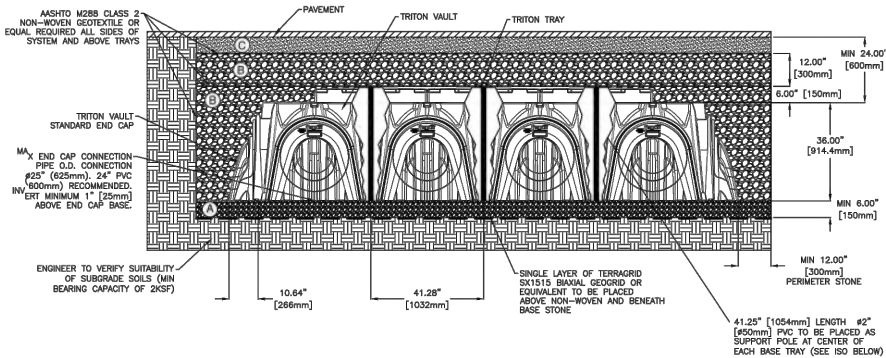
NOTES:

- Multiple inlets may be required to bring flow into proposed vault system
- WHPA Vulnerability Score: 8

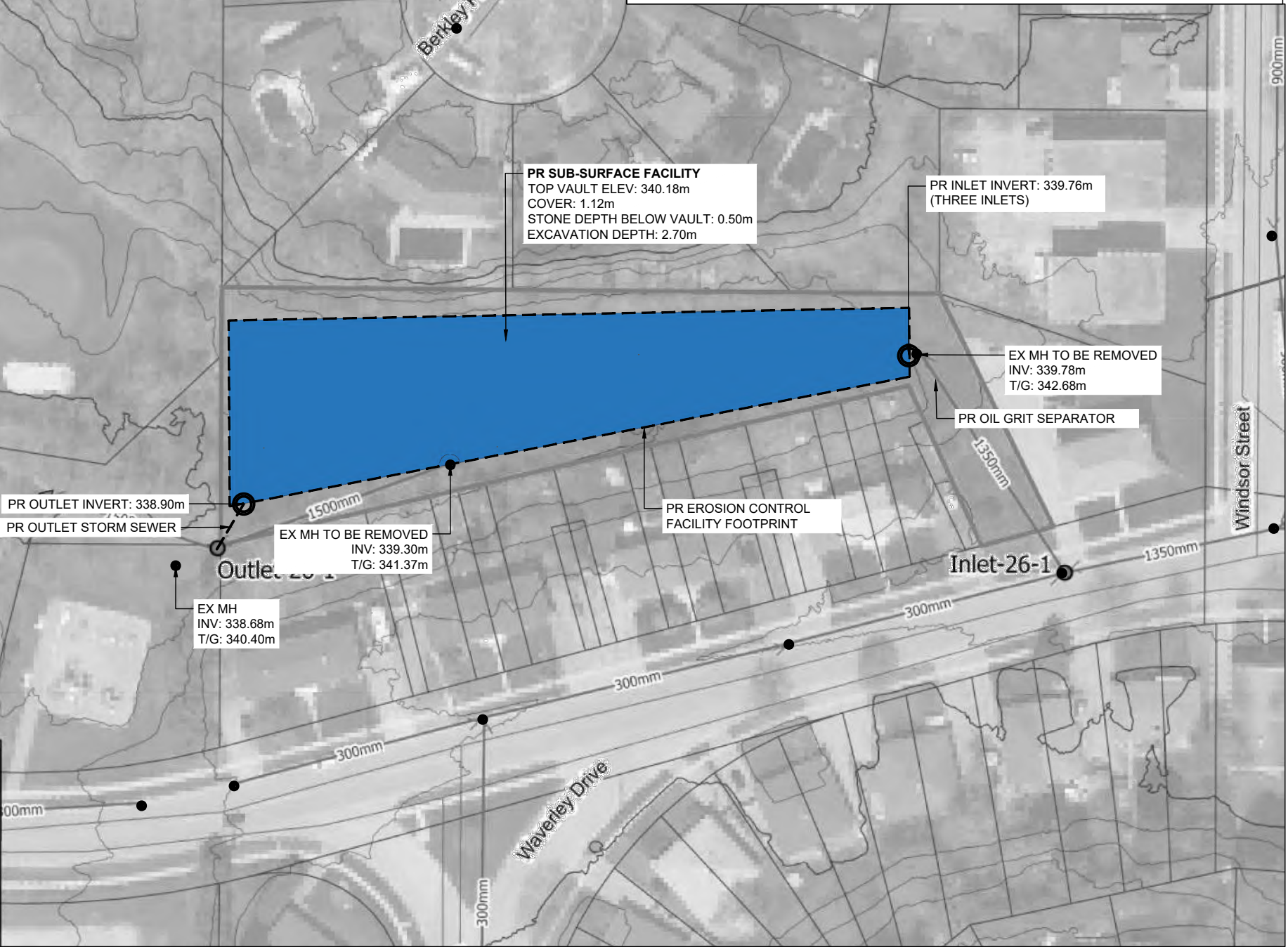
Location 26: L-13 Windsor Park
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.

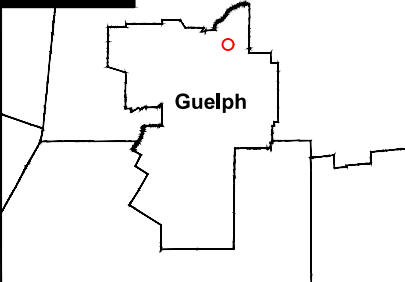
0 5 10 20
Meters



DTL 01 TYPICAL SUBSURFACE VAULT SYSTEM OR EQUIVALENT PROFILE



LOCATOR MAP































































LEGEND:














































- EX. SAN MAIN
- EX. STM MAIN
- EX. WATER MAIN
- - - PR. STM MAIN
- [- - -] PR. ESC FOOT PRINT
- [Blue Area] PR. SUB SURFACE FACILITY
- [Blue Line] PR. BIOSWALE
- EX. MAINTENANCE HOLE

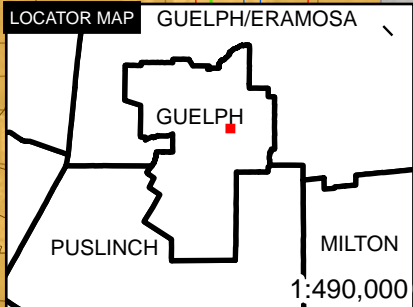
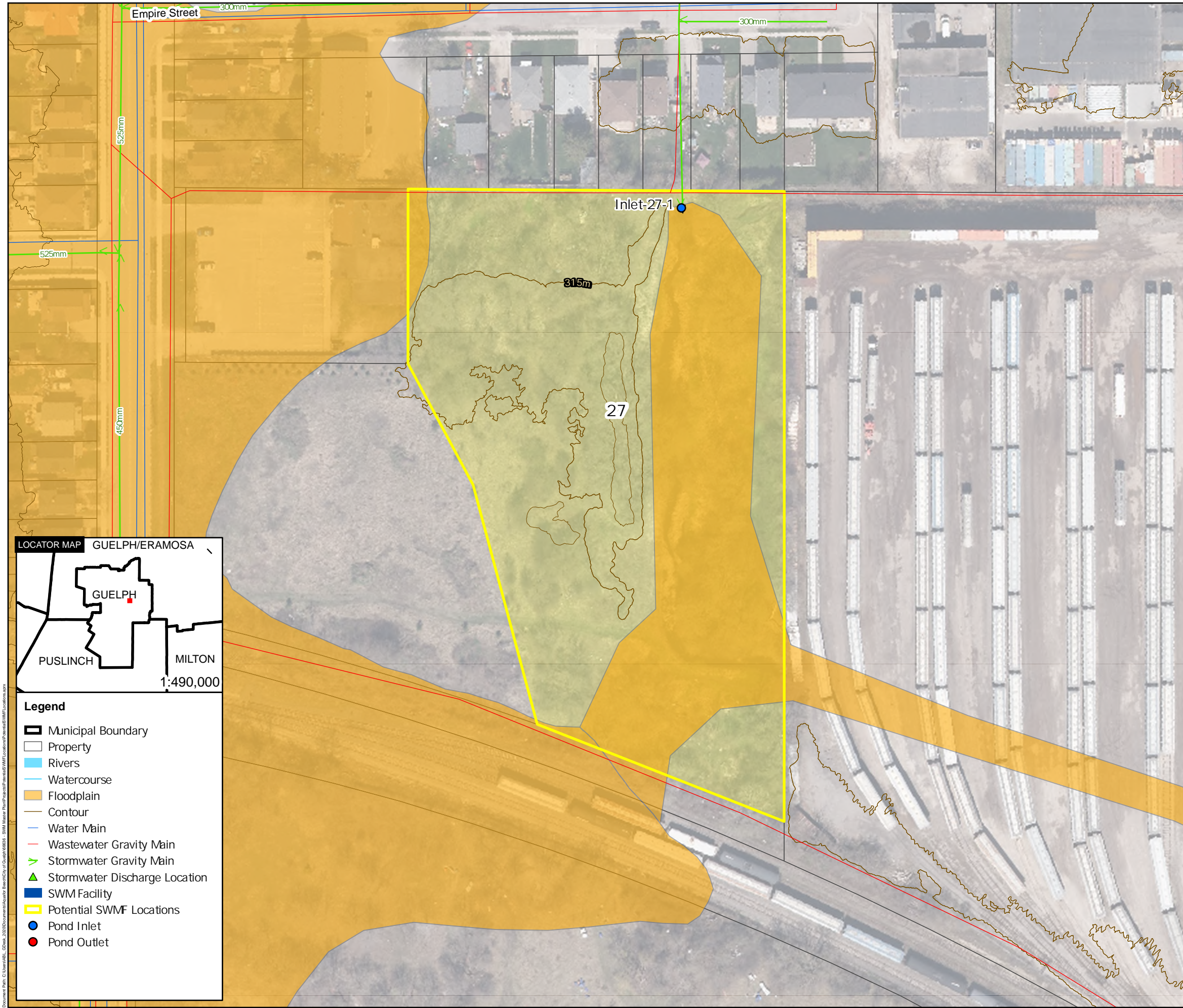
4.11 Stevenson / Guelph Junction Railway (Site 27)

Owned by the City of Guelph, the site is a vacant lot at Stevenson Street and Guelph Junction Railway Municipal Street. The land was previously used for unknown industrial purposes. There is an existing stormwater channel that conveys flows across the site. **Figure 4.20** presents the existing condition. The preferred alternative for Stevenson / Guelph Junction Railway is Alternative 2 – Wet Pond (**Table 4.12**). A conceptual design is presented as **Figure 4.21**.

Table 4.12: Stevenson / Guelph Junction Railway Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					



Legend

- Municipal Boundary
- Property
- Rivers
- Watercourse
- Floodplain
- Contour
- Water Main
- Wastewater Gravity Main
- Stormwater Gravity Main
- Stormwater Discharge Location
- SWM Facility
- Potential SWMF Locations
- Pond Inlet
- Pond Outlet

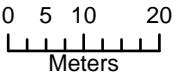


Possible SWM Facility Location 27: Stevenson / Guelph Junction Railway
Ownership: City of Guelph
Current Use: Vacant
Total Area: 1.27ha
Available Area: 1.27ha
Drainage Area: 177.90ha
TIMP: 42%
Inlets At: 300mm Ø storm sewer
Depth to Pipe Invert at Inlet: 0.0m
Outlets To: 1500mm Ø storm sewer
Depth to Pipe Invert at Outlet: 1.0m
Floodplain Present: Yes
Mature Trees: Yes
Identified Conflicts: Sanitary sewer along southern
Notes:
• Land previously used for unknown industrial purposes, with some debris remaining on site. Multiple monitoring wells recently installed across vacant parcels.
• Existing surface channel connects proposed pond inlet and outlet.
• Weigh station located in location of proposed channel relocation identified in 2007 design drawings.
• 2007 drawing indicates existing 600mm HDP outlet, but site visit indicated CSP pipe of unknown diameter.



End-of-Pipe Opportunities - Drainage Areas (27)

Date: 2021-10-14
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



CURRENT CONDITIONS:

Railway
Ownership: City of Guelph
Current Use: Vacant
Total Area: 1.27ha
Available Area: 1.27ha
Drainage Area: 177.90ha
TIMP: 42%
Inlets At: 300mm Ø storm sewer
Depth to Pipe Invert at Inlet: 0.0m
Outlets To: 1500mm Ø storm sewer
Depth to Pipe Invert at Outlet: 1.0m
Floodplain Present: Yes
Mature Trees: Yes
Identified Conflicts: Sanitary sewer along southern
Notes: Land previously used for unknown industrial purposes, with some debris remaining on site. Multiple monitoring wells recently installed across vacant parcels.

- Existing surface channel connects proposed pond inlet and outlet.
- Weigh station located in location of proposed channel relocation identified in 2007 design drawings.
- 2007 drawing indicates existing 600mm HDP outlet, but site visit indicated CSP pipe of unknown diameter

PROPOSED CONDITIONS:

System: Wet Pond Facility
Total Water Quality Storage Volume: 16310m³
Required Total Water Quality Storage Volume: 28187m³
Water Quality Active Storage: 7116m³
Permanent Pool Storage: 9150m³

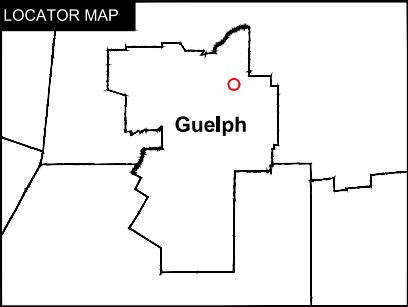
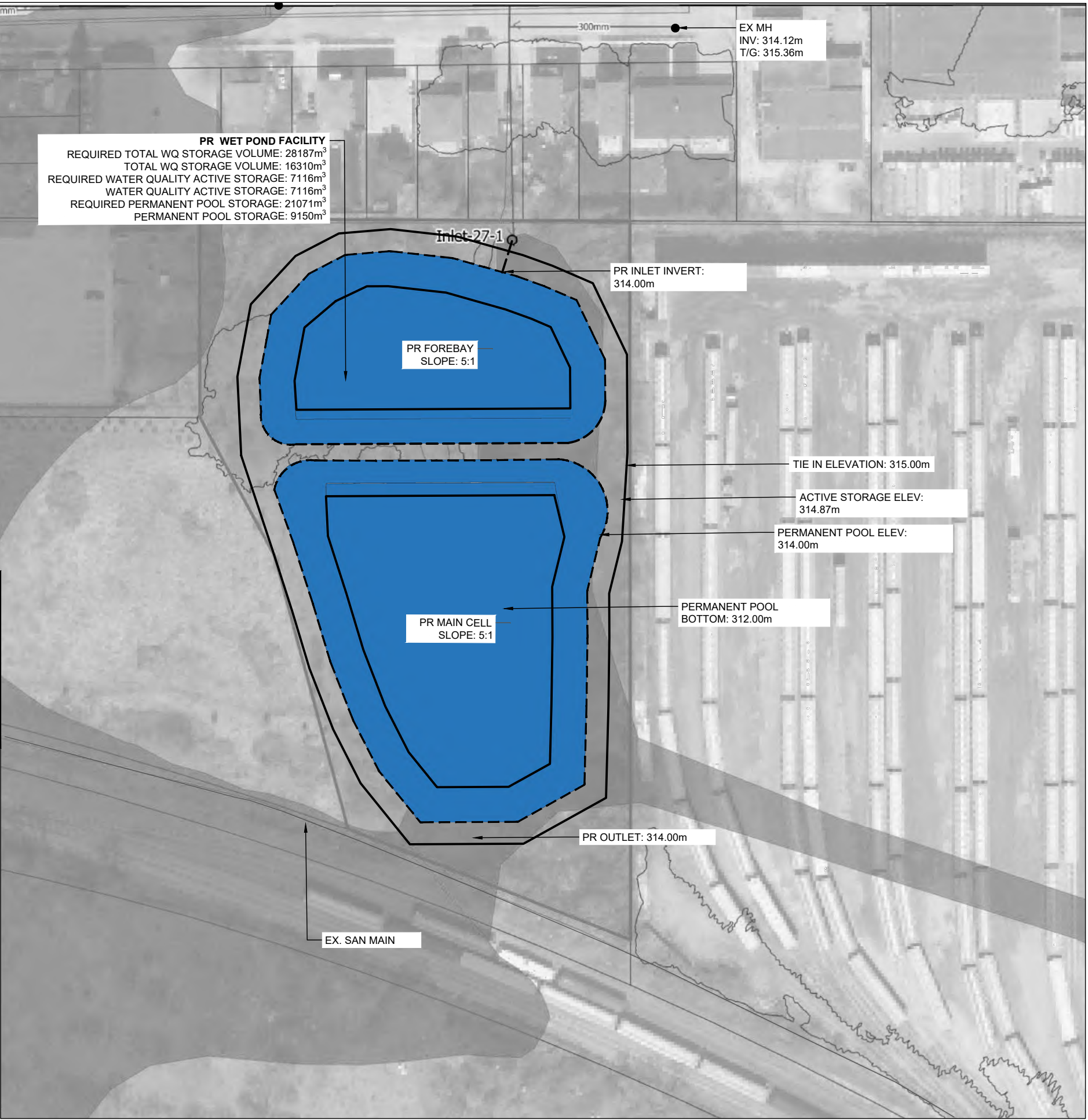
NOTES:

- WHPA Vulnerability Score: 10

Location 27: Stevenson / Guelph Junction
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.

0 5 10 20
Meters

























































- LEGEND:**
- EX. SAN MAIN
 - EX. STM MAIN
 - EX. WATER MAIN
 - PR. STM MAIN
 - PR. ESC FOOT PRINT
 - PR. SUB SURFACE FACILITY
 - PR. BIOSWALE
 - EX. MAINTENANCE HOLE

4.12 End of Dawn Avenue (Site 28)

Owned by the GRCA, the north end of Dawn Avenue is the low point where drainage from Lowes Avenue and Dawn Avenue collect. The site consists of a wetland and trail network. **Figure 4.22** presents the existing condition. A sixth alternative was included for analysis at this site, consisting of Low Impact Development facilities throughout the catchment. The preferred alternative for End of Dawn Avenue is Alternative 6 - Low Impact Development (**Table 4.13**). A conceptual design is presented as **Figure 4.23**.

Table 4.13: End of Dawn Avenue Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage	Low Impact Development
1. Physical/Natural Environment						
Potential Aquatic Habitat Benefit						
Potential Water Quality Benefit						
Potential to Reduce Erosion						
Potential to Reduce Flooding						
Potential to Improve Terrestrial Habitat						
Integration with Existing Environment						
2. Social/Cultural Environment						
Aesthetic / Recreation						
Integration with other City Plans, Policies and Initiatives (Programs)						
Compatibility with Adjacent Land Use						
Community Disruption						
Public Health and Safety Objectives						
Potential to Provide Public Safety Objectives – Physical Characteristics						

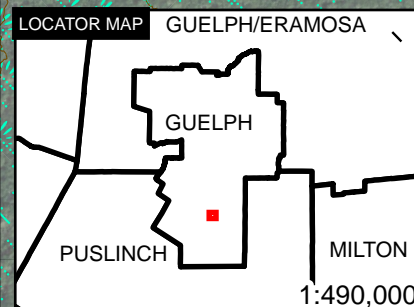
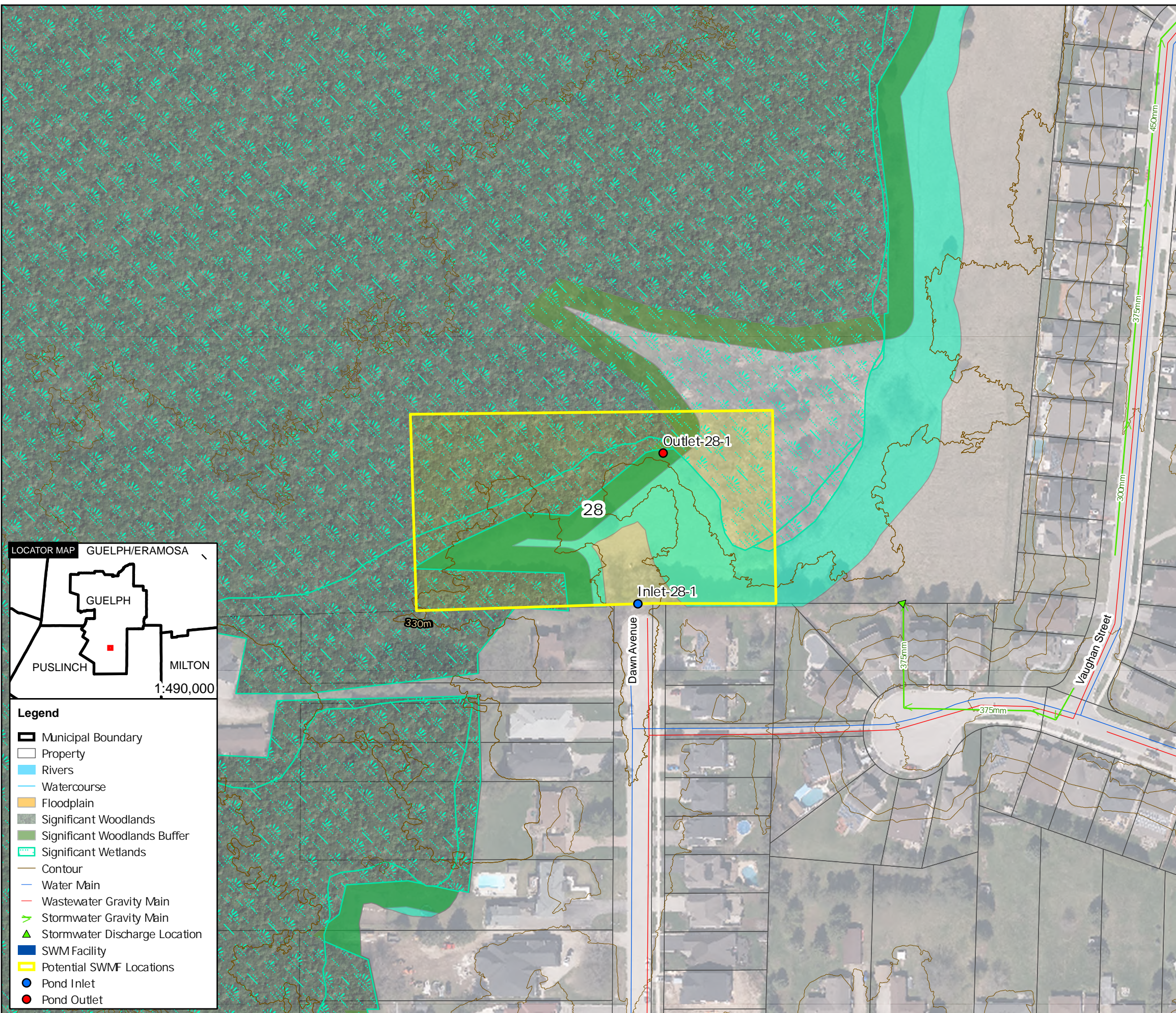
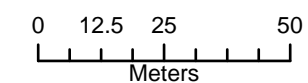
Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage	Low Impact Development
3. Economic Environment						
Construction Costs						
Long term O&M Costs						
Life Cycle Costs						
Infrastructure Protection						
4. Technical/Engineering Considerations						
Ease of Implementation						
Agency Acceptance						
Technical Feasibility						
Integration with Existing Infrastructure						
Total Score						

Possible SWM Facility Location 28: End of Dawn Avenue
Ownership: Grand River Conservation Authority
Current Use: Vacant
Total Area: 1.06ha
Available Area: 0.064ha
Drainage Area: 8.63ha
TIMP: 31%
Inlets At: Surface Channel
Ground Elevation at Inlet: 329.92m
Outlets To: Surface Channel
Ground Elevation at Outlet: 329.67m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: None
Notes:
• Significant sediment accumulation along Dawn Avenue due to poor erosion and sediment control practices at construction site on Lowes Road West.
• Two monitoring wells located at proposed location.
• Trail and interpretive sign present.
• Cul-de-sac at lower elevation than proposed location.
• Drainage pipe inlet present at end of cul-de-sac, but o outlet location unknown.



End-of-Pipe Opportunities - Drainage Areas (28)

Date: 2021-10-14
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



- Legend**
- Municipal Boundary
 - Property
 - Rivers
 - Watercourse
 - Floodplain
 - Significant Woodlands
 - Significant Woodlands Buffer
 - Significant Wetlands
 - Contour
 - Water Main
 - Wastewater Gravity Main
 - Stormwater Gravity Main
 - Stormwater Discharge Location
 - SWM Facility
 - Potential SWMF Locations
 - Pond Inlet
 - Pond Outlet

CURRENT CONDITIONS:

Possible SWM Facility Location 28: End of Dawn Avenue
Ownership: Grand River Conservation Authority
Current Use: Vacant
Total Area: 1.06ha
Available Area: 0.064ha
Drainage Area: 8.63ha
TIMP: 31%
Inlets At: Surface Channel
Ground Elevation at Inlet: 329.92m
Outlets To: Surface Channel
Ground Elevation at Outlet: 329.67m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: None
Notes:Significant sediment accumulation along Dawn Avenue due to poor erosion and sediment control practices at construction site on Lowes Road West.

- Two monitoring wells located at proposed location.
- Trail and interpretive sign present.
- Cul-de-sac at lower elevation than proposed location.
- Drainage pipe inlet present at end of cul-de-sac, but outlet location unknown.

PROPOSED CONDITIONS:

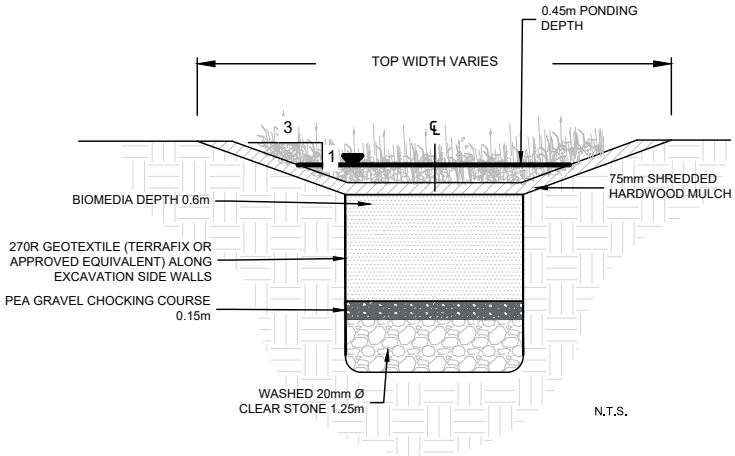
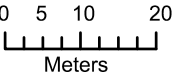
System:
Total Facility Storage: 1006m³
Total Required Storage: 1639m³ (5 Year Storm Design)
Volume Reduction (%): 61%

NOTES:

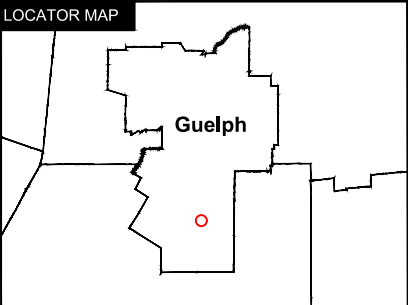
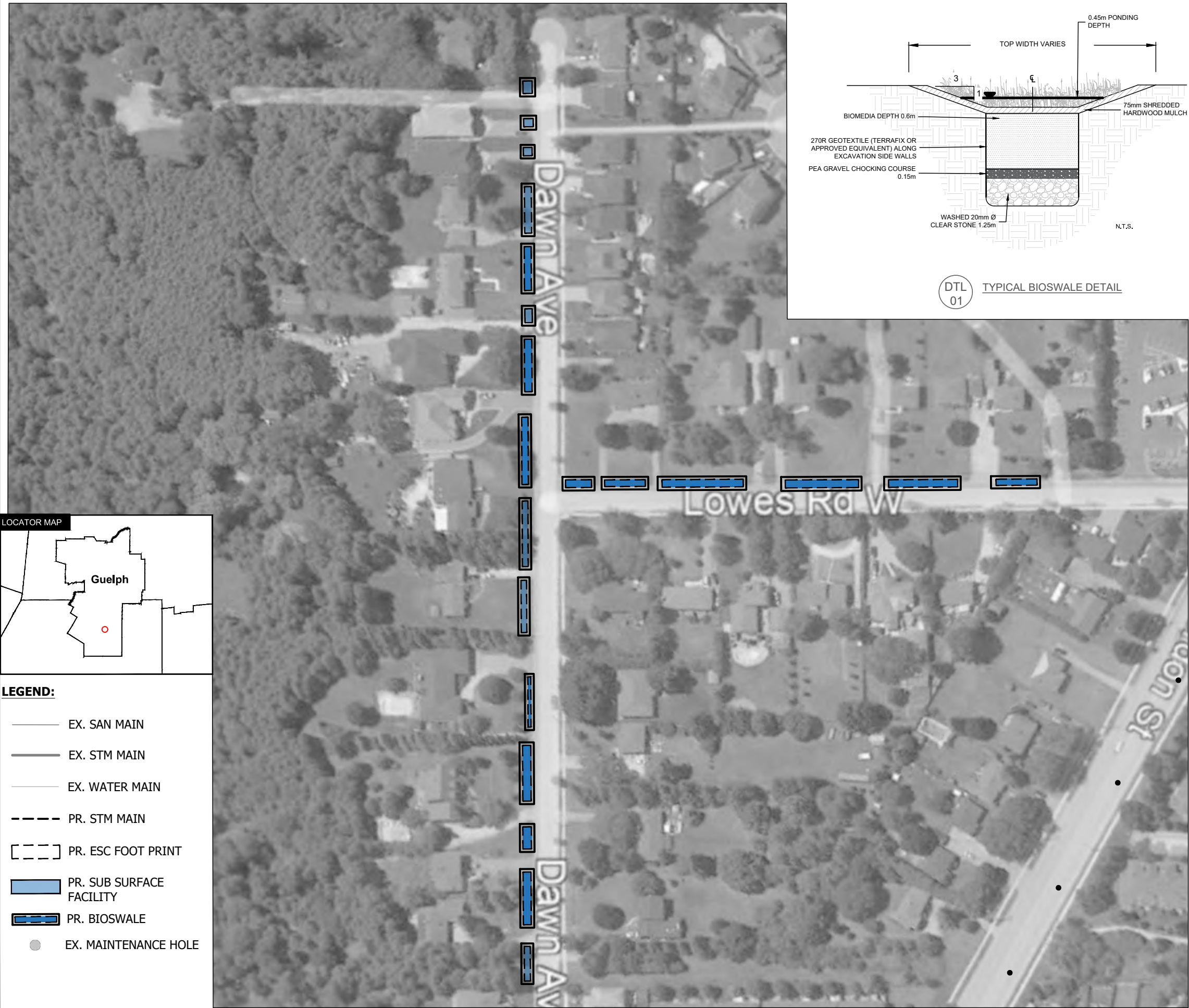
- Retrofit of existing ditch system along Dawn Avenue and Lowes Road to provide water quantity control
- WHPA Vulnerability Score: 8
- Power lines run along street
- Bioswale locations along Lowes Road are dependent on final layout of new development, available storage volumes are based on existing conditions.

Location 28: End Of Dawn Avenue
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



DTL
01 TYPICAL BIOSWALE DETAIL












































































































- LEGEND:
- EX. SAN MAIN
 - EX. STM MAIN
 - EX. WATER MAIN
 - PR. STM MAIN
 - PR. ESC FOOT PRINT
 - PR. SUB SURFACE FACILITY
 - PR. BIOSWALE
 - EX. MAINTENANCE HOLE

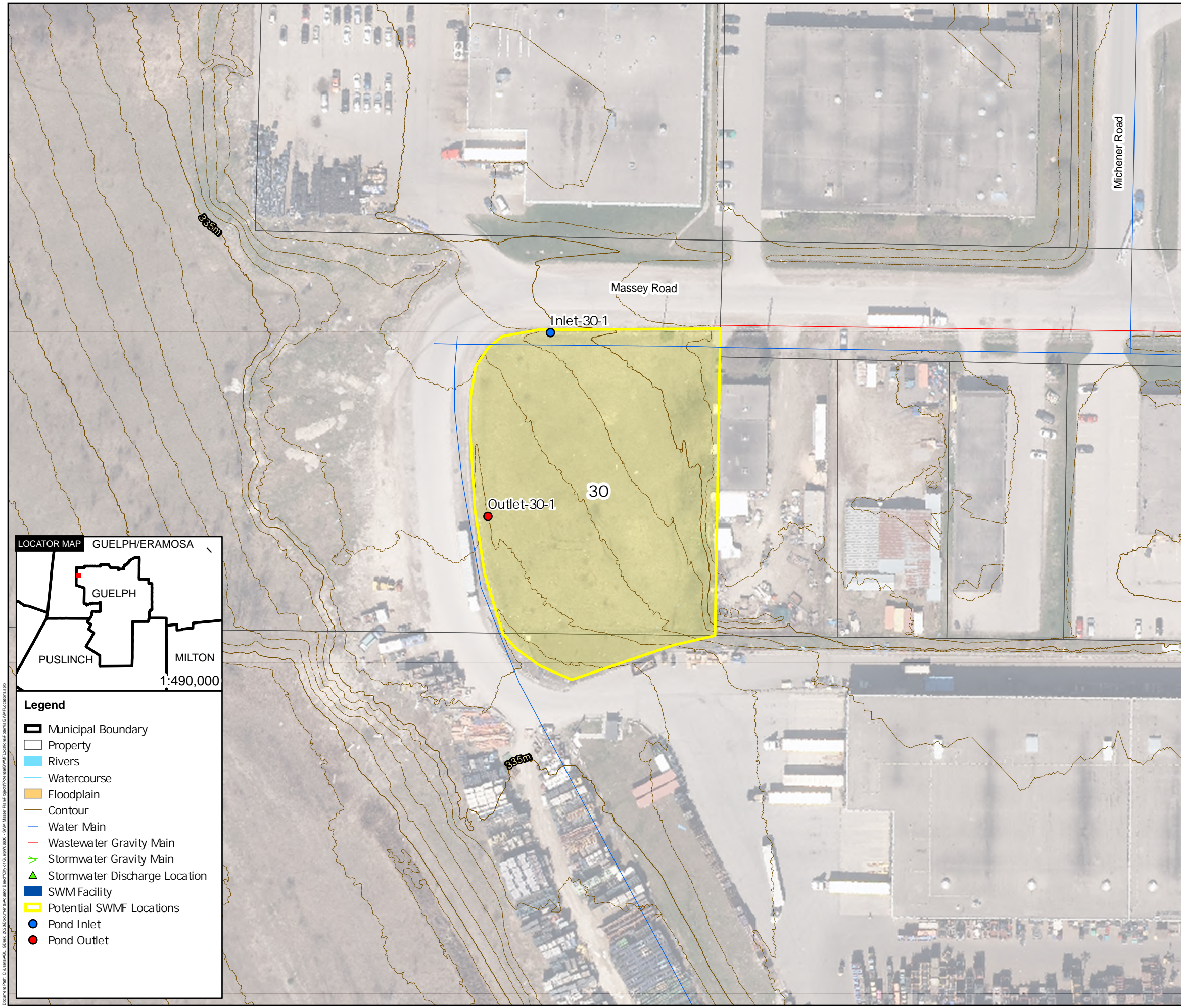
4.13 606 Massey Road (Site 30)

Owned by the City of Guelph, 606 Massey Road is an unused, vacant lot on the western end of Massey Road. **Figure 4.24** presents the existing condition. The preferred alternative for 606 Massey Road is Alternative 2 – Wet Pond (**Table 4.14**). A conceptual design is presented as **Figure 4.25**.

Table 4.14: 606 Massey Road Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

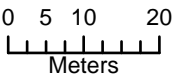


Possible SWM Facility Location 30: 606 Massey Road
Ownership: City of Guelph
Current Use: Vacant
Total Area: 0.53ha
Available Area: 0.53ha
Drainage Area: 5.1ha
TIMP: 72%
Inlets At: Surface Channel
Ground Elevation at Inlet: 339.19m
Outlets To: No Outlet
Ground Elevation at Outlet: 337m
Floodplain Present: No
Mature Trees: No
Identified Conflicts: None
Notes:
• Cell tower located at northeast corner of site.
• No visible outlet from site.
• Ditch on north side of Massey Road discharges uncontrolled to vacant land to the west. No evidence of channelization visible.
• West side of Massey Road used for storage.



End-of-Pipe Opportunities - Drainage Areas (30)

Date: 2021-10-14
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



CURRENT CONDITIONS:

Possible SWM Facility Location 30: 606 Massey Road
Ownership: City of Guelph
Current Use: Vacant
Total Area: 0.53ha
Available Area: 0.53ha
Drainage Area: 5.1ha
TIMP: 72%
Inlets At: Surface Channel
Ground Elevation at Inlet: 339.19m
Outlets To: No Outlet
Ground Elevation at Outlet: 337m
Floodplain Present: No
Mature Trees: No
Identified Conflicts: None
Notes:

- Cell tower located at northeast corner of site.
- No visible outlet from site.
- Ditch on north side of Massey Road discharges uncontrolled to vacant land to the west. No evidence of channelization visible.
- West side of Massey Road used for storage.

PROPOSED CONDITIONS:

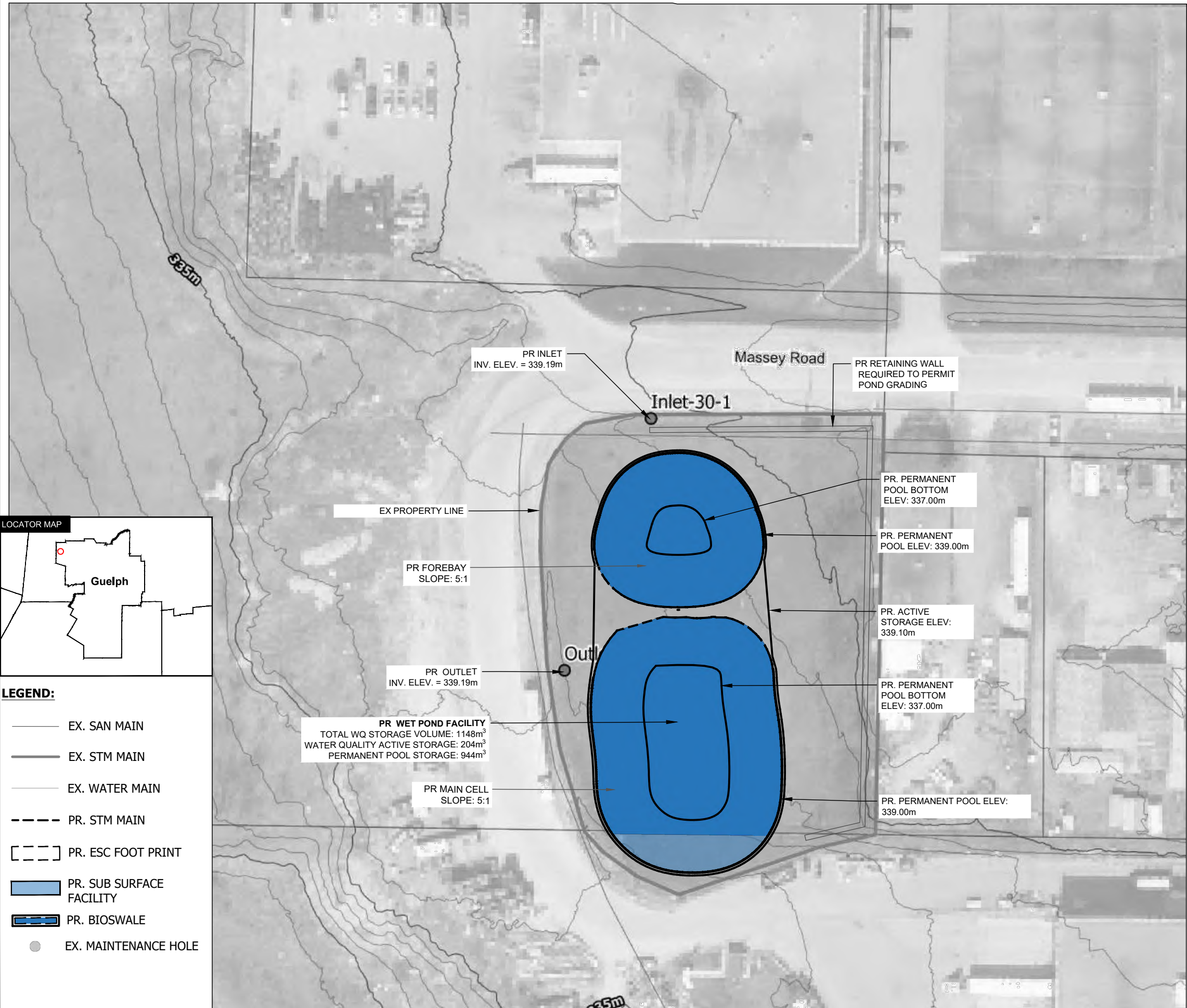
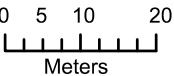
System: Wet Pond Facility
Total Water Quality Storage Volume: 1147m³
Total Required Water Quality Storage Volume: 1147m³
Water Quality Active Storage: 204m³
Permanent Pool Storage: 944m³

NOTES:

- WHPA Vulnerability Score: 8
- Retaining measures will be require along the north and east sides of the parcel

Location 30: 606 Massey Road
End-of-Pipe Concept Design





























































Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.
















































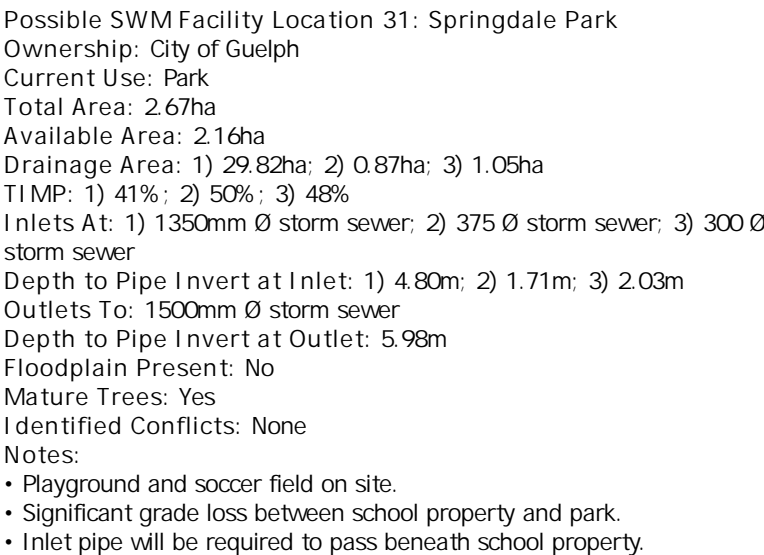
4.14 Springdale Park (Site 31)

Owned by the City of Guelph, Springdale Park is located between Springdale Boulevard, West Acres Drive, and Parkview Crescent. Current site uses include a playground and soccer field. **Figure 4.26** presents the existing condition. The preferred alternative for Springdale Park is Alternative 5 - Subsurface Storage Facility (**Table 4.15**). A conceptual design is presented as **Figure 4.27**.

Table 4.15: Springdale Park Preferred Alternative Evaluation

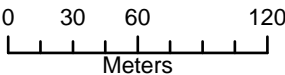
Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					



End-of-Pipe Opportunities - Drainage Areas (31)

Date: 2021-10-14
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



CURRENT CONDITIONS:

Possible SWM Facility Location 31: Springdale Park
Ownership: City of Guelph
Current Use: Park
Total Area: 2.67ha
Available Area: 2.16ha
Drainage Area: 1) 29.82ha; 2) 0.87ha; 3) 1.05ha
TIMP: 1) 41%; 2) 50%; 3) 48%
Inlets At: 1) 1350mm Ø storm sewer; 2) 375 Ø storm sewer; 3) 300 Ø storm sewer
Depth to Pipe Invert at Inlet: 1) 4.80m; 2) 1.71m; 3) 2.03m
Outlets To: 1500mm Ø storm sewer
Depth to Pipe Invert at Outlet: 5.98m
Floodplain Present: No
Mature Trees: Yes
Identified Conflicts: None
Notes:

- Playground and soccer field on site.
- Significant grade loss between school property and park.
- Inlet pipe will be required to pass beneath school property.

PROPOSED CONDITIONS:

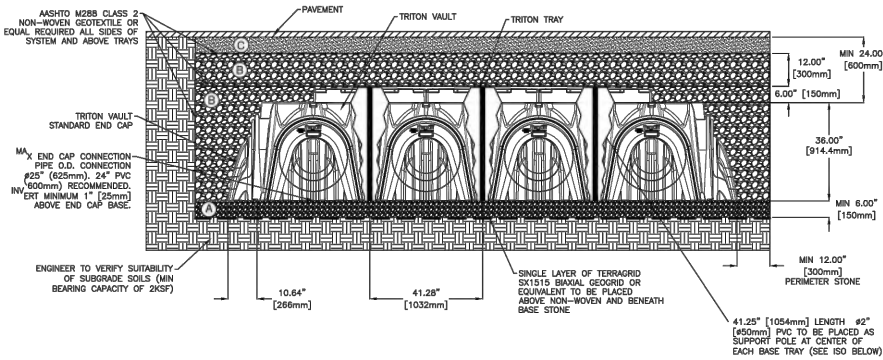
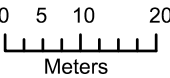
System: Subsurface Infiltration/Storage Facility
Facility Footprint: 2831.16m²
Total Facility Storage: 3907m³
Total Required Storage (enhanced water quality): 3907m³
Volume Reduction (%): 100%

NOTES:

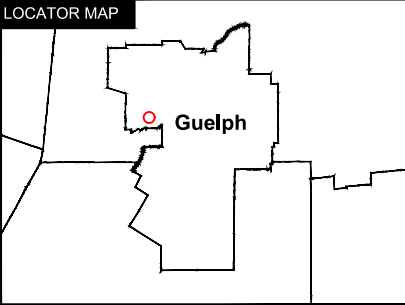
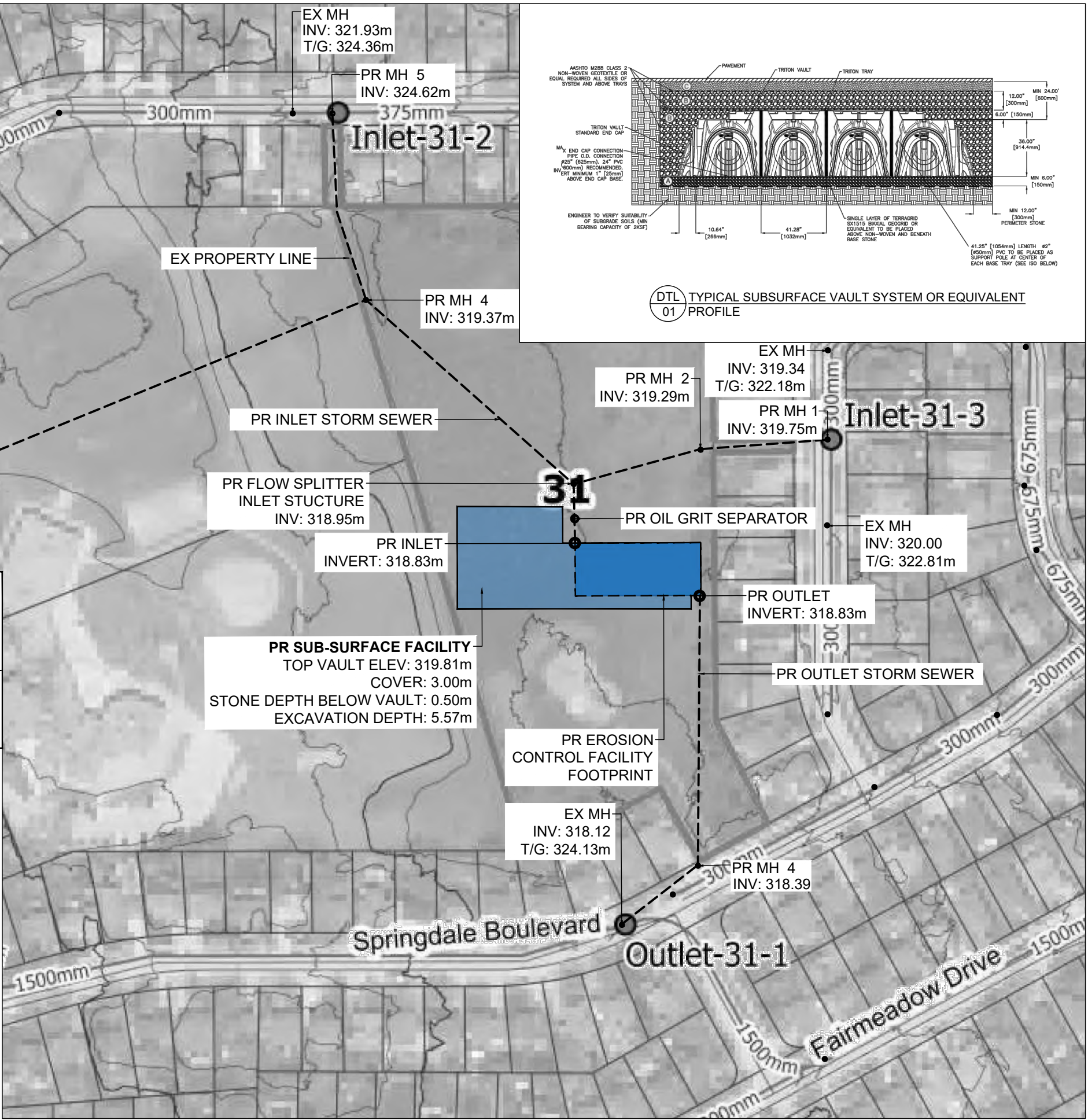
- Multiple inlets may be required to bring flow into proposed vault system
- WHPA Vulnerability Score: 10

Location 31:Springdale Park
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



DTL 01 TYPICAL SUBSURFACE VAULT SYSTEM OR EQUIVALENT PROFILE












































































































- LEGEND:**
- EX. SAN MAIN
 - EX. STM MAIN
 - EX. WATER MAIN
 - PR. STM MAIN
 - PR. ESC FOOT PRINT
 - PR. SUB SURFACE FACILITY
 - PR. BIOSWALE
 - EX. MAINTENANCE HOLE

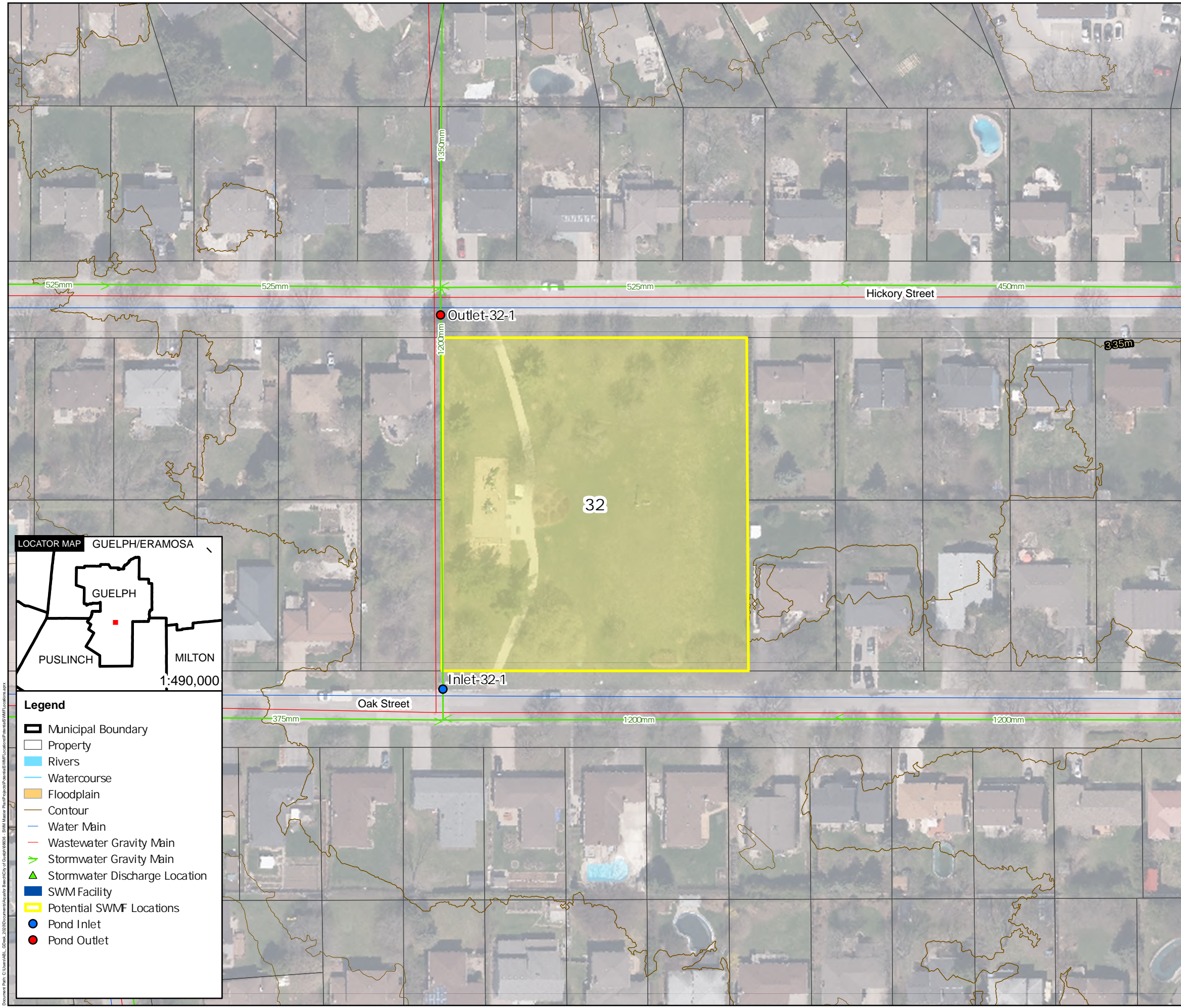
4.15 Oak Street Park (Site 32)

Owned by the City of Guelph, Oak Street Park is located between Oak Street and Hickory Street. Current site uses include a playground, trail, and winter ice rink. **Figure 4.28** presents the existing condition. The preferred alternative for Oak Street Park is Alternative 5 - Subsurface Storage Facility (**Table 4.17**). A conceptual design is presented as **Figure 4.29**.

Table 4.16: Oak Street Park Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
3. Economic Environment					
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

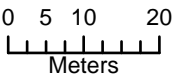


Possible SWM Facility Location 32: Oak Street Park
Ownership: City of Guelph
Current Use: Park
Total Area: 0.70ha
Available Area: 0.70ha
Drainage Area: 29.65ha
TIMP: 39%
Inlets At: 1200mm Ø storm sewer
Depth to Pipe Invert at Inlet: 3.87m
Outlets To: 1200mm Ø storm sewer
Depth to Pipe Invert at Outlet: 4.20m
Floodplain Present: No
Mature Trees: No
Identified Conflicts: Hydro Line
Notes:
• Hydro line crosses park from east to west.
• Ice rink in park during winter.
• Playground and trail present.



End-of-Pipe Opportunities - Drainage Areas (32)

Date: 2021-10-14
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



CURRENT CONDITIONS:

Possible SWM Facility Location 32: Oak Street Park
Ownership: City of Guelph
Current Use: Park
Total Area: 0.70ha
Available Area: 0.70ha
Drainage Area: 29.65ha
TIMP: 39%

Inlets At: 1200mm Ø storm sewer
Depth to Pipe Invert at Inlet: 3.87m
Outlets To: 1200mm Ø storm sewer
Depth to Pipe Invert at Outlet: 4.20m
Floodplain Present: No
Mature Trees: No
Identified Conflicts: Hydro Line

Notes:

- Hydro line crosses park from east to west.
- Ice rink in park during winter.
- Playground and trail present

PROPOSED CONDITIONS:

System: Subsurface Infiltration/Storage Facility
Facility Footprint: 2401.45m²
Total Facility Storage: 3314m³
Total Required Storage (enhanced water quality): 3314m³
Volume Reduction (%): 100%

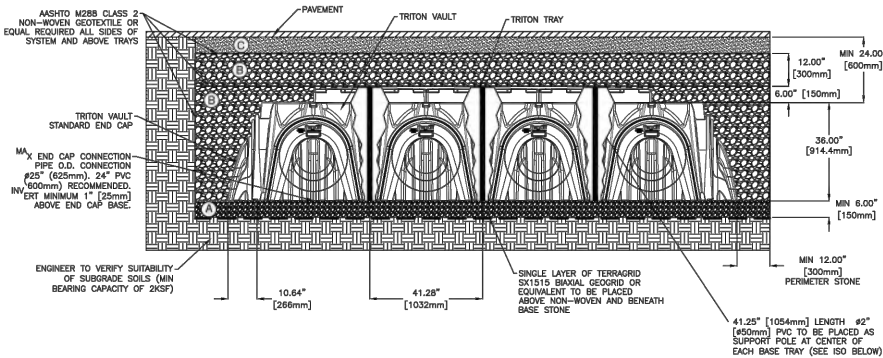
NOTES:

- Multiple inlets may be required to bring flow into proposed vault system
- WHPA Vulnerability Score: 6

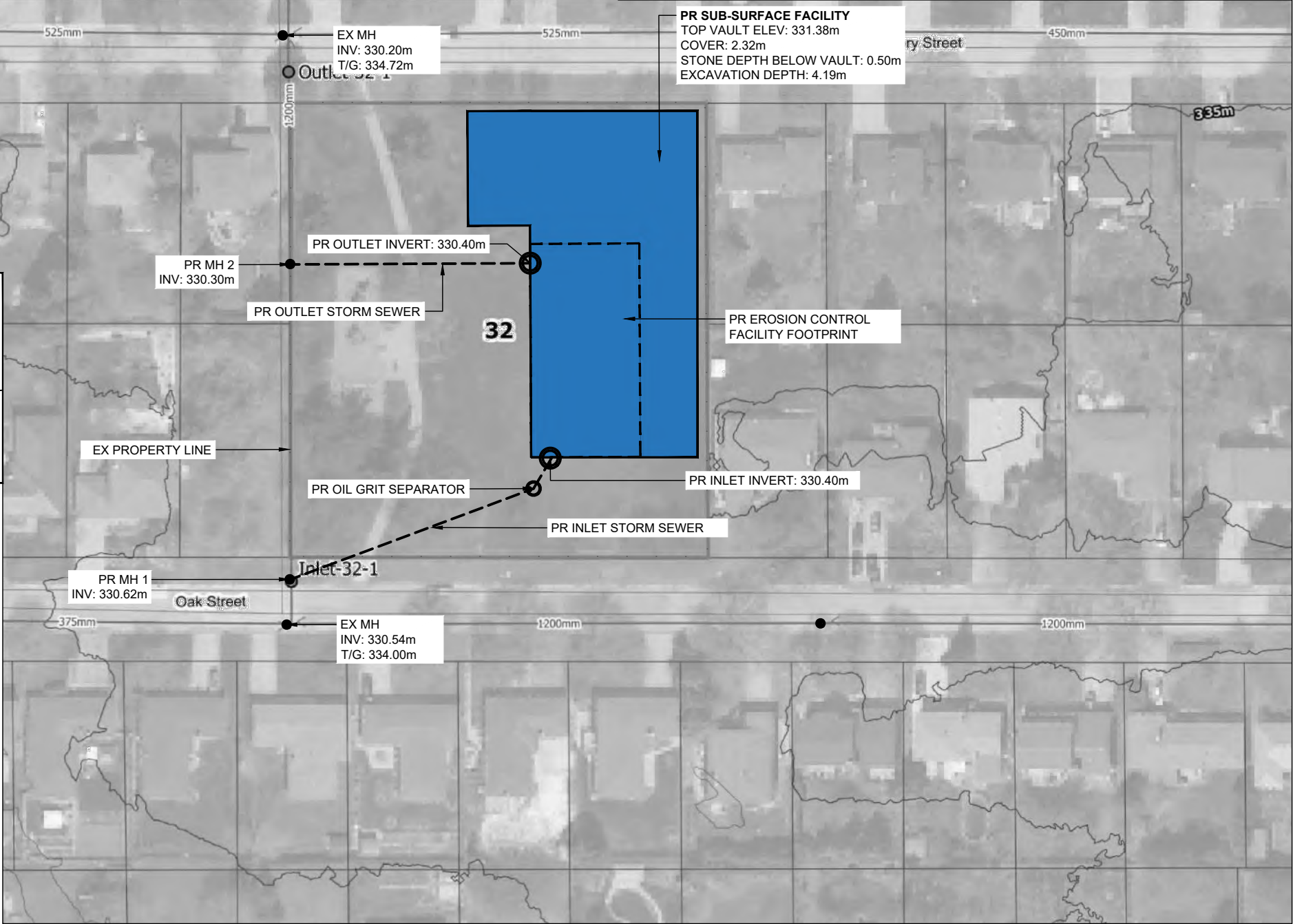
Location 32: Oak Street Park
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.

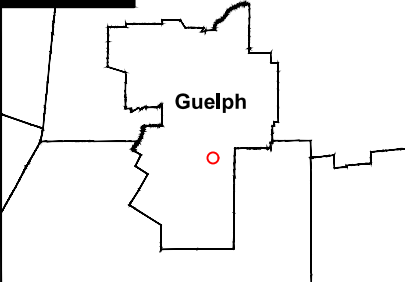
0 5 10 20
Meters



DTL TYPICAL SUBSURFACE VAULT SYSTEM OR EQUIVALENT
01 PROFILE



LOCATOR MAP































































LEGEND:














































- EX. SAN MAIN
- EX. STM MAIN
- EX. WATER MAIN
- PR. STM MAIN
- PR. ESC FOOT PRINT
- PR. SUB SURFACE FACILITY
- PR. BIOSWALE
- EX. MAINTENANCE HOLE

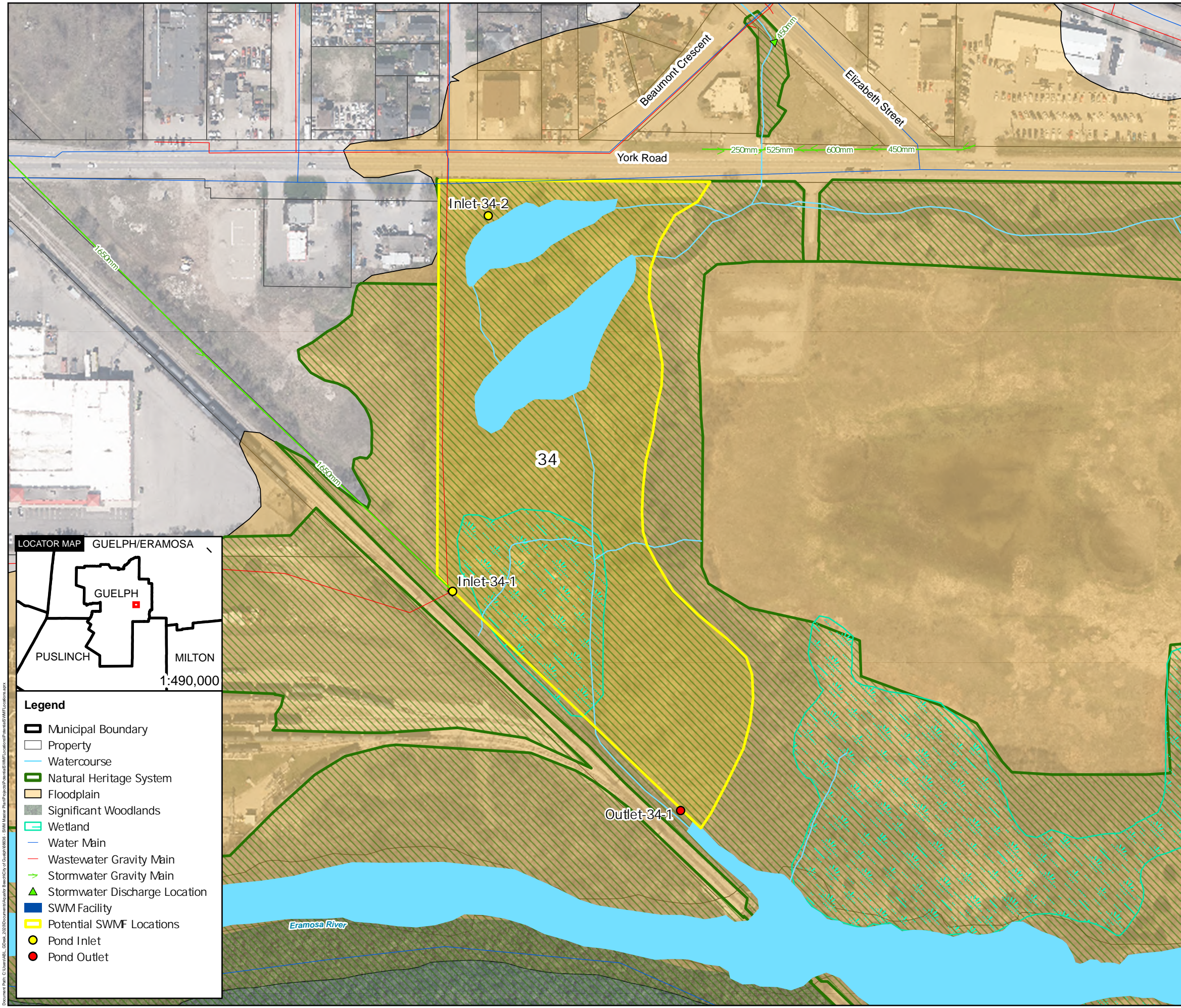
4.16 End of Industrial Street (Site 34)

Owned by the City of Guelph, Site 34 is a parcel on the south side of York Road at the end of Industrial Street. The site is currently vacant, and includes wetland, two constructed water bodies, and informal trails. **Figure 4.30** presents the existing condition. The preferred alternative for Centennial Park is Alternative 2 – Wet Pond (**Table 4.17**). A conceptual design is presented as **Figure 4.31**.

Table 4.17: End of Industrial Street Preferred Alternative Evaluation

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
1. Physical/Natural Environment					
Potential Aquatic Habitat Benefit					
Potential Water Quality Benefit					
Potential to Reduce Erosion					
Potential to Reduce Flooding					
Potential to Improve Terrestrial Habitat					
Integration with Existing Environment					
2. Social/Cultural Environment					
Aesthetic / Recreation					
Integration with other City Plans, Policies and Initiatives (Programs)					
Compatibility with Adjacent Land Use					
Community Disruption					
Public Health and Safety Objectives					
Potential to Provide Public Safety Objectives – Physical Characteristics					
3. Economic Environment					

Evaluation Criteria	Do Nothing	Wet Pond	Constructed Wetland	Hybrid Facility	Subsurface Storage
Construction Costs					
Long term O&M Costs					
Life Cycle Costs					
Infrastructure Protection					
4. Technical/Engineering Considerations					
Ease of Implementation					
Agency Acceptance					
Technical Feasibility					
Integration with Existing Infrastructure					
Total Score					

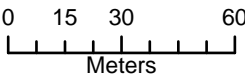


Possible SWM Facility Location 34: End of Industrial Street
Ownership: City of Guelph (pending)
Current Use: Natural Heritage
Total Area: 3.46ha
Available Area: 3.46ha
Drainage Area: 229.16ha
TIMP: 44.06%
Inlets At: 1) Existing 1650mm Ø storm sewer; 2) Proposed twin 1800mm x 900mm storm sewer
Depth to Pipe Invert at Inlet: 2m (assumed)
Outlets To: Proposed channel
Depth to Pipe Invert at Outlet: N/A
Floodplain Present: Yes
Mature Trees: Yes
Identified Conflicts: Sanitary main
Notes:
• Informal trails present, with associated dumping
• Evidence of recent beaver activity
• Two outfalls currently discharge into existing ponds. Evidence of historical control structures on watercourse between the two ponds.
• Significant erosion noted associated with the Victoria Street Outfall along the Guelph Junction Railway.
• Potential wetlands at south end of parcel. If wetland presence confirmed, available area may be decreased pending GRCA direction.



End-of-Pipe Opportunities - Drainage Areas (34)

Date: 2022-09-02
Projection: NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.



CURRENT CONDITIONS:

Possible SWM Facility Location 34: End of Industrial Street
Ownership: City of Guelph (pending)
Current Use: Natural Heritage
Total Area: 3.46ha
Available Area: 3.46ha
Drainage Area: 229.16ha
TIMP: 44.06%
Inlets At: 1) Existing 1650mm Ø storm sewer; 2) Proposed twin 1800mm x 900mm storm sewer
Depth to Pipe Invert at Inlet: 2m (assumed)
Outlets To: Proposed Channel
Depth to Pipe Invert at Outlet: N/A
Floodplain Present: Yes
Mature Trees: Yes
Identified Conflicts: Sanitary Main
Notes:
• Informal trails present, with associated dumping
• Evidence of recent beaver activity
• Two outfalls currently discharge into existing ponds. Evidence of historical control structures on watercourse between the two ponds.
• Significant erosion noted associated with the Victoria Street Outfall along the Guelph Junction Railway
• Potential wetlands at south end of parcel. If wetland presence confirmed, available area may be decreased pending GRCA direction.

PROPOSED CONDITIONS:

System: Wet Pond Facility
Total Required Water Quality Storage: 37358m³
Total Water Quality Storage Provided: 37404m³
Water Quality Active Storage Provided: 9171m³
Permanent Pool Storage: 28233m³

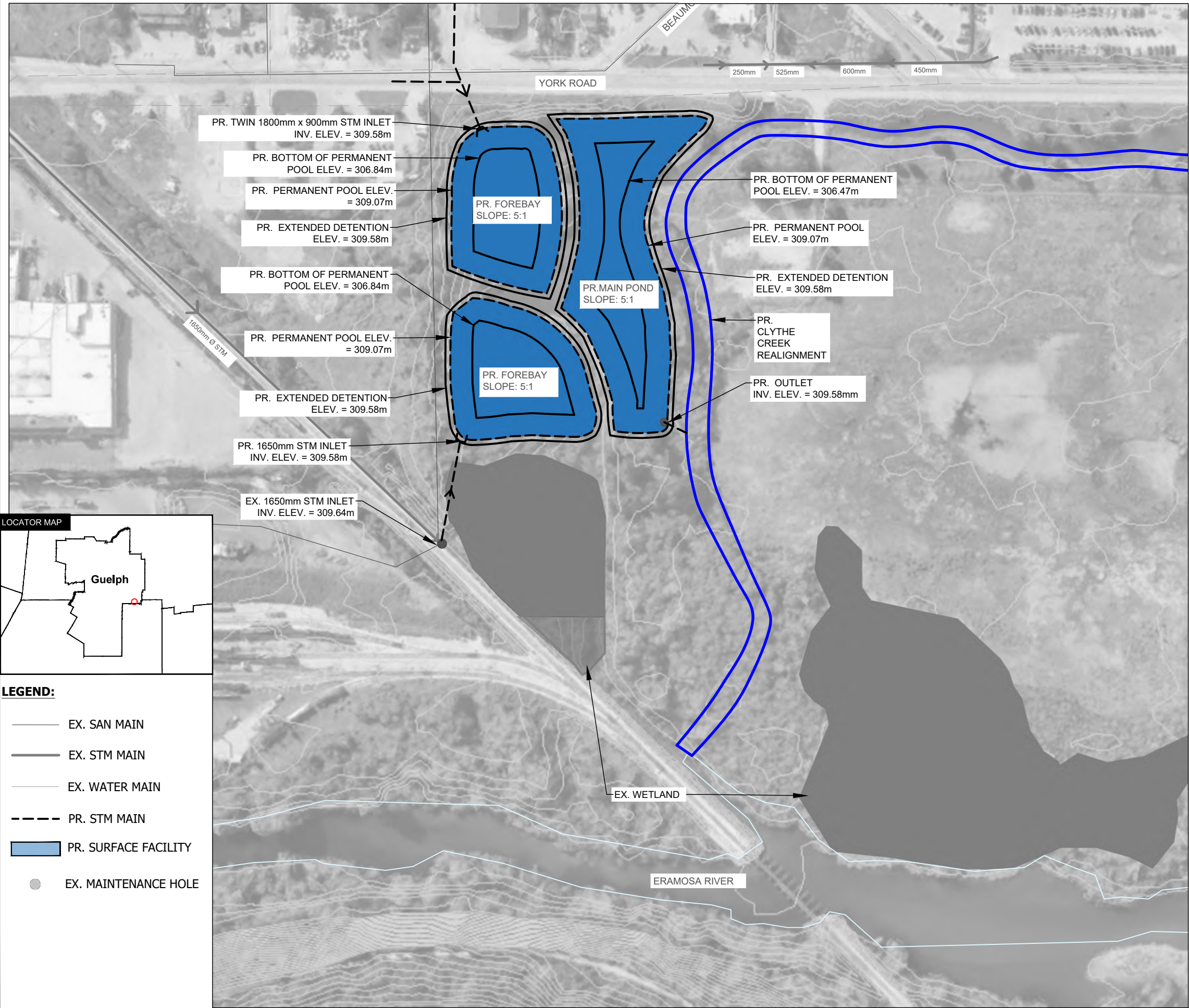
NOTES:

Additional storage above facility maybe feasible, but must be confirmed in detailed design.

Location 34: End of Industrial Street
End-of-Pipe Concept Design

Date: 2021-10-05 Projection:
NAD83_UTM_Zone_17N
Data Source: City of Guelph, GRCA
Created by: A.V.

0 5 10 20
Meters



5.0 Summary and Next Steps

The evaluation completed above identified that the preferred alternative of fifteen (15) of the sixteen (16) proposed SWM facilities is the construction of a SWM facility, whether a subsurface facility, wet pond, or LID facility. The preferred alternatives are summarized in **Table 5.1**.

Table 5.1: Summary of Preferred Alternatives

Site ID	Location Name	Recommended Facility Type
1	Golfview Park	Subsurface Storage Facility
2	Waverley Park	Subsurface Storage Facility
3	Victoria Road Recreation Centre	Subsurface Storage Facility
4	Green Meadows Park	Do Nothing
5	Bailey Park	Subsurface Storage Facility
8	Exhibition Park	Subsurface Storage Facility
14	Dunhill Place Park	Subsurface Storage Facility
16	Margaret Greene Park	Surface Facility
18	Centennial Park	Subsurface Storage Facility
26	L-13 Windsor Park	Subsurface Storage Facility
27	Stevenson / Guelph Junction Railway	Surface Facility
28	Dawn Avenue	Low Impact Development
30	606 Massey Road	Surface Facility
31	Springdale Park	Subsurface Storage Facility
32	Oak Street Park	Subsurface Storage Facility
34	End of Industrial Street	Surface Facility

The final prioritization of each of the preferred alternatives identified above will be determined by integrating these alternatives with other stormwater, infrastructure, and environmental management objectives as part of the forthcoming Implementation Plan.