MASTER SERVICING STUDY:
WATER, WASTEWATER
AND TRANSPORTATION SERVICING

PARKBRIDGE MEAFORD DEVELOPMENT

MUNICIPALITY OF MEAFORD
COUNTY OF GREY

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by Parkbridge Lifestyle Communities Inc. (Parkbridge) to prepare a Water, Wastewater and Transportation Master Servicing Study for the proposed Parkbridge Meaford Development. Parkbridge describes their proposed Meaford Development as a comprehensive and complete mixed-use community with residential and supporting non-residential uses that serves residents' needs through integration of both public and private spaces.

The purpose of this Water, Wastewater, and Transportation Engineering Master Servicing Study is to investigate servicing alternatives for the Parkbridge Meaford Development in consultation with the Municipality of Meaford. This Master Servicing Study explores and evaluates servicing options and identifies the most suitable solutions for water, wastewater and transportation infrastructure. It was completed in a comprehensive, environmentally sound manner in accordance with good engineering practice. The Master Servicing Study will support the Official Plan Amendment (OPA) application subject to the Planning Act (*Planning Act, R.S.O. 1990, c. P.13*) and the preferred servicing alternatives identified herein will be expanded upon through subsequent engineering studies through the Planning Process.

The proposed development (site) resides to the east of the defined Urban Settlement Area of the Municipality of Meaford. The Municipality of Meaford, located within Grey County, is surrounded by the City of Owen Sound to the west, the Town of The Blue Mountains to the east, and the Georgian Bay shoreline to the north. The socio-economic environment in Meaford is influenced by the waterfront location with a strong recreational tourist-based economy.

The site is located in a geographic location known as the "Southeast Clay Banks". The site is approximately 135 ha, and is bounded by Georgian Bay to the north, existing residential lands to the northeast, Christie Beach Road to the east, Provincial Highway 26 to the south, and land designated and zoned for open space to the west. The Georgian Trail runs parallel to Highway 26 through the southern portion of the site. **Figure 1** illustrates the site location.

The Municipality of Meaford approved the Terms of Reference (TOR) for this Master Servicing Study in an email dated March 18, 2020. The Ministry of Transportation Ontario (MTO) also agreed upon an established transportation Terms of Reference for this project, dated July 8, 2022. A copy of the Master Servicing Study TOR and authorization is provided in **Appendix A** and **Appendix B** contains a copy of the MTO TOR.

Background Documents

Many background documents were reviewed and consulted as part of this study. The documents reviewed are grouped into the following categories:

- Parkbridge Meaford Development Supporting Studies
- Town of Meaford Planning
- Grey County Planning
- Town of Meaford Water and Wastewater System
- Town of The Blue Mountains Water and Wastewater System
- Transportation: Provincial Highway 26

Parkbridge Meaford Development Supporting Studies

- Geotechnical Investigation and Slope Stability Study Parkbridge Lifestyle Communities Project Highway 26 and Christie Beach Road Meaford, Ontario (DS Consultants Ltd., July 4, 2022)
- Geotechnical and Slope Stability Due Diligence, Northwest Quadrant of Highway 26 and Christie Beach Road, Meaford ON (WSP Canada, September 2016)
- Preliminary Geotechnical Investigation Proposed Residential Subdivision Barker Street Meaford, Ontario (Peto MacCallum LTD., May 2018)
- Stage 1 Archaeological Background Study of the Christie Beach Lower Lands (Bluestone Research Inc., January 2017)
- Stage 2 Archaeological Assessment of the Parkbridge Christie Beach Property at 2052817 and 207065 Highway 26 (Bluestone Research Inc., September 2017)
- Reasonable Use / Feasibility Study Proposed Residential Subdivision Barker Street Meaford, Ontario (Peto MacCallum LTD., September 2018)
- Due Diligence Water Quality Assessment (WSP Canada, June 2016)
- Parkbridge Meaford Development Residential Market Justification and Fiscal Benefits Assessment (Parcel Economics Inc., January 22, 2024)
- Parkbridge Meaford Development Commercial Needs Assessment (Parcel Economics Inc., January 22, 2024)
- Planning and Urban Design Rationale and Comprehensive Review, Parkbridge Meaford Development (Bousfields Inc., January 2024)
- Environmental Impact Study Parkbridge – Christie Beach (Neil Morris, January 2024)
- Parkbridge Meaford Development Master Plan (SvN, January 16, 2024)

Town of Meaford Planning Documents

- Municipality of Meaford Official Plan (Municipality of Meaford, approved by the County of Grey in March 2023)
- Meaford Zoning By-Law (60-2009, 2019)
- Grey County Official Plan: Re-colour Grey (Grey County, 2019)

Town of Meaford Water Supply and Wastewater Systems

- Municipality of Meaford Master Plan Water and Wastewater Servicing Volume 1 and 2 (Ainley Group, April 2015)
- Municipality of Meaford Water Pollution Control Plant Uncommitted Reserve Capacity, 2017 Year End (Ainley Group, December 2018)
- Meaford Wastewater Treatment Plant Annual Report for the Year 2023 (Municipality of Meaford, 2023)
- Meaford WWTP Servicing Allocation (Municipality of Meaford, 2020)
- Municipality of Meaford Ultimate Water Supply and Distribution System Model Update (Ainley & Associates LTD., January 2011)
- Municipality of Meaford Water Treatment Plant Summary & Annual Reports 2023
- 2023 Operating and Capital Budget (Municipality of Meaford, March 2023)
- Municipality of Meaford Expansion of Meaford Wastewater Treatment Plant Class EA Public Information Centre (October 12, 2023)
- Municipality of Meaford Development Criteria and Standard Drawings (November 2023)

Town of The Blue Mountains Water Supply and Wastewater System

- The TOBM Comprehensive Environmental Study Report for the Lora Bay, Clarksburg, Thornbury and Camperdown Service Areas Phase 2 Report (Skelton Brumwell & Associates & MacViro, July 2002)
- Phase 3 Residential Development West of Roundabout and Adjacent to Sunset Blvd. February 2007
- Water and Wastewater Servicing Extension Plan Staff Report (Allison Kershaw, January 2019)
- 2018 Year End Water & Wastewater Capacity Assessment Staff Report (Allsion Kershaw, August 2019)
- Water and Wastewater Capacity Assessment 2020 Year End Report (Town of The Blue Mountains, May 2021)
- TOBM Engineering Services for Water Distribution Capital Improvements (Author, August 9, 2016)
- TOBM Westside Storage & Pumping Capacity Class Environmental Assessment (J.L. Richards & Associates, April 2020)
- Town of The Blue Mountains Westside Storage Class EA (J.L. Richards & Associates, June 2020)
- Environmental Assessment – Phase 2 Report: Town of the Blue Mountains Municipal Class Environmental Assessment Westside Water Storage and Pumping (J.L. Richards & Associates, October 2021)
- Master Plan – Project File Report: Town of The Blue Mountains Municipal Master Plan for Town-Wide Water Distribution System (J.L. Richards & Associates, October 2019)
- Parkbridge Meaford Development, Water and Wastewater Analysis: Water Modelling Analysis (J.L. Richards, June 29, 2023)
- Parkbridge Meaford Development, Water and Wastewater Analysis: Wastewater Modelling Analysis (J.L. Richards, August 15, 2023)
- Town of The Blue Mountains Engineering Standards (May 29, 2023)

Transportation Supporting Documentation

- Ontario Provincial Highways Traffic Volumes 1988-2016 (Ministry of Transportation June 2017)
- Ontario Provincial Highways Traffic Volumes 1988-2019 (Ministry of Transportation, April 2023)
- TOBM Planning and Development Projects, Development Activity GIS Mapping

2.0 Master Servicing Study Process and Policy Context

This Master Servicing Study was prepared to address the Terms of Reference (TOR) agreed upon with the Municipality of Meaford. The purpose of the Master Servicing Study is to comprehensively investigate servicing alternatives for the Parkbridge Meaford development in consultation with the Municipality and other stakeholders. The Master Servicing Study explores servicing options in a comprehensive, environmentally sound manner in accordance with good engineering practice, to identify the most suitable servicing option(s) for water, wastewater and transportation infrastructure to service the development.

This Master Servicing Study will be included as part of the submission to the Municipality for Official Plan Amendment and will be reviewed through the Planning Process per the *Planning Act, R.S.O. 1990, c.P.13*. As such, there are provincial, regional, and municipal policies which are referenced throughout to guide the development of the site.

2.1 Background

A Class Environmental Assessment (Class EA) was initiated in 2019 to assess the servicing alternatives for the Study Area including the Parkbridge Meaford site. Following subsequent changes in scope to the development and development plans in the surrounding area, and through consultation with the Ministry of the Environment, Conservation and Parks (MECP), it was agreed that the servicing infrastructure for the development is not subject to requirements under the *Environmental Assessment Act, R.S.O. 1990, c.E.18*. The MECP confirmed via teleconference on March 6, 2020, that O.Reg 345/93, a designating regulation for Private Sector Developers, only designates Schedule C activities that are provided for the residents of a municipality as an undertaking to which the *Planning Act,1990* applies. The EA Notice of Study Initiation, Notice of Study Closure, and Meeting Minutes from the teleconference with the MECP are attached in **Appendix C**.

The need for a Master Servicing Study was identified by the Municipality of Meaford following the closure of the Class EA for the Parkbridge Meaford development, and the TOR was developed in consultation with the Municipality.

The Parkbridge Meaford development constitutes a mixed-use community that will be serviced through a local road network so that any potential servicing connection to an adjacent municipality can be constructed through an existing right-of-way (ROW), negating any immediate requirements for a Schedule C EA if selected. If the Preferred Solution results in an infrastructure project that is identified as a Schedule C Class EA Project (e.g. new water source(s), new wastewater treatment plant, etc.), then Class EA requirements will be triggered through O.Reg 345/93. It would be reasonable to proceed to these steps only upon review and general agreement from the Municipality on the initial servicing direction and shortlisting of alternatives investigated through this Master Servicing Study.

The TOR for the Master Servicing Study indicates that the Study will be completed in a comprehensive and environmentally sound manner in accordance with good engineering practice. To facilitate the assessment of alternatives, the study parameters are generally mirrored after the Municipal Class EA Process. Similar to the requirements of a Class EA, this Master Servicing Study identifies and assesses alternative solutions and the proposed alternatives using a series of criteria to measure each alternative. This allows for assessment of the overall system and long-range infrastructure planning to comprehensively identify need and establish broader infrastructure options.

The assessment includes:

- Review of background and supporting studies
- Completion of evaluation matrices
- Identification of alternative solutions and preferred solution(s)
- Public consultation process (through the Planning Act Process)

For the public consultation process, Parkbridge held a non statutory open house in February 2023. Statutory meetings will occur throughout the planning process once applications have been filed.

2.2 Policy and Regulation Context

A diverse range of policies and regulations apply to the site. All or part of the site is subject to a set of provincial, county, and municipal policies and plans including:

- *Conservation Authorities Act R.S.O. 1990, C.27*
- *Environmental Assessment Act, R.S.O. 1990, c. E.18*
- *Environmental Protection Act, R.S.O. 1990, c. E.19*
- *Ontario Water Resources Act, R.S.O. 1990, c. O.40*
- *The Planning Act R.S.O. 1990, C.P13*
- *Safe Drinking Water Act, 2002, S.O. 2002, c. 32*
- *Clean Water Act, 2006, S.O. 2006, c. 22*
- The Provincial Policy Statement (2020)
- Grey County Official Plan (2019)
- Meaford Official Plan (2023)

These policies and plans are broad and integrated policy tools which help to guide and shape development.

The *Planning Act, 1990* provides the framework for land use planning in the Province of Ontario and sets forward the policy direction for planning procedure, provincial interest, growth, environmental protection, and adequate and efficient use of infrastructure, including wastewater, water systems and waste management systems. *The Planning Act, 1990* forms the basis for provincial planning policies (Provincial Policy Statement) and municipal planning instruments (e.g., Official Plans, Zoning By-laws). Key policies in *The Planning Act* provide direction on sustainable economic development in a healthy natural environment and the integration of matters of provincial interest. Of key interest is the protection of ecological systems, conservation of natural resources, and development designed to be sustainable and desirable in built form. *The Planning Act, 1990* also provides the Ministry of Municipal Affairs and Housing (MMAH) with the approval authority with respect to the use of land and provides site-specific requirements for new development (e.g., Minister Zoning Order) that would prevail over other policies and regulations.

The Conservation Authorities Act, 1990 provides for the organization and delivery of programs and services that further the conservation, restoration, development, and management of natural resources in watersheds in Ontario. *The Conservation Authorities Act* aims to apply a prevention-first approach built around the management of watersheds and authorizes the formation of conservation authorities and their respective roles, responsibilities and governance in resource management and environmental protection. Through the permissions in the *Conservation Authorities Act*, *1990*, the Grey Sauble Conservation Authority (GSCA) has jurisdiction in all matters provided for in the *Conservation Authorities Act R.S.O. 1990, C.27*, including the development and implementation of policies and procedures such as the regulation of development around watershed communities. Many areas of the site are located within lands regulated by the GSCA;

therefore, the development of these lands shall generally be in compliance with GSCA policies, procedures and guidelines.

Key policies in the Provincial Policy Statement, 2020 provide direction on where and how growth and development will occur as well as areas that should be protected. The policies provide that growth be focused in settlement areas with direction on building strong and complete communities through the efficient use of land and infrastructure while protecting our resources. Development in this area must be consistent with the policy directions set out in the Provincial Policy Statement. Regional and municipal plans must be consistent with and conform to the Provincial Policy Statement and the Growth Plan.

The Grey County Official Plan (2019), also titled "Recolour Grey", was adopted on October 25, 2018. Schedule A of Recolour Grey identifies the Parkbridge Meaford development as being outside of the Meaford Settlement Area boundary and designated Rural and Hazard Lands, with some Inland Lakes and Shoreline areas in the northeast section of the property.

2.2.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) 2020 provides policy direction on matters of provincial interest related to land use planning and development. *The Planning Act,1990* requires that decisions affecting planning matters shall be consistent with policy statements issued under the *Planning Act,1990*. Policies generally relevant to this Master Servicing Study include:

- Efficient use of infrastructure, including:
    - Suitability of the infrastructure for the development
    - Use and optimization of existing infrastructure
    - Coordination and integration with land use planning and growth management
    - Financial viability over the lifecycle
    - Protects human health and safety
    - Protects the natural environment
- Planning for the impact of a changing climate
- Promotion of green infrastructure

The Master Servicing Study addresses the requirements of the Provincial Policy Statement through evaluation of the various alternative servicing solutions from a technical, natural and social environment and costs perspective. The servicing strategy considers growth of the proposed development and existing lot fabric in the immediate vicinity (i.e. Barker Street). There was also consideration granted for potential future growth areas in proximity to the potential servicing route(s) established.

The Master Servicing Study also addresses the Provincial Policy Statement items relating to the sewage and water services through evaluation of the various alternative water and sanitary sewer servicing solutions from a technical, natural, and social environment and costs perspective. Comparison of the various options is completed through the lens of the servicing hierarchy put forward by the PPS, with municipal water and sewer services preferred over private communal or private individual services. Furthermore, an evaluation of the capital and operational costs of each servicing alternative is completed.

The general strategy for stormwater management of the site is to provide quality control through the use of stormwater management ponds and low impact design features. Quantity control is not

specifically required provided safe conveyance to Georgian Bay is provided as the ultimate receiving body immediately adjacent the site. At this stage of the development, a direct outlet from the site to Georgian Bay (the ultimate receiver of stormwater runoff) is anticipated, which may reduce or eliminate the need for quantity controls onsite. Future studies will provide further detail on the stormwater management strategy chosen to meet the requirements of the Municipality and MECP through the planning process.

2.2.2 Grey County Official Plan

The Grey County Official Plan (Recolour Grey) 2019 designates the site as rural with hazard lands identified, and a component of inland lakes and shoreline settlement area in the northeast corner along Fraser and Barker Streets. The Grey County Official Plan (Grey County OP) outlines provisions for potentially designating or expanding settlement areas, contingent upon the availability of adequate infrastructure and public services conducive to sustainable development. This determination aligns with the policy framework of the PPS, with emphasis placed on ensuring financial viability, safeguarding public health and safety, and preserving the integrity of the natural environment. Servicing considerations for a new settlement area or settlement area expansion identified in the Grey County OP are generally aligned with the PPS and include:

- Efficient use of infrastructure, including:
    - Suitability of the infrastructure for the development
    - Use and optimization of existing infrastructure
    - Coordination and integration with land use planning and growth management
    - Financial viability over the lifecycle
    - Protects human health and safety
    - Protects the natural environment
- Cross jurisdictional considerations
- Sufficient water quantity, quality and assimilative capacity of water body to accommodate the development
- Analysis of transportation facilities

Furthermore, Recreational Resort Settlement Area policies are outlined in the Grey County OP that include the need to facilitate municipal service infrastructure and accommodate existing un-serviced development areas and areas with development potential within the existing land use type or in settlement areas. Recreational Resort Settlement Area Official Plan requirements also indicate the need to consider, where viable, integration of low-impact development techniques and green infrastructure.

The Master Servicing Study addresses the requirements of the Grey County OP through evaluation of the various alternative servicing solutions from a technical, natural and social environment and costs perspective, with particular attention to those policies that mirror the PPS policies identified in earlier sections. This study also includes review of cross-jurisdictional servicing considerations as part of the evaluation criteria. Additionally, a high-level stormwater management strategy is outlined in this Study, with more details to be provided through future zoning applications. Lastly, a fulsome transportation evaluation is completed through this Study.

2.2.3 Meaford Official Plan

The Meaford Official Plan (Meaford OP) 2023 designates the site as rural with Hazard Lands identified, and a component of shoreline area in the northeast corner along Fraser and Barker Streets. The Meaford OP also highlights the resource-based recreational use zoning requirements, in accordance with the Grey County OP. The Meaford OP, in keeping with the Grey County OP and the PPS, indicates that the proposed use must be serviced with an appropriate water supply and means of sewage disposal. Servicing considerations from the Meaford OP for resource-based recreational zoning also include the following:

- An appropriate program to monitor the effects the landuse designation has on the quality and quantity of groundwater, surface waters and the environment in general is developed
- The proposed use can be serviced with an appropriate water supply and means of sewage disposal
- If an expansion is proposed, the entire use is serviced by an appropriate water supply and means of sewage disposal
- Appropriate guarantees shall be in place to ensure that the impacts of the effluent from a private sewage treatment system on the lands (if required) on adjacent water supplies is monitored frequently
- Any extension to Municipal services will be technically and economically justified or necessary, and where the allocation of services to the development would not negatively impact the Municipality's objective to provide full municipal services to designated lands within the Urban Area
- Appropriate financial agreements, which may include cost sharing and cost recovery mechanisms are required as a condition of approval
- A Water Resources Management Report will be prepared
- The development may be phased to ensure the establishment of the resource based recreational use, and other public uses either in advance of, or concurrently with, the residential component.
- Where viable, watercourses shall be naturalized and integrated into the Master Plan

Furthermore, the Meaford OP outlines the requirements of a Comprehensive Servicing Analysis to be completed in support of municipal servicing infrastructure expansion:

> ***D1.8 Comprehensive Servicing Analysis***
> *A comprehensive servicing analysis is intended to provide information to the appropriate authority to determine the ability/capacity of the municipal servicing infrastructure to support new development and to ensure that the proposed infrastructure is compatible with the existing infrastructure. Prior to the consideration of any proposal to extend or provide municipal water or sewage services the following shall be provided to the satisfaction of the Municipality in terms of content and scope:*
>
> - *An evaluation of the scale and nature of both the specific development and the anticipated development beyond the extension or provision of the services;*
> - *An examination of the physical or environmental features of the land and their potential impacts to the provision of services, including financing;*
> - *An assessment of the capacity of the existing infrastructure leading to the development;*
> - *The layout of the proposed servicing system including pipes, pumping stations, emergency structures, etc.*

The Master Servicing Study addresses the requirements of the Meaford OP through evaluation of the various alternative servicing solutions from a technical, natural and social environment and costs perspective, particularly for those policies that mirror the PPS policies and Grey County OP policies identified in the earlier sections. The study also identifies anticipated traffic increases and assesses various transportation improvements to identify the preferred solution to address these increases.

Further planning and refinement of servicing requirements will be addressed in collaboration with the Municipality as the site proceeds through the planning process. For example, appropriate financial agreements including potential cost sharing and cost recovery will be identified and outlined in consultation with the Municipality as the developer moves forward with planning applications. Additionally, the development of a monitoring program, a water resources management report, and the layout of the detailed proposed servicing system will all occur through the planning process as the development is refined and the site applications move forward in consultation with the Municipality and other regulatory agencies.

2.3 Stakeholders

Key stakeholders were identified through the establishment of the Terms of Reference for the Master Servicing Study, as agreed with the Municipality of Meaford. The project is being undertaken by Parkbridge, with C.F. Crozier and Associates Inc. as their engineering consultant completing the Master Servicing Study works. The Municipality of Meaford is a critical stakeholder as the reviewer of the Master Servicing Study.

Various technical agencies and regulatory bodies were also identified to be consulted and involved to some level through the process. Many of these have or will also be consulted through the *Planning Act, 1990* processes and OPA submission, including:

- County of Grey
- Grey Sauble Conservation Authority (GSCA)
- Town of The Blue Mountains (TOBM)
- Ministry of Natural Resource and Forestry (MNRF)
- Ministry of the Environment, Conservation and Parks (MECP)
- Ministry of Transportation (MTO)
- Department of Fisheries and Oceans (DFO)
- Major utility companies
- Indigenous Communities

2.4 Review Agencies and Public Consultation

Public consultation is important to the success of the Master Servicing Study, and the public has received various opportunities to learn about and provide input throughout the project, and consultation will continue throughout the planning process. Consultation with the public and agencies is mandated by the *Planning Act, 1990* and realized through the Planning applications and review process. Public and agency participation is integral to the development and evaluation of the servicing alternatives for the Master Servicing Study and will continue throughout the planning process.

Preliminary contact with technical agencies and the public had been realized through the initiation of the subsequently closed Class EA Study, with publication of the following notices:

1. Notice of Commencement (October 24, 2019 & November 7, 2019)

   A Notice of Study Commencement was distributed in the Meaford Independent newspaper, on the Municipality of Meaford website, and the Parkbridge EA website to provide information on the EA Study, including the study approach, study area, problem statement, and contact details.

2. Notice of Study Closure (April 9, 2020, and April 16, 2020)

   A Notice of Study Closure was distributed to inform the public of the closure of the EA Study as it was no longer subject to the *Environmental Assessment Act, R.S.O. 1990, c. E.18*and that future planning applications will be outlined.

The Notices were placed in the Meaford Independent and copies of the Notice were sent out to each of the review agencies and individuals who requested being added to the mailing list. A copy of the Notices and the Review Agencies and Individuals contacted is included in **Appendix C.**

Further consultation continued to occur following the closure of the EA process, and in support of the preparation of this Master Servicing Study. These include, but are not limited to, the following:

- General project introduction meetings with Meaford, Grey County, Town of The Blue Mountains, and the Grey Sauble Conservation Authority (GSCA)
- Meetings with the Municipality of Meaford to understand their existing system, planned expansions with the Wastewater Treatment Plant Class EA addendum, and to complete water and wastewater servicing modelling.
- Meetings with the TOBM and their Consulting Engineer J.L. Richards to discuss their existing and planned water and wastewater systems including their TOBM Westside Storage Class EA.
- Multiple meetings between Parkbridge and the Municipality of Meaford to discuss the proposed development.
- Submission of a preliminary OPA/ZBLA application in December 2020 (submission deemed incomplete). Receipt of comments from Grey County and Town of The Blue Mountains.
- Circulation of submission materials to the GSCA and receipt of comments for review.
- A secondary "Pre-Consultation" meeting with the Municipality of Meaford to review the recommended servicing strategy and receive feedback.
- Communications with the Municipality of Meaford with respect to changes and adjustments to their Wastewater Treatment Plant Class EA addendum, and to request updated water and wastewater modelling to address an updated site plan.
- Attendance at Municipality of Meaford Class EA PIC on October 12th, 2023, and provide feedback on Class EA PIC.
- Non-statutory Public Information Centres with the Community to introduce and provide an update on the development plans and solicit feedback from the Community in 2021 and 2023.
- Communications with the TOBM and their consulting engineer J.L. Richards to discuss water and wastewater servicing opportunities and complete modelling.

Further review and feedback from the appropriate regulatory agencies will be conducted as the applications progress through the Planning Process.

3.0 Natural and Socio-Economic Environment

The following sections provides an overview of the current natural and socio-economic environment of the site.

3.1 Natural Environment

This section provides a summary of the physical setting, natural features and ecological resources of the site and surrounding areas based on the review of available maps, documents and publicly available information. Together with the site-specific details obtained through field investigations completed on the site, including review of the Environmental Impact Study (EIS) dated June 2023, a conceptual understanding of the physical properties of the site has been developed.

The site is situated along the shore of Georgian Bay in a geographic location known as the Southeast Clay Banks. The property is largely undeveloped land with one residential dwelling in the north central portion of the site overlooking Georgian Bay, and an abandoned airstrip on the western portion of the site. The Georgian Trail runs parallel to Provincial Highway 26 through the southern half of the site.

Vegetation on the property consists primarily of meadows with clusters of trees. External drainage from lands south of Highway 26 is conveyed through the site via existing watercourses and in-line ponds. Drainage is generally from south to north via sheet flow and a number of drainage draws, ditches and small watercourses that discharge to Georgian Bay.

The Southeast Clay Banks span from east to west along much of the shoreline in the Study Area with an approximately 50 m elevation drop to the shoreline at slopes ranging from of 1:1 to 2:1 (Horizontal: Vertical). The Southeast Clay Banks generally exhibit significant areas of exposed clay soils; evidence of ongoing erosion from stormwater runoff exists, particularly where runoff flows are concentrated on drainage draws. The Southeast Clay Banks transform into a lesser sloped ridge in the eastern portion of the site that is highly vegetated, where there are existing residences at the base of the ridge along the shoreline. Several drainage features traverse this portion of the ridge, crossing through an existing shoreline cottage area prior to discharging to Georgian Bay. Erosion due to stormwater runoff is less evident in the eastern portion of the site.

The site area above the Southeast Clay Banks is occupied by plant communities that are early succession or “Cultural” in nature, while the site area below the ridge on the eastern section of the site is almost entirely wooded.

Only one plant species of conservation concern (SOCC) was observed (Black Ash) and was found primarily within the property in the northern section below the ridge. Eight species of fauna were identified to be either SOCC or Species at Risk (SAR) within or near the properties. The Eastern Meadowlark is the only SAR within the property, consisting of 2 or 3 breeding territories within a 10 ha expanse of cultural meadow habitat in the site.

Approximately 47 ha of Significant Woodlands and approximately 10 ha of wetlands were identified onsite, although the characteristics are such that most have relatively limited ecosystem function and value. As stated in the Environmental Impact Study (EIS) completed by Neil Morris, some encroachment into Significant Woodlands and/or their adjacent lands could occur without

negative impacts, depending on extent and specific locations of encroachment. No Provincially Significant Wetlands (PSWs) were identified on the site. No Provincially Significant Areas of Natural and Scientific Interest (ANSI) were identified on the site. Some encroachment on wetlands could occur without negative impacts subject to GSCA permitting regulations. There is localized presence of burrowing crayfish (a SOCC) in areas associated with some watercourses onsite.

3.2 Source Water Protection

The Clean Water Act, 2006, S.O. 2006, c. 22 provides a framework for provincial drinking water source protection programs in Ontario. Its focus is on the protection of raw water sources for municipal drinking water systems across the province. Under the *Clean Water Act, 2006* a drinking water threat is defined as "an activity or condition that adversely affects or has the potential to adversely affect the quality or quantity of any water that is or may be used as a source of drinking water".

As part of the *Clean Water Act, 2006* vulnerable areas are delineated around surface water intake systems and wellheads for every existing and planned municipal drinking water system that is located in a Source Protection Area. These vulnerable areas are known as surface Intake Protection Zones (IPZs) and Wellhead Protection Areas (WHPAs).

The Site Lands are located within the Grey Sauble Source Protection Area which is governed by the Grey Sauble Source Protection Authority (GSSPA). The GSSPA is one of the three source protection authorities comprising the Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region and authorized to act under legislated powers of Ontario's *Clean Water Act, 2006*. The general mandate for each Source Protection Plan is to locally manage or remove activities that are or could be a *Significant Threat* to drinking water sources. However, for the threat to be considered "Significant", this is dependent on the type of threat and the proximity to a wellhead or intake.

According to the Approved Saugeen, Grey Sable, Northern Bruce Peninsula Source Protection Plan (2015), there are twenty-one (21) activities incorporating risk to drinking water sources through impacts to quality within the region's Source Protection Plan. The activities include:

1. The establishment, operation, or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act, R.S.O. 1990, c. E.19*.

2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage.

3. The application of agricultural source material to land.

4. The storage of agricultural source material.

5. The management of agricultural source material.

6. The application of non-agricultural source material to land.

7. The handling and storage of non-agricultural source material.

8. The application of commercial fertilizer to land.

9. The handling and storage of commercial fertilizer.

10. The application of pesticide to land.

11. The handling and storage of pesticide.

12. The application of road salt.

13. The handling and storage of road salt.

14. The storage of snow.

15. The handling and storage of fuel.

16. The handling and storage of a dense non-aqueous phase liquid.

17. The handling and storage of an organic solvent.

18. The management of runoff that contains chemicals used in the de-icing of aircraft.

19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.

20. An activity that reduces the recharge of an aquifer.

21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.

It should be noted that the following activities also incorporate risk to drinking water sources through impacts of quantity:

19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.

20. An activity that reduces the recharge of an aquifer.

Chapter 3 of the Approved Source Protection Plan (2015) provides corresponding resources which outline under what circumstances, each activity above has the potential to be considered a *Significant Drinking Water Threat*.

A review of Ontario's Source Protection Information Atlas mapping revealed that the Subject Lands include the following source protection features:

- Intake Protection Zone 2 (IPZ-2)
    - Vulnerability Index Score of 4 – 5.99
- Intake Protection Zone 3 (IPZ-3)
    - Vulnerability Index Score of 4 or less.
- Event-Based Area (EBA)
    - Vulnerability Index Score of N/A
- Highly Vulnerable Aquifer (HVA)

    - Vulnerability Index Score of 6.
- Significant Groundwater Recharge Area (SGRA)
    - Vulnerability Index Score of 2, 4, and 6.

Regarding the IPZ-2 and IPZ-3, it is important to note, according to the Approved Source Protection Plan (2015), *Significant Drinking Water Threats* only exist if the Vulnerability Index Score is greater than 8 for IPZ-2 areas. Similarly, no scenarios exist where *Significant Drinking Water Threats* are classified for IPZ-3 areas. Therefore, no source protection policy tools are triggered as a result of the proposed development within the IPZ-2 and IPZ-3 areas.

For the EBA, "the handling and storage of fuel" represents the only activity that has the potential to incur a *Significant Drinking Water Threat* on the Subject Lands. As this activity is not planned for the proposed development, no source protection policies are applicable.

Similarly, for the HVAs and SGRAs on the Subject Lands, with Vulnerability Index Scores maxing out at 6, no source protection policies are applicable.

Refer to the **Appendix D** for Source Water Mapping.

3.3 Social Environment

The social environment encompasses existing communities, residential areas and recreational facilities. Consideration must be given to the potential impacts to these communities including potential impacts to access, noise and vibration impacts, air quality impacts, and aesthetics.

Land Use

The Grey County Official Plan (Recolour Grey) 2019 designates the site as rural with Hazard Lands identified, and a component of inland lakes and shoreline settlement area in the northeast corner along Fraser and Barker Streets. The Meaford Official Plan (Meaford OP) 2023 designates the site as rural with hazard lands identified, and a component of shoreline area in the northeast corner along Fraser and Barker Streets.

The existing land use for the site consists of several 'checkerboard' parcels that consist primarily of meadows, with clusters of trees. An existing vacant residence exists in the north central portion of the site, situated just above the Southeast Clay Banks overlooking Georgian Bay. The site is currently unpopulated.

Land uses around the site include rural and hazard lands to the south of Highway 26 with some existing single-family residential, and seasonal or recreational dwellings. Lands identified as settlement lands in the Grey County OP and designated Inland Lakes and Shoreline areas exist to the northeast, including existing shoreline residences with individual services. Areas designated Recreational Resort including the Lora Bay community exist to the east of Christie Beach Road in the Town of The Blue Mountains. To the south of Highway 26, the dormant Meaford Highlands Resort development had been proposed in 2012 but remains a dormant application with the Municipality and County. To the west of the site are vacant lands designated as Rural and Hazard Lands, with the Settlement Area and serviced boundary of downtown Meaford farther west.

Archaeological Assessment

Bluestone Research Inc. conducted Stage 1 and Stage 2 Archaeological Assessments for the site. These studies determined that there was no identification of archaeological resources on the site. These documents have been provided under separate cover.

Population Growth

The current pace of housing in the region has increased in the past few years as outlined in the Residential Market Justification and Fiscal Benefits Assessment (Parcel, June 23, 2023). Per the County of Grey Growth Management Strategy (Hemson Consulting Ltd., 2021), there is an assumed growth of approximately 49 households per year between 2021 and 2046, which is lower than the current pace of housing construction in Meaford at approximately 65 completions per year. Additionally, the average age of the population in Meaford is 49 years, and the share of one person households is 28% in Meaford.

Prior to this recent increase in population within Meaford, the population growth rate in Grey County had been well below the provincial average. Through the 1996 to 2016 Census, population in Grey County grew at an annual average pace of 0.3%, well below the provincial average growth rate of 1.1% per year. The population in Meaford grew by less than 500 people between 1996 and 2016, and between 2011 and 2016, the population declined by approximately 110 people.

Agricultural Lands

There are no designated agricultural or specialty agricultural lands on the site. There are specialty agricultural lands to the west of the site, between the Meaford proper settlement area and the site, along the Georgian Trail and Highway 26.

4.0 Proposed Development

A Master Plan was prepared by SvN for the Parkbridge Meaford site to illustrate preliminary development potential across the site. The Demonstration Plan for the proposed development consists of a Community Use and Village Centre (11 ha), a Residential Community area (91.1 ha), an Environmental area consisting largely of the Southeast Clay banks and associated ridge, slope and setback (29.2 ha), and the Georgian Trail (6.3 ha). Stormwater management ponds and features, watercourse buffers, and open spaces will be included in the residential community and community use and village centre areas. Internal to the site, the site is proposed to be serviced with a network of roadways, accessed by way of two entrances to Highway 26, and one entrance along Christie Beach Road. A preliminary road network and trail network are illustrated on the Master Plan. **Figure 2** to **Figure 5** illustrate the latest SvN proposed Master Plan dated January 24, 2024.

The Community Use and Village Centre is envisioned to consist of spaces that can provide public and recreational benefit to the community. A community facility is envisioned that will provide opportunities for municipal and regional amenities and programs. This space may have the potential to provide municipal-run programs and services, arts and culture and other related amenities that would serve as a community anchor.

Immediately northeast of the site, there are existing residential units along the shoreline of Georgian Bay with frontage on Barker Street and Fraser Street. These residential lands are not part of the site;

however, due to their proximity to the site they will be included in the analysis of servicing alternatives through the Master Servicing Study. It should be noted that the Master Servicing Study will not evaluate detailed options to service Barker Street and Fraser Street but these existing residences and lots have been included in the analysis of flows as they could be potential future recipients of services in association with the servicing solution identified.

The following is being used as a general outline for servicing requirements, based on the latest SvN Master Plan dated January 24, 2024, and the existing lot fabric of units along Barker and Fraser Street:

Site area:	135 ha
Site Unit count:	1,250 residential units
Commercial area:	2 ha
Existing Barker and Fraser Street Lot Count:	100 residential units equivalent
Total Unit count for servicing:	1,350 residential units equivalent

While preliminary planning and site layout exercises indicate that the above noted site yield is appropriate at this current project stage, it is understood that variation in unit counts may occur through the entitlement process. Final site unit yields will be confirmed as the project proceeds through the approval process and in advance of any detailed design or implementation of infrastructure across the site.

Due to the size of the development and various infrastructure upgrades required to service the site, phasing considerations will also be critical to the successful implementation of services over time. Phasing considerations are outlined in the next section.

4.1 Phasing Considerations

At this stage, a detailed phasing plan has not been prepared by the proponent. However, it is anticipated that the proposed development will proceed in multiple phases. Ultimately, the number of phases, and the respective unit count for each phase, will be determined based on several factors which may include the following:

- Capacity of receiving municipal infrastructure (i.e., treatment plants) and staging of potential upgrades.
- The number of access points proposed.
- The staging of various road improvements (i.e., turn lanes or intersection signalization).

For the purposes of the Master Servicing Study, it has been assumed that the proposed development will proceed in three (3) phases, each containing approximately one third of the total development. Although there is a possibility that each of these larger phases may be broken down into smaller "sub phases" as the project implementation proceeds, and the development would proceed in potentially upwards of 5-6 phases of construction. Each phase has the possibility of staged construction for the various development blocks; however, the initial phase of development will include the selected solution to provide water/sanitary services to the subject lands, including required upgrades to Municipal infrastructure if identified as a preferred alternative.

Detailed phasing considerations and planning will be considered and built out as the design progresses through the planning process.

4.2 Stormwater Management

The site generally drains from south to north via sheet flow and a number of drainage draws and small watercourses which outlet to Georgian Bay. Several of these watercourses appear to convey drainage from external catchment areas south of Highway 26 and cross the highway through a series of existing culverts. The site consists of primarily silty clay overlain with a layer of topsoil with various thickness across the site. The site is underlain by shale bedrock, generally expected at depths of 2.0 to 2.5 m below existing surface. A high groundwater level is expected at 0.6 m to 5.5 m below the existing ground surface.

The proposed development will require stormwater management and site drainage in conformance with the policies and standards of various agencies including the Ministry of the Environment, Conservation and Parks (MECP), Municipality of Meaford, the Ministry of Transportation (MTO), and Grey Sauble Conservation Authority (GSCA). Stormwater management criteria for the subject development will include the following:

- Water Quality Control
    - MECP "Enhanced Protection" (80% long-term TSS removal for 90% of the annual runoff) given Georgian Bay as the ultimate receiver
- Water Quantity Control for outlets to existing watercourses
    - "Post to Pre" runoff peak flow control to maintain or reduce pre-development peak flows in post-development conditions at site outlets
    - It may also be possible to consider development of new outlets (i.e., storm sewer of constructed channels) direct to Georgian Bay which would reduce the need for strict quantity controls
- Erosion Control
    - Source control and extended detention required to respect natural geomorphic characteristics of receiving watercourses
- Development Standard
    - Minor and major drainage system to convey frequent and infrequent storm events.

As Georgian Bay is the ultimate receiver of stormwater from the site, quantity control may not be required for the site as a whole. Consideration and controls will be required for flows that exit the site and travel through the existing residential area in the Barker and Fraser Street Shoreline community. There may be opportunities to improve or alleviate existing detrimental conditions which were noted by existing residents through public consultation, such as flooding during large storm events and major freshets, through appropriate stormwater management controls. This approach will be confirmed with the Municipality and the appropriate regulatory agencies through the review process.

The general strategy for stormwater management of the site is to provide quality control through the use of multiple stormwater management facilities and low impact design (LID) features, and convey flows directly to Georgian Bay, the ultimate receiving body immediately adjacent the site. LID features may include minimizing site disturbance, leveraging vegetation and landscape in design, and time of concentration modifications. In addition, flows would ultimately be expected to be

routed through one of the conceptual stormwater management facilities envisioned in the Master Plan for end of pipe treatment prior to discharge from the site.

Stormwater management is a critical component of the development. A detailed stormwater management strategy and plan will be included in future applications.

5.0 Water Supply and Distribution

This section examines the existing water systems and planned upgrades in proximity to the site, identifies design criteria and constraints, provides an overview of servicing alternatives developed and evaluates these against assessment criteria, and offers a preferred alternative to service the site.

5.1 Existing Drinking Water Supply and Distribution Systems

The Parkbridge Meaford development lies between the existing servicing limits of the Municipality of Meaford to the west and the Town of The Blue Mountains to the east. There are currently no municipal services supporting this area. The existing residential, rural, and commercial properties in proximity to the proposed development are generally serviced by individual wells and onsite sewage systems.

5.1.1 Meaford Water Distribution System

Network and Capacity

Potable water within the serviced area of Meaford is provided by way of the Meaford Water Treatment Plant (WTP), located at Sykes Street and Albery Court in Meaford. Source water is drawn from a raw water intake into Georgian Bay, treated, and distributed through a water supply system network of approximately 57 km of watermain ranging in size from 50 mm to 400 mm. The WTP has a capacity of 26,848 m^3/day.

The 2023 Meaford Water Treatment Plant Summary Report prepared by the municipality indicates the WTP has an ADD of 1,389m^3/d and an MDD of 1,745m^3/d and as such, is operating at only 5-7% of rated capacity. The Meaford Master Plan Water and Wastewater report indicated that the ultimate buildout for Meaford projects an ADD of 5,500m^3/day, which is only 20% of the rated capacity of the plant. Therefore, there is substantial available capacity in the Meaford water supply system.

The closest potential connection locations of water services in proximity to the Parkbridge Meaford site from the Meaford serviced areas are services at Knight's Home Centre on Highway 26, and along Montgomery Street to the Georgian Trail. On the south side of Highway 26 at Knight's Home Centre, there is an existing 250mm watermain that terminates within an existing easement directly in front of the Building Centre. At the crossing of Montgomery Street and the Georgian Trail, there is an existing 100mm diameter watermain running along Montgomery Street.

Storage

The Water Treatment Plant has a total system storage capacity of 2,880m^3. This consists of in-ground pumped storage at the WTP with a capacity of 2,310 m^3, and an elevated water storage tank

located near Trowbridge Street and Owen Street with a capacity of 570m^3. Per the Meaford Master Servicing Plan (Ainley Group, 2015) the required storage for the 2015 population is 2,166 m^3, and there is adequate storage in the existing system. For the ultimate buildout population of 12,000 persons, the required storage is planned to increase to 4,710m^3, requiring an additional 1,830m^3 of storage for the ultimate scenario.

Pressure Zones

As outlined in the Meaford Master Servicing Plan (Ainley Group, 2015), the Meaford water distribution system is divided into three pressure zones:

- Zone 1 is serviced by the elevated tank and pumps at the WTP and covers the northeast end of Meaford and the majority of the Municipality of Meaford extending south.
- Zone 2 (Nelson Street Booster Pumping Station (BPS) Pressure Zone) is located in the west end serviced by a BPS on Nelson Street.
- Zone 3 (St. Vincent Street Booster Pumping Station (BPS) Pressure Zone) is located in the south end and serviced by a BPS on St. Vincent Street.

Pressure Zone 3 is closest to the proposed Parkbridge Meaford Development, in the south end of the serviced area of Meaford. The St. Vincent Booster Pump Station servicing this area was constructed in 2010 and has five vertical multi-stage duty pumps each rated at 22 L/s at 37 m Total Dynamic Head (TDH) and one low flow protection pre-pressurized well tank to help maintain system pressure at low to no flow conditions. According to the Master Servicing Study (Ainley Group, 2015), the St. Vincent Booster Pumping Station provides adequate pressure during existing and full build-out conditions as identified in the 2015 Meaford Master Servicing Study EA based on growth in the Town anticipated at that time.

Planned Drinking Water Infrastructure Upgrades: Water Reservoir to boost Pressure in Pressure Zone 3

The Master Servicing Study (Ainley Group, 2015) identified some scenarios under which fire flow pressures were inadequate in sections of Pressure Zone 3. To provide adequate pressure for fire flows to meet MECP Design guidelines in Pressure Zone 3, the Master Servicing Plan (Ainley Group, 2015) recommended a proposed reservoir to service the St. Vincent Street BPS Zone (Pressure Zone 3). Floating storage options including an in-ground reservoir at 260 metres above sea level (masl) along a ridge to the southeast of the pressure zone, and an elevated storage tank at a ground elevation of 215 m adjacent the BPS site.

5.1.2 TOBM Water Distribution System

Network and Capacity

The existing Town of The Blue Mountains (TOBM) water distribution system is divided into five main pressure zones and consists of the Thornbury WTP with a capacity of 15,140 m^3/day, five water storage tanks / reservoirs, eight booster pumping stations (BPS), and fourteen pressure relief valves. There is approximately 126 km of watermain ranging in size from 25mm to 600mm. The Town of The Blue Mountains also has an agreement with the Town of Collingwood to obtain an additional 1,250 m^3/day of water.

The Town of The Blue Mountains Municipal Master Plan for Town-Wide Water Distribution System (October 24, 2019) indicated the Town-wide water supply was found to be adequate to meet the 20-year servicing needs of the TOBM. However, the current water distribution system is long, lacks redundancy, and is reliant on the Thornbury Water Treatment Plant located at the west end of Town.

As outlined in the TOBM Master Plan Project File Report (J.L. Richards & Associates, 2019), the Average Day Demand (ADD) over the prior five years was 4,247 m^3/day and the Maximum Day Demand (MDD) over the prior five years was 9,069 m^3/day. Due to the many pressure zones across the TOBM, the demands were broken down by pressure zone to understand existing and anticipated build out conditions. The supply is expected to meet the 20-year MDD demands.

The Lora Bay area on the west side of TOBM is the closest to the Municipality of Meaford and is serviced by a 300mm trunk watermain that loops through the Lora Bay development. There is an existing 250mm diameter watermain teed off the 300mm diameter watermain at the roundabout of Lora Bay Drive and East Ridge Drive which enters a pressure reducing valve (PRV) to lower pressures and extends along Sunset Blvd. There is also an existing booster station along 10th Line.

Storage

The TOBM has two elevated storage towers and three reservoirs. The breakdown of potable water storage is shown below:

- Victoria Street Elevated Tower: storage capacity of 747 m^3
- Thornbury Reservoir: storage capacity of 3,400 m^3
- Camperdown Reservoir: storage capacity of 2,600 m^3
- Happy Valley Road Reservoirs: Two reservoirs with combined storage capacity of 5,000 m^3
- Swiss Meadows Standpipe: storage capacity of 536 m^3

The TOBM Master Plan Project File Report (J.L. Richards & Associates, 2019) calculated the requirements for the 20-year scenario and ultimate build-out for each pressure zone. It was determined there are currently deficits in Pressure Zone 2 (Lora Bay, closest to the Parkbridge Meaford development) and Pressure Zone 5 (Swiss Meadows). Furthermore, at ultimate build out there are deficits in 4 of the 5 pressure zones. The primary issue for Pressure Zone 2 is that there is currently no storage within the zone, and insufficient pumping capacity to provide max day plus fire flow throughout the pressure zone.

Pressure Zones

The TOBM has five (5) main pressure zones, broken down as follows:

- Zone 1-West is serviced by storage at the Thornbury Water Treatment Plant, the Thornbury Victoria Street Tower, and the Thornbury Reservoir and Booster Station which covers Thornbury East, Thornbury West, Clarksburg and the majority of Camperdown. It should be noted there is also an ongoing Hidden Lake Class EA occurring in the area of Wards Road BPS within the 1-West and 1a Pressure Zones. Zone 1-East consists of the northern section of Craigleith.

- Zone 2 & 2a is serviced by the 10th Line BPS and covers the majority of the western service area to the boundary of Christie Beach Road and Meaford, consisting of Lora Bay.

- Zone 3 consists of some southern parts of Camperdown and is serviced by the Camperdown Court BPS and Camperdown Road BPS.

- Zone 4 is serviced by the Arrowhead Road BPS and the Happy Valley Road Reservoir and BPS. Zone 4 consists of the southern part of Craigleith.

- Zone 5 is serviced by the Swiss Meadows Stand Pipe and consists of Swiss Meadows.

There is an existing Class EA for the Castle Glen and Osler developments, evaluating the site-specific pressures for the respective Study Areas.

Pressure Zone 2 & 2a is the most western pressure zone in TOBM and the closest to the Parkbridge Meaford site. Therefore, any connection to the proposed Parkbridge Meaford development would be in connection with Pressure Zone 2 & 2a.

Planned Drinking Water Infrastructure Upgrades: Westside Storage Class EA

The TOBM retained J.L. Richards to complete a Class EA for improving water storage and pumping for the Town's west pressure zones, following completion of the Town-Wide Water Distribution Master Plan in 2019. The Westside Storage Class EA was completed in October 2021. Through the course of the Class EA, this project team had multiple discussions with the TOBM Westside Storage Class EA project team to understand the alternative solutions being proposed.

Through the EA process the TOBM assessed 6-7 alternatives, however the majority consisted of slight variations of two key options:

1) **Option 1**: Rehabilitate Victoria Street Tower and Construct in-ground storage reservoir as expansion of existing Zone 2 in-ground storage at 10th Line Booster Pump Station with upgrade of feedermain and pumps at 10th line; and

2) **Option 3**: Rehabilitate Victoria Street Tower and Construct new Zone 2 elevated tower on west side of Pressure Zone 2 (Lora Bay) and extension of transmission main in Lora Bay at elevation that will provide adequate pressures.

The preferred alternative identified through the TOBM Westside Storage Class EA was to rehabilitate the Victoria St. Elevated Tower (now completed) and construct a new 800m^3 in-ground reservoir at 10th Line Booster Pump Station complete with pumping upgrades and a new 400mm diameter feedermain loop in Zone 2. This preferred alternative also includes upgrades to the Upper Camperdown Booster Pump Station to address pumping deficiencies in Zone 3.

5.2 Design Criteria: Water Demand Projections

Water demands for the site were determined using Municipal standards in conjunction with parameters outlined in the Ministry of Environment, Conservation and Parks (MECP) Design Guidelines for Drinking Water Systems. Water demands were calculated using both the Meaford and TOBM criteria and parameters. The Meaford design criteria was identified to be used as the ultimate solution for onsite infrastructure sizing, as it is consistent with the MECP design guidelines for

vertical infrastructure sizing, the site is located in Meaford, and the demand scenario is more conservative.

Applicable design criteria have been summarized in **Table 1** below:

Table 1: Water Design Criteria

Criteria	Connection to Meaford Municipality of Meaford / MECP Guidelines
Average Day Demand (L/cap/day)	350 (In accordance with recent development applications)
Commercial & Institutional Flow Rate (m^3/ha/d)	28 (MECP guidelines)
Residential Population Density (PPU)	2.4 (Per Meaford Master Plan, 2008)
Maximum Day Factor (MDF)	2.0 (MECP guidelines)
Peak Hour Factor	3.0 (MECP guidelines)

The Ministry of the Environment Design Guidelines for Drinking Water Systems 2008 recommends a range of 350 – 480 kPa for normal operating pressures. The normal operating pressure in the distribution system should be approximately 350 to 480 kPa and not less than 275 kPa and not more than 700 kPa under peak conditions.

The Municipality of Meaford does not identify a recommended operating pressure within their Engineering Standards, and so the assumed criteria for design will be as per the MECP guidelines, noted above.

The recommended operating pressure criteria outlined in the Town of The Blue Mountains Engineering Standards is as follows:

- Pressure Range 350 kPa to 550 kPa under ADD and MDD
- Pressure Range 275 kPa to 700 kPa under Minimum and Peak Hour
- Pressure Range 140 kPa to 700 kPa under Maximum Day plus Fire Suppression

Watermain internal to the site will follow the alignment of the road network complete with individual service connections for each building. Fire hydrants will be spaced as required to provide the necessary fire protection and to meet municipal standards. All development parcels will have at

least two connection points to the water distribution network for redundancy which will satisfy municipal and MECP requirements for a looped distribution system.

Water Demand and Storage Requirements

Design criteria for the Municipality of Meaford were utilized for the development of servicing demands, as the site is within the municipality of Meaford, and the servicing criteria is more conservative than that outlined for the TOBM. Tables calculating servicing demands and flows for both Meaford and TOBM are provided in **Appendix E**.

The calculated ultimate water demand for the site is outlined in **Table 2** below, based on the assumed design population of 1,350 equivalent units (including offsite units along Fraser and Barker), at 2.4 persons per unit, and including a commercial area of 2 ha. Calculations are included in **Appendix E**.

Table 2: Ultimate Water Demand

	Ultimate Water Demand	
Water Demand Scenario	**ADD** (m^3/d)	**MDD** (m^3/d)
Meaford Design Criteria	1,190	2,380

In addition to water supply and treatment capacity, water storage facilities will be required. Water storage requirements have been calculated in accordance with MECP Guidelines for the projected water demands. Water storage requirements are based on the provision of fire storage, equalization storage and emergency storage. Fire storage is based on population, while equalization storage is based on maximum day demand (typically 25% of MDD). Emergency storage is a calculated percentage of the fire and equalization volumes.

Total Storage requirement = A + B + C
A = Fire Storage
B = Equalization Storage (25% MDD)
C = Emergency Storage (25% of A + B)

The objective of the design of onsite water storage is to provide adequate fire protection for future development without oversizing storage which may result in water quality issues. It is recommended that a minimum fire flow of 150L/s over a 2-hour duration be provided for the development. A fire flow rate of 150L/s is greater than the requirement of the MECP Water Design Guidelines based on population and proposed residential unit count, and using this increased flow will allow for more flexibility in the design of the unit type and the future mixed-use and commercial developments proposed in the Community Use and Village Centre.

The calculated ultimate water storage requirements for the development are outlined in **Tables 3 and 4** below. Calculations are included in **Appendix E.**

Table 3: Water Pumping Requirements

Water Demand Scenario	**Population** (persons)	**Com-mercial Area** (ha)	**Maximum Daily Demand** (m^3/day)	**Maximum Daily Demand** (L/s)	**Maximum Fire Flow** (L/s)	**Maximum Day Plus Fire Flow** (L/s)
Meaford Design Criteria	3,240	2	2,380	28	150	178

Table 4: Water Storage Requirements

Water Demand Scenario	**Fire Flow** (L/s)	**Dur-ation** (hr)	**Population** (persons)	**Maximum Daily Demand** (m^3/day)	**Storage Volume Required** (m^3) **(A)**	**Equalization Storage** (m^3) **(B)**	**Emergency Storage** (m^3) **(C)**	**Total Storage** (m^3) **(A+B+C)**
Meaford Design Criteria	150	2	3,240	2,380	1,080	595	419	2,094

5.3 Servicing Strategy and Alternatives (Options)

Based on the site's location and constraints as well as the design criteria provided, the following preliminary water servicing alternatives have been developed for the site:

Option A: Do Nothing / Limit Growth

Option B: Development of individual water supply systems (wells) to service individual units onsite

Option C: Development of a new, communal water treatment and distribution system onsite

Option D: Connection to an existing Municipal System (Meaford or TOBM)

The following sections will discuss these alternatives.

Option A: Do Nothing / Limit Growth

The "Do Nothing / Limit Growth" Alternative does not allow for development of servicing for the site and therefore does not allow for future development of the site.

Option B: Development of individual water supply systems (individual wells) to service units onsite

This alternative evaluates individual water wells to service each residential or commercial development independently as they are developed/constructed. The flow rate, size and use of the individual wells would vary significantly depending on the proposed development (i.e., commercial use versus residential use) and would perhaps impose limitations on development potential. Water quantity would have to meet minimum MECP guidelines for private drinking water wells. Water quality would also have to be evaluated in accordance with the Ontario Drinking Water Objectives and the *Safe Drinking Water Act, 2002, S.O. 2002, c. 32*.

Based on the desktop review completed and reference to earlier studies, it was determined that although water quality may or may not be adequate to meet requirements, neither individual wells nor a communal well system would provide sufficient yield to support development based on demands projected with the proposed zoning and demonstration plan for the site.

Crozier prepared a report summarizing our investigation of the potential for individual services (wells and septic beds) for the proposed development. Refer to **Appendix F** for the Master Servicing Study: Investigating Individual Water and Sewage Servicing study.

Option C: Development of a new, communal water treatment and distribution system onsite

Groundwater

This alternative considers establishing a new groundwater supply, treatment, and distribution system to provide the forecasted water demands to the proposed development. This option would include the construction of at least one, if not several groundwater production wells, as well as a treatment plant, treated water transmission mains and a water storage facility.

In order to support this alternative solution, an aquifer with sufficient capacity to supply the forecasted demand will be required. A hydrogeological report in accordance with MECP Policy D-5-5 would need to be completed.

Based on the desktop review completed and reference to earlier studies, it was determined that although water quality may or may not be adequate to meet requirements, neither individual wells nor a communal well system would provide sufficient yield to support development based on demands projected with the proposed zoning and demonstration plan for the site. Refer to **Appendix F** for the report.

Surface water

This alternative investigates the feasibility of providing the forecasted water demand for the site through development of a new communal water supply from a surface water source (Georgian Bay). This option would include construction of an intake pipe, pumping station, raw water transmission main, treatment plant, treated water transmission main and water storage.

This alternative is technically feasible, and Georgian Bay has sufficient quality and quantity of water. However, there are potential constraints to the intake line related to the geography of the site. Georgian Bay adjacent the site has a shallow shelf of under 10 feet of depth which extends 1.0 – 1.5 km out into the Bay. Therefore, any surface intake is expected to be quite long to avoid near shore turbidity and ice impacts. Furthermore, there is a significant elevation difference between the water level of Georgian Bay and the top of the Southeast Clay Banks where water will need to be pumped with a lift station. The likely location for a new WTP would be at the base of Christie Beach Road in close proximity or within the existing Christie Beach Conservation Area due to the steep clay banks within the development and existing residential properties to the west of Christie Beach Road. A new main would be extended along either a proposed trail system up to the development or along Christie Beach Road up above the ridge to service the development.

This alternative has the disadvantage of significant capital and operating costs, with some of these costs potentially assumed by the Municipality in future. This alternative would also result in two (2)

WTP's in the Municipality of Meaford when there is an existing WTP with a very high surplus capacity. Furthermore, there are considerable environmental impacts with another surface water WTP, and considerable impacts on the social environment and aesthetics at the existing Conservation Area and along the shoreline.

This alternative would require completion of a Schedule C EA in conjunction with the Municipality. An increased number of approvals and permits required including a new Permit To Take Water (PTTW), and requires the Municipality to obtain Certificate of Approval for intake, low lift Pump Station, Transmission Main, and Water Storage Facility.

Option D: Connection to an existing Municipal System (Meaford or TOBM)

This alternative evaluates providing the forecasted water demand to the proposed development by establishing a connection to a neighbouring municipal water system. The site is within the Municipality of Meaford, and the western boundary of the site is approximately 2.5 km – 3 km east of the serviced boundary of Meaford. The site is also adjacent to the Town of The Blue Mountains (TOBM) with Christie Beach Road forming the boundary between the two Municipalities, and is located approximately 5-6 km west of downtown Thornbury. Both Meaford and TOBM operate municipally owned water treatment and supply systems.

An overview of water and wastewater servicing connections to adjacent Municipalities is shown in **Figure 6** to **Figure 11**. Modelling completed by Meaford's Consulting Engineer (Ainley) is available in **Appendix G.** The modelling was originally completed by Ainley in 2020 for an earlier conceptual development plan, and model updates will be completed as needed through the planning process based on refinement of the conceptual Development Plan.

Meaford

As noted in previous sections, Meaford is serviced by the Meaford Water Treatment Plant (WTP) that draws water from Georgian Bay and has a rated capacity of 26,848 m^3/d. The 2023 Meaford Water Treatment Plant Summary Report indicates the WTP has an ADD of 1,389m^3/d and an MDD of 1,745m^3/d and as such, is operating at only 5-7% of rated capacity. The Meaford Master Plan Water and Wastewater report indicated that the ultimate buildout for Meaford projects an ADD of 5,500m^3/day, which is only 20% of the rated capacity of the plant. This facility offers more than adequate capacity in the plant to service the Parkbridge Meaford development. Furthermore, the WTP exists within the Municipal boundary and therefore no cross-jurisdictional issues would arise.

There are three pressure zones throughout the system, with Pressure Zone 3 on the southeastern end of the serviced area, closest to the Parkbridge Meaford development. Adequate pressure could be achieved at the Parkbridge Meaford development through a combination of appropriately sized and routed transmission main and a water reservoir.

Within Pressure Zone 3, water services extend southeast to Knight's Home Centre on Highway 26, and along Montgomery Street to the Georgian Trail crossing, which were both examined as potential connection locations. On the south side of Highway 26 at Knight's Home Building Centre, there is an existing 250mm watermain that terminates within an existing easement directly in front of the Building Centre. At the crossing of Montgomery Street and the Georgian Trail, there is an existing 100mm diameter watermain running along Montgomery Street. Modelling was prepared by the Municipality's Consulting Engineer with connection to both locations to determine whether

adequate flows could be conveyed to the site for storage and distribution, and the impacts to flows and pressure in the existing system. As part of the analysis of this alterative, the potential conveyance corridors, infrastructure required for appropriate water storage and pressures are also assessed.

Town of The Blue Mountains

As mentioned in previous sections, the TOBM is serviced by the Thornbury Water Treatment Plant (WTP) that draws water from Georgian Bay and has a rated capacity of 15,140 m^3/day, and the Town has an agreement in place with the Town of Collingwood to obtain 1,250 m^3/day. In April 2024, the Town of Collingwood announced that it was proceeding with the construction of an expansion to the existing water treatment plant.

There are existing pressure zones that do not have adequate pressure to service existing units in the TOBM water servicing network. Pressure Zone 2 is in the western end of the TOBM, closest to the Parkbridge Meaford development. This pressure zone has an existing 1,200m^3 storage deficit which increases to 1,700m^3 at build out of the Lora Bay Community. The TOBM retained J.L. Richards to conduct a Westside Storage Class EA process to identify the preferred solution to address the storage and pressure deficit in Pressure Zone 2. The recommended solution was determined to be Option 1, rehabilitate the existing Victoria Street Tower and construct in-ground storage reservoir at 10th Line Booster Pump Station.

Within Pressure Zone 2 in the TOBM, services extend to the intersection of 39th Sideroad and Sunset Boulevard. The TOBM's Consulting Engineer J.L. Richards conducted modelling for a connection to their existing services to determine whether adequate flows could be conveyed to the site for storage and distribution, and the impacts to flows and pressure in the existing system, and further details are provided in the below sections regarding their evaluation. Through further discussions with the Municipality, additional analysis may be conducted to determine whether improvements planned for the 10th Line Booster Pump Station and reservoir may be expanded to accommodate servicing of the Parkbridge Meaford site, to replace the need for an onsite reservoir and booster pump station should this connection alternative be selected. As part of the analysis of this alterative, the potential conveyance corridors, infrastructure required for appropriate water storage and pressures are also assessed.

5.4 Evaluation of Water Supply Alternatives

This Water, Wastewater and Transportation Master Servicing Study evaluates the infrastructure servicing alternatives to service the proposed development. This Study has been prepared following the TOR agreed with the Municipality, and a "Do Nothing" Alternative and a "Limit/ Manage Growth" Alternative is required for assessment, similar to the requirements of a typical Class EA. These alternatives are evaluated against options that provide servicing to the site.

The criteria to be used for evaluation of alternative solutions for water, wastewater and transportation projects are set out in the agreed Terms of Reference for the Master Servicing Study. Based on the specifics of the study area and proposed developments, a suggested criteria list has been developed for use in the evaluation process.

The following criteria Identified in **Table 5** was used for the analysis of the water and wastewater components of the Master Servicing Study:

Table 5: Summary of Criteria for Weighing Servicing Alternatives

Criteria	Sub Criteria
Land Use Planning Objectives	Provincial / Regional / Municipal
Natural Environment	Environmentally Sensitive Areas ANSI's Woodlots Creeks Fisheries Wetlands Wildlife and birds Vegetation Air Quality Habitat
Social Environment	Community Cohesiveness Quality of Life – Health & Safety Noise Construction Impacts Land Use Heritage Agricultural Land Archaeology
Technical Considerations	Capacity Reliability Ability to Satisfy Design Geometrics (Vertical & Horizontal) Approvability Timeliness Structural Considerations Land Requirements Maintenance and Operating Needs
Economic Considerations	Capital Cost Operating Cost

Each alternative was evaluated against the criteria with the following approach:

Most Preferred (green) to Least Preferred (red): 

The alternative(s) that have the least number of impacts while meeting project goals based on the evaluation of each consideration was chosen as the preferred alternative.

Comparison of Preliminary Drinking Water Servicing Alternatives

Table 6 presents a high-level comparison of the preliminary drinking water servicing options considering the identified impacts.

Table 6: High Level Comparison of Water Servicing Options

Considerations	Option A: Do Nothing / Limit Growth	Option B: Individual Wells	Option C: New Water Treatment Plant	Option D: Connect to Municipal Water Distribution System		
				Option D. No. 1A: Connect to existing watermain on Montgomery Street in Meaford	Option D. No. 1B: Connect to existing watermain on Highway 26 in Meaford (Knights' Home Hardware)	Option D. No. 2: Connect to existing watermain on Sunset Boulevard in Town of The Blue Mountains
Technical Impacts	Does not meet Parkbidge Meaford Site development needs	Existing groundwater supply likely not able to meet Parkbridge Meaford Site development needs.	Meets Parkbridge Meaford Site water supply needs. Provides reliable water supply that is owned and operated by the municipality to future residents	Meets Parkbridge Meaford Site water supply needs, but additional water storage required onsite. Upgrades required to the watermain along Montgomery Street Provides reliable water supply that is owned and operated by the municipality to future residents	Meets Parkbridge Meaford Site water supply needs, but additional water storage required onsite. Connection across Highway 26 required. Provides reliable water supply that is owned and operated by the municipality to future residents	Meets Parkbridge Meaford Site water supply needs, but additional water storage required onsite. Upgrades required to existing infrastructure. Provides reliable water supply that is owned and operated by the municipality to future residents
Environmental Impacts	No expected environmental impacts	Potential impact to groundwater supply because of new wells.	Potential impact to natural environment because of new surface water intake or wells.	Potential impact to natural heritage systems and wildlife (watercourse and associated natural feature crossings). Mitigation measures such as trenchless technology will assist in alleviating impacts.		No known impacts to natural heritage systems and wildlife (watercourse and associated natural feature crossings)
Social And Cultural Impacts	Does not provide opportunities for growth within the Site	Potential impact to existing resident's domestic wells because of new wells Long-term well maintenance requirements for future residents within the Site	Potential impact to existing resident's domestic wells because of new wells Potential impact to residents along the waterfront during the installation of a water intake	Potential for existing residents along the servicing route to connect to the watermain Potential for future growth within the Municipality to be serviced by the watermain extension Connection to the Montgomery Street would also require an upgrade to the existing 100mm diameter watermain, which would benefit existing residents	Potential for existing residents along the servicing route to connect to the watermain Potential for future growth within the Municipality to be serviced by the watermain extension	Watermain extension may provide servicing to existing residents along the proposed route and/or future development lands within the Town of The Blue Mountains Potential for emergency interconnection of TOBM / Meaford systems
Financial Impacts	No financial impacts	High life cycle and operating and maintenance costs for future residents within the Site	High life cycle and operating and maintenance costs. There may be opportunities to decrease costs using a modular or non-conventional onsite system solution.	High capital cost associated with extending a watermain approximately 3.5km to the site, as well as a new reservoir / booster pumping station.	High capital cost associated with extending a watermain approximately 3.5km to the site. as well as a new reservoir / booster pumping station Increased capital costs associated with construction within the Highway 26 corridor to connect to existing watermain.	High capital cost associated with extending a watermain approximately 1km to the site, as well as a new reservoir / booster pumping station. Upgrades will likely be required to existing infrastructure (i.e. watermain upgrades)
Overall Impacts	X **Do not carry forward as alternative solution to service the Site**	X **Do not carry forward as alternative solution to service the Site**	X **Do not carry forward as alternative solution to service the Site**	✓ **Carry forward as alternative solution to service the Site**	✓ **Carry forward as alternative solution to service the Site**	✓ **Carry forward as alternative solution to service the Site**

Based on the high-level evaluation of technical, environmental, social and cultural, financial and overall impacts, Option A, Option B, and Option C, were eliminated from consideration. Option D was brought forward as the preliminary preferred drinking water servicing option. **Figure 6** to **Figure 8** shows the preferred drinking water servicing options.

Table 7 presents a detailed comparison of the preferred drinking water servicing options considering the identified impacts. Further discussions with the Municipalities should occur to identify the preferred servicing route and connection point.

Table 7: Detailed Comparison of Ultimate Drinking Water Servicing Options

Considerations	Option D: Connect to Municipal Water Distribution System		
	Option D. No. 1A: Connect to existing watermain on Montgomery Street in Meaford	**Option D. No. 1B: Connect to existing watermain on Highway 26 in Meaford (Knights' Home Hardware)**	**Option D. No. 2: Connect to existing watermain on Sunset Boulevard in Town of The Blue Mountains**
Technical Impacts			
Capacity, Ability to Satisfy Design	Meets the water supply needs of the Site	Meets the water supply needs of the Site	Meets the water supply needs of the Site
Land Requirements, Approvability, Timeliness	Moderate number of approvals and permits to obtain for the watermains / reservoir & booster pumping station	Moderate number of approvals and permits to obtain for the watermains / reservoir & booster pumping station Additional approvals required from MTO for works within the Highway 26 corridor	Moderate number of approvals and permits to obtain for the watermains / reservoir & booster pumping station Cross jurisdictional approvals required in order to service the Site from Town of The Blue Mountains
Geometrics (Vertical & Horizontal), Structural Considerations	Moderate anticipated construction challenges because the watermain may be installed within the Georgian Trail corridor. Access for the contractor will be limited to existing road crossings and directional drilling may be required due to width of the corridor. Multiple watercourse crossings will be required on route to the connection point.	Moderate anticipated construction challenges because the watermain may be installed within the Georgian Trail corridor. Access for the contractor will be limited to existing road crossings and directional drilling may be required due to width of the corridor. Multiple watercourse crossings will be required on route to the connection point.	Minimal anticipated construction challenges because the watermain extension would be installed within existing roadways, with minimal watercourse crossings. Potential challenges to upgrade existing water distribution system (if required) while maintaining water services to existing residents
Reliability, Maintenance and Operating Needs	Booster pumping station and reservoir will be equipped with a generator to maintain operation during power outages. An operator will be required for periodic maintenance and operation of the new booster pumping station/reservoir. Minimal maintenance concerns associated with the watermain extension to the site.	Booster pumping station and reservoir will be equipped with a generator to maintain operation during power outages. An operator will be required for periodic maintenance and operation of the new booster pumping station/reservoir. Minimal maintenance concerns associated with the watermain extension to the site.	Booster pumping station and reservoir will be equipped with a generator to maintain operation during power outages. An operator will be required for periodic maintenance and operation of the new booster pumping station/reservoir. Minimal maintenance concerns associated with the watermain extension to the site.
Technical Impacts Summary	✓ **More Preferred**	✓ **Equally Preferred**	✓ **Equally Preferred**
Environmental Impacts			
Impact to Aquatic Environment (Creeks, Fisheries, Wetlands, Habitat)	Some impacts to the environmental system because the watermain will cross multiple watercourses if unmitigated.	Some impacts to the environmental system because the watermains cross multiple watercourses if unmitigated.	Minimal anticipated impacts to the environmental system because the watermain extension would be installed within existing roadways, with minimal watercourse crossings.
Impact to Terrestrial Environment (Woodlots, Wildlife and birds, Vegetation, Habitat)	Limited impacts to wildlife and species at risk with the watermain extension primarily proposed to be located within the Georgian Trail corridor	Limited impacts to wildlife and species at risk with the watermain extension primarily proposed to be located within the Georgian Trail corridor	Limited impacts to wildlife and species at risk with the watermain extension primarily proposed to be located within existing roadways and the Georgian Trail corridor
Impact to Air Quality	Low level of impact to air quality during construction anticipated	Low level of impact to air quality during construction anticipated	Low level of impact to air quality during construction anticipated
Impact to Environmentally Sensitive Areas, ANSI's	The watermain extension would need to cross Workman's Creek, which is an ANSI Earth Science, subtype 1068. It is identified as a non-sensitive ANSI with no restriction needed. Based on field recconnaissance, there appears to be sufficient cover over the existing box culvert to allow services to be installed above the creek crossing. Refer to **Appendix H** for photo's of the Workman's Creek crossing.	The watermain extension would need to cross Workman's Creek, which is an ANSI Earth Science, subtype 1068. It is identified as a non-sensitive ANSI with no restriction needed. Based on field recconnaissance, there appears to be sufficient cover over the existing box culvert to allow services to be installed above the creek crossing. Refer to **Appendix H** for photo's of the Workman's Creek crossing.	No ANSIs identified along the routing of the watermain extension

Considerations	Option D: Connect to Municipal Water Distribution System		
	Option D. No. 1A: Connect to existing watermain on Montgomery Street in Meaford	**Option D. No. 1B: Connect to existing watermain on Highway 26 in Meaford (Knights' Home Hardware)**	**Option D. No. 2: Connect to existing watermain on Sunset Boulevard in Town of The Blue Mountains**
Environmental Impacts Summary	✓ **Equally Preferred**	✓ **Equally Preferred**	✓ **More Preferred**
Social And Cultural Impacts			
Impact to Community Cohesiveness, Quality of Life - Health and Safety	Potential impact to community due to construction along the Georgian Trail / temporary closures	Potential impact to community due to construction along the Georgian Trail / temporary closures	High potential impact to existing community in Lora Bay due to potential downstream infrastructure upgrades. There may be economies of scale if existing community infrastructure upgrades are proceeding in Lora Bay regardless of the Parkbridge Meaford site. Potential impact to community due to construction along the Georgian Trail / Temporary closures
Impact to Noise, Construction Impacts	Low level of impact to noise and construction impacts anticipated	Low level of impact to noise and construction impacts anticipated	Low level of impact to noise and construction impacts anticipated
Cultural Heritage and Archeological Features Impacts	No known impact to cultural heritage and archeological features but low potential in already disturbed Georgian Trail corridor	No known impact to cultural heritage and archeological features but low potential in already disturbed Georgian Trail corridor	No known impact to cultural heritage and archeological features but low potential in already disturbed Georgina Trail corridor and Municipal right-of-ways
Social And Cultural Impacts Summary	✓ **Equally Preferred**	✓ **Equally Preferred**	✓ **Equally Preferred**
Financial Impacts			
Capital Costs	High capital cost for booster pumping station, reservoir and watermain extension Downstream, onsite, and connecting infrastructure can be phased to accommodate phased development and hence phased costs	High capital cost for booster pumping station, reservoir and watermain extension Downstream, onsite, and connecting infrastructure can be phased to accommodate phased development and hence phased costs	High capital cost for booster pumping station, reservoir and watermain extension Downstream, onsite, and connecting infrastructure can be phased to accommodate phased development and hence phased costs
Operating Costs	Moderate annual operation and maintenance costs booster pumping station and reservoir	Moderate annual operation and maintenance costs booster pumping station and reservoir	Moderate annual operation and maintenance costs booster pumping station and reservoir
Financial Impacts Summary	✓ **Equally Preferred**	✓ **Equally Preferred**	✓ **Equally Preferred**
Overall Impacts			
Recommendation	✓ **Carry forward as potential solution to service the Site**	✓ **Carry forward as potential solution to service the Site**	✓ **Carry forward as potential solution to service the Site**

5.5 Preliminary Preferred Alternative Water Servicing

As noted in the overall evaluation of servicing options for water servicing, Option D (Connection to an existing Municipal System) is the preferred alternative to provide adequate servicing to support development of the site. Option C (Development of a new, communal water treatment and distribution system onsite) is also technically feasible for surface-water treatment; however Option D was found to be preferred based on the overall evaluation based on technical, environmental, social and financial impact considerations identified.

Option D (Connection to an existing Municipal System) has two viable potential connections: either to the Municipality of Meaford or to the TOBM. Further discussions between the Municipalities, the County, Parkbridge, and Crozier are required to determine the preferential route, although both are technically feasible, and have similar environmental and socio-economic impacts. Additional details including the ownership of an onsite booster pumping station and water storage, the exact location of infrastructure, routing and connection location to the existing system, and costing of proposed connections will be finalized once the preferred connecting Municipality is confirmed.

For the preferred water servicing alternative, consideration must be given to the water and wastewater servicing as a parallel process. For example, there are economies of scale to consider when evaluating connections that both follow the same alignment to one Municipality. There are potential cost savings related to construction for mobilizing and constructing one route for both services, rather than connecting water to one Municipality and wastewater to another.

Potential Connection to Meaford for Water Servicing

Water modelling of a previous iteration of the development plan for the subject lands was conducted by Meaford's Consulting Engineer, Ainley, to confirm that adequate pressures are available to transmit water to the development site where an onsite water storage and booster pumping station is required to provide adequate storage and pressures for drinking water and fire flows. There are ongoing discussions to update the modeling with Meaford to incorporate the latest changes to the development plan, and refine the modelling completed in 2020, available in **Appendix G**.

If a connection to Meaford is agreed to with the Municipality, additional design details for water storage and water distribution and routing will be confirmed at the detailed design stage, including:

- Onsite water storage to provide adequate pressure to the development for fire flows. Both an elevated tower and inground concrete reservoir were evaluated as options to meet the storage requirements of the site. An in-ground reservoir with associated High Lift Pumping station with jockey, duty and fire pumps is a likely solution based on preliminary evaluation. An inground reservoir will have a lower visual impact and can be constructed in a modular manner to spread out capital costs over time.

- Specific routing to the site. The alternatives considered include routing along either the Georgian Trail or Highway 26 to Meaford. Challenges associated with the Highway 26 corridor were identified due to the need for approvals from MTO, increased disruption of traffic requiring additional traffic management, increased impacts to community, and increased capital costs. Furthermore, the MTO was consulted at a preliminary stage of this evaluation and did not prefer large scale work efforts associated with infrastructure

installation within their Highway 26 corridor. If servicing from Meaford is selected to proceed, then routing is therefore proposed along the Georgian Trail with a connection to services at the intersection of Montgomery Street and Georgian Trail, where the existing watermain along Montgomery Street would be replaced with a 250mm transmission main. Installation along the Georgian Trail to Meaford could be completed with a combination of conventional and trenchless technologies to minimize disturbance where feasible. Refer to **Figure 12** for the Georgian Trail cross-sections which identify the preliminary alignment of the water transmission line within the Georgian Trail 20m right-of-way.

- Infrastructure for the transmission line. A twin 150mm and 200mm transmission line and a single 250mm transmission line were considered, with both options being reviewed with the Municipality's Engineer, Ainley. Based on correspondence with Ainley, a single 250mm transmission line proves more preferential as there is a lower capital cost and lesser environmental impact associated with a single line. Also, the use of onsite water storage in conjunction with the single transmission line allows for the development to continue to receive water should the main need to be repaired or shut off in the case of an emergency. Onsite water storage negates the reliability benefit associated with a twin main system in a cost-effective way, leaving the single transmission line design preferable.

Furthermore, there is potential for system interconnection with the TOBM planned expansion to Lora Bay, which would improve redundancy in emergency conditions for each water system. However, an appropriate cross jurisdictional agreement would need to be secured outlining the conditions this would be reasonable to use under.

Potential Connection to Meaford for Water Servicing – Servicing of Potential Development Lands

For a proposed connection to Meaford services, there could be a possible community benefit for servicing other potential developable areas in proximity to a proposed service extension. For the purposes of this Master Servicing Study, potential developable areas were identified by the Developer's Planning Agent Bousfields to determine the potential future development area and targeted density for those intermediary lands in Meaford between the Parkbridge site and the Primary Settlement Area of Meaford, refer to **Figure 13.** The water demands from these lands is included for the Municipality's consideration and future discussions, but they have not been accounted for when determining preliminary sizing of infrastructure and associated costs to service the subject site, as there is no current development proposal on these lands. The demands and storage requirements associated with these additional lands were analyzed to support future discussions with the Municipality if a connection option to Meaford is preferred.

The criteria and resulting calculations associated with the inclusion of these additional external lands is highlighted below:

Density for potential development areas: 20 units/ha
Ultimate water demand (including potential development areas):

- Population: 4,942 persons
- Commercial Area: 2 ha
- ADD: 1,786 m^3/d
- MDD: 3,571 m^3/d

Pumping and Water Storage Requirements:

- Maximum Fire Flow: 150 L/s
- Maximum Day Plus Fire Flow: 191 L/s
- Total Storage: 2,466 m^3

With the potential addition of these development lands, there is an approximate 50% increase in the population, and the resulting average day flows and maximum day flows that would be contributing to the system. Additional modelling to incorporate these additional flows and understand the implications to downstream infrastructure is recommended, if a servicing solution to Meaford is identified as the preferred servicing alternative, further discussions with the Municipality and County to validate assumptions around the potential development properties in proximity to the servicing route should occur.

Any increases to capital or operational costs associated with the addition of the potential development lands in Meaford that may benefit from servicing if a potential connection route to the Meaford serviced area is selected have not been included in this Study. The magnitude of servicing demands has been calculated and provided, and further modelling or consideration should be discussed with the Municipality to validate potential development and understand potential impacts, if Meaford is the eventual servicing solution.

Potential Connection to TOBM for Water Servicing

The TOBM's Consultant Engineer, J.L. Richards, completed water modelling and provided a summary memo titled Parkbridge Meaford Development, Water and Wastewater Analysis: Water Modelling Analysis (J.L. Richards, June 29, 2023) to confirm adequate pressures are available to transmit water to the development site with some identified upgrades to TOBM infrastructure. It was assumed that onsite water storage and booster pumping station will provide adequate storage and pressures for drinking water and fire flows for the development. Refer to **Appendix G** for a copy of the memo.

If a connection to the TOBM is agreed with the Municipalities, additional design details for water storage and water distribution and routing will be confirmed at the detailed design stage, including:

- Onsite water storage to provide adequate pressure to the development for fire flows. Similar to the solution for Meaford, both an elevated tower and inground concrete reservoir were considered. An in-ground reservoir with associated High Lift Pumping station with jockey, duty and fire pumps is a likely solution based on preliminary evaluation. An inground reservoir will have a lower visual impact and can be constructed in a modular manner to spread out capital costs over time. There may also be the opportunity for discussions with the Municipality to determine whether the proposed 10th Line Booster Pumping Station and

Reservoir expansion may also service the Parkbridge Meaford development with sufficient storage and pressures to provide adequate fire flows.

- Specific routing to the site. The Parkbridge Meaford Development, Water and Wastewater Analysis: Water Modelling Analysis (J.L. Richards, June 29, 2023) identified a connection into future ultimate water servicing infrastructure proposed as part of the Town's future growth in the Lora Bay area, at the intersection of Christie Beach Road and 39th Sideroad where a future looped 250mm transmission main is proposed as part of the ultimate build-out. Depending on the timing of future development and these infrastructure upgrades in Lora Bay, a connection here is warranted, or potential early extension of the proposed 250mm transmission main along 39th sideroad for a connection into existing watermain at 39th Sideroad and Sunset Boulevard. If servicing from TOBM is selected to proceed, then routing should be discussed with the Municipality in further detail as the Municipality may have plans to expand along Sunset Boulevard to service existing lots in Lora Bay, and so potential future connections may become available and be more preferential.

- Infrastructure for the transmission line. A single 250mm transmission line is identified as the ultimate solution per the model results for the Christie Beach Road and 39th Sideroad, for routing to existing watermain infrastructure. There is a lower capital cost and lesser environmental impact associated with a single line vs. twinned transmission lines, and so a proposed 250mm line is preferable to connect to the TOBM water system. The use of an onsite reservoir in conjunction with the single transmission line allows for the development to continue to receive water should the main need to be repaired or shut off in the case of an emergency.

A cross-jurisdictional agreement would also need to be negotiated between the two Municipalities if servicing is provided to Meaford from the TOBM services.

The TOBM has completed a Class EA to improve and plan for municipal infrastructure over the long term and is in the process of implementing servicing solutions. The Westside Storage Class EA identified multiple infrastructure upgrades and extensions to the infrastructure in the Lora Bay area, including a future ultimate build out that includes watermain along 39th Sideroad, Sunset Boulevard, and Christie Beach Road. The Parkbridge Meaford Development, Water and Wastewater Analysis: Water Modelling Analysis (J.L. Richards, June 29, 2023) identifies the need for additional upgrades to accommodate the flows from the proposed Parkbridge Meaford development, including expansions to the existing Thornbury Water Treatment Plant, the 10th Line Booster Pumping Station, and upsizing or twinning of existing infrastructure along Peel St. North between Timber Lane and High Bluff Lane, and along High Bluff Lane between Peel St South and 10th Line.

Further discussions need to occur with the Municipality to understand their planned infrastructure expansions including associated costs and timing. Ongoing discussions are occurring with the Municipality to understand the impacts of incorporating demands from the Parkbridge Meaford site.

To support the analysis of water and wastewater servicing alternatives, Crozier retained DLW Engineering Services to complete a memo outlining capital costs associated with identified larger infrastructure items onsite (i.e., an onsite WWTP, SPS, BPS and reservoir). The DLW Engineering Services memo is available in **Appendix I.**

Cost estimates associated with the servicing alternatives are available in **Appendix J.**

Recommended Next Steps

The recommended next steps to proceed with the consideration of servicing alternatives includes:

1. Verify further modelling with Meaford and the TOBM and their Engineering Consultants based on the current Parkbridge Demonstration Concept and items discussed in this section, including preferred routing, storage, and connection details.
2. Enter into detailed discussions on more formal upfront capital costs and lifecycle costing, including further engagement with the Municipalities to understand their ongoing Class EA processes and proposed expansions. Begin preliminary discussion around potential future ownership and operations of onsite and connecting infrastructure.

These recommended next steps will require ongoing engagement with both Municipalities to agree on the preferential solution, to be further outlined through detailed design.

6.0 Wastewater Collection and Treatment

6.1 Existing Wastewater Collection and Treatment Systems

6.1.1 Meaford Wastewater System

The existing Meaford wastewater treatment system consists of approximately 35,080 m of gravity feed sewer pipe and 2,140 m of forcemain, five (5) sanitary pump stations (SPSs), and one Wastewater Treatment Plan (WWTP). The Meaford WWTP was constructed in 1969 and initiated service in 1970. It operates as a high rate activated sludge process plant with UV disinfection and continuous discharge into Georgian Bay and has aerobic digestion with land disposal of bio-solids. The plant has no processes for phosphorus removal. Per the Meaford Master Servicing Plan (Ainley Group, 2015), the Meaford WWTP has a rated capacity of 3,910 m^3/day and a peak flow capacity of 11,730 m^3/d. The plant is located in a residential area and can be susceptible to noise and odour complaints.

The Meaford WWTP is located on Aiken Street and is owned by the Municipality and operated by Ontario Clean Water Agency (OCWA). There are five SPSs in the system that capture flows which are then conveyed to the Meaford WWTP, with the majority of flows (approximately 80%) directed to a centrally located SPS (SPS No. 1) on the east side of the Bighead River.

Meaford had completed an Inflow and Infiltration (I/I) Study in 2015, which identified that I/I remained a historic issue for the Municipality with several major deficiencies identified in the sewer system, including in particular a series of cracks, holes and pipe misalignments identified along Sykes Street south of the Bighead River, and cracks and breaks throughout the collection network. Meaford has subsequently completed various works to reduce I/I issues.

The sanitary sewer servicing network extends southeast along Highway 26, with a 250mm diameter sewer terminating at Knights Home Centre on the south side of the highway, as well as a 250 mm diameter sewer running along Montgomery Street and available at the intersection of Montgomery Street and the Georgian Trail.

Wastewater Collection System Catchment Areas

As outlined in the Meaford Master Servicing Plan (Ainley Group, 2015), the wastewater collection system is divided into five distinct catchment areas:

- Area 1: Located in the southwest and feeds into SPS No.1. This is the largest catchment area.
- Area 2: Located in the southeast and mostly located east of St. Vincent Street, feeding SPS No.2.
- Area 3: Located in the north and including everything north of Susan Street, feeding SPS No.3 which then flows into Area 1.
- Area 4: Includes the proposed Skydevco Mixed Use Redevelopment site (formerly known as the Stanley Knight Ltd. Lands) feeding SPS No.4 which then flows into Area 1. The Meaford Master Servicing Plan (Ainley Group, 2015) suggests the SPS No.4 will be decommissioned in the future.
- Area 5: Includes the marina and Canadian Coast Guard and Harbour Master's Offices, feeding SPS No.5 which then flows into Area 1.

Wastewater collection Area 2 is closest to the proposed Parkbridge Meaford Development, in the south end of the Serviced area of Meaford, serviced by SPS No.2. SPS No. 2 was constructed at the WWTP site in 1978 to service the southeast area of Meaford. Per the Meaford Master Servicing Plan (Ainley Group, 2015), the station is a wet well / dry well facility with two variable speed 37 kW pumps (Fairbanks Morse Model 5414) with Benshaw VFD drives. Flow monitoring is completed using an Endress & Hauser magnetic flow meter and a seven-day circular chart recorder. The SPS No.2 pumps are rated at 148L/s at a Total Dynamic Head (TDH) of 18.8 m. The Master Servicing Plan (Ainley Group, 2015) also indicates that the station capacity is sufficient to accommodate planned growth to full build-out as per the Class EA ultimate build-out scenario.

The wet well of SPS No.2 has a storage capacity of approximately 22m^3, and overflow from SPS No.2 is conveyed to the maintenance hatch at the end of Aiken Street on Georgian Bay. Overflow will only occur if there is surcharging of the sewer system and requires manual operation of a gate located on a 450mm diameter cross line to the existing 600mm plant outfall.

Planned Wastewater System Infrastructure Upgrades: Meaford WWTP Expansion

In 2007, Earth Tech Canada Inc. completed a Schedule C Municipal Class EA, triggered by a capacity analysis completed by Ainley in 2006, which identified that the Meaford WWTP was operating above 80% of design capacity. According to the Municipality of Meaford Master Plan (Ainley Group, 2015), the 2007 Earth Tech Canada Inc. Class EA outlined the expansion needs based on an ultimate population of 11,500 over a 20-year planning period, with an ultimate ADF of 5,940m^3/d and PDF of 17,700m^3/d. The capital costs required to finance the expansion of the existing plant were calculated in 2007 to be $26,500,000 with an additional $3,000,000 to add tertiary treatment to the plant. Following completion of the EA, the Municipality determined there were inadequate funds to proceed with the preferred solution identified in the Earth Tech Canada Inc. 2007 Class EA.

In 2010, Genivar Consulting LP was retained to re-evaluate the design population and consider alternative options to expand the plant capacity. The 2010 recommended solution was to complete a 20% expansion to the existing plant, equivalent to additional capacity for approximately 605 residential units. The Municipality consulted with the MECP who advised that an addendum to the existing 2007 Class EA would be required to proceed with an alternative that differs from the preferred alternative originally identified.

Subsequently, as the Municipality initiated the process for the Class EA Addendum, wastewater volumes treated by the plant declined to a decade-low 56%, and the Municipality opted not to proceed with the project at the time. Additionally, various Inflow & Infiltration improvement projects were identified and executed through the years to treat the existing extraneous flow problem and reduction of I&I realized at the WWTP have been largely able to offset the increased demands of new development within the Municipality.

Additional growth in 2020 increased sanitary flows at the plant, with flows again reaching approximately 80% of the plant capacity. The Municipality initiated a Class EA Addendum in 2021, sending out a Notice of Commencement in September 2021. The Study Area indicated in the notice included the Meaford Service Area and extended east to Christie Beach Road and south to Highway 26. Refer to **Appendix K** for a copy of the Meaford WWTP EA Addendum Notice of Commencement. Following discussions with the Municipality in 2023 they indicated that they are not proceeding with the addendum but will be undertaking another iteration of the Class EA process.

On October 12th, 2023, the Municipality hosted a Public Information Centre (PIC) with their Consulting Engineers Ainley, to provide an update on the Class EA for the expansion of the Wastewater Treatment Plant. The PIC indicated they are in Phase 3 of the Class EA Process, which entails identification and evaluation of alternative design solutions for the wastewater treatment plant expansion. The PIC identified the Study Area as the urban area of Meaford and presented a projected 30-year population increase of 40.3 units of new housing in the Meaford urban area and 26 new jobs every year, for a required ADF capacity of 4,400 m^3/d in 2054. The PIC documentation also noted that based on previous planning efforts an ultimate expansion of ADF capacity of 6,000m^3/d is envisaged in future.

The recommended solution identified in the PIC included a three-phase expansion of the wastewater treatment plant:

Phase 1: expand the existing capacity of the WWTP by an additional 1,700 m^3/d to 4,400 m^3/d

Phase 2: replace the existing 2,700 m^3/d secondary aeration and secondary clarifiers in the future

Phase 3: expand the plant by an additional 1,600 m^3/d to achieve projected capacity of 6,000 m^3/d

Various treatment technology alternatives were compared, and a recommended treatment technology was identified for all treatment technologies, including mechanical screening and grit removal with odour control system for preliminary treatment, extended aeration for secondary treatment, cloth disc filters for tertiary treatment, UV disinfection, aerobic digestion for biosolids management, and equalization storage for peak flow management.

6.1.2 TOBM Wastewater System

The existing TOBM Wastewater Servicing System consists of a network of sewers, sanitary pumping stations, and wastewater treatment plants. The Lora Bay Service Area is located within the western boundary of the TOBM, closest to Meaford, and sewage from this service area flows to the Thornbury Wastewater Treatment Plant (WWTP) located on Grey Street in Thornbury. The Thornbury WWTP was constructed in 1994, with a rated capacity of 3,580 m^3/day, and planned expansion is underway to increase this capacity by 1,750 m^3/day to 5,330 m^3/day.

In the Lora Bay Service Area, flows from the area west of Lora Bay Drive and above the Nipissing Ridge flow via gravity to a sanitary sewer line located on the former 11th Concession right of way through to Sunset Blvd. Sanitary sewers conveying sewage along Sunset Blvd. increase in size to 375mm diameter and drain via gravity to the existing Sunset Blvd. sewage pumping station (SPS) located in the vicinity of the intersection of Sunset Blvd. and Lora Bay Drive. The Sunset Blvd. SPS pumps to Eastridge Drive in Lora Bay where it discharges to a sewer network that conveys wastewater to a sewage pumping station on Mill Street in Thornbury, from which is ultimately conveyed via a network of forcemains to the Thornbury WWTP.

The summary memo Parkbridge Meaford Development, Water and Wastewater Analysis: Wastewater Modelling Analysis (J.L. Richards, August 15, 2023) indicates that some downstream improvements to existing infrastructure are required to convey flows from the Parkbridge Meaford site through the existing TOBM sanitary sewer network. The addition of flows from the Parkbridge Meaford development exceed the design capacity of 915m of sanitary sewers along East Ridge Drive and the Georgian Trail. The modelling conducted by J.L. Richards was only completed to a connection at the intersection of Peel Street South and Arthur Street West in the TOBM. Therefore, further potential downstream improvements to existing infrastructure including sanitary sewers and pumping station(s) remain possible and should be investigated in collaboration with the Municipality if a connection to TOBM is deemed preferable.

Planned Wastewater Collection System Infrastructure Upgrades: Thornbury WWTP Expansion

There is a planned expansion in progress for the Thornbury Wastewater Treatment Plant. At the time of this report, Phase 1A expansion is required to be constructed and operational by the end of 2024, and design has been completed and construction initiated.

The Thornbury Wastewater Treatment Plant expansion is planned to include addition of one extended aeration tank, one clarifier, replacement of existing air blowers, and a new outfall into Georgian Bay. The expansion will increase the current ultraviolet disinfection system, effectively increasing the capacity of the plant from 3,580 m^3/day to 5,330 m^3/day, a net increase of 1,750 m^3/day. Additionally, a 14,000 m^3/day mechanical screen and associated hardware will be added, and energy efficiency initiatives incorporated throughout the plant.

6.2 Design Criteria: Wastewater Flow Projections

Wastewater collection requirements for the site were determined using Municipal standards in conjunction with parameters identified in the Ministry of Environment, Conservation and Parks (MECP) Design Guidelines for Drinking Water Systems, and MECP Guidelines for the Design of Sanitary Sewage Systems, 1985. Wastewater flows were calculated using both the Meaford and TOBM criteria and parameters. The Meaford design criteria was identified to be used as the ultimate

solution for onsite infrastructure sizing, as it is consistent with the MECP design guidelines for vertical infrastructure sizing, the site is located in Meaford, and the calculated flows scenario is more conservative.

Applicable design criteria have been summarized in **Table 8** below:

Table 8: Wastewater Design Criteria

Criteria	Connection to Meaford Municipality of Meaford / MECP Guidelines
Average Day Demand (L/cap/day)	350 (In accordance with recent development applications)
Commercial & Institutional Flow Rate (m^3/ha/d)	28 (MECP guidelines)
Residential Population Density (PPU)	2.4 (Per Meaford Master Plan, 2008)
Maximum Day Factor (MDF)	2.0 (MECP guidelines)
Harmon Peaking Factor	3.41 (MECP guidelines)
Average Wet Weather Inflow and Infiltration, I&I	90 L/cap/day (MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)
Peak Wet Weather Inflow and Infiltration I&I	227 L/cap/day (MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)

Wastewater treatment plants are typically sized so their biological systems can process organics, and their tertiary systems, where available, are designed to handle maximum wet weather flows. WWTP's are typically sized for Average Day Flows (ADF) and need to accommodate Peak Instantaneous Flows (PIF). This differs from a Sewage Pump Station (SPS) which is typically sized based on Wet Weather Flows. Therefore, the WWTP flows were calculated using ADF and average inflow

and infiltration of 90 L/cap/d, with peak flows at 227 L/cap/d for consistency with the MECP guidelines.

Internal wastewater servicing for the site will be provided with a network of gravity sewers that follow the alignment of the internal roadways. Sanitary sewers will be designed and constructed in accordance Municipal design standards, at a size and depth sufficient to service each building.

Summary of Ultimate Wastewater Flows

The calculated ultimate sanitary flows for the Study Area are outlined in **Table 9** below, based on the assumed design population of 1,350 equivalent units (including offsite units along Fraser and Barker), at 2.4 persons per unit, and including a commercial area of 2 ha. Calculations associated with sanitary sewage flows are included in **Appendix E**.

Table 9: Ultimate Wastewater Flows

Sanitary Flow Scenario	**Average Day Flow (Wet Weather Flow)** ADF (m^3/d)	**Maximum Day Flow** MDF (m^3/d)	**Peak Dry Weather Flow** PDWF (m^3/d)	**Peak Wet Weather Flow** PWWF (m^3/d)	**Peak Instantaneous Flow** PIF (m^3/d)
Meaford Design Criteria	1,481	2,962	4,062	4,798	5,330

6.3 Description of Wastewater Servicing Alternative Solutions

Based on the site's location and constraints as well as the design criteria provided, the following preliminary wastewater servicing alternatives have been developed for the site:

Option A: Do Nothing / Limit Growth

Option B: Development of individual onsite sewage systems (septic systems) to service units

Option C: Development of a new, communal wastewater treatment system onsite

Option D: Connection to an existing Municipal System (Meaford or TOBM)

The following sections will discuss these alternatives.

Option A: Do Nothing / Limit Growth

The "Do Nothing" Alternative does not allow for development of servicing for the site to a level that is consistent with the desired level of development across the site.

Option B: Development of individual onsite sewage systems (septic systems) to service units

This alternative evaluates individual onsite sewage systems to service each residential and commercial development independently as they are constructed. Onsite sewage systems typically

consist of two components, a below grade septic tank and a leaching bed. The size of the leaching bed is dependent on the characteristics of the receiving soils, and where there are poor soils and/or other constraints such as high groundwater and high bedrock, raised leaching beds may be required. Advanced treatment systems may also be considered and/or required if there are space and or environmental constraints.

Onsite sewage systems with design flows less than 10,000 L/day are generally subject to the Ontario Building Code, which mandates minimum construction and design standards. Minimum mandatory setbacks would be required for each onsite sewage system to various environmental and site features, and the size of lots would be dictated based on the size of the onsite sewage system as well as any required setbacks.

When evaluating the feasibility of a new development on individual services, the cumulative impact of the onsite sewage systems must be examined in accordance with MECP Policy D-5-4. This policy assumes that the sewage systems will be individually owned and operated, and that the development will eventually sub-divided. If the lands and sewage systems are held in common under a condominium or land lease type ownership structure, the onsite sewage systems may be subject to a Reasonable Use assessment in accordance with Chapter 22 of the MECP Design Guideline for Sewage Works. This could require additional treatment for each onsite sewage system.

Crozier prepared a report to investigate the potential for individual services (Wells and septic beds) for the proposed development. Refer to **Appendix F** for the Master Servicing Study: Investigating Individual Water and Sewage Servicing Study.

<u>Option C</u>: Development of a new, communal wastewater treatment and disposal system onsite

This alternative evaluates the development of a new communal wastewater collection, treatment, and disposal system for the proposed development. This option will include a sanitary collection system, a communal sewage treatment plant, as well as discharge options for treated effluent.

A communal wastewater treatment system will be subject to the *Ontario Water Resources Act, R.S.O. 1990, c. O.40*, which requires an Environmental Compliance Approval (ECA) for all sewage treatment and disposal systems. The ECA application is subject to MECP review and approval, and must meet MECP standards for the collection, treatment, and discharge of treated effluent. Treatment standards will be based on the preferred method of discharge or treated effluent.

Discharge options for treated effluent include a subsurface disposal system (i.e., leaching bed), or surface discharge (i.e., Georgian Bay). The impact on the receiver must be carefully evaluated. Large subsurface disposal systems are subject to a Reasonable Use assessment in accordance with Chapter 22 of the MECP Design Guidelines for Sewage Works 2008, which examines the impact of the proposed sewage system on the shallow groundwater. Typically, the contaminant of concern is nitrate nitrogen. In this case, given the proximity to Georgian Bay phosphorous removal may also be required and would require further investigation. Given the size of the proposed development, it is expected that a level of treatment similar to a municipal wastewater treatment plant would be required, with additional treatment for nitrate nitrogen.

Discharge of treated effluent to Georgian Bay may also be considered. The development includes shoreline access to a large stretch of Georgian Bay, although along much of the shore length the slope is steep and unstable. For surface discharge proposals an assimilative capacity analysis would

be required which would dictate the required level of treatment before discharge. It is expected that a similar level of treatment to other surface water discharge plants in the area would be required. Package wastewater treatment plants are readily available which can meet these criteria, however given the size of the proposed WWTP a more conventional approach may be more cost effective. Contaminants of concern include ammonia, phosphorous and bacteria. The proximity to the intake protection zones for both the Meaford WTP and the Thornbury WTP, as well as the impact on local recreation areas (beaches etc.) would also have to be carefully considered.

An Owner of a privately owned communal wastewater treatment and disposal system that serves primary residences i.e., year-round occupancy is also required to enter into a Municipal Responsibility Agreement (MRA) with the local municipality, in this case Meaford. The MRA requires the provision of financial assurance by the Owner to the Municipality. If the Owner defaults on their obligations, the municipality is required to operate the system on the Owner's behalf, in order to maintain service for the residence. Typically, the financial assurance consists of 15% of the capital costs and 100% of the operating costs for three years, although this is negotiated on a case-by-case basis with the Municipality.

The evaluation of this alternative will include the feasibility, footprint, cost, and additional studies and approvals required. The ownership of the system will also be considered.

Option D: Connection to an existing Municipal System (Meaford or TOBM)

As noted previously, the site is located between the existing servicing limits of Meaford to the west, and TOBM to the east. Both municipalities own and operate wastewater collection and treatment systems. This alternative will evaluate the possibility of a connection to either of these systems.

Both the Meaford and TOBM wastewater treatment plants are operating near 80% of their rated capacity, which is the MECP triggering point for expansion. Currently, the Municipality of Meaford has initiated a new Class EA to expand upon the Class EA that was originally completed in 2007 for the expansion of the Wastewater Treatment Plant. The TOBM WWTP has recently undergone a Class EA to increase capacity and is currently constructing upgrades.

As part of the analysis of this alterative, the potential connection point in the existing system and conveyance to the connection will be considered. This alternative will also consider additional infrastructure that may be required (i.e., sewage pumping stations). Ownership of the wastewater infrastructure, permitting and operational agreements and capital costs will also be considered.

An overview of potential water and wastewater servicing connections to adjacent Municipalities is shown in **Figure 6** to **Figure 11.**

Meaford

The existing Meaford WWTP has a rated treatment capacity of 3,910 m^3/d, with a peak flow capacity of 11,730 m^3/d. As outlined in the Meaford Wastewater Treatment Plant Annual Report for the Year 2023 (Meaford, 2023), the WWTP services a population of 4,749 people and has been in service since 1970. The 2023 annual average daily flow was 2,258 m^3/d, operating at approximately 58% of the design capacity, which is relatively consistent to the flows for the last two years. In the Meaford Master Servicing Report (Ainley Group, 2015), the ADF was 2,600 m^3/d. We understand based on recent discussions with the Municipality that extensive development has been proposed

recently in the Meaford area and expansions to the Meaford WWTP are required and time sensitive to allow development to proceed.

Expansion of the Meaford WWTP had already been identified through the 2007 Schedule "C" Class EA completed by Earth Tech Canada Inc. The initial projection within the 2007 Class EA is for an ADF and Peak Flow for 2031of 5,940 m^3/d and 17,700 m^3/d respectively. However, flow projections were subsequently revised and applied for a revised population estimate based on historical average growth and a new ultimate population of 12,000 considering projected growth for the Meaford Settlement area (not including the Parkbridge Meaford site). For the ultimate population of 12,000, the ultimate Average Day Flow (ADF) was calculated as 5,350 m^3/d, with a peak flow rate of 15,600 m^3/d. The Municipality also initiated a large I&I improvement initiative to reduce overall flows to the plant.

As noted previously, the Municipality hosted a Public Information Centre (PIC) on October 12th, 2023, with their Consulting Engineers, Ainley, to provide an update on the Class EA for the expansion of the Wastewater Treatment Plant. The PIC presented an updated required ADF capacity of 4,400 m^3/d for 2054, with an ultimate ADF capacity of 6,000m^3/d in the future.

The recommended solution identified in the PIC included a three-phase expansion of the wastewater treatment plant:

Phase 1: expand the existing capacity of the WWTP by an additional 1,700 m^3/d to 4,400 m^3/d

Phase 2: replace the existing 2,700 m^3/d secondary aeration and secondary clarifiers in the future

Phase 3: expand the plant by an additional 1,600 m^3/d to achieve projected capacity of 6,000 m^3/d

Within the Serviced area of Meaford, services extend southeast to Knight's Home Building Centre on Highway 26, and along Montgomery Street to the Georgian Trail crossing, which were both examined as potential connection locations. On the south side of Highway 26 at Knight's Home Building Centre, there is an existing 250 mm sanitary sewer that terminates within an existing easement directly fronting the building. At the crossing of Montgomery Street and the Georgian Trail, there is also an existing 250 mm sanitary sewer that runs along Montgomery Street. Modelling was prepared by the Municipality's Consulting Engineer with connection to both locations to determine whether downstream horizontal infrastructure was sufficient to accept additional flows from the site.

Town of The Blue Mountains

The existing Thornbury WWTP has a rated treatment capacity of 3,580 m^3/d, equivalent to 3,541 units based on the historical five year rolling average day flow (ADF) of 1.011m^3/unit/day. In 2017 the TOBM completed an addendum to the 2006 Environmental Assessment (EA) for the Thornbury WWTP.

Based on the findings of the EA, the Town proceeded with design of the upgrades to the WWTP to increase capacity. The Environmental Study Report (ESR) identified that the first phase (Phase 1A and Phase 1B) of the works to expand the facility would provide an additional average day capacity of 3,500m^3/d for a total average day capacity of 7,080m^3/d. Phase 1A increasing ADF to 5,330 m^3/d, and phase 1B increasing to the full 7,080 m^3/d, with a peak daily flow PDF of 16,187

m^3/d. The TOBM has initiated the Phase 1A design upgrade and is proceeding with construction. The construction of Phase 1A of the Thornbury WWTP to enable an additional 1,182 units to be serviced.

In the TOBM, sanitary services extend to the intersection of 39th Sideroad and Sunset Boulevard. The TOBM's Consulting Engineer J.L. Richards conducted wastewater modelling and provided a summary memo Parkbridge Meaford Development, Water and Wastewater Analysis: Wastewater Modelling Analysis (J.L. Richards, August 15, 2023) for a connection to their existing services to determine whether the existing system can accommodate the additional flows from the Parkbridge site and identify downstream upgrades that may be required. Refer to **Appendix G** for a copy of the memo.

6.4 Evaluation of Wastewater Treatment Alternatives

This Water, Wastewater and Transportation Master Servicing Study evaluates the infrastructure servicing alternatives to service the proposed development. This Study has been prepared following the TOR agreed with the Municipality, and a "Do Nothing" Alternative and a "Limit/ Manage Growth" Alternative is required for assessment, similar to the requirements of a typical Class EA. These alternatives are evaluated against options that provide servicing to the site.

The criteria to be used for evaluation of alternative solutions for water, wastewater and transportation projects are set out in the agreed Terms of Reference for the Master Servicing Study. Based on the specifics of the Study Area and proposed developments, a suggested criteria list has been developed for use in the evaluation process.

The following criteria identified in **Table 10** was used for the analysis of the water and wastewater components of the Master Servicing Study:

Table 10: Summary of Criteria for Weighing Servicing Alternatives

Criteria	Sub Criteria
Land Use Planning Objectives	Provincial / Regional / Municipal
Natural Environment	Environmentally Sensitive Areas ANSI's Woodlots Creeks Fisheries Wetlands Wildlife and birds Vegetation Air Quality Habitat
Social Environment	Community Cohesiveness Quality of Life – Health & Safety Noise Construction Impacts Land Use Heritage Agricultural Land

Criteria	Sub Criteria
	Archaeology
Technical Considerations	Capacity Reliability Ability to Satisfy Design Geometrics (Vertical & Horizontal) Approvability Timeliness Structural Considerations Land Requirements Maintenance and Operating Needs
Economic Considerations	Capital Cost Operating Cost

Each alternative was evaluated against the criteria with the following approach:

Most Preferred (green) to Least Preferred (red): 

The alternative(s) that have the least number of impacts based on the evaluation of each consideration was chosen as the preferred alternative.

Comparison of Preliminary Wastewater Servicing Alternatives

Table 11 presents a high-level comparison of the preliminary wastewater servicing options considering the identified impacts.

Table 11: High Level Comparison of Wastewater Servicing Options

Considerations	Option A: Do Nothing / Limit Growth	Option B: Individual Septic Systems	Option C: New Wastewater Treatment Plant	Option D: Connect to Municipal Wastewater System		
				Option D. No. 1A: Connect to existing sanitary sewer on Montgomery Street in Meaford	Option D. No. 1B: Connect to existing sanitary sewer on Highway 26 in Meaford (Knights' Home Hardware)	Option D. No. 2: Connect to existing sanitary sewer on Sunset Boulevard in Town of The Blue Mountains
Technical Impacts	Does not meet Parkbridge Meaford Site development needs	Does not meet Parkbridge Meaford Site development needs	Meets Parkbridge Meaford Site servicing needs Provides reliable wastewater system that is owned and operated by municipalities to future residents	Existing downstream sanitary sewers meet ultimate Site development needs Municipality's wastewater treatment plant will require upgrades to meet ultimate Site development needs Provides reliable wastewater system that is owned and operated by municipalities to future residents	Existing downstream sanitary sewers require upgrades to meet ultimate Site development needs Municipality's wastewater treatment plant will require upgrades to meet ultimate Site development needs Provides reliable wastewater system that is owned and operated by municipalities to future residents	Municipality's wastewater treatment plant and existing sanitary sewer system will require upgrades to meet ultimate Site development needs Provides reliable wastewater system that is owned and operated by municipalities to future residents
Environmental Impacts	No expected environmental impacts	Limited impacts to natural heritage systems and wildlife	Potential impact to natural environment because of new surface water discharge system	Potential impact to natural heritage systems and wildlife (watercourse and associated natural feature crossings) Mitigation measures such as trenchless technology will assist in alleviating impacts.		No known impacts to natural heritage systems and wildlife (watercourse and associated natural feature crossings)
Social And Cultural Impacts	Does not provide opportunities for growth within the Site	Short term impact to residents' quality of life during construction Long-term septic maintenance requirements for future residents within the Site	Potential impact to groundwater table because of new sub-surface treatment system Potential impact to residents along the waterfront during the installation of a surface water discharge system	Potential for existing residents along the servicing route to connect to the sanitary sewer/forcemain Potential for future growth within the Municipality to be serviced by the sanitary sewer/forcemain extension	Potential for existing residents along the servicing route to connect to the sanitary sewer/forcemain Potential for future growth within the Municipality to be serviced by the sanitary sewer/forcemain extension	Potential for existing residents along the servicing route to connect to the sanitary sewer/forcemain Potential for future growth within the Town to be serviced by the sanitary sewer/forcemain extension
Financial Impacts	No financial impacts	High life cycle and operating and maintenance costs for future residents within the Site	High life cycle and operating and maintenance costs. There may be opportunities to decrease costs using a modular or non-conventional onsite system solution.	High capital cost associated with extending a sanitary sewer/forcemain approximately 3.5km to the site, as well as the construction of a new sewage pumping station.	High capital cost associated with extending a sanitary sewer/forcemain approximately 3.5km to the site, as well as the construction of a new sewage pumping station. Upgrades will be required to existing infrastructure downstream (i.e. wastewater treatment plant)	High capital cost associated with extending a sanitary sewer/forcemain approximately 1km to the site, as well as the construction of a new sewage pumping station. Upgrades will be required to existing infrastructure downstream (i.e. sanitary sewers, wastewater treatment plant, sewage pumping stations)
Overall Impacts	X **Do not carry forward as alternative solution to service the Site**	X **Do not carry forward as alternative solution to service the Site**	X **Do not carry forward as alternative solution to service the Site**	✓ **Carry forward as alternative solution to service the Site**	✓ **Carry forward as alternative solution to service the Site**	✓ **Carry forward as alternative solution to service the Site**

Based on the high-level evaluation of technical, environmental, social and cultural, financial and overall impacts, Option A, Option B, and Option C, were eliminated from consideration. Option D was brought forward as the preliminary preferred wastewater servicing option. **Figure 9** to **Figure 11** shows the preferred wastewater servicing options.

Table 12 presents a detailed comparison of the preferred wastewater servicing options considering the identified impacts. Further discussions with the Municipalities should occur to identify the preferred servicing route and connection point.

Table 12: Detailed Comparison of Ultimate Wastewater Servicing Options

Considerations	Option D: Connect to Municipal Wastewater System		
	Option D. No. 1A: Connect to existing sanitary sewer on Montgomery Street in Meaford	**Option D. No. 1B: Connect to existing sanitary sewer on Highway 26 in Meaford (Knights' Home Hardware)**	**Option D. No. 2: Connect to existing sanitary sewer on Sunset Boulevard in Town of The Blue Mountains**
Technical Impacts			
Capacity, Ability to Satisfy Design	Upgrades required at the wastewater treatment plant for the ultimate buil-out of the Site	Upgrades required at the wastewater treatment plant and downstream sanitary sewers for the ultimate build-out of the Site	Upgrades required at the wastewater treatment plant and downstream sanitary sewers / sewage pumping stations for the ultimate build-out of the Site
Land Requirements, Approvability, Timeliness	Moderate number of approvals and permits to obtain for the sewage pumping station and forcemain/sanitary sewer	Moderate number of approvals and permits to obtain for the sewage pumping station and forcemain/sanitary sewer Additional approvals required from MTO for works within the Highway 26 corridor	Moderate number of approvals and permits to obtain for the sewage pumping station and forcemain/sanitary sewer Cross jurisdictional approvals required in order to service the Site from Town of The Blue Mountains
Geometrics (Vertical & Horizontal), Structural Considerations	Moderate anticipated construction challenges because the sanitary sewer/forcemain may be installed within the Georgian Trail corridor. Access for the contractor will be limited to existing road crossings and directional drilling may be required due to width of the corridor. Multiple watercourse crossings will be required on route to the connection point.	Moderate anticipated construction challenges because the sanitary sewer/forcemain may be installed within the Georgian Trail corridor. Access for the contractor will be limited to existing road crossings and directional drilling may be required due to width of the corridor. Multiple watercourse crossings will be required on route to the connection point.	Minimal anticipated construction challenges because the sanitary sewer extension would be installed within existing roadways, with minimal watercourse crossings Potential challenges to upgrade existing sanitary sewers / sewage pumping stations (if required) while maintaining services to existing residents
Reliability, Maintenance and Operating Needs	Sewage pumping station will be equipped with a generator to maintain operation during power outages. An operator will be required for periodic maintenance and operation of the sewage pumping station. Minimal maintenance concerns associated with the sanitary sewer/forcemain extension to the site.	Sewage pumping station will be equipped with a generator to maintain operation during power outages. An operator will be required for periodic maintenance and operation of the sewage pumping station. Minimal maintenance concerns associated with the sanitary sewer/forcemain extension to the site.	Sewage pumping station will be equipped with a generator to maintain operation during power outages. An operator will be required for periodic maintenance and operation of the sewage pumping station. Minimal maintenance concerns associated with the sanitary sewer/forcemain extension to the site.
Technical Impacts Summary	✓ **More Preferred**	✓ **Equally Preferred**	✓ **Equally Preferred**
Environmental Impacts			
Impact to Aquatic Environment (Creeks, Fisheries, Wetlands, Habitat)	Some impacts to the environmental system because the sanitary sewer/forcemain may cross multiple watercourses	Some impacts to the environmental system because the sanitary sewer/forcemain may cross multiple watercourses	Minimal impacts to the environmental system because the sanitary sewer/forcemain may cross minimal watercourses
Impact to Terrestrial Environment (Woodlots, Wildlife and birds, Vegetation, Habitat)	Limited impacts to wildlife and species at risk because the sanitary sewer/forcemain extension will primarily be located within the Georgian Trail corridor	Limited impacts to wildlife and species at risk because the sanitary sewer/forcemain extension will primarily be located within the Georgian Trail corridor	Limited impacts to wildlife and species at risk because the routing of the sanitary sewer/forcemain extension will likely be located in an existing roadway
Impact to Air Quality	Low level of impact to air quality during construction anticipated	Low level of impact to air quality during construction anticipated	Low level of impact to air quality during construction anticipated
Impact to Environmentally Sensitive Areas, ANSI's	The sanitary sewer/forcemain extension would need to cross Workman's Creek, which is an ANSI Earth Science, subtype 1068. It is identified as a non-sensitive ANSI with no restriction needed. Based on field recconnaissance, there appears to be sufficient cover over the existing box culvert to allow services to be installed above the creek crossing. Refer to **Appendix H** for photo's of the Workman's Creek crossing.	The sanitary sewer/forcemain extension would need to cross Workman's Creek, which is an ANSI Earth Science, subtype 1068. It is identified as a non-sensitive ANSI with no restriction needed. Based on field recconnaissance, there appears to be sufficient cover over the existing box culvert to allow services to be installed above the creek crossing. Refer to **Appendix H** for photo's of the Workman's Creek crossing.	No ANSIs identified along the routing of the sanitary sewer/forcemain extension

Considerations	Option D: Connect to Municipal Wastewater System		
	Option D. No. 1A: Connect to existing sanitary sewer on Montgomery Street in Meaford	**Option D. No. 1B: Connect to existing sanitary sewer on Highway 26 in Meaford (Knights' Home Hardware)**	**Option D. No. 2: Connect to existing sanitary sewer on Sunset Boulevard in Town of The Blue Mountains**
Environmental Impacts Summary	✓ **Equally Preferred**	✓ **Equally Preferred**	✓ **More Preferred**
Social And Cultural Impacts			
Impact to Community Cohesiveness, Quality of Life - Health and Safety	Potential impact to community due to construction along the Georgian Trail / temporary closures	Potential impact to community due to construction along the Georgian Trail / temporary closures	High potential impact to existing community in Lora Bay due to potential downstream infrastructure upgrades. There may be economies of scale if existing community infrastructure upgrades are proceeding in Lora Bay regardless of the Parkbridge Meaford site. Potential impact to community due to construction along the Georgian Trail / Temporary closures.
Impact to Noise, Construction Impacts	Low level of impact to noise and construction impacts anticipated	Low level of impact to noise and construction impacts anticipated	Low level of impact to noise and construction impacts anticipated
Cultural Heritage and Archeological Features Impacts	No known impact to cultural heritage and archeological features but low potential in already disturbed Georgian Trail corridor	No known impact to cultural heritage and archeological features but low potential in already disturbed Georgian Trail corridor	No known impact to cultural heritage and archeological features but low potential in already disturbed Municipal right-of-ways
Social And Cultural Impacts Summary	✓ **Equally Preferred**	✓ **Equally Preferred**	✓ **Equally Preferred**
Financial Impacts			
Capital Costs	High capital cost for sewage pumping station and sanitary sewer/forcemain extension Downstream, onsite, and connecting infrastructure can be phased to accommodate phased development and hence phased costs	High capital cost for sewage pumping station and sanitary sewer/forcemain extension Downstream, onsite, and connecting infrastructure can be phased to accommodate phased development and hence phased costs	High capital cost for sewage pumping station and sanitary sewer/forcemain extension, as well as upgrades to existing Town infrastructure Downstream, onsite, and connecting infrastructure can be phased to accommodate phased development and hence phased costs
Operating Costs	Moderate annual operation and maintenance costs for sewage pumping station	Moderate annual operation and maintenance costs for sewage pumping station	Moderate annual operation and maintenance costs for sewage pumping station
Financial Impacts Summary	✓ **Equally Preferred**	✓ **Equally Preferred**	✓ **Equally Preferred**
Overall Impacts			
Recommendation	✓ **Carry forward as potential solution to service the Site**	✓ **Carry forward as potential solution to service the Site**	✓ **Carry forward as potential solution to service the Site**

6.5 Preliminary Preferred Alternative Wastewater Servicing

As noted in the overall evaluation of servicing options for wastewater servicing, Option D is the preferred alternative to provide wastewater collection and treatment services to the development based on technical, environmental, social, and financial impact considerations. Option C (Development of a new, communal wastewater treatment system onsite) is also technically feasible for either subsurface discharge or surface water discharge, however Option D was found to be more preferential based on the overall evaluation based on technical, environmental, social, and financial impact considerations identified.

Similar to the water servicing solution, this option has two viable potential connections: either to the Municipality of Meaford, or to the TOBM. Further discussions between the Municipalities, the County, Parkbridge and Crozier are required to determine the preferred route, although both are technically feasible, and have similar environmental and socio-economic impacts. Additional details including the ownership and location of an onsite sewage pumping station, connectivity to the wastewater treatment system and the gravity sewer and/or forcemain alignment will need to be established once the preferred connecting Municipality is confirmed.

For the preferred wastewater servicing alternative, consideration must be given to the water and wastewater servicing as a parallel process. For example, there are economies of scale to consider when evaluating connections that both follow the same alignment to one municipality. There are potential cost savings related to construction for mobilizing and constructing one route for both services, rather than connecting water to one municipality and wastewater to another.

Potential Connection to Meaford for Wastewater Servicing

Wastewater modelling was conducted by Meaford's Consulting Engineer, Ainley, to confirm that downstream horizontal sanitary sewer infrastructure is adequate to accept the proposed ultimate flows from the site. There are ongoing discussions to update the modeling with Meaford to incorporate the latest changes to the development plan, and refine the modelling completed in 2020, available in **Appendix G.**

If a connection to Meaford is agreed with the Municipality, additional design details for the sanitary pumping station and forcemain and/or gravity sewer will be confirmed through the detailed design stage, including:

- An onsite sewage pumping station will be required to pump sewage through a forcemain towards Meaford's existing sanitary sewer network. The sewage pumping station will likely consist of a wet well and submersible sewage pumps, and potentially equipped with an odour control unit and standby generator.

- Specific routing to the site. Similar to the solution for water servicing, alternatives considered include routing along either the Georgian Trail or Highway 26 to Meaford. Challenges associated with the Highway 26 corridor were identified due to the need for approvals from MTO, increased disruption of traffic requiring additional traffic management, increased impacts to community, and increased capital costs. Furthermore, the MTO was consulted at a preliminary stage of this evaluation and did not prefer large scale work efforts associated with infrastructure installation within their Highway 26 corridor. If servicing from Meaford is selected to proceed, then routing is therefore proposed along the Georgian Trail with a

connection to services at the intersection of Montgomery Street and Georgian Trail, into the existing 250 mm sanitary gravity sewer. Installation along the Georgian Trail to Meaford could be completed with a combination of conventional and trenchless technologies to minimize disturbance where feasible. Refer to **Figure 12** for the Georgian Trail cross-section which identifies the preliminary alignment of the sanitary forcemain within the Georgian Trail 20m right-of-way.

- Infrastructure for the sanitary sewer pipe. Conveyance of flows through construction of either a gravity sewer, forcemain, or combination gravity sewer and forcemain would need to be considered for the preferred route. The preferred solution may be a hybrid solution with use of gravity sewer from a high point of the route, which can mitigate the potential for a syphoning effect or vacuum conditions that could occur with a full forcemain solution. Implementing gravity sewers wherever possible reduces costs as well as more readily allow for additional future users to connect. An understanding of phased build-out of the development is required to adequately design the forcemain(s) to mitigate the risk of operational issues with an oversized forcemain built in advance of adequate buildout of the development for appropriate flows to operate, therefore the need for a twinned forcemain will be considered through the design process.

Meaford has an ongoing Schedule C Class EA with respect to its wastewater treatment plant. Further discussions need to occur to understand potential additional demands and costs associated with any additional flows from the Parkbridge Meaford development. Meaford has previously noted that the requirement for tertiary treatment is not triggered based on their current anticipated flows from their existing serviced area for their anticipated 30-year growth (Phase 2 of their planned WWTP expansion), however is anticipated for their ultimate buildout (Phase 3 of their planned WWTP expansion). The addition of flows from the Parkbridge Meaford development would likely trigger the need for tertiary treatment. Further discussion with the Municipality and engagement in their ongoing Class EA is recommended to understand their phased expansion plans and implications of the inclusion of Parkbridge Meaford flows.

A Public Information Centre (PIC) for Meaford's ongoing WWTP Class EA was conducted on October 12, 2023, providing an overview of the planned upgrades. It was noted that the Study Area evaluated included only the urban area of Meaford and no longer included the Parkbridge Meaford site. The 30-year population projection resulted in an ADF capacity of 4,400 m^3/d in 2054, and an ultimate ADF capacity of 6,000 m^3/d is envisaged for the future. It was noted that a tertiary treatment solution of cloth disc filter was identified as a preferred treatment solution, however tertiary treatment is not anticipated to be installed until Phase 3, along with additional expansion of other treatment solutions including aeration tanks, aerobic digester, and biosolids storage.

Following the PIC, Crozier provided comments to Ainley for consideration. As of the time of writing this report a response to all comments and completion of the Environmental Study Report (ESR) is pending. Further review and comment on the ESR and additional dialogue with the Municipality is recommended to explore the possible inclusion of flows from the proposed Parkbridge Meaford development.

Potential Connection to Meaford for Wastewater Servicing – Servicing of Potential Development Lands

For a proposed connection to Meaford services, there could be a possible community benefit for servicing other rural / potential developable areas in proximity to a proposed service extension. For the purposes of this Master Servicing Study, potential developable areas were identified by Bousfields to determine the potential future development area and targeted density for those intermediary lands in Meaford between the Parkbridge site and the Primary Settlement Area of Meaford, refer to **Figure 13**. The sanitary sewer flows from these lands is included for the Municipality's consideration and future discussions, but they have not been accounted for when determining preliminary sizing of infrastructure and associated costs to service the site, as there is no current development proposal on these lands. The demands and storage requirements associated with these additional lands were analyzed to support future discussions with the Municipality if a connection option to Meaford is preferred.

The criteria and resulting calculations associated with the inclusion of these additional external lands is highlighted below:

Density for potential development areas: 20 units/ha
Ultimate wastewater flows (including Parkbridge Meaford site and potential development areas):

- Area: 171 ha
- Developed area (assuming 60%): 102 ha
- Population: 4,942 persons
- Average Day Flow (Wet Weather Flow): 2,230 m^3/d
- Maximum Day Flow: 4,461 m^3/d
- Peak Dry Weather Flow: 5,803 m^3/d
- Peak Wet Weather Flow: 6,924 m^3/d
- Peak Instantaneous Flow: 7,694 m^3/d

With the potential addition of these development lands, there is an approximately 50% increase in the population, and the resulting average day flows and maximum day flows that would be contributing to the system. Additional modelling to incorporate these additional flows and understand the implications to downstream infrastructure is recommended, if an approach to Meaford is identified as the preferred route, and further discussions with the Municipality and County to validate assumptions around the potential development properties should occur.

Any increases to capital or operational costs associated with the addition of the potential development lands in Meaford that may benefit from servicing if a potential connection route to the Meaford serviced area is selected have not been included in this Study. The magnitude of servicing demands has been calculated and provided, and further modelling or consideration should be discussed with the Municipality in order to validate potential development and understand potential impacts, if Meaford is the eventual servicing solution.

Potential Connection to TOBM for Wastewater Servicing

The TOBM's Consultant Engineer, J.L. Richards, conducted wastewater modelling to confirm the existing capacity and identify potential future expansions and improvements required to accommodate flows from the development site, where an onsite sewage pumping station would collect and convey flows to the existing TOBM sanitary services. A summary memo Parkbridge

Meaford Development, Water and Wastewater Analysis: Wastewater Modelling Analysis (J.L. Richards, August 15, 2023) provides an overview of recommended improvements to the immediate downstream network. However, improvements to existing infrastructure for the entirety of the downstream network to the wastewater treatment plant has not been completed at this time, including identification of any upgrades required at the existing Sanitary Pumping Stations.

If a connection to the TOBM is agreed with the municipalities, additional design details for the infrastructure required on site, routing of services, and downstream capacity constraints will be confirmed at the detailed design stage, including:

- Similar to the Meaford solution, an onsite sewage pumping station will be required to pump sewage through a forcemain towards TOBM's existing sanitary sewer network. The sewage pumping station will consist of a wet well and submersible sewage pumps, and potentially equipped with an odour control unit and standby generator.

- Specific routing to the site. The Parkbridge Meaford Development, Water and Wastewater Analysis: Wastewater Modelling Analysis (J.L. Richards, August 15, 2023) identified a connection into the existing sanitary sewer network at the intersection of 39th Sideroad and Sunset Boulevard. It is understood that the Town has an interest in extending sanitary servicing further west along Sunset Boulevard to the intersection with Christie Beach Road, which may be an easier point of connection to service the Parkbridge Meaford property. If servicing from TOBM is selected to proceed, then routing should be discussed with the Town in further detail.

- The Parkbridge Meaford Development, Water and Wastewater Analysis: Wastewater Modelling Analysis (J.L. Richards, August 15, 2023) identified approximately 915 m of existing sanitary sewer within the Lora Bay development that would require upgrades to convey the additional sewage flows from the Parkbridge Meaford development. The analysis completed by J.L. Richards was restricted to the sanitary sewer infrastructure upstream of Peel Street South and did not evaluate capacity at the existing sewage pumping stations within the Town. If servicing from TOBM is selected to proceed, further discussions should be had with the Town and J.L. Richards regarding downstream capacity of the wastewater collection system.

A cross-jurisdictional agreement would also need to be negotiated between the two Municipalities if servicing is provided to Meaford from the TOBM services.

The TOBM is currently in the midst of construction of a planned expansion to their Thornbury WWTP. There is also the potential for future planned expansion of services to accommodate growth in the Lora Bay Community.

To support the analysis of water and wastewater servicing alternatives, Crozier retained DLW Engineering Services to complete a memo outlining capital and lifecycle costs associated with identified larger infrastructure items onsite (i.e., an onsite WWTP, SPS, BPS and reservoir). The DLW Engineering Services memo is available in **Appendix I.**

Cost estimates associated with the servicing alternatives are available in **Appendix J.**

Recommended Next Steps

The recommended next steps to proceed with the consideration of servicing alternatives includes:

1. Verify further modelling with Meaford and the TOBM and their Engineering Consultants based on the current Parkbridge Demonstration Concept and items discussed in this section, including preferred routing, infrastructure, and connection details.
2. Enter into detailed discussions on more formal upfront capital costs and lifecycle costing, including further engagement with the Municipalities to understand their ongoing Class EA processes and proposed expansions. Begin preliminary discussion around potential future ownership and operations of onsite and connecting infrastructure.

These recommended next steps will require ongoing engagement with both Municipalities to agree on the preferential solution, to be further outlined through detailed design.

7.0 Transportation

This section examines the existing transportation system in proximity to the site, identifies opportunities and constraints within the existing system, and evaluates alternative solutions to address constraints and offers a preferred alternative to support the site. A full Transportation Impact Study has been prepared and submitted under separate cover.

7.1 Existing Transportation System

The Parkbridge Meaford Development is located in the east end of the Municipality of Meaford, in a geographic location known as the "Southeast Clay Banks". The lands total approximately 135 ha. The site is bounded by Georgian Bay and existing residential units to the north, Christie Beach Road and existing residential units to the east, Highway 26 to the south, and land designated and zoned for open space to the west. The Georgian Trail runs parallel to Highway 26 through the site.

7.1.1 Study Intersections

The following intersections are analyzed in this report.

- 39th Sideroad and Christie Beach Road
- Highway 26 and Christie Beach Road
- Highway 26 and Starlight Lane
- Highway 26 and Old Highway 26
- Proposed site accesses

Details relating to the boundary roadways are summarized in the subsequent section.

7.1.2 Boundary Road Network

The boundary road network is described in **Table 13**. The roadway classifications were obtained from "Functional Road Classification" ArcGIS mapping system produced by Grey County.

Table 13: Boundary Road Network

Roadway	Highway 26	Christie Beach Road	39th Sideroad	Starlight Lane	Old Highway 26
Direction	East-West	North-South	East-West	North-South (curves to East-West)	North-South
Jurisdiction	MTO	Municipality of Meaford / The Town of The Blue Mountains	The Town of The Blue Mountains	Municipality of Meaford	Municipality of Meaford
Street Classification	Provincial Highway	Local Road	Local Road	Local Road	Local Road
Speed Limit	80 km/h	80[1]-50 km/hr.	50 km/h	80[1] km/h	80[1] km/h
Number of Lanes	2	2	2	2	2

Note 1: Grey County GIS Mapping labels the speed limits as 80 km/h. Christie Beach Road is labeled as 50km/h north of 39th Side Road.

The Georgian Trail runs parallel to Highway 26 through the proposed development site, set back by a minimum of 70 metres from the Highway. The trail is relatively straight and flat. It is available to pedestrians and cyclists between Collingwood and Meaford. The road network does not provide any additional pedestrian or cycling facilities.

Passing segments exist on Highway 26. As of 2021, two westbound lanes and one eastbound lane were available from approximately 290 metres west Christie Beach Road to approximately 600 metres west of Starlight Lane. Another 140 metres west, the roadway then transitions to one lane westbound and two lanes eastbound for approximately 1.5 kilometres.

7.1.3 Existing Traffic Operations

Existing traffic volumes were collected on Thursday April 21st and Saturday April 23rd of 2022. Since 2011 historical Annual Average Daily Traffic (AADT) volumes and Summer Average Daily Traffic (SADT) volumes recorded by the MTO (Traffic Volumes 1988-2019) for this section of Highway 26 have been similar. No seasonal adjustment has been made to the volumes. These traffic volumes were assessed as part of the Transportation Impact Study for the development.

The existing operations indicate that the Study intersections are operating well at a LOS "C" or better under weekday a.m., p.m., and Saturday peak hour traffic volume conditions. The maximum control delay of 15.1 seconds is experienced at the intersection of Highway 26 and Old Highway 26 during the p.m. peak hour. The existing volumes do not produce queues which exceed available storage and volume-to-capacity ratios demonstrate excess room for additional traffic volumes.

7.2 Transportation Demand Projections

As part of the Transportation Impact Study, a review of operations at the Study intersections was completed for future horizon years. The final horizon of 2045 represents ten years past the estimated full build-out of the site. While phasing and construction of the development may proceed faster or slower than the forecasted horizons, the ten-year horizon provides a confidence in a conservative analysis of operations and required improvements to transportation systems.

7.2.1 Future Background Operations

The future background operations are assessed by growing the existing traffic volumes to the forecasted horizon years, including the addition of new developments in proximity to the site. The purpose of a future background assessment is to understand what requirements are needed on the boundary road network, regardless of whether the development proceeds. It is the forecasted scenario for the "Do Nothing Option".

The 2045 future background operations indicate that the Study intersections will continue operating with a LOS 'C' or better. The exception being the intersection of Highway 26 and Old Highway 26 which is expected to operate at a LOS 'D' during the p.m. peak hour, with 27.7 seconds of control delay. The forecasted volume-to-capacity ratios continue to demonstrate excess capacity for future traffic volume growth.

7.2.2 Development Generated Impacts

To review the impact of the development, forecasts for the residential units and building areas were estimated. The Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition was referenced to establish the trip generation for these uses. The commercial and recreational uses proposed for the development are expected to generate a substantial proportion of trips from within the residential areas. Residents may choose to drive, walk, or cycle to the commercial centre and trips will not be added to the boundary road network. An estimate of 50% external trips has been utilized for the commercial and recreational uses. **Table 14** outlines the forecasted trip generation for the proposed development.

Table 14: Forecasted External Trip Generation

Unit Type	Units/GFA	Peak Hour	Inbound Volumes	Outbound volumes	Total Volumes
Residential Units (Hybrid Rate)	1,250 units	A.M.	188	563	750
		P.M.	551	324	875
		Saturday	473	403	875
Commercial Use	2,450 m^2	A.M.	17	11	28
		P.M.	39	39	78
		Saturday	44	43	87
Community Use	9,290 m^2	A.M.	63	33	96
		P.M.	63	70	133
		Saturday	29	25	54
Total External Trips		**A.M.**	**268**	**606**	**874**
		P.M.	**653**	**433**	**1,086**
		Saturday	**546**	**470**	**1,016**

The development is forecasted to generate 874 a.m., 1,086 p.m. and 1,016 Saturday external peak hour trips. Trips are expected to arrive and depart equally east and west of the site, with downtown Meaford and the City of Owen Sound to the west and the Town of The Blue Mountains and the Town of Collingwood to the east.

7.3 Development Access

The National Fire Protection Association (NFPA) Standards recommends three accesses for developments with over 600 units, to provide sufficient access from an emergency perspective.

Per the MTO's Highway Corridor Management Manual (September 2018), the recommended minimum intersection spacing is 800 metres for public and private road access connections to a 2B Arterial such as Highway 26 and is measured from any intersection regardless of which side of the roadway the intersection is located on. The measured distance between the existing intersections on Highway 26 at Old Highway 26 and Starlight Lane is approximately 1700 m. The development does not include frontage to Highway 26 between Starlight Lane and Christie Beach Road, though approximately 1,150 m of spacing is available between the intersections.

The Municipality of Meaford currently holds an existing 20 m right-of-way to the west of Christie Beach Road, in line with 39th Sideroad, which has been previously discussed with the Municipality to provide access to the site, however no agreement has been finalized for its use at this time.

7.4 Transportation Alternative Solutions

The following sections review the potential alternative solutions to provide access to the development. The 'Do Nothing' and 'Limit Growth' options reviewed for serving, have not been reassessed as Transportation Alternative Solutions as they are not preferred from a servicing perspective and do not allow for future development of the site.

The following access alternatives have been reviewed for the site:

Option A: A single access connection to Highway 26 or Christie Beach Road

Option B: Two access connections to Highway 26 and Christie Beach Road

Option C: Three access connections to Highway 26

Option D: Two connections to Highway 26 and a single connection to Christie Beach Road

It should be noted that the alternative solution selected will require further consultation with the Municipality of Meaford and the Ministry of Transportation.

Option A: A Single Access Connection

This alternative considers a single connection to Highway 26 within the site frontage or a single connection to Christie Beach Road through the municipal right-of-way.

However, the National Fire Protection Association #1141 Standard for Fire Protection Infrastructure for Land Development requires three accesses for any development of over 600 households and a single connection would result in approximately 1,000 two-way trips during the peak hours through one intersection.

As such, this option has not been carried forward for further evaluation.

Option B: Two Access Connections

This alternative considers providing two connections to Highway 26 within the site frontage or a single connection to Highway 26 within the site frontage in combination with a single access to Christie Beach Road through the municipal right-of-way.

However, the National Fire Protection Association #1141 Standard for Fire Protection Infrastructure for Land Development requires three accesses for any development of over 600 households.

As such, this option has not been carried forward for further evaluation.

Option C: Three Access Connections to Highway 26

This alternative considers providing three access connection within the site frontage to Highway 26.

A total of three access would adhere to the National Fire Protection Association #1141 Standard for Fire Protection Infrastructure for Land Development requirement for developments over 600 units. It is

noted that one of the three accesses may be limited to an emergency access or all three may operate as general accesses.

As such, this option has been carried forward for further evaluation.

Option D: Two Access Connections of Highway 26 and a Single Connection to Christie Beach Road

This alternative considers providing two access connections to Highway 26 within the site frontage and a single connection to Christie Beach Road through the municipal right-of-way.

A total of three access would adhere to the National Fire Protection Association #1141 Standard for Fire Protection Infrastructure for Land Development requirement for developments over 600 units. It is noted that one of the three accesses may be limited to an emergency access or all three may operate as general accesses.

As such, this option has been carried forward for further evaluation.

7.4.1 Evaluation of Transportation Alternatives

For analysis of the transportation components of the Master Servicing Study, the criteria and weighting are presented in **Table 15**.

Table 15: Summary of Criteria for Weighing Transportation Alternatives

Criteria	Sub Criteria
Technical Considerations	Capacity Ability to Satisfy Internal Design Geometrics Land Requirements Approvability Timelines
Safety Considerations	Sight Distance Movements Through Intersections Emergency Access Routes

Each alternative was evaluated against the criteria with the following ranking.

Most Preferred (green) to Least Preferred (red): 

The alternative(s) that have the least number of impacts based on the evaluation of each consideration was chosen as the preferred alternative.

Table 16: Detailed Comparison of Transportation Alternatives

Considerations	Option C: Three access connections to Highway 26		Option D: Two connections to Highway 26 & a Connection to Christie Beach Road	
Technical Considerations				
Capacity, Ability to Satisfy Internal Design		Site design needs are met. Distributing traffic through three intersections will reduce the impact on intersection capacity.		Site design needs are met. Distributing traffic through three intersections will reduce the impact on intersection capacity.
Geometric Considerations		Adequate spacing cannot be provided within the available frontage per MTO Highway Access Guidelines. Reduced spacing to approximately 425 m or less between each access would be required within the site frontage.		Adequate spacing cannot be provided within the available frontage per MTO Highway Access Guidelines. Reduced spacing to approximately 567 m or less between each access would be required within the site frontage.
Land Requirements, Approvability, Timeliness		Based on the available frontage, three intersections would not be granted approval from the MTO. Additional land acquisition is required for adequate spacing along Highway 26.		Based on the available frontage, discussions and agreement from the MTO for reduced spacing would be required for approval. An agreement to utilize the existing ROW to establish the roadway access to Christie Beach Road would require no additional land acquisitions.
Safety Considerations				
Sight Distance, Emergency Access, Movements		Three connections to Highway 26 would adhere to the NFPA Standards which require a total of 3 accesses for a development of over 600 units. Adequate sight distance is available.		Three connections to Highway 26 would adhere to the NFPA Standards which require a total of 3 accesses for a development of over 600 units. Adequate sight distance is availabe.
Summary	X	**Not a Preferred Solution**	✓	**Preferred Solution**

7.4.2 Transportation – Preferred Alternative

The Transportation solution selected must be capable of meeting the needs of the development as well as future growth of the Study Area. The preferred alternative from a technical and safety perspective is to have the development connect to the boundary road network at the intersection of Christie Beach Road and 39th Sideroad as well as at two points along the frontage of Highway 26.

Providing three access connections to the development allows for the disbursement of generated volumes. The preferred solution has an inconsequential impact on the capacity for the minor approaches of the intersections of Old Highway 26 and Starlight Lane as forecasted volumes are low compared to the forecasted volumes of Highway 26. Ongoing monitoring and communication with the Ministry of Transportation is encouraged.

7.5 Future Total Operations

The development has been assessed with the preferred solution of three accesses under full build-out conditions. A central entrance (noted as Access A herein) to Highway 26, an eastern connection to Christie Beach Road (noted as Access B herein) which could utilize the existing right-of-way held by the Municipality of Meaford and act as an emergency access until full build-out, as well as a western access to Highway 26 (noted as Access C herein). Trips associated with commercial and community uses were assigned to Access A as they are expected to surround the roadway, as well as 20% of the residential development. The remaining 80% of the residential development was split between Accesses B and C.

The future total operations were assessed by the addition of the forecasted trip generation to the future background volumes previously established. The purpose of a future total assessment is to understand what requirements are needed on the boundary road network, due to the impacts of the development. Warrants from the Ministry of Transportation Geometric Design Guidelines and the Ontario Traffic Manual were used to assess the requirement for signalization and auxiliary turn lanes.

It was concluded that the intersection of Christie Beach Road and Highway 26 warrants signalization by the 2035 future total horizon (full build-out), which will benefit the existing homes at the end of Christie Beach Road as well as the existing and proposed homes in Lora Bay. The intersection should be monitored to determine if signalization if required earlier based on the travel patterns of the Lora Bay units currently under construction.

Under the ultimate conditions, auxiliary left-turn lanes are required on Highway 26 at Access A and Access C. Further details regarding signalization and turn lanes can be referenced in the full Transportation Impact Study submitted under separate cover.

Under 2045 future total conditions, the signalized intersection of Christie Beach Road and Highway 26 operates with an acceptable LOS ‘C’ or better during the peak hours. The intersection of Highway 26 and Starlight Lane is expected to operate with an LOS “D” or better and with minimal delays. Old Highway 26 is forecasted to experience a LOS ‘F’ during the p.m. peak hour with 72.0 s of delay.

The future intersection of Christie Beach Road and Access B/39th Sideroad is forecasted to operate with an LOS ‘D’ or better with a maximum control delay of 29.6 s for the westbound movements.

The proposed intersection of Highway 26 and Access A is forecasted to operate with a LOS 'F' under all peak hours. The p.m. peak hour is forecasted to operate with a volume-to-capacity ratio of 2.32 and a control delay of greater than 150 s. Though not warranted, signalization of the intersection of Highway 26 and Access A will improve operations to a LOS 'A' and reduce 95th percentile queuing.

The proposed intersection of Access C and Highway 26 is forecasted to operate with an LOS 'F' under all peak hours with a maximum volume-to-capacity ratio of 1.17 and control delay greater then 200 s. It is noted that with the signalization of Access A and Christie Beach Road, it is expected that drivers will re-route to the signalized intersections to turn left out of the site, which would have a positive impact on the operations of Access C.

All operations should be monitored as the development proceeds. The Study intersections should be continually monitored during build-out to review the warrants and timeline of mitigation measures.

7.5.1 Additional Considerations

As the preferred solution requires the site accesses to Highway 26 be provided at a lower spacing than the requirement outlined in the MTO's Highway Corridor Management Manual, two additional considerations are noted for discussion with the MTO as detailed design of the development progresses.

Consideration 1: Two Connections and an Emergency Access

The MTO may require one of the two access to Highway 26 to be restricted to an emergency only access. The total volumes through the other two accesses will be higher than through three, signalization would mitigate a low level of service experienced.

Consideration 2: Realignment of Starlight Lane to a Connection with Highway 26

Improvement to the intersection spacing could be achieved by reconfiguring Starlight Lane so the connection to Highway 26 is aligned with the center site access forming a four-leg intersection. Assessment of this configuration was reviewed in the Transportation Impact Study and requires further discussion with the Ministry of Transportation.

7.5.2 Georgian Trail Alignment

The Georgian Tail is proposed to be realigned along the site frontage bringing it further south while remaining outside of the MTO's 14 m setback. The realignment would allow for the trail to curve down to the proposed intersections with Highway 26 with the curvature of the trail subject to further design. These locations would allow for crossing at a stop controlled or signalized intersection instead of requiring a secondary stop for vehicles mid-block at its original location. Bringing the trail to the intersections also removes the conflict of southbound queuing vehicles and the trail crossings. Crossing control and protections such as pavement markings, signage and signal timings can be confirmed through detailed design and further Study of existing and future use of the Georgian Trail within the proposed development.

8.0 Mitigation Measures, Permits and Approvals

This section summarizes the findings of this report and expands upon potential mitigation measures and next steps to refine the recommended solution and proceed with detailed design.

8.1 Environmental Impacts and Mitigation Measures

Any development has a potential for negative impacts to the natural environment and existing communities. The need to mitigate impacts through appropriate measures is integral to good engineering design. These proposed mitigation measures will be further refined through the design process in an iterative and collaborative process with the Municipality and other key agencies.

Table 17 summarizes the potential impacts and mitigation measures for the preferred solutions.

Table 17: Mitigation Measures

Potential Impacts	Mitigation Measures
Disruption of aquatic habitat	Develop and implement erosion and sediment control measures for construction activities. Minimize or avoid in-stream construction works. Observe spawning windows during construction. Potential for trenchless technology at crossings to reduce impacts.
Disruption of Terrestrial Habitat	Minimize construction footprint through design and construction. Mitigate impact through construction timing and detailed design considerations. Meadowlark (SAR) habitat determined on property. Per the EIS, habitat compensation plans can be developed in consultation with MNRF, associated with Site Plan Process. Per the EIS, mitigation of loss of woodlands through Tree Preservation Plan (TPP) and Vegetation Protection Zone (VPZ) associated with Site Plan Process. Propose planting and seeding of native species within designated areas, such as buffer areas around natural features, that is consistent with GSCA and Municipal guidelines. Potential for trenchless technology for required crossings of sensitive areas.
Disruption to Community Cohesiveness	Provide notice of temporary work and potential re-routing signage for construction along Georgian Trail.

Potential Impacts	Mitigation Measures
	Provide filters and scrubbers to prevent odours from escaping Sewage Pump Station. Provide vegetative screening for larger infrastructure elements (e.g. water reservoir, sewage pump station) through detailed design.
Construction Impacts including noise and dust nuisances	Limit construction working hours and designate permitted construction routes. Apply standard dust and noise suppression practices through construction. Apply protocol of "No idling" to construction vehicles on site. Potential for seasonal construction staging.
Disruption of archaeological resources	The site has undergone Stage 1 and Stage 2 Archaeological assessments, and no Archaeological resources were identified. The routing of proposed infrastructure is proposed along an existing Trail and Municipal Right of Ways and no impact to Archaeological resources is anticipated. If any unknown Archaeological resources are identified during construction, activities will cease, and a Licensed Archaeologist will be brought onsite to investigate.

8.2 Permits and Approvals

Potential permits and approvals required for the project include:

- Grey Sauble Conservation Authority Permit for GSCA regulated areas.
- Environmental Compliance Approval (Water and Wastewater).
- Permit to Take Water (for construction dewatering if over 400,000 L/day, or an Environmental Activity and Sector Registry (EASR) for construction dewatering between 50,000 and 400,000L/day).
- County and Municipal Zoning (OPA and ZBLA) and Draft / Site Plan Approval.
- Municipal Building Permits.
- The site is located adjacent to Highway 26, within MTO's Permit Control Area (PCA), and as such, MTO permits are required before any demolition, grading, construction or alteration to the site commences, and MTO permits are required for buildings or other structures. Highway

26 at this location is classified as a 2B Freeway in MTO's Access Management Classification System.

- Fisheries and Oceans Canada (DFO) permit for any in-water works.
- Notice of Approval from the municipality's Risk Management Official as the development is within an IPZ.

Additional studies will be prepared in support of detailed design work.

9.0 Closing

This section summarizes the analysis and findings of this report and expands upon next steps to refine the recommended solution and proceed with detailed design.

9.1 Summary of Preferred Design Alternatives

Analysis and evaluation of potential servicing solutions for the proposed Parkbridge Meaford development were completed with various servicing options evaluated against evaluation criteria outlined in the agreed Master Servicing Study TOR. There were multiple feasible options identified for servicing the site, and a preferred solution based on the evaluation of technical, natural, and social environment was identified for each. A summary of the evaluation and preferred solution for water, wastewater, and transportation follows:

Water Servicing

Option A: Do Nothing / Limit Growth

Option B: Development of individual water supply systems (wells) to service individual units onsite

Option C: Development of a new, communal water treatment and distribution system onsite

Option D: Connection to an existing Municipal System (Meaford or TOBM)

The preliminary preferred servicing solution for water for the proposed Parkbridge Meaford development is through connection and servicing from an adjacent municipality. An onsite water treatment plant (surface water source) was also deemed feasible, however is not the preferred solution based on the technical, environmental, and social evaluation completed.

Potable water for the site can be provided from either the existing water services in Meaford, or existing services in TOBM. If a connection to Meaford is preferred, services will tie into existing services along Montgomery Street, which will be upgraded to a minimum 250 mm diameter watermain. Routing is proposed along the Georgian Trail with a future minimum 250 mm diameter transmission main, and a new water storage solution will be constructed onsite, likely an in-ground water reservoir and booster pumping station.

If a connection to TOBM is preferred, a connection at existing infrastructure in the intersection of Sunset Boulevard and 39th Sideroad, or the future ultimate build-out infrastructure in the Lora Bay area at the intersection of Christie Beach Road and 39th Sideroad is suggested, dependent on the

timing of the build-out of Lora Bay infrastructure. A minimum 250mm transmission main is preferred, with an onsite water storage solution, although there may be opportunities to discuss potential expansions of the ongoing 10th Line Booster pumping station and reservoir and potential for storage and servicing from an increased expansion to provide adequate fire flows to the site. Discussions with either Municipality will need to occur to confirm whether the Municipality will own and operate the proposed infrastructure. It should be noted that an onsite surface water-drawn water servicing solution is also a feasible solution but was not deemed preferred through evaluation.

Wastewater Servicing

Option A: Do Nothing / Limit Growth

Option B: Development of individual onsite sewage systems (septic systems) to service units

Option C: Development of a new, communal wastewater treatment system onsite

Option D: Connection to an existing Municipal System (Meaford or TOBM)

The preliminary preferred servicing solution for water and wastewater for the proposed Parkbridge Meaford development is through connection and servicing from an adjacent municipality. An onsite wastewater treatment plant was also deemed feasible, however is not the preferred solution based on the technical, environmental, and social evaluation completed.

Wastewater for the site will be collected and treated through either the existing municipal system in Meaford or TOBM. If a connection to Meaford is preferred, services will tie into existing services along Montgomery Street, and be routed along the Georgian Trail via a proposed gravity sewer / forcemain to the site. A new sanitary pumping station will be required at the site to collect and convey flows along the forcemain to the adjacent Municipality. If a connection to TOBM is preferred, a connection to existing infrastructure at the intersection of Sunset Boulevard and 39th Sideroad is suggested, however this may be adjusted based on planned future expansions of existing Municipal infrastructure in the TOBM. An onsite SPS and potential combination forcemain / gravity sewer would convey flows to the connection location, and downstream infrastructure upgrades including increased pipe sizes and expansions to existing SPS would be required. Discussions with either Municipality will need to occur to confirm whether the Municipality will own and operate the proposed infrastructure.

Transportation Servicing

A review of technical and safety considerations for the following alternative solutions was completed.

Option A: A single access connection

Option B: Two access connections

Option C: Three access connections to Highway 26

Option D: Two connections to Highway 26 and a single connection to Christie Beach Road

It was determined that the preferred alternative is to have the development connect to the boundary road network at the intersection of Christie Beach Road and 39th Sideroad as well as at two points along the frontage of Highway 26.

To mitigate the transportation impacts of the development, signalization of Christie Beach and Highway 26 is recommended with left and right auxiliary turn lanes. A left turn lane at Access A and Highway 26 is recommended and the intersection should be monitored as the site is developed to determine if future signalization is required. The intersection of Access C and Highway 26 is recommended to be minor stop controlled with an auxiliary left turn lane and a right turn taper. The intersection of Christie Beach Road and Access B/39th Sideroad does not warrant any turn lanes and is recommended to be stop controlled in the eastbound and westbound directions.

9.2 Recommended Next Steps

Further discussion with both Municipalities (Meaford and the TOBM) is recommended to further refine the preferred servicing alternatives for water, wastewater and transportation servicing of the proposed Parkbridge Meaford site. Water and wastewater modelling should be refined, and the results discussed with both Meaford and the TOBM and their Engineering Consultants to verify servicing impacts and expansion requirements based on the current Parkbridge Demonstration Concept. Discussions regarding the preferred routing, storage, and connection details, along with potential phasing of the development to proceed in tandem with potential existing infrastructure expansions may also occur. Detailed discussions regarding more formal upfront capital costs and lifecycle costing should also be discussed through this process as the preliminary preferred servicing alternative is further refined.

In closing, the Parkbridge Meaford site can be serviced through multiple different servicing options. The preferred water and wastewater servicing solution is to service the site via existing services in an adjacent Municipality, and further discussions with the Municipalities should continue to refine the servicing solution.

The preferred transportation servicing solution includes three access points and improvements to Highway 26 and Christie Beach Road, and further discussions with the Municipalities and MTO should occur to confirm and refine the transportation servicing solutions.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Sarah O'Neill, E.I.T.
Project Manager

C.F. CROZIER & ASSOCIATES INC.

George Cooper, P.Eng.
Project Engineer

C.F. CROZIER & ASSOCIATES INC.

Jonathan M. Proctor, P.Eng.
Director, Land Development

C.F. CROZIER & ASSOCIATES INC.

Alex Fleming, P.Eng.
Director, Transportation

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APPENDIX A

Master Servicing Study Terms of Reference and Authorization

MARCH 19, 2020

PROJECT NO: 1046-5391

SENT VIA: EMAIL

Municipality of Meaford
21 Trowbridge Street West,
Meaford, ON N4L 1N2

Attention: Rob Armstrong

RE: PARKBRIDGE LIFESTYLE COMMUNITIES
CHRISTIE BEACH WATER, WASTEWATER AND TRANSPORTATION SERVICING STUDY

Dear Rob,

For your consideration, we are pleased to submit our Terms of Reference (ToR) for engineering services related to the preparation of a Water, Wastewater and Transportation Servicing Study examining engineering servicing solutions for the proposed Parkbridge Meaford development.

1. Purpose

A Class Environmental Assessment (EA) had been initiated by Parkbridge Lifestyle Communities Inc. (Parkbridge) in October 2019 to assess servicing options for the Christie Beach Study Area in consultation with the Municipality of Meaford. Subsequently, there has been a change in status of other developments in the area, and therefore the scope of the Study Area has been reduced and the focus of infrastructure servicing will be primarily for the Parkbridge Meaford private development moving forward. The Ministry of the Environment, Conservation and Parks (MECP) confirmed via teleconference on March 6, 2020 that the servicing infrastructure associated with the Parkbridge Meaford development is exempt from the Municipal Class EA process through the exemption for Private Developers under O. Reg 345/93. As a result of this change in scope and based upon direction from the MECP, the Schedule "B" Class EA initiated in October 2019 for the Christie Beach EA Study Area will be closed.

To comprehensively investigate servicing alternatives for the Parkbridge Meaford development in close consultation with the Municipality, an engineering Master Servicing Study will be completed. The Servicing Study will explore servicing options and identify the most suitable route and location for water, wastewater and transportation infrastructure. The Servicing Study will be completed in a comprehensive, environmentally sound manner in accordance with good engineering practice, and associated with the proposed development applications that will be subject to the Planning Act.

2. Study Area

The proposed Parkbridge Meaford Development comprises several parcels located in the east end of the Municipality of Meaford, bounded by Highway 26 to the south, vacant woodlands to the west, Georgian Bay to the north, and Christie Beach Road and The Town of The Blue Mountains

border to the east. The Georgian Trail runs parallel to Highway 26 through the subject lands. The lands total approximately 160 ha (400 acres). See **Figure 1**.

Based on our review of available infrastructure records and prior servicing investigations including the Master Plan, Water and Wastewater Servicing (Ainley Group, 2015), we believe there are feasible servicing connections to the Municipality of Meaford's servicing networks for both sanitary and water, as well as potential conveyance corridors. External services are also available with the adjacent Municipal system of TOBM. Preliminary analysis indicates there would be potential to bolster this existing system to extend services to the Subject Site should a cross jurisdictional servicing agreement be considered. Any proposed servicing routes will be identified with consideration to the social, economic and natural environment and in accordance with good engineering practice.

3. Project Management & Consultation

This project is being undertaken by Parkbridge Lifestyle Communities Inc. (Parkbridge) who will enter into a consulting services contract with C.F. Crozier & Associates (Crozier) to complete the servicing study. The Project Team will continue to keep the Municipality involved in all aspects of the servicing study, and key documentation including non-statutory public open houses and the final Servicing Study will be submitted to the Municipality for review and comment prior to being finalized. Further, the results of the Servicing Study will inform the planning and development applications, which will be subject to review and approval by the Municipality through the Planning Act.

Various technical agencies will be consulted throughout the project to provide technical input and guidance. Agencies to be consulted include, but are not limited to:

- Municipality of Meaford
- County of Grey
- Grey Sauble Conservation Authority (GSCA)
- Town of The Blue Mountains
- Ministry of Natural Resource and Forestry
- Ministry of Environment, Conservation and Parks
- Ministry of Transportation
- Department of Fisheries and Oceans as needed
- Major utility companies
- Indigenous Groups

Furthermore, public consultation will be important to the success of the project. The public will have opportunities to learn about and provide input at multiple points throughout the process.

Preliminary contact with the above technical agencies and the public has already been initiated, and communication will continue as the development applications proceed subject to the Planning Act.

4. Study Tasks

4.1 Background Review and Analysis

Review all available background studies and document / characterize existing conditions in the Study Area including land uses, topography, existing servicing systems, roads and natural features.

This Study Area Profile will rely primarily on existing sources provided by the Municipality, previous studies and development applications. However, fieldwork, as needed, will be completed to provide necessary information to prepare the Study Area Profile.

Confirm with Parkbridge and the Municipality of Meaford the proposed development populations of the subject lands, including consideration of future potential development in proximity to the Parkbridge Meaford property. Prepare water and wastewater demands based on historical water and wastewater data from, and consultation with, Meaford. Prepare proposed traffic demands based on transportation models and summarize new / improved road requirements.

4.2 Identification of Alternative Solutions

Identify alternatives including combinations of alternatives which would service the subject lands and address the study objectives. Possible alternatives may include:

Water
- New water source(s)
- Existing water source(s)
- New water treatment facility(ies)
- Existing water treatment facility(ies)
- Type and location of treatment
- Water storage
- Conveyance of water supply to proposed developments (e.g. booster pump station, pipes, etc.)

Wastewater
- New wastewater treatment facility(ies)
- Existing wastewater treatment facility(ies)
- Type and location of treatment
- Collection of wastewater from proposed developments (e.g. sewage pump station, pipes, etc.)
- Disposal of wastewater

Transportation
- New roadway(s) on new alignment(s)
- Non-structural improvements (signing, traffic optimization or traffic control)
- Diversion of traffic to other roads
- Other traffic management measures (e.g. truck lanes)
- Improvements on existing roads

To assess the viability of proposed alternatives a series of criteria by which to measure each alternative will be developed. These may include, but are not limited to, the following topics:

Social environment
- Land use
- Community cohesiveness
- Noise
- Construction Impacts
- Heritage
- Archaeology
- Agricultural land

- Quality of life – Health and safety

Natural environment
- Environmentally sensitive areas
- ANSI's
- Woodlots
- Creeks
- Fisheries
- Wetlands
- Wildlife and birds
- Vegetation
- Air quality
- Habitat

Technical
- Ability to satisfy design criteria
- Capacity
- Geometrics (vertical and horizontal)
- Reliability
- Approvability
- Timeliness
- Land requirements
- Structural considerations
- Maintenance and operating needs

Cost
- Capital
- Operating

4.3 Identification of Preferred Solution

Assess alternatives using the selected evaluation criteria and prepare the preliminary preferred solution. A weighted matrix evaluation method may be employed to ensure that each alternative is assessed against the same criteria. Assessment of the alternatives and selection of the preferred solution will occur with consultation and input from the Municipality of Meaford and the Municipality's Engineering Consultant.

If the proposed alternative results in an infrastructure project that is identified as a Schedule C Class EA project (e.g. new water source(s), new wastewater treatment plant, etc.), then Class EA requirements will be triggered.

4.4 Documentation

A Servicing Study document including the identification and assessment of alternatives including the selection of the preferred solution will be provided to the Municipality of Meaford for review and comment. Best management practices will also be included outlining the steps necessary to reduce or eliminate environmental impacts of the proposed solution.

The results of the Servicing Study will inform the next steps of the planning and development application for the Parkbridge Meaford development.

5. Conclusion

We look forward to working with you on this project. Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.

Sarah O'Neill, E.I.T.
Operations Manager
/so

C.F. CROZIER & ASSOCIATES INC.

Jon Proctor, P.Eng.
Associate

c.c. rvoigt@parkbridge.com
syousif@parkbridge.com
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tperejmybida@meaford.ca
lbuckton@meaford.ca
mullan@ainleygroup.com
andrew@pascuzzoinc.ca

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Figure 1

Location Map

207065 & 207145 Highway 26, Meaford, Ontario

LEGEND

- Property Boundary
- Right of Way

Sunset Boulevard

Fraser Street

Barker Street

39th Sideroad

Christie Beach Road

Highway 26

Data Source: First Base Solutions Aerial Flown 2016

DATE: October 16, 2019

SCALE: 1:8000

Parkbridge

Sarah O'Neill

From: Rob Armstrong <rarmstrong@meaford.ca>
Sent: March 18, 2020 2:18 PM
To: Sarah O'Neill
Cc: Tori Perejmybida; Liz Buckton
Subject: RE: Parkbridge Meaford - draft Notice of Study Closure & Master Servicing TOR

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Filed to Sharepoint

We have reviewed and good with the Terms of Reference. Once request is to change “Ainley” to “the Municipality’s Engineering Consultant” It is likely to be Ainley but we have not made formal decision on who we will be using for Peer Review on this file now that the process has changed.

Rob Armstrong.

From: Liz Buckton
Sent: Wednesday, March 18, 2020 8:56 AM
To: Rob Armstrong <rarmstrong@meaford.ca>; Tori Perejmybida <tperejmybida@meaford.ca>
Subject: Fw: Parkbridge Meaford - draft Notice of Study Closure & Master Servicing TOR

Hi Rob, can you please confirm if you/Tori have responded on thi? I've delegated it to you in the overdrive table, just wanted to keep tabs on status.

Thanks!
Liz

Sent from my BlackBerry—the most secure mobile device—via the Bell Network

---

From: soneill@cfcrozier.ca
Sent: March 12, 2020 9:28 AM
To: rarmstrong@meaford.ca; lbuckton@meaford.ca; tperejmybida@meaford.ca; rvoigt@parkbridge.com; syousif@parkbridge.com; sborst@parkbridge.com; mullan@ainleygroup.com; andrew@pascuzzoinc.ca
Cc: jproctor@cfcrozier.ca
Subject: Parkbridge Meaford - draft Notice of Study Closure & Master Servicing TOR

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Hello all,

Attached, please find the updated Terms of Reference (TOR) addressing the Municipality’s comments, and including updated content based on the MECP decision from our teleconference last week. Please advise if we are ok to proceed within finalizing the TOR.

Also attached is a draft of the Notice of Study Closure for the Class EA. Please provide any comments you may have, and we will update and provide to the MECP for their comment.

Thank you,
Sarah

Sarah O'Neill | Operations Manager
C.F. Crozier & Associates Consulting Engineers
40 Huron Street, Suite 301 | Collingwood, ON L9Y 4R3
cfcrozier.ca | soneill@cfcrozier.ca
tel: 705.446.3510 | direct: 705.719.3452



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APPENDIX B

MTO Terms of Reference

Kerianne Hagan

From: Denise McCarl <dmccarl@meaford.ca>
Sent: May 9, 2022 1:11 PM
To: Kerianne Hagan
Cc: Joel Saunders
Subject: RE: Terms of Reference - Christie Beach Road (Parkbridge)

Hi Kerianne,

We will review the TOR information you have provided below and let you know if we have any obvious additions.

In terms of the reports for Lora Bay being provided by us; as you are aware that development is within a different municipality. You will need to get these reports from the author or The Blue Mountains – we are not able to provide other municipality's reports to you.

Kind Regards,

Denise McCarl, MSc RPP MCIP
Manager, Planning Services
Municipality of Meaford
21 Trowbridge Street West, Meaford
519 538-1060 ext.1120 | dmccarl@meaford.ca
Twitter | Facebook | meaford.ca

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From: Kerianne Hagan <khagan@cfcrozier.ca>
Sent: May 9, 2022 1:04 PM
To: Meaford Planning <planning@meaford.ca>
Subject: FW: Terms of Reference - Christie Beach Road

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good Afternoon,

I received an out-of-office for Helena, and am hoping my inquiry can be forwarded to the appropriate party for the Town.

Greatly appreciated,
Kerianne

Kerianne Hagan, EIT | Engineering Intern
1 First Street, Suite 200 | Collingwood, ON L9Y 1A1
T: 705.446.3510

CROZIER
CONSULTING ENGINEERS

Crozier Connections:

Read our latest news and announcements here.

From: Kerianne Hagan
Sent: May 9, 2022 1:01 PM
To: Jessica Pegelo <Jessica.Pegelo@ontario.ca>; hfascinato@meaford.ca
Subject: Terms of Reference - Christie Beach Road

Good Afternoon Jessica and Helena,

We are seeking confirmation of the following Terms of Reference. If you are not the correct contact for this correspondence, we would be grateful if you can direct us to the appropriate person.

C.F. Crozier & Associates was retained to complete a Traffic Impact Study by Parkbridge Developments for the lands west of Christie Beach Road and north of Highway 26 in Meaford. At this time only an application for OPA is being pursed. Updated TIS reports can be prepared for future ZBA and SPA submissions. Initial consultation was undertaken in late 2019 and early 2020 before the project was put on hold. The following Terms of Reference are based on the previous consultation.

- The Traffic Impact Study will assess the following intersection:
  - Christie Beach Road and Highway 26
  - Christie Beach Road and 39th Sideroad
  - Starlight Lane and Highway 26
  - Old Highway 26 and Highway 26
  - Future Site Accesses
- The site is expected to be build-out in two phases. The horizon years of 2027, 2030, 2035 and 2040 will be assessed.
- A growth rate of 2% will be applied to all movements based on historical AADT data for that section of Highway 26.
- The Lora Bay subdivision to the east of Christie Beach Road will be considered as a background development for the purposes of the analysis.
- Trip generation will be forecasted based on the 11th edition of the ITE Trip Generation Manual. Trip distribution will be established based on the existing distribution recorded at the study intersections and expected catchment areas.

- A review of auxiliary turn lane warrants and signal warrants will be undertaken to determine if mitigation measures are required at study intersections.

We request that the accepted TIS reports for Lora Bay Phase 3, 4 and Cottages be provided to determine the trips associated with the background development. Should these reports not be available we will determine the trip generation based on ITE and the number of units for each phase of development.

If you have any questions please feel free to contact me.

Thank you in advance,
Kerianne

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From: Pegelo, Jessica (MTO) <Jessica.Pegelo@ontario.ca>
Sent: July 8, 2022 2:55 PM
To: Kerianne Hagan; hfascinato@meaford.ca
Subject: RE: Terms of Reference - Christie Beach Road

Good afternoon Kerianne,

MTO has reviewed the TOR the have the following comments that can be found in green:

- The Traffic Impact Study will assess the following intersection:
  - Christie Beach Road and Highway 26
  - Christie Beach Road and 39th Sideroad
  - Starlight Lane and Highway 26
  - Old Highway 26 and Highway 26
  - Future Site Accesses
  - **Eight (8) hours of data as a minimum are required to assess signal warrants for existing and background conditions.**
- The site is expected to be build-out in two phases. The horizon years of 2027, 2030, 2035 and 2040 will be assessed. **Provide number of units to be included in each phase. Confirm horizon year for each phase. Study horizons need to include background and total traffic conditions.**
- A growth rate of 2% will be applied to all movements based on historical AADT data for that section of Highway 26. **Agree.**
- The Lora Bay subdivision to the east of Christie Beach Road will be considered as a background development for the purposes of the analysis.
- Trip generation will be forecasted based on the 11th edition of the ITE Trip Generation Manual. Trip distribution will be established based on the existing distribution recorded at the study intersections and expected catchment areas. **Use the guiding principles included in the ITE's Trip Generation Handbook for the selection between rates and equations.**

- A review of auxiliary turn lane warrants and signal warrants will be undertaken to determine if mitigation measures are required at study intersections.

We request that the accepted TIS reports for Lora Bay Phase 3, 4 and Cottages be provided to determine the trips associated with the background development. Should these reports not be available we will determine the trip generation based on ITE and the number of units for each phase of development.

- **When evaluating impacts at intersections please refer to the TAC's Geometric Design Guide for Canadian Roads, MTO Design Supplement for TAC's Geometric Design Guide for Canadian Roads** (http://www.mto.gov.on.ca/phmpmbp/Reference%20Materials/HwyDes-MTO_DS_TAC_GDG-April2020-Final.pdf) **and the OTM Books.**

- **Queue and storage lengths for left turn and through movements for signalized intersections under MTO jurisdiction need to be calculated using the arrival rate method explained on MTO's Signal Timing Policy (attached). For queues/storage lengths for right turn movements please refer to Chapter 9 of TAC's Geometric Design Guide for Canadian Roads (excerpt attached). Queue assessment shall include a review to determine if the thru queues impede access to auxiliary lanes or if they reach the adjacent intersection.**
    - **Provide the results in tabular form. For thru and left turn queues include: peak period, movement, volume, cycle length, %trucks, pcph, m value, number of vehicles and total length. For right turn storage length include: peak period, volume, cycle length, design speed, total length.**
- **Submit 2 copies of the report in PDF format: one locked and sealed ;and the other unlocked (editable) and without the seal.**
- **Synchro:**
    - **Provide digital files in version 11.**
    - **For the Synchro files use an Ideal Saturation Flow Rate of 1900 and a PHF of 0.88 for MTO facilities. For all scenarios and peak periods.**
    - **Synchro model shall reflect existing and future proposed geometric characteristics of the road network.**

Consider the following volume related impacts at MTO intersections:

- **Double left turn lanes should be considered when the peak left turn volumes exceed 300 vph.**
- **Right turn channels should be considered when the peak right turn volumes exceed 500 vph.**
- **Additional thru lane should be considered when the thru volumes exceed 800 vph.**
- **A separate right turn lane should be considered when the right turn volumes exceed 200 vph.**

If you have any questions or would like to meet to discuss, please let me know.

Regards,

Jessica Pegelo
Ministry of Transportation
Corridor Management Planner (A)
Highway Corridor Management Section
659 Exeter Rd. London, ON N6E 1L3
Telephone: 519-379-4397 Fax: 519-376-6842
E-mail: jessica.pegelo@ontario.ca

Ontario

From: Kerianne Hagan <khagan@cfcrozier.ca>
Sent: May 9, 2022 1:01 PM
To: Pegelo, Jessica (MTO) <Jessica.Pegelo@ontario.ca>; hfascinato@meaford.ca
Subject: Terms of Reference - Christie Beach Road

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good Afternoon Jessica and Helena,

We are seeking confirmation of the following Terms of Reference. If you are not the correct contact for this correspondence, we would be grateful if you can direct us to the appropriate person.

C.F. Crozier & Associates was retained to complete a Traffic Impact Study by Parkbridge Developments for the lands west of Christie Beach Road and north of Highway 26 in Meaford. At this time only an application for OPA is being pursed. Updated TIS reports can be prepared for future ZBA and SPA submissions. Initial consultation was undertaken in late 2019 and early 2020 before the project was put on hold. The following Terms of Reference are based on the previous consultation.

- The Traffic Impact Study will assess the following intersection:
  - Christie Beach Road and Highway 26
  - Christie Beach Road and 39th Sideroad
  - Starlight Lane and Highway 26
  - Old Highway 26 and Highway 26
  - Future Site Accesses
- The site is expected to be build-out in two phases. The horizon years of 2027, 2030, 2035 and 2040 will be assessed.
- A growth rate of 2% will be applied to all movements based on historical AADT data for that section of Highway 26.
- The Lora Bay subdivision to the east of Christie Beach Road will be considered as a background development for the purposes of the analysis.
- Trip generation will be forecasted based on the 11th edition of the ITE Trip Generation Manual. Trip distribution will be established based on the existing distribution recorded at the study intersections and expected catchment areas.
- A review of auxiliary turn lane warrants and signal warrants will be undertaken to determine if mitigation measures are required at study intersections.

We request that the accepted TIS reports for Lora Bay Phase 3, 4 and Cottages be provided to determine the trips associated with the background development. Should these reports not be available we will determine the trip generation based on ITE and the number of units for each phase of development.

If you have any questions please feel free to contact me.

Thank you in advance,
Kerianne

Kerianne Hagan, EIT | Engineering Intern
1 First Street, Suite 200 | Collingwood, ON L9Y 1A1
T: 705.446.3510

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CONSULTING ENGINEERS

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Kerianne Hagan

From: Kerianne Hagan
Sent: May 12, 2022 5:00 PM
To: Pegelo, Jessica (MTO)
Subject: RE: Terms of Reference - Christie Beach Road
Attachments: Christie Beach MP-ALT 21 H - _Christie Beach Community_Land Area_220511.pdf

Good Morning Jessica,

The Concept Plan is still undergoing refinement, but I have attached the latest version for your reference.

If you have any question please let me know.
Thank you,
Kerianne

From: Pegelo, Jessica (MTO) <Jessica.Pegelo@ontario.ca>
Sent: May 9, 2022 1:44 PM
To: Kerianne Hagan <khagan@cfcrozier.ca>; hfascinato@meaford.ca
Subject: RE: Terms of Reference - Christie Beach Road

Good afternoon Kerianne,

Thank you for contacting MTO. I am the correct MTO contact. Please provide a concept plan for review so that MTO can have a better understanding of what will be proposed on-site.

Regards,

Jessica Pegelo
Ministry of Transportation - Corridor Management Planner (A)
Highway Corridor Management Section
659 Exeter Rd. London, ON N6E 1L3
Telephone: 519-379-4397 Fax: 519-376-6842
E-mail: jessica.pegelo@ontario.ca

Ontario

From: Kerianne Hagan <khagan@cfcrozier.ca>
Sent: May 9, 2022 1:01 PM
To: Pegelo, Jessica (MTO) <Jessica.Pegelo@ontario.ca>; hfascinato@meaford.ca
Subject: Terms of Reference - Christie Beach Road

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good Afternoon Jessica and Helena,

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C.F. Crozier & Associates was retained to complete a Traffic Impact Study by Parkbridge Developments for the lands west of Christie Beach Road and north of Highway 26 in Meaford. At this time only an application for OPA is being pursed. Updated TIS reports can be prepared for future ZBA and SPA submissions. Initial consultation was undertaken in late 2019 and early 2020 before the project was put on hold. The following Terms of Reference are based on the previous consultation.

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    - Old Highway 26 and Highway 26
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We request that the accepted TIS reports for Lora Bay Phase 3, 4 and Cottages be provided to determine the trips associated with the background development. Should these reports not be available we will determine the trip generation based on ITE and the number of units for each phase of development.

If you have any questions please feel free to contact me.

Thank you in advance,
Kerianne

Kerianne Hagan, EIT | Engineering Intern
1 First Street, Suite 200 | Collingwood, ON L9Y 1A1
T: 705.446.3510

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APPENDIX C

MECP Correspondence and EA-related Notices

Review Agency and Individuals Notice

#	First Name	Last Name	Title	Agency	Email
LOCAL GOVERNMENT AND OTHER AGENCIES					
1	Rob	Armstrong	CAO	Municipality of Meaford	rarmstrong@meaford.ca
2	Tori	Perejmybida	Director of Infrastructure Services	Municipality of Meaford	tperejmybda@meaford.ca
3	Shawn	Everitt	CAO	Municipality of the Town of The Blue Mountains	
4	-	-	Clerk's Office	Municipality of the Town of The Blue Mountains	
5	Kim	Wingrove	CAO	County of Grey	
6	Randy	Scherzer	Director of Planning & Development	County of Grey	randy.scherzer@grey.ca
~~7~~	~~Chris~~	~~Munn~~	~~Director of Operations~~	~~Grey Bruce District Health Unit~~	
7A	Andrew	Barton	Public Health Manager	Grey Bruce Health Unit	A.Barton@publichealthgreybruce.on.ca
8	Andy	Sorensen	Environmental Planning Coordinator	Grey Sauble Conservation Authority	a.sorensen@greysauble.on.ca
9	Jayme	Bastarache		Bluewater District School Board	jayme_bastarache@bwdsb.on.ca
10	-	-	-	Bruce Grey Catholic District School Board	
11	-	-	-	Georgian Trail Management Board	
12	-	-	-	Fire Services	fire@meaford.ca
PROVINCIAL & FEDERAL AGENCIES					
13	-	-	Regional EA Coordinator	Ministry of the Environment, Regional Office	
~~14~~	~~-~~	~~-~~	~~Regional Environmental Planner & EA Coordinator~~	~~Ministry of the Environment, Conservation & Parks~~	~~eanotification.swregion@ontario.ca~~
14A	Callee	Robinson		Ministry of the Environment, Conservation & Parks	Callee.Robinson@ontario.ca
15	Marie	Campbell	Director (Acting)	Ministry of Tourism, Culture and Sport	
16	Dave	Marriott	Rural Planner	Ministry of Agriculture, Food and Rural Affairs	david.marriott@ontario.ca
17	Tyler	Shantz		Ministry of Municipal Affairs & Housing	tyler.shantz@ontario.ca
18	Shawn	Carey	District Manager	Ministry of Natural Resources & Forestry	shawn.carey@ontario.ca
19	Kim	Benner	District Planner	Ministry of Natural Resources & Forestry	kim.benner@ontario.ca
20	Ken	Mott	District Planner	Ministry of Natural Resources & Forestry	ken.mott@ontario.ca
21	-	-	-	MPAC	mr25enquiry@mpac.ca
22	Zsolt	Katzirz	Regional Development Review Coordinator	MTO	zsolt.katzirz@ontario.ca
23	Jessica	Pegelo	Corridor Management Officer, MTO	MTO	jessica.pegelo@ontario.ca
24	Michael	Nadeau	Manager, Engineering Office	MTO	michael.nadeau@ontario.ca
FIRST NATIONS CONSULTATION					
25	-	-	-	Ministry of Indigenous Affairs	
26	-	-	-	Metis Nation of Ontario	consultations@metisnation.org
27	-	-	-	Saugeen Ojibway Nation (SON)	d.ritchie@saugeenojibwaynation.ca; j.chegahno@saugeenojibwaynation.ca

					kathleen.ryan@saugeenojibwaynation.ca
27B	-	-	-	Saugeen Ojibway Nation (SON)	
28	-	-	-	Historic Saugeen Metis Nation	saugeenmetisadmin@bmts.com
29	Lonny	Bomberry	Land and Resources Director	Six Nations	lonnybomberry@sixnations.ca
FEDERAL DEPARTMENTS AND AGENCIES					
30	-	-	Manager	Ministry of the Environment Canada, Ontario Region	
31	-	-	-	DFO	info@dfo-mpo.gc.ca
UTILITIES					
32	Nicholas	Kellar	Implementation Manager	Bell Canada	Nicholas.kellar@bell.ca
33	-	-	-	Enbridge Gas	ONTUGLLandsINQ@uniongas.com
34	Tony	Dominguez	System Planner/Outside Plant Engineering	Rogers Cable	tony.dominguez@rci.rogers.com
35	-	-	-	Hydro One	landuseplanning@hydroone.com
36	John Korey	Matheson Taylor	-	Eastlink	john.matheson@corp.eastlink.ca korey.taylor@corp.eastlink.ca
37	Vicki	Manto	-	Wightman	vmanto@wightman.ca
38	Sherry	Anstett	-	Bruce Telecom	sherry.anstett@brucetelecom.com
39	Wendy	Peeters	-	Eh!tel	wpeeters@ehtel.ca
INDIVIDUALS					
40	-	Richardson	=	-	dottirich@gmail.com

OCTOBER 23, 2019

PROJECT NO: 1046-5391

SENT VIA: EMAIL

Rob Armstrong
CAO
Municipality of Meaford
21 Trowbridge Street West
Meaford ON
N4L 1A1

RE: PARKBRIDGE LIFESTYLE COMMUNITIES
CLASS ENVIRONMENTAL ASSESSMENT
MEAFORD CHRISTIE BEACH WATER, WASTEWATER AND TRANSPORTATION MASTER PLAN

Dear Rob,

In order to properly plan for future growth in the Meaford Christie Beach Study Area, Parkbridge Lifestyle Communities (Parkbridge) has initiated a Master Plan, Class Environmental Assessment (EA) planning process to identify and assess servicing options (water, wastewater and transportation) for the Christie Beach EA Study Area. C.F. Crozier & Associates Inc. has been retained by Parkbridge to complete and document the Class EA Planning process.

The Class EA Study is being completed in support of future development applications under the Planning Act, which will soon be submitted to the Municipality of Meaford and the County of Grey.

Please find enclosed a copy of the Notice of Study Commencement, outlining the purpose of the study and the Study Area. The Notice will be advertised in the Meaford Independent on October 24 and October 31, 2019.

Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.

Sarah O'Neill, E.I.T.
Operations Manager
/so

c.c. ea@parkbridgemeaford.com

Enclosure **Notice of Study Commencement**

J:\1000\1046-Parkbridge Lifestyle\5391-Christie Beach Environmental Assessment\Letters\2019.08.29 Notice of Study Commencement\ Covering Letter - Notice of Study Commencement.doc

40 Huron Street, Suite 301
Collingwood, ON L9Y 4R3
T. 705.446.3510
F. 705.446.3520
cfcrozier.ca

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NOTICE OF STUDY COMMENCEMENT

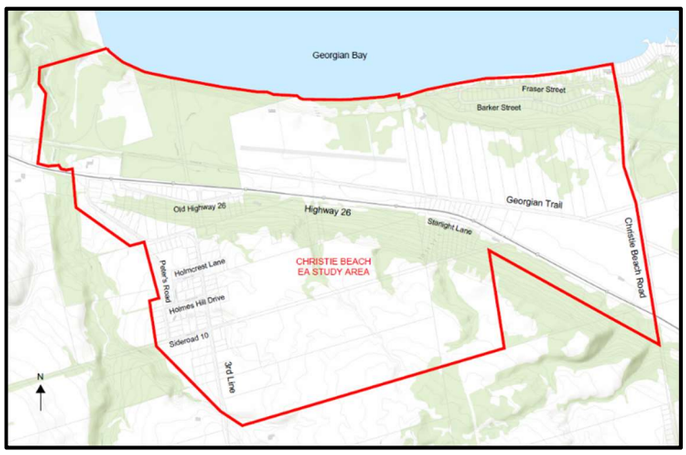
Class Environmental Assessment: Meaford Christie Beach Study Area

THE STUDY

In order to properly plan for future growth in the Meaford Christie Beach Study Area, Parkbridge Lifestyle Communities (Parkbridge) is the proponent undertaking a Master Plan Study following the Class Environmental Assessment (EA) Planning process to determine water, wastewater and transportation infrastructure requirements. The purpose of this Master Plan Study is to plan and provide preliminary design options for the provision of water, wastewater and transportation improvements to service future growth in the Christie Beach Area. This Study is being conducted in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment, which is an approved process under the Environmental Assessment Act.

The Study Area consists of proposed development area(s) and adjacent potential future development areas. The potential development areas include the Parkbridge Christie Beach Development area.

The limits of the Study Area include Georgian Bay to the North, Christie Beach Road to the East (also the boundary of the Town of The Blue Mountains), Properties bordering Highway 26 and future potential development areas to the South, and residential properties bordering 3rd Line and adjacent roads to the West. The limits of the Study Area are shown on the adjacent plan.



Project plans and other information are available at www.parkbridgemeaford.com/environmental-assessment/

THE PROCESS

This Class EA Study is being completed in support of future development applications under the Planning Act, which will soon be submitted to the Municipality of Meaford and the County of Grey. This Master Plan Study will follow the planning and design process for Schedule "B" projects as described in the Municipal Class Environmental Assessment Document (October 2000, as amended in 2007, 2011 & 2015), published by the Municipal Engineer's Association. Consultation with the public, stakeholders and government review agencies is an important component of the Class EA process. A Public Information Centre (PIC) will be scheduled during the course of the study to present and receive comments on the project, alternative solutions and the preferred solution for servicing the Study Area. A Notice of PIC will be published in the future. In addition, there will be an opportunity to review the final Master Plan Report.

Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act, and all comments will become part of the public record. If you have any questions or comments or wish to be added to the mailing list to receive project information, please contact:

STUDY CONTACTS

Sarah O'Neill, E.I.T.
Operations Manager
C.F. Crozier & Associates Consulting Engineers
40 Huron Street, Suite 301
Collingwood, Ontario
L9Y 4R3
Phone: 705.446.3510
Email: soneill@cfcrozier.ca

Project Management Office
Parkbridge Lifestyle Communities Inc.
200, 1 First Street
Collingwood, Ontario
L9Y 1A1
Email: EA@parkbridgemeaford.com

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This Notice issued Thursday October 24 & October 31, 2019

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40 Huron St., Suite 301 | T. 705.446.3510
Collingwood, ON | F. 705.446.3520
L9Y 4R3 | cfcrozier.ca

MINUTES

NAME OF MEETING: **Infrastructure Servicing for Parkbridge Lifestyle Development in Meaford**
DATE OF MINUTES: **March 10, 2020; Updated March 27, 2020**
DATE OF MEETING: **March 6, 2020**
PROJECT NAME: **Parkbridge Christie Beach EA**
PROJECT NO.: **1046-5391**
LOCATION: **Teleconference**

ATTENDEES

NAME	COMPANY	EMAIL ADDRESS
Callee Robinson	Ministry of the Environment, Conservation and Parks (MECP)	callee.robinson@ontario.ca
Shelley Graham	Ministry of the Environment, Conservation and Parks (MECP)	shelley.graham@ontario.ca
Robert Armstrong	Municipality of Meaford	rarmstrong@meaford.ca
Tori Perejmybida	Municipality of Meaford	tperejmybida@meaford.ca
Joe Mullan	Ainley Group	mullan@ainleygroup.com
Jon Proctor	C.F. Crozier & Associates	jproctor@cfcrozier.ca
Sarah O'Neill	C.F. Crozier & Associates	soneill@cfcrozier.ca

ITEMS

ACTION / DISCUSSION	ACTION BY
1.0 Parkbridge Meaford Development - Background	N/A
1.1 Joe Mullan provided a brief history of the proposed development and recent Environmental Assessments (EA's) completed for the Municipality of Meaford including:	
1.1.1 The Municipality of Meaford completed a Water and Wastewater Master Servicing Plan through the EA process in late 2015, projecting growth out for the next 30 years. The Study Area for the EA was focused on the Urban Settlement Area of Meaford	
1.1.2 Parkbridge has proposed a Recreational Resort lifestyle development community of approximately 1,000 units outside of the Urban Settlement boundary. A Notice of EA was published in late 2019 for the Parkbridge development, with Parkbridge identified as the Proponent. Parkbridge received some concerns from the MECP with respect to Parkbridge leading the EA as Proponent, per the email from the Ministry	

dated December 23 that indicated private developers cannot be the Proponent for a Class EA per O. Reg. 345/93.	
1.1.3 Another development (Meaford Highlands Resort) was previously proposed to the south of the Parkbridge lands, and the Municipality had considered looking at servicing both developments through the EA process. Subsequently, it was determined the other development is no longer proceeding. Joe Mullan indicated the intent going forward is to narrow the scope of infrastructure consideration and focus primarily on the Parkbridge development with the other development no longer proceeding.	
1.2 Rob Armstrong clarified that the Municipality had previously made a conscious decision to not include the other developer in the Municipality's Master Water and Wastewater EA as they were not within the urban boundary.	
1.3 The objective of this discussion is to determine next steps for the proposed Parkbridge Meaford development and whether an EA is required.	
2.0 Parkbridge Meaford Infrastructure requirement	N/A
2.1 Joe Mullan indicated that the purpose of the infrastructure proposed is to service the proposed private Parkbridge Meaford development	
2.2 The infrastructure may eventually be assumed by the Municipality. Parkbridge would be paying for the work and completing the work to install infrastructure and service the development	
3.0 MECP Confirmation of no EA requirements	N/A
3.1 The MECP indicated that O.Reg 345/93, a designating regulation for Private Developers, only designates Schedule C activities that are provided for the residents of a municipality as an undertaking to which the Act applies. The MECP confirmed there are no EA requirements for the Parkbridge development, as it was indicated that the undertaking would be classified as a Schedule B undertaking.	
3.2 Joe Mullan indicated that if upgrades to the Wastewater Treatment Plant are required in the future, EA requirements may be triggered at that time.	
3.3 Joe Mullan indicated that the 2015 Meaford Master Water and Wastewater servicing EA identified the requirement for a new Municipal water reservoir. If this reservoir is identified as the appropriate solution for Parkbridge to service their development, the Municipality will need to complete an addendum to their Schedule B Master Plan with respect to the reservoir. This would be a consideration during implementation as Parkbridge would likely have secured their planning approvals by this time.	
4.0 Principals of the EA Process	N/A
4.1 The MECP reiterated that based on this information, there are no EA requirements at this time for the private Parkbridge development. The MECP indicated that if any further questions with respect to the EA process are raised, we should contact the MECP again.	

4.2 The MECP mentioned that it is important to consider the Purpose / initial intent of installing infrastructure to determine if there are EA requirements. The MECP indicated that since the proponent is a private developer, i.e. the undertaking is solely for the purpose of the private development, and is being paid for by the private developer, the private developer could be considered the proponent. If however, the undertaking was to service the broader municipality and more than just the development, the municipality would likely have EA requirements. Further, if the undertaking was a Schedule C undertaking, the private developer would be designated under O.Reg 345/93, if the project was for the residents of a municipality.	
5.0 Notice to Public to end EA Process	
5.1 MECP advised that Parkbridge should distribute another notice that we will not be proceeding with the EA, as the scope of the development does not require an EA	Crozier / Parkbridge

These minutes are a record of the above noted meeting and are considered final. If there are any additions or revisions, please contact the undersigned prior to March 17, 2020 otherwise these minutes will be accepted as correct. Thank you.

Yours truly,

C.F. CROZIER & ASSOCIATES INC.



Sarah O'Neill, E.I.T.
Operations Manager
/so

Distribution:

Callee Robinson	callee.robinson@ontario.ca
Shelley Graham	shelley.graham@ontario.ca
Robert Armstrong	rarmstrong@meaford.ca
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Liz Buckton	lbuckton@meaford.ca
Joe Mullan	mullan@ainleygroup.com
Silva Yousif	syousif@parkbridge.com
Robert Voigt	rvoigt@parkbridge.com
Andrew Pascuzzo	andrew@pascuzzoinc.ca
Susan Borst	sborst@parkbridge.com

J:\1000\1046-Parkbridge Lifestyle\5391-Christie Beach Environmental Assessment\Minutes\2020.03.10 Call with MECP meeting minutes Revised 03.27.2020.docx

APRIL 9, 2020

PROJECT NO: 1046-5391

SENT VIA: EMAIL

Rob Armstrong
CAO
Municipality of Meaford
21 Trowbridge Street West
Meaford ON N4L 1A1

RE: PARKBRIDGE LIFESTYLE COMMUNITIES
CLASS ENVIRONMENTAL ASSESSMENT
CHRISTIE BEACH WATER, WASTEWATER AND TRANSPORTATION MASTER PLAN

Dear Rob,

A Class Environmental Assessment had been initiated in October 2019 by Parkbridge Lifestyle Communities (Parkbridge) as the Proponent to undertake a Master Plan Study following the Class Environmental Assessment (EA) Planning process for the Christie Beach EA Study Area, identified in consultation with the Municipality of Meaford.

Subsequently, the scope of the Study Area has been reduced due to the current status of other development applications in the area and based on discussions with the Municipality and will focus on the proposed Parkbridge Meaford (Christie Beach) development. **As a result of the change in scope and based upon direction from the Ministry of the Environment, Conservation and Parks (MECP), the Schedule "B" Class EA initiated in October 2019 for the Christie Beach EA Study Area will be closed, as it is no longer subject to requirements under the Environmental Assessment Act.**

Please find enclosed a copy of the Notice of Study Closure. The Notice will be advertised in the Meaford Independent on April 9 and April 16, 2020.

Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.

Sarah O'Neill, E.I.T.
Operations Manager
/so

c.c. ea@parkbridgemeaford.com

Enclosure **Notice of Study Closure**

J:\1000\1046-Parkbridge Lifestyle\5391-Christie Beach Environmental Assessment\Letters\2020.03.06 Notice of Study Closure\Covering Letter - Notice of Study Closure

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cfcrozier.ca

CROZIER
CONSULTING ENGINEERS

NOTICE OF STUDY CLOSURE

Class Environmental Assessment: Meaford Christie Beach

UPDATE ON STUDY REQUIREMENTS

A Class Environmental Assessment had been initiated in October 2019 by Parkbridge Lifestyle Communities (Parkbridge) as the Proponent to undertake a Master Plan Study following the Class Environmental Assessment (EA) Planning process for the Christie Beach EA Study Area, identified in consultation with the Municipality of Meaford. Subsequently, the scope of the Study Area has been reduced due to the current status of other development applications in the area and based on discussions with the Municipality and will focus on the proposed Parkbridge Meaford (Christie Beach) development.

As a result of the change in scope and based upon direction from the Ministry of the Environment, Conservation and Parks (MECP), the Schedule "B" Class EA initiated in October 2019 for the Christie Beach EA Study Area will be closed, as it is no longer subject to requirements under the Environmental Assessment Act.

Parkbridge will be proceeding with assessment of servicing infrastructure associated with the Parkbridge Meaford Development by conducting a Master Servicing Study in place of the EA. The Master Servicing Study will include review and discussion of various servicing alternatives in coordination with the Municipality of Meaford and appropriate agencies. The Master Servicing Study will inform the development applications for the forthcoming Planning Approvals process. Future information and notifications will be provided through the Public Planning Approvals process, including at least one statutory public meeting.



Information on the Parkbridge Meaford development is available at http://parkbridgemeaford.com/

Should you have any questions or require any further information, please do not hesitate to contact the below individuals:

CONTACTS

Sarah O'Neill, E.I.T.
Operations Manager
C.F. Crozier & Associates Consulting Engineers
40 Huron Street, Suite 301
Collingwood, Ontario
L9Y 4R3
Phone: 705.446.3510
Email: soneill@cfcrozier.ca

Project Management Office
Parkbridge Lifestyle Communities Inc.
200, 1 First Street
Collingwood, Ontario
L9Y 1A1
Email: EA@parkbridgemeaford.com

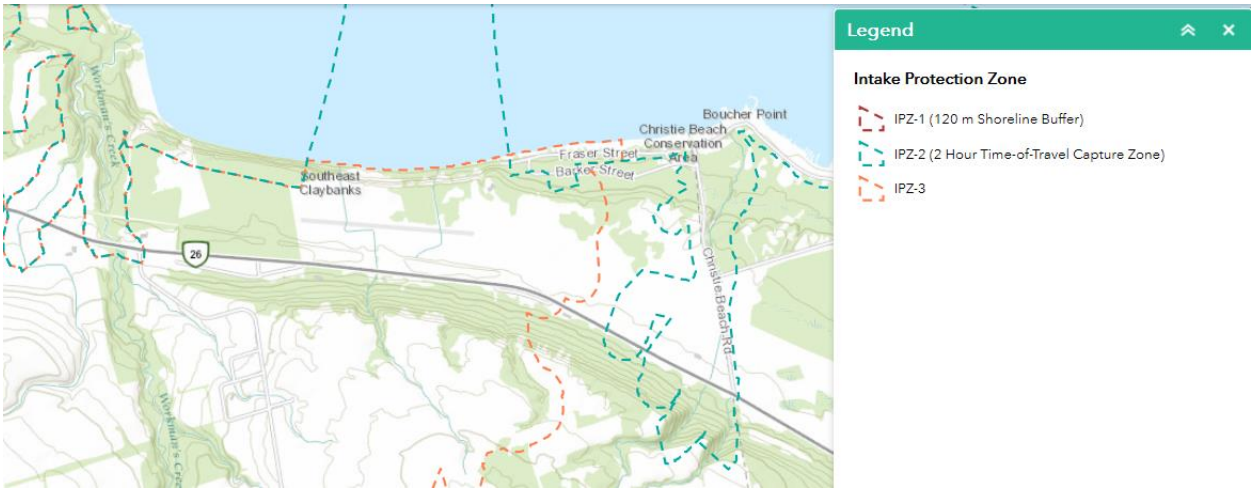
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This Notice issued April 9 & April 16, 2020

APPENDIX D

Source Water Mapping

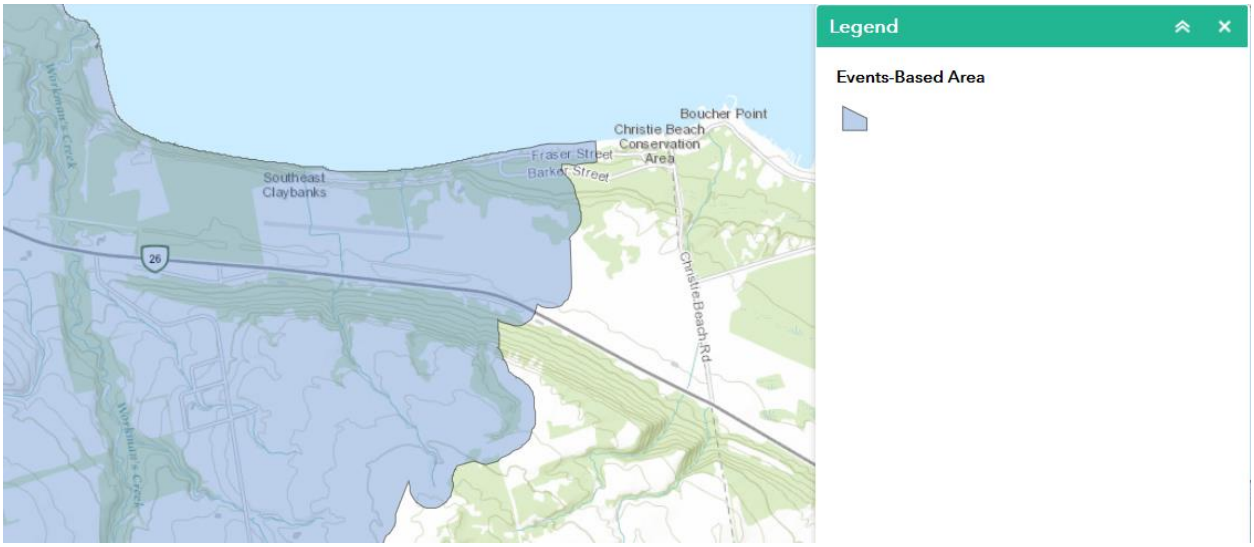
1. Source Water Protection: Intake Protection Zone



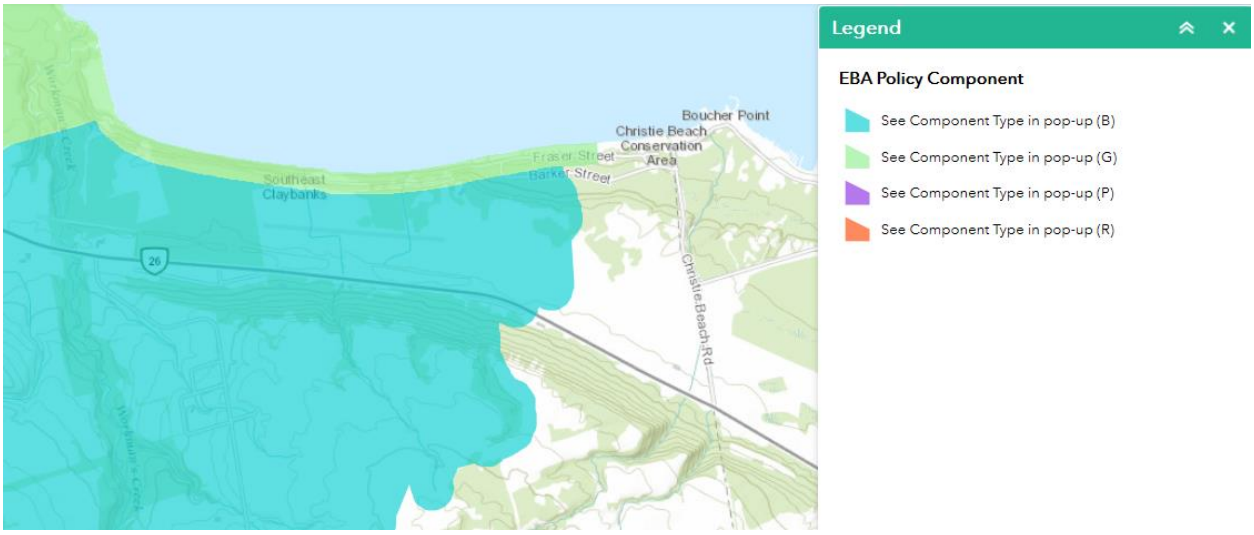
2: Source Water Protection - Intake Protection Zone Vulnerability



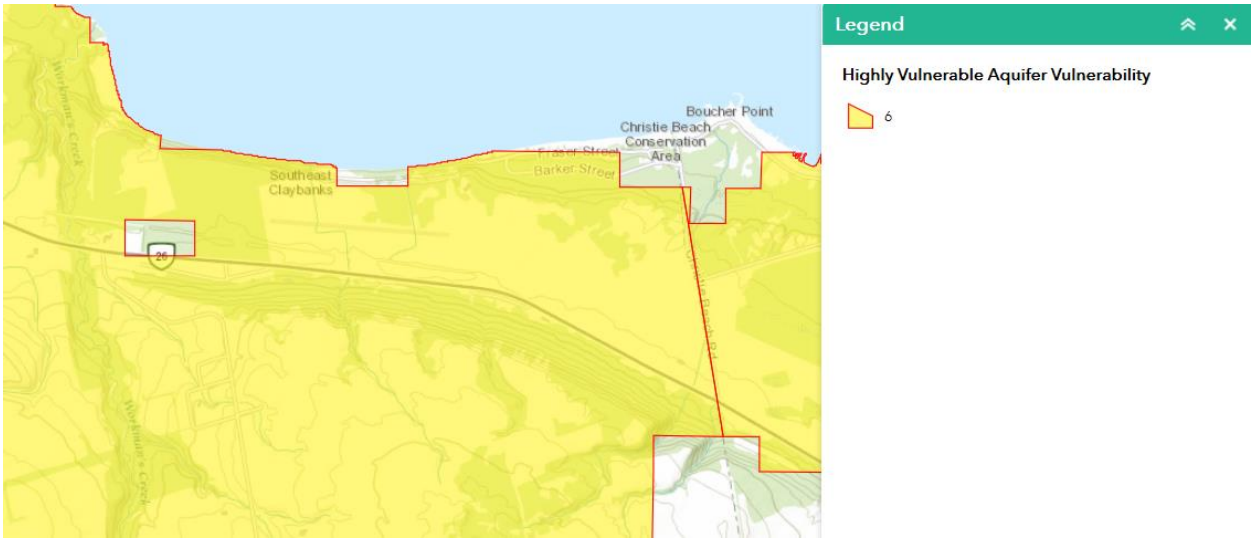
3: Source Water Protection - Events-based Area



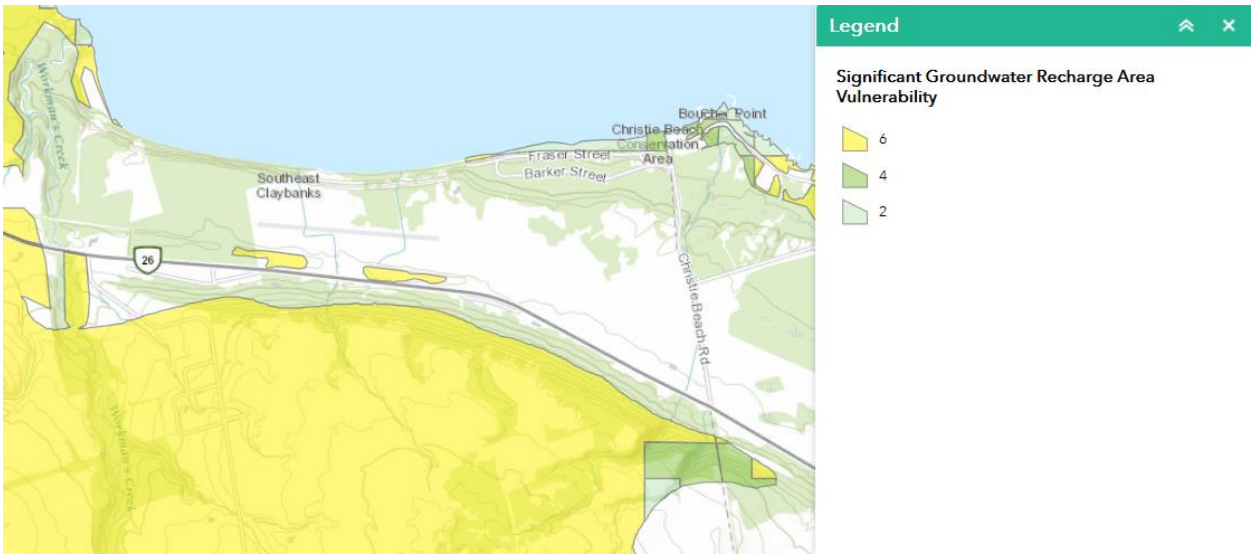
4: Source Water Protection - EBA Policy Component



5: Source Water Protection - Highly Vulnerable Aquifer Vulnerability



6: Source Water Protection - Significant Groundwater Recharge Area Vulnerability



APPENDIX E

Water Demands and Sanitary Sewer Flow Parameters and Calculations

Water Design Criteria

Table 1: Water Design Criteria

Criteria	Connection to Meaford Municipality of Meaford / MECP Guidelines	Connection to TOBM TOBM Engineering Standards (Updated May 29, 2023) / MECP Guidelines
Average Day Demand (L/cap/day)	350 (In accordance with recent development applications)	350 (TOBM Standards)
Commercial & Institutional Flow Rate (m^3/ha/d)	28 (MECP guidelines)	28 (MECP guidelines)
Residential Population Density (PPU)	2.4 (Per Meaford Master Plan, 2008)	2.15 (TOBM Standards)
Maximum Day Factor (MDF)	2.0 (MECP guidelines)	2.0 (MECP guidelines)
Peak Hour Factor	3.0 (MECP guidelines)	3.0 (MECP guidelines)

Water Demand Calculations

Table 2: Ultimate Water Demand

	Ultimate Water Demand	
Water Demand Scenario	**ADD** (m^3/d)	**MDD** (m^3/d)
TOBM Design Criteria	1,072	2,144
Meaford Design Criteria	1,190	2,380

Table 3: Water Pumping Requirements

Water Demand Scenario	**Population** (persons)	**Maximum Daily Demand** (m^3/day)	**Maximum Daily Demand** (L/s)	**Maximum Fire Flow** (L/s)	**Maximum Day Plus Fire Flow** (L/s)
TOBM Design Criteria	2,903	2,144	25	150	175
Meaford Design Criteria	3,240	2,380	28	150	178

Table 4: Water Storage Requirements

Water Demand Scenario	**Fire Flow** (L/s)	**Dur-ation** (hr)	**Population** (persons)	**Maximum Daily Demand** (m^3/day)	**Storage Volume Required** (m^3) **(A)**	**Equalization Storage** (m^3) **(B)**	**Emergency Storage** (m^3) **(C)**	**Total Storage** (m^3) **(A+B+C)**
TOBM Design Criteria	150	2	2,903	2,144	1,080	536	404	2,020
Meaford Design Criteria	150	2	3,240	2,380	1,080	595	419	2,094

Wastewater Design Criteria

Table 5: Wastewater Design Criteria

Criteria	Connection to Meaford Municipality of Meaford / MECP Guidelines	Connection to TOBM TOBM Engineering Standards (Updated May 29, 2023) / MECP Guidelines
Average Day Demand (L/cap/day)	350 (In accordance with recent development applications)	350 (TOBM Standards)
Commercial & Institutional Flow Rate (m^3/ha/d)	28 (MECP guidelines)	28 (TOBM Standards)
Residential Population Density (PPU)	2.4 (Per Meaford Master Plan, 2008)	2.15 (TOBM Standards)
Maximum Day Factor (MDF)	2.0 (MECP guidelines)	2.0 (TOBM Standards)
Harmon Peaking Factor	3.41 (MECP guidelines)	3.45 (TOBM Standards)
Average Inflow and Infiltration, I&I	90 L/cap/day (MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)	*Per Standards: 0.28 L/s/ha** *(TOBM Standards)* **Note that for the purposes of calculating flows for vertical infrastructure, the MECP guidelines were used.* 90 L/cap/day (MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)
Peak Inflow and Infiltration I&I	227 L/cap/day (MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)	227 L/cap/day (MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)

Wastewater Flow Calculations

Table 6: Ultimate Wastewater Flows

Sanitary Flow Scenario	**Average Day Flow (Wet Weather Flow)** ADF (m^3/d)	**Maximum Day Flow** MDF (m^3/d)	**Peak Dry Weather Flow** PDWF (m^3/d)	**Peak Wet Weather Flow** PWWF (m^3/d)	**Peak Instantaneous Flow** PIF (m^3/d)
TOBM Design Criteria	1,072	2,666	3,703	4,362	4,846
Meaford Design Criteria	1,481	2,963	4,062	4,798	5,330

Note that flows sent to TOBM for modelling purposes were based on the outdated Engineering Standards (current at the time of calculation), which resulted in higher wastewater flows for the purposes of modelling. These flows can be deemed very conservative and are available in the modelling memo provided by TOBM's Consulting Engineer, J.L. Richards, in Appendix G.

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Project: Parkbridge Meaford
Project No.: 1046-4273
Date: 19-Sep-23
By: SO

Parkbridge Meaford Development - Water Design Criteria
Connection into TOBM (Including Fraser & Barker Streets)

Site Area	**135**	**ha**
Number of Residential Units and Land Usage		
Future Parkbridge Meaford Units + Fraser & Barker Street Existing Lot Fabric (approx. 100 units)	**1,350**	**units**
Commercial Developed Area:	2	**ha**
Person Per Residential Unit (Per TOBM Standards)	2.15	persons/unit
Residential Population	**2,903**	**persons**
Domestic Water Design Flows		
Residential (per TOBM Standards)	350	L/C-day
Commercial (per MECP Design Guidelines for Water Works, 2008)	28	m^3/(ha*day)
Total Domestic Water Design Flows		
Average Daily Flow	11.76	L/sec
Average Daily Commercial Flow	0.65	L/sec
ADD	1,072	m^3/day
Max Day Peak Factor (per MECP Design Guidelines for Water Works, 2008 Table 3-1)	2.0	
Max Day Demand Flow	**25**	L/sec
MDD	**2,144**	m^3/day
Peak Hour Factor (per MECP Design Guidelines for Water Works, 2008 Table 3-1)	3.0	
Peak Hour Flow	**37**	L/sec
Water Supply Requirements		
MDD	**2,144**	m^3/day
Fire Flow 150 *L/sec for 2 hours. Note MECP requirements of 125L/s for 2 hours for population of 4,000 persons (Table 8-1)*	**1,080**	m^3/day
Total	**3,224**	m^3/day
Fire Storage Requirements		
MOE Formula (A+B+C)		
A Fire Storage (Fire flow)	**1,080**	m^3
B Equalization (25% of MDD)	**536**	m^3
C Emergency (25% of A+B)	**404**	m^3
Total	**2,020**	m^3

Note: Results are preliminary and are subject to change

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Project: Parkbridge Meaford
Project No.: 1046-4273
Date: 19-Sep-23
By: SO

Parkbridge Meaford Development - Water Design Criteria
Connection into Meaford (Including Fraser & Barker Streets)

Site Area	**135**	**ha**
Number of Residential Units and Land Usage		
Future Parkbridge Meaford Units + Fraser & Barker Street Existing Lot Fabric (approx. 100 units)	**1,350**	**units**
Commercial Developed Area:	2	**ha**
Person Per Residential Unit (Per Meaford Master Plan - Water and Wastewater Servicing (Ainley, 2008))	2.4	persons/unit
Residential Population	**3,240**	**persons**
Domestic Water Design Flows		
Residential (Per feedback from Ainley that recent developments are modelled at 350L/C/d. More conservative than the 300 L/C/d used for the 2008 Master Plan)	350	L/C-day
Commercial (per MECP Design Guidelines for Water Works, 2008)	28	m^3/(ha*day)
Total Domestic Water Design Flows		
Average Daily Flow	13.13	L/sec
Average Daily Commercial Flow	0.65	L/sec
ADD	1,190	m^3/day
Max Day Peak Factor (per MECP Design Guidelines for Water Works, 2008 Table 3-1)	2.0	
Max Day Demand Flow	**28**	L/sec
MDD	**2,380**	m^3/day
Peak Hour Factor (per MECP Design Guidelines for Water Works, 2008 Table 3-1)	3.0	
Peak Hour Flow	**41**	L/sec
Water Supply Requirements		
MDD	**2,380**	m^3/day
Fire Flow 150 *L/sec for 2 hours. Note MECP requirements of 125L/s for 2 hours for population of 4,000 persons (Table 8-1)*	**1,080**	m^3/day
Total	**3,460**	m^3/day
Fire Storage Requirements		
MOE Formula (A+B+C)		
A Fire Storage (Fire flow)	**1,080**	m^3
B Equalization (25% of MDD)	**595**	m^3
C Emergency (25% of A+B)	**419**	m^3
Total	**2,094**	m^3

Note: Results are preliminary and are subject to change

CROZIER CONSULTING ENGINEERS

Project: Parkbridge Meaford
Project No.: 1046-4273
Date: 19-Sep-23
By: SO

Parkbridge Meaford Development - Water Design Criteria
Connection into Meaford (Including Fraser & Barker Streets and Potential Future Development Lands)

Site Area + Potential Future Developable Land Inventory between Meaford Settlement Boundary and Site	**170**	**ha**
Number of Residential Units and Land Usage		
Future Parkbridge Meaford Units + Fraser & Barker Street existing lot fabric (approx. 100 units) + Future Potential Future Developable Lanc	**2,059**	**units**
Commercial Developed Area:	2	**ha**
Person Per Residential Unit (Per Meaford Master Plan - Water and Wastewater Servicing (Ainley, 2008))	2.4	persons/unit
Residential Population	**4,942**	**persons**
Domestic Water Design Flows		
Residential (Per feedback from Ainley that recent developments are modelled at 350L/C/d. More conservative than the 300 L/C/d used for the 2008 Master Plan)	350	L/C-day
Commercial (per MECP Design Guidelines for Water Works, 2008)	28	m^3/(ha*day)
Total Domestic Water Design Flows		
Average Daily Flow	20.02	L/sec
Average Daily Commercial Flow	0.65	L/sec
ADD	1,786	m^3/day
Max Day Peak Factor (per MECP Design Guidelines for Water Works, 2008 Table 3-1)	2.0	
Max Day Demand Flow	**41**	L/sec
MDD	**3,571**	m^3/day
Peak Hour Factor (per MECP Design Guidelines for Water Works, 2008 Table 3-1)	3.0	
Peak Hour Flow	**62**	L/sec
Water Supply Requirements		
MDD	**3,571**	m^3/day
Fire Flow 150 *L/sec for 2 hours. Note MECP requirements of 144L/s for 2 hours for population of 5,000 persons (Table 8-1)*	**1,080**	m^3/day
Total	**4,651**	m^3/day

Fire Storage Requirements

MOE Formula (A+B+C)

A	Fire Storage (Fire flow)	**1,080**	m^3
B	Equalization (25% of MDD)	**893**	m^3
C	Emergency (25% of A+B)	**493**	m^3
	Total	**2,466**	m^3

Note: Results are preliminary and are subject to change

CROZIER CONSULTING ENGINEERS

Project: Parkbridge Meaford
Project No.: 1046-4273
Date: 19-Sep-23
By: SO

Parkbridge Meaford Development - Sanitary Sewer Design Criteria
Connection into TOBM (Including Fraser & Barker Streets)

Site Area	**135**	**ha**
Assumed % Site area developable	60%	
Developed Site Area	**81.00**	**ha**
Number of Residential Units and Land Usage		
Future Parkbridge Meaford Units + Fraser & Barker Street Existing Lot Fabric (approx. 100 units)	**1,350**	**units**
Commercial Developed Area:	2	**ha**
Person Per Residential Unit (per TOBM Standards)	2.15	persons/unit
Residential Population	**2,903**	**persons**
Unit Sewage flows		
Residential (per TOBM Standards)	350	L/C-day
Commercial (per MOE Design Guidelines for Water Works, 2008)	28	m^3/(ha*day)
Average Infiltration Allowance (per MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)	90.00	L/C-day
Peak Infiltration Allowance (per MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)	227.00	L/C-day
Total Design Sewage Flows and Factors		
Infiltration/Inflow (I&I) Residential	3.02	L/sec
Average Daily Flow	11.8	L/sec
Average Daily Commercial Flow	0.65	L/sec
Peak Factor (Harmon Formula)	3.45	
Average Dry Weather Flow per Unit (Per Unit)	0.79	m^3/day/unit
Average Dry Weather Flow (TOTAL (m^3/day))	1,071.88	m^3/day
Average Dry Weather Flow (TOTAL (L/sec))	**12.41**	**L/sec**
Peak Dry Weather Flow	**42.9**	**L/sec**
Average Wet Weather Flow per Unit (Per Unit)	0.99	m^3/day/unit
Average Wet Weather Flow (TOTAL (m^3/day))	1,333.10	m^3/day
Average Wet Weather Flow (ADF) (TOTAL (L/sec))	**15.43**	**L/sec**
Maximum Day Flow (TOTAL (m^3/day))	**2,666.20**	m^3/day
Peak Wet Weather Flow	**50.5**	**L/sec**
Peak Instantaneous Flow (PIF)	56.1	L/sec

Note: Results are preliminary and are subject to change

CROZIER CONSULTING ENGINEERS

Project: Parkbridge Meaford
Project No.: 1046-4273
Date: 19-Sep-23
By: SO

Parkbridge Meaford Development - Sanitary Sewer Design Criteria
Connection into Meaford (Including Fraser & Barker Streets)

Site Area	**135**	**ha**
Assumed % Site area developable	60%	
Developed Site Area	**81.00**	**ha**
Number of Residential Units and Land Usage		
Future Parkbridge Meaford Units + Fraser & Barker Street Existing Lot Fabric (approx. 100 units)	**1,350**	**units**
Commercial Developed Area:	2	**ha**
Person Per Residential Unit (Per Meaford Master Plan - Water and Wastewater Servicing (Ainley, 2008))	2.4	persons/unit
Residential Population	**3,240**	**persons**
Unit Sewage flows		
Residential (Per feedback from Ainley that recent developments are modelled at 350L/C/d. More conservative than the 300 L/C/d used for the 2008 M	350	L/C-day
Commercial (per MOE Design Guidelines for Water Works, 2008)	28	m^3/(ha*day)
Average Infiltration Allowance (per MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)	90.00	L/C-day
Peak Infiltration Allowance (per MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)	227.00	L/C-day
Total Design Sewage Flows and Factors		
Infiltration/Inflow (I&I) Residential	3.38	L/sec
Average Daily Flow	13.1	L/sec
Average Daily Commercial Flow	0.65	L/sec
Peak Factor (Harmon Formula)	3.41	
Average Dry Weather Flow per Unit (Per Unit)	0.88	m^3/day/unit
Average Dry Weather Flow (TOTAL (m^3/day))	1,190.00	m^3/day
Average Dry Weather Flow (TOTAL (L/sec))	**13.77**	**L/sec**
Peak Dry Weather Flow	**47.0**	**L/sec**
Average Wet Weather Flow per Unit (Per Unit)	1.10	m^3/day/unit
Average Wet Weather Flow (TOTAL (m^3/day))	1,481.60	m^3/day
Average Wet Weather Flow (ADF) (TOTAL (L/sec))	**17.15**	**L/sec**
Maximum Day Flow (TOTAL (m^3/day))	**2,963.20**	m^3/day
Peak Wet Weather Flow	**55.5**	**L/sec**
Peak Instantaneous Flow (PIF)	61.7	L/sec

Note: Results are preliminary and are subject to change

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Project: Parkbridge Meaford
Project No.: 1046-4273
Date: 19-Sep-23
By: SO

Parkbridge Meaford Development - Sanitary Sewer Design Criteria
Connection into Meaford (Including Fraser & Barker Streets and Potential Future Development Lands along Route)

Site Area + Potential Future Developable Land Inventory between Meaford Settlement Boundary and Site	**171**	**ha**
Assumed % Area developable	60%	
Developed Area	**102.30**	**ha**
Number of Residential Units and Land Usage		
Future Parkbridge Meaford Units + Fraser & Barker Street existing lot fabric (approx. 100 units) + Future Potential Future Developable Lands	**2,059**	**units**
Commercial Developed Area:	2	**ha**
Person Per Residential Unit (Per Meaford Master Plan - Water and Wastewater Servicing (Ainley, 2008))	2.4	persons/unit
Residential Population	**4,942**	**persons**
Unit Sewage flows		
Residential (Per feedback from Ainley that recent developments are modelled at 350L/C/d. More conservative than the 300 L/C/d used for the 2008 Master Plan)	350	L/C-day
Commercial (per MOE Design Guidelines for Water Works, 2008)	28	m^3/(ha*day)
Average Infiltration Allowance (per MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)	90.00	L/C-day
Peak Infiltration Allowance (per MECP Guidelines for the Design of Sanitary Sewage Systems, 1985)	227.00	L/C-day
Total Design Sewage Flows and Factors		
Infiltration/Inflow (I&I) Residential	5.15	L/sec
Average Daily Flow	20.0	L/sec
Average Daily Commercial Flow	0.65	L/sec
Peak Factor (Harmon Formula)	3.25	
Average Dry Weather Flow per Unit (Per Unit)	0.87	m^3/day/unit
Average Dry Weather Flow (TOTAL (m^3/day))	1,785.56	m^3/day
Average Dry Weather Flow (TOTAL (L/sec))	**20.67**	**L/sec**
Peak Dry Weather Flow	**67.2**	**L/sec**
Average Wet Weather Flow per Unit (Per Unit)	1.08	m^3/day/unit
Average Wet Weather Flow (TOTAL (m^3/day))	2,230.30	m^3/day
Average Wet Weather Flow (ADF) (TOTAL (L/sec))	**25.81**	**L/sec**
Maximum Day Flow (TOTAL (m^3/day))	**4,460.61**	m^3/day
Peak Wet Weather Flow	**80.1**	**L/sec**
Peak Instantaneous Flow (PIF)	89.0	L/sec

Note: Results are preliminary and are subject to change

APPENDIX F

Master Servicing Study: Investigating Individual Water and Sewage Servicing

MASTER SERVICING STUDY: INVESTIGATING INDIVIDUAL WATER AND SEWAGE SERVICING

PARKBRIDGE MEAFORD DEVELOPMENT

TOWN OF MEAFORD
COUNTY OF GREY

PREPARED FOR:

PARKBRIDGE LIFESTYLE COMMUNITIES INC.

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
2800 HIGH POINT DRIVE, SUITE 100
MILTON, ON L9T 6P4

JANUARY 2024

CFCA FILE NO. 1046-4273

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CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev.0	January 2024	Issued for First Submission

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Figure 1: Site Overview

1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) has undertaken a desktop private servicing investigation for a proposed mixed use residential and non-residential (or commercial) community in the Municipality of Meaford which is presently owned by Parkbridge Lifestyle Communities Inc. (Parkbridge). The subject lands comprise several parcels located in the east end of the Municipality of Meaford, bounded by Highway 26 to the south, Georgian Bay to the north, existing residential lands to the northeast, Christie Beach Road and existing residential development to the east, and land designated and zoned for open space to the west. The Georgian Trail runs parallel to Highway 26 through the subject lands. The lands total approximately 135 ha (334 acres). See Figure 1.

This report investigates the feasibility and suitability of individual water and sewage servicing to support a mixed use community. The proposed Demonstration Plan prepared by SvN in June 2023 indicates that the development will consist of approximately 1,250 units, and a Community Use and Village Centre. As the Development concept has been variable, we are assuming a residential unit equivalent of 1,250 units for our servicing calculations, to provide a conservative estimate of flows. The total developed land area for the residential development is anticipated to be approximately 60% of the total site, or 81 ha, including a 2 ha commercial block.

In the preparation of this report, we have reviewed the following information and reports:

- Geotechnical Investigation and Slope Stability Study, Parkbridge Lifestyle Communities Project, Highway 26 and Christie Beach Road Meaford Ontario. DS Consultants Ltd., July 2022
- Preliminary Geotechnical Investigation, Proposed Residential Subdivision Barker Street Meaford, Peto MacCallum Ltd. 2018
- Reasonable Use/Feasibility Study, Proposed Residential Subdivision Barker Street Meaford, ON, Peto MacCallum Ltd. 2018
- Geotechnical and Slope Stability Due Diligence, Northwest Quadrant of Highway 26 and Christie Beach Road, Meaford ON, WSP Canada Inc., 2016
- Geotechnical Investigation Proposed Residential Development, Meaford Highlands, Terraprobe May 17, 2012
- Hydrogeological Investigation for the Meaford Highlands Resort – Cole Engineering, August 2012
- Due Diligence Water Quality Assessment, WSP, June 22, 2016
- Source Protection Information Atlas
- Grey and Bruce Counties Groundwater Studies, Waterloo Hydrogeologic Inc, July 2003

2.0 Physical Setting

The Site is located in the east end of the Municipality of Meaford, in the physiographic region known as the Beaver Valley, and is bounded by Bighead Valley at the western property boundary. In The Physiography of Southern Ontario (1984), Champan and Putnam define the Beaver Valley as "a small physiographic region that runs between Thornbury and Flesherton along the path of the Beaver River which flows into Georgian Bay" and describe it as "a steep-sided, broad-bottomed, open valley with geological features such as drumlins being a noted rarity. The Beaver Valley, although small, includes variable and complex landforms such as cliffs, lake plains, beaches, and moraines. "

There are two (2) escarpments in the area running northwest to southeast, one south of the site and the other bisecting the property, which creates a large plateau that falls gradually from south to north by approximately 40 m. Vegetation in this portion of the site consists primarily of meadows, with clusters of trees. There is an area in the southwest corner of the site containing a series of connected ponds and wetland areas. The upper plateau ends in a long ridge that spans much of the site from west to east.

The northwestern portion of the subject lands contain the Southeast Clay Banks, which span the site from east to west and consist of an approximately 50 m elevation drop to the shoreline. The Clay Banks generally exhibit significant areas of exposed clay soils, and ongoing erosion from stormwater runoff is evident, particularly where flows are concentrated in drainage draws.

The ridge in the eastern portion of the lands exhibits a less significant slope and is highly vegetated. Several drainage features traverse this portion of the ridge, crossing through an existing shoreline cottage area prior to discharge to Georgian Bay. An existing residence is present in the north central portion of the site, situated just above the ridge overlooking Georgian Bay.

The subject lands generally drain from south to north via sheet flow and a number of drainage draws and small watercourses that outlet to Georgian Bay. Several of these watercourses appear to convey drainage from external catchment areas south of Highway 26.

3.0 Site Soils

The soils of the Project Area consist predominately of Brighton sand over gravel, and Granby sand. Brighton sand over gravel can be found in gently sloping areas; this soil exhibits good drainage and is essentially stone free (Hoffman and Acton 1974). Whereas Granby sand can be found in smooth, gently sloping to moderately sloping areas; this soil exhibits poor drainage and is moderately stone free. The Beaver River flows through downtown Clarksburg, meeting Lake Huron approximately 2.5 km north of the Project Area.

WSP completed a detailed geotechnical investigation of the Site in 2016, advancing 23 boreholes across the site. According to their report, soil conditions across the site generally consist of 100 mm to 350 mm of topsoil, underlain by stiff to hard silty clay. In some areas fill ranging from 0.2 m - 1.0 m thick was encountered below the topsoil. The fill consisted variably of silty clay, silt, sand, gravelly sand and sandy gravel materials. Where fill was encountered, it was underlain by the native silty clay. The silty clay layer ranges from 0.3 m - 2.3 m in thickness and is overlying shale bedrock. Bedrock was encountered in all borehole locations, at elevations ranging from 1.8 m - 4.0 m below grade.

Peto MacCallum completed a geotechnical report for the northeast portion of the site in 2018, advancing four (4) boreholes across the area. Soils encountered in this portion of the site are generally consistent with the soils encountered during the WSP investigation (i.e., topsoil underlain by silty clays, overlying shale bedrock). Two (2) soil samples were submitted for grain size analysis. One soil was classified as a silty clay, with a T time over 50 min/cm. The other soil was classified a sandy silt with some clay. Peto MacCallum also recommended a T-time over 50 min/cm for this soil.

DS Consultants Ltd. also completed a geotechnical investigation and slope stability study in July 2022. Twenty- seven (27) boreholes were drilled across the site ranging from 1.2 m to 12.2 m below ground surface. Soil samples were obtained from all boreholes, and select samples were forwarded to the laboratory for grain size analysis. Water level observations were made during drilling, and 16 boreholes were equipped with monitoring wells. In general, the soils and groundwater conditions encountered across the site are consistent with the results of the previous two investigations.

4.0 Groundwater

The study area is comprised of a thin overburden layer underlain by Queenston Formation Shale which is a thinly bedded reddish shale with grey-green bands of interbedded limestone. The Grey and Bruce Counties Groundwater Studies indicate that wells in the Queenston Shale will typically yield poor quality water at rates of less than 12.0 L/s in the northern parts of the counties where the study area is located.

4.1 Water Quantity

The Peto MacCallum Report and WSP Report both indicate that the wells in the area surrounding the Parkbridge property obtain water from the shale bedrock with yields reported to be in the range of 7.5 L/min - 15.1 L/min. While the Cole report did not provide the same information for wells surrounding what has been previously known as the Meaford Highlands property, they did indicate that based on the results of the door-to-door survey, many residents indicated that their wells produced very low yields and some users required cisterns to provide adequate storage in order to meet typical daily water demand. The presence of low yielding wells in the area is supported by a review of the MECP Water Well Database which indicates most wells surrounding the Site are in the shale bedrock with reported well yields of approximately 11.3 - 15.2 L/s. The MECP considers a well to be sustainable at a rate of 13.7 L/min (D-5-5 Private Wells: Water Supply Assessment). Therefore, the majority of the wells in the study area would be considered marginal in terms of yield.

4.2 Water Quality

While the WSP and Cole reports raise some concerns with the quality of water in the area, it would be premature to comment on the potability of the water on a broad scale without detailed analysis from wells in the area. Notwithstanding the fact that water quality may or may not be an issue, I am of the opinion that proposed developments in the area are not likely to be able to find water in suitable quantity to support development on either individual water supply wells, or a communal well system. This opinion is shared by the Cole report that identified potential long-term impacts to the groundwater system including a reduction in groundwater supply available to existing well owners and the introduction of preferential pathways for contaminants if the development were to proceed on individual wells.

5.0 Individual Onsite Sewage Systems

Parkbridge is proposing to develop up to 1,250 units on the property. Individual onsite sewage systems may be a viable servicing option for this development. Onsite sewage systems, sometimes referred to as "septic" systems, typically serve one (1) home, and are typically owned and operated by the homeowner. In this particular development, onsite sewage systems could service individual units, or clusters of units, (i.e., townhomes). Onsite sewage systems generally consist of a below grade septic tank, followed by a leaching bed. The leaching bed may be below or above grade, depending on the nature of the receiving soils. In some instances, advanced treatment units may be considered.

Onsite sewage systems with a total daily design sanitary sewage flow of less than 10,000 L/day are regulated by Part 8 of the Ontario Building Code. A building permit must be obtained prior to the construction of the system. Systems with sewage flows exceeding 10,000 L/day are regulated by the Ministry of Environment, Conservation and Parks. It is important to note that the 10,000 L/day threshold is a cumulative value that includes all the sewage systems on a property. Therefore, if the development is not subdivided into individual parcels, rather it is held in a land lease arrangement, then the property would be regulated as a whole under the Ministry of Environment. For the purposes of this report, we have assumed that the sewage systems will be individually owned.

5.1 Onsite Sewage System Design Flows

For residential occupancies, onsite sewage system design flows are calculated in accordance with Table 8.2.1.3A of the Ontario Building Code (OBC). Sewage flows are considered maximum day flows, and are based on the number of bedrooms, the number and type of fixtures, and the total finished floor area of the dwelling. For the purposes of this report, we have assumed that the units will consist of 200 m^2, three (3) or four (4) bedroom units with 2.5 bathrooms. Table 1 shows the total daily design sanitary sewage flow for these two options.

Table 1: Total Daily Design Sanitary Sewage Flow for Onsite System Servicing

	200 m^2, 3 Bedroom, 2.5 Bath Home	**200 m^2, 4 Bedroom, 2.5 Bath Home**
Total Daily Design Sanitary Sewage Flow (L/day)	1,600 L/day	2,000 L/day

5.2 Onsite Sewage System Footprint

Onsite sewage systems consist of two (2) main components, a below grade septic tank, and a leaching bed. Depending on the nature of the receiving soils, the leaching bed may be constructed in the native soils, or if soils are poor, constructed with imported sand raised above grade. The footprint of the leaching bed increases as the percolation rate of the receiving soils increases. If the percolation rate exceeds 50 min/cm, conventional leaching beds must be constructed in imported sand and are typically raised above grade. The leaching bed is typically sized according to the maximum total daily design sanitary sewage flow, and the T-time of the underlying soils. As indicated above, the T-time for the soils on the site are considered to be over 50 min/cm, therefore fill-based raised leaching beds will be required.

In very poor soils, or on sites where space for the leaching bed is constrained, advanced treatment systems may be considered. Advanced treatment systems generally consist of a type of aeration unit that precedes the leaching bed and improves the treatment of the effluent prior to discharge to the bed. Due to the enhanced treatment prior to discharge, alternative leaching beds, such as Type A dispersal beds and shallow buried trenches may be considered. These types of systems have considerably smaller footprints than more conventional systems.

Advanced treatment technologies must demonstrate that they can consistently meet "Level IV" effluent objectives as defined by the OBC in order to be used with smaller types of leaching beds. The testing standard for Ontario is the CAN/BNQ 3680 standard for residential onsite wastewater treatment technologies. A number of technologies are certified to this standard, including the Waterloo Biofilter, the Norweo Hydrokinetic, and the EcoBiofilter, among others.

Table 2 shows the minimum leaching bed footprints required for the three (3) and four (4) bedroom homes described above.

Table 2: Minimum Footprints for Onsite Sewage Systems

Type of Leaching Bed	200 m², 3 Bedroom, 2.5 Bath	200 m², 4 Bedroom, 2.5 Bath
Conventional Filter Bed, Fully Raised	400 m²	500 m²
Type A Dispersal Bed, Fully Raised	210 m²	260 m²
Shallow Buried Trench	110 m²	150 m²

Note: Type A dispersal beds and shallow buried trenches require Level IV treatment technology prior to discharge.

5.3 Minimum Lot Sizing

The construction of an onsite sewage system must conform with the requirements of the OBC, which includes minimum mandatory setback distances from components of the sewage system to critical environmental and site features. Table 3 shows the minimum mandatory OBC setback distances.

Table 3: Minimum Setback Distances for Onsite Sewage System Components

Site Feature	Horizontal Setback Distance (m)
Water Well[1]	15 m
Any Other Well[2]	30 m
Structure	1.5 m
Property Line	3 m
Surface Water Source	15 m

1. Must be equipped with a watertight casing to a depth of 6 m
2. Only applies to "distribution pipe", not septic tanks or treatment units

In addition to OBC setback distances, the lot must also respect local zoning bylaws, which include minimum front and side yard setbacks. For the purposes of this report, it has been assumed that the minimum front yard setback is 6 m, and the minimum side yard setback is 3 m.

Based on these constraints the minimum lot size for the three (3) and four (4) bedroom homes described in the preceding sections are illustrated in Table 4.

Table 4: Minimum Lot Sizes to Accommodate Onsite Sewage Systems

Type of Leaching Bed	200 m², 3 Bedroom, 2.5 Bath	200 m², 4 Bedroom, 2.5 Bath
Conventional Filter Bed, Fully Raised	0.15 ha	0.2 ha
Type A Dispersal Bed, Fully Raised	0.12 ha	0.15 ha
Shallow Buried Trench	0.10 ha	0.12 ha

As shown in Table 4, the minimum lot size required ranges from 0.1 ha to 0.2 ha. Note this does not accommodate a reserve bed area. Although no minimum lot size is legislated by the province, many municipalities do not allow development of individual onsite sewage systems on lots smaller than 0.2 ha (0.5 acre). For the purposes of this report, we will assume that the minimum allowable lot size is 0.2 ha. Therefore, the proposed maximum development area of 81 ha could accommodate approximately 405 lots. Detailed design of the subdivision layout would be required to further refine this number.

5.4 D-5-4 Analysis

The proposed development consists of up to 1,250 units. For the purposes of this report, we have assumed that the sewage systems will be individually owned. Note if the sewage systems are owned by Parkbridge than the property would be subject to a Reasonable Use assessment in accordance with Chapter 22 of the MECP Design Guideline for Sewage Works.

Developments that consist of more than five (5) lots that will be serviced with individual onsite sewage systems are subject to the Ministry of Environment, Conservation & Parks (MECP) Procedure D-5-4 Technical Guidelines for Individual Onsite Sewage Systems: Water Quality Impact Risk Assessment (Procedure D-5-4). This analysis assesses the cumulative impact of the proposed sewage systems on the local groundwater regime. The potential for impacts to occur depends on the local hydrogeological setting, the volume of effluent discharged as well as the concentration of nutrients discharged in the effluent. The nutrient of concern is typically nitrate nitrogen.

Procedure D-5-4 outlines a three-step assessment process as follows:

> Step 1 – Assessment considers the minimum lot size for each private residence. For developments where the lot size is one hectare or larger, it is assumed that the attenuative processes will be sufficient to reduce nitrate nitrogen to an acceptable concentration below adjacent properties. If smaller lots are proposed, the assessment proceeds to Step 2.
>
> Step 2 – System Isolation. This considers the relationship between the individual onsite sewage systems and the groundwater. Developments are considered to be low risk where it can be demonstrated that the effluent is hydrogeologically isolated from existing or potential supply aquifers. Where it cannot be demonstrated that the systems are isolated from existing or potential groundwater supplies, it is necessary to progress to Step 3 of the assessment.

Step 3 – If lots smaller than 1 ha are proposed, and system isolation cannot be demonstrated a detailed examination of contaminant loading to the groundwater must be completed. A predictive contaminant attenuation calculation must be completed that demonstrates that the proposed development will not cause concentrations of nitrate nitrogen in the groundwater to exceed 10 mg/L at the downgradient development boundary.

As noted in Section 5.3 the minimum lot size proposed is 0.20 ha. Therefore Step 1 cannot be satisfied and we must proceed to Step 2. Preliminary hydrogeological reports completed for this development indicate that there are both shallow and deep-water supply wells in the area. Therefore, the assessment must progress to Step 3, the predictive contaminant attenuation assessment.

Crozier has completed a mass balance calculation to predict the concentration of nitrate nitrogen at the development boundary, using the following general assumptions, per D-5-4 guidelines:

- The concentration of nitrate in the effluent is 40 mg/L.
- The average volume of effluent generated by each single-family dwelling is 1,000 L/day.
- The only dilution mechanism is by infiltration of surface precipitation. An infiltration value of 100 mm/year has been assigned, based on MECP values for clayey silt soils.
- Background concentrations of nitrate are assumed to be zero.

Using this approach, the concentration of total nitrogen at the property boundary is predicted to be 26.96 mg/L, which exceeds the maximum allowable concentration of 10 mg/L. Refer to Appendix A for detailed calculations. It should be noted that this calculation is based on the development of only 405 homes, which is what can be supported on the site with a minimum lot size of 0.2 ha, as described in the preceding section.

Some advanced treatment technologies may be able to remove some nitrate nitrogen from the effluent. The CAN/BNQ testing standard referred to above includes certifications for technologies which can remove nitrogen. Level N-I technologies have been certified to remove 50% total nitrogen, and Level N-II are certified for 75% nitrogen. Technologies that have successfully passed this standard are limited. However, if N-II technologies are employed, the total nitrogen concentration for 405 homes at the property boundary would be reduced to 6.74 mg/L, which would meet the D-5-4 objective of 10 mg/L.

The proposed development of 1,250 units cannot be serviced by individual onsite sewage systems. Therefore, other options for sewage servicing, such as a communal sewage system or connection to a municipal sanitary sewer system, should be investigated.

6.0 Conclusions & Recommendations

Parkbridge Lifestyle Communities Inc. proposes to construct a mixed use community of up to 1,250 units on a 135 ha parcel in the east end of the Municipality of Meaford. The desktop servicing investigation has found the following:

- There is insufficient water supply to support individual groundwater wells.
- The minimum footprint for individual onsite sewage systems ranges from 150 m^2 to 700 m^2, depending on the size of the home and the type of treatment and leaching bed employed.
- The minimum lot size required to accommodate individual onsite sewage systems is approximately 0.2 ha.
- Approximately 405 lots can be developed with a minimum lot size of 0.2 ha if 81 ha of the Site are developable.
- Onsite sewage systems for 405 homes must include N-II nitrogen removal technology in order to meet D-5-4 guidelines for nitrogen removal at the property boundary. Additional lots may be developed if N-II technology is employed, subject to accommodation on the site plan.
- Detailed design should be completed to determine the maximum lot yield.
- If the lots are not subdivided and the lands are held in common than the development will have to meet Reasonable Use as described in Chapter 22 of the MECP Design Manual for Sewage Works at the property boundary.
- A communal onsite sewage system or connection to a municipal sanitary sewage system should be explored in order to increase development yield.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Katherine Rentsch, P.Eng.
Senior Project Manager

C.F. CROZIER & ASSOCIATES INC.

Chris Gerrits, M.Sc., P.Eng.
Senior Project Manager

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APPENDIX A

D-5-4 Calculations

CROZIER CONSULTING ENGINEERS

Project Name:	Parkbridge Meaford Development
Project Number:	1046-4273
Date:	2023.06.23
Designed By:	AL
Checked By:	KR

D-5-4 IMPACT ASSESSMENT

Calculate the Nitrate Concentration at a Boundary (Property or Surface Water)

Parameter	Value	Unit	Notes:
Infiltration Volume			
Area of Dilution =	71.5	ha	Total area of site
Background Nitrate Quality in Groundwater =	0.00	mg/L	Assume background nitrate quality in groundwater is zero
Annual Infiltration Rate =	100	mm/m2/yr	MECP infiltration rate
	2,739.73	L/ha/day	
Annual Infiltration Volume =	71,500	m^3/year	
Total Average Background Nitrate =	0	mg/day	
Sewage Effluent Volume			
Proposed Number of Lots	405		
Average Daily Volume of Sewage Effluent =	405,000	L/day	The average volume of effluent generated by each single family home si 1,000 L/day
Number of Days of Operation/Use =	365	days/year	
Annual Volume of Sewage Effluent =	147,825	m^3/year	
Totals			
Total Dilutant = wastewater V + infiltration V =	219,325	m^3/year	
Nitrate Concentration in wastewater =	40.0	mg/L	
Total Average Nitrate Loading =	16,200,000	mg/day	
Nitrate Concentration in Percolate =	**26.96**	**mg/L**	Maximum allowable concentration of 10 mg/L

CROZIER CONSULTING ENGINEERS

Project Name:	Parkbridge Meaford Development
Project Number:	1046-4273
Date:	2023.06.23
Designed By:	AL
Checked By:	KR

D-5-4 IMPACT ASSESSMENT

Calculate the Nitrate Concentration at a Boundary (Property or Surface Water)

Parameter	Value	Unit	Notes:
Infiltration Volume			
Area of Dilution =	71.5	ha	Total area of site
Background Nitrate Quality in Groundwater =	0.00	mg/L	Assume background nitrate quality in groundwater is zero
Annual Infiltration Rate =	100	mm/m2/yr	MECP infiltration rate
	2,739.73	L/ha/day	
Annual Infiltration Volume =	71,500	m^3/year	
Total Average Background Nitrate =	0	mg/day	
Sewage Effluent Volume			
Proposed Number of Lots	405		
Average Daily Volume of Sewage Effluent =	405,000	L/day	The average volume of effluent generated by each single family home si 1,000 L/day
Number of Days of Operation/Use =	365	days/year	
Annual Volume of Sewage Effluent =	147,825	m^3/year	
Totals			
Total Dilutant = wastewater V + infiltration V =	219,325	m^3/year	
Nitrate Concentration in wastewater =	10.0	mg/L	
Total Average Nitrate Loading =	4,050,000	mg/day	
Nitrate Concentration in Percolate =	**6.74**	**mg/L**	Maximum allowable concentration of 10 mg/L

FIGURES

Unit Summary	
12m Singles	783
6m Lane Townhouses	339
12m Lane Singles	29
Mixed use*	48
TOTAL	**1,199**

*Mixed Use Units Calculated as 95 units/ha ave.



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www.svn-ap.com

Christie Beach
Parkbridge Meaford Development
Master Plan
Meaford, Ontario

Site Plan and Statistics

ver. 21J | January 16, 2024 | DRAFT ONLY

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APPENDIX G

Water and Wastewater Modelling

Ainley & Associates Limited
280 Pretty River Pkwy, Collingwood, ON L9Y 4J5
Tel: (705) 445-3451 • Fax: (705) 445-0968
E-mail: collingwood@ainleygroup.com

December 21, 2020 File No. 120098

Municipality of Meaford
21 Trowbridge Street West
Meaford ON
N4L 1Y1

Attn: **Tori Perejmybida**
Director of Infrastructure Services

Ref: **Parkbridge Meaford Development**
Review of Municipal Water/Wastewater Servicing

Dear Ms. Perejmybida:

Per your July 28, 2020 request we have completed a review of infrastructure requirements for wastewater collection and water distribution for the proposed Parkbridge Meaford development. The analysis reviews theoretical pressures and available fire flows to the site was well as sanitary drainage capacity from potential connection points.

1. Water System

Our analysis includes a comparison of the pressures within the area of interest under average day demand (ADD), maximum day demand (MDD), peak hour (PH) and maximum day demand plus available fire flow (MDD + FF) under the following conditions:

- Connection at the existing 250mm diameter watermain on Highway 26 at Knights Home Centre
- Connection at Montgomery Street and the Georgian Trail. We note that the watermain on Montgomery Street is a combination of 100mm diameter cast iron and ductile iron pipe. If this option is chosen the pipe will need to be replaced. It was assumed that the replacement pipe would be 250mm diameter to provide a trunk main because the demand to the proposed Parkbridge development is significant

This analysis was completed using the Municipality of Meaford WaterGEMS water supply and distribution model, updated to 2013 Existing Conditions. The demands in the system have been updated to include water demand data from 2014 – 2019. The demands used for this review, including demands to the proposed Parkbridge development are as follows:

- Future average day demands are consistent with demands developed for the Municipality of Meaford Master Plan – Water and Wastewater Servicing (Ainley Group Project Number 114106):
  - ADD 300L/cap/day and a population density of 2.4 people per unit.
- For maximum day demand a maximum day factor (MDF) of 1.944 was applied. The MDF was updated from 2014 with data from 2014 - 2019 provided by the Municipality of Meaford. An MDD of 3576 m^3/day that occurred in December 2018 is considered to be an outlier and was not included in the data.
- Peak hour demand is 1.5 times the MDD, per the Ministry of the Environment, Conservation and Parks design guidelines. This results in a peak hour factor of 2.92. The Water Design

Criteria outline completed by Crozier Consulting Engineers suggests a Peak Hour Factor of 3.38, and although it is listed in the MECP Design Guidelines for the population, it is not consistent with the Maximum Day Factor times 1.5

- Demand for Commercial developed areas is based on 28m^3/ha/day, per the MECP Design Guidelines

All scenarios were modelled under the following conditions: existing and ultimate build out. The conditions for all scenarios are as follows:

- Watermain length and also elevations are per a sketch prepared by Crozier Consulting Engineers
- 900 proposed residential units
- 3 ha of proposed Commercial developed area

Information related to this proposed development provided by the Municipality is attached.

We also note that upgrades are currently being designed for the water supply system, and as part of the upgrades a smaller highlift pump will be included at the Water Treatment Plant. This proposed highlift pump can provide water for the existing system and approximately an additional 740 equivalent residential units. Beyond the 740 additional units, the Town will need to review a solution to provide water supply to the distribution system. With the revised strategy to service the water distribution system the existing highlift pumps are too large, even with a variable frequency drive, to provide supply at an acceptable pressure.

2. Wastewater

Our analysis includes a review of sanitary drainage capacity from two locations:

- Connection to the existing 250mm diameter sewermain on Highway 26 at Knights Home Centre
- Connection to the existing 250mm diameter sewermain at the intersection of Montgomery Street and the Georgian Trail.

The analysis of wastewater servicing for the development was completed using the Municipality of Meaford SewerGEMS collection model, calibrated as part of the 2014 Master Plan EA. The Model was revised to asses development review and evaluate the impact of the new development on the Municipality's wastewater collection infrastructure.

Both connection options were evaluated under a peak flow scenario. Flow estimates developed by Crozier were adopted and input to the model. It should be noted that wastewater flow estimates for the Town have been more conservative during previous development reviews, assuming 350 L/cap/day wastewater flow generation, as opposed to 300 L/cap/day.

3. Existing System Conditions Plus the Proposed Meaford Parkbridge Development - Water

A review of pressures within the area of interest under ADD, MDD, PH and MDD + FF was completed under existing system conditions plus the proposed Meaford Parkbridge development. We reviewed three different potential scenarios for the watermain between the

connection point and the proposed development site: twin 150 trunk mains, a combination of 150mm and 200mm twin trunk mains and a single 250mm trunk main. We note that a review of pressures with the two different proposed connection points, as listed above, was completed and the review indicates that there are only marginal differences in the pressures and available fire flows between the two conditions. As such, the following summary of the theoretical pressures and available fire flows is applicable for both scenarios:

Table 1: Projected Pressures at the Parkbridge Development - Existing Conditions

	Twin 150 trunk mains	Twin trunk mains, combination 150 and 200	Single 250mm trunk main
ADD	270 kPa	275 kPa	280 kPa
MDD	225 kPa	255 kPa	260 kPa
PH	155 kPa	215 kPa	225 kPa

Without any pressure augmentation (booster pumping station dedicated to this development) the pressures that would be available at the proposed development from the Meaford Water Supply and Distribution System are significantly below the range recommended in the MECP Design Guidelines for normal operating conditions (Per the MECP Design Guidelines for Drinking Water Systems 2008, Chapter 10, Section 10.2 Hydraulic Design, 10.2.2.1 Maximum and Minimum Operating Pressures: The normal operating pressure in the distribution system should be approximately 350 to 480 kPa and not less than 275kPa).

With respect to theoretical available fire flows, we note that a pump had to be included in the model in order to provide a maximum theoretical available fire flow of 45L/s to the proposed Meaford Parkbridge development. This is the maximum emergency flow that could be provided to the site from the Meaford Distribution System, under the above noted conditions and MDD, and assumes it would be provided via a booster pumping station. With no booster pump, the theoretical available fire flow to the proposed development under MDD conditions is approximately 25L/s. To provide fire flow higher than 45L/s a water reservoir on the site would be required.

4. Ultimate Build Out

A review of pressures within the area of interest under ADD, MDD, PH and MDD + FF was completed under ultimate build out. We reviewed three different potential scenarios for the watermain between the connection point and the proposed development site: twin 150 trunk mains, a combination of 150mm and 200mm twin trunk mains and a single 250mm trunk main. We note that a review of pressures with the two different proposed connection points, as listed above, was completed and the review indicates that there are only marginal differences in the pressures and available fire flows between the two conditions. As such, the following summary of the theoretical pressures and available fire flows is applicable for both scenarios:

Table 2: Projected Pressures at the Parkbridge Development – Ultimate Build Out Conditions

	Twin 150 trunk mains	Twin trunk mains, combination 150 and 200	Single 250mm trunk main
Future ADD	270 kPa	275 kPa	275 kPa
Future MDD	200 kPa	225 kPa	230 kPa
Future PH	130 kPa	190 kPa	200 kPa

Without any pressure augmentation (booster pumping station dedicated to this development) the pressures that would be available at the site from the Meaford Water Supply and Distribution System are significantly below the range recommended in the MECP Design Guidelines for normal operating conditions (Per the MECP Design Guidelines for Drinking Water Systems 2008, Chapter 10, Section 10.2 Hydraulic Design, 10.2.2.1 Maximum and Minimum Operating Pressures: The normal operating pressure in the distribution system should be approximately 350 to 480 kPa and not less than 275kPa).

With respect to theoretical available fire flows, we note that a pump had to be included in the model in order to provide a maximum theoretical available fire flow of 29L/s to the proposed Meaford Parkbridge development. This is the maximum emergency flow that could be provided to the site from the Meaford Distribution System, under the above noted conditions and MDD, and assumes it would be provided via a booster pumping station. To provide higher fire flow a water reservoir on the site would be required.

5. Existing System Conditions Plus the Proposed Meaford Parkbridge Development – Wastewater

5.1 Gravity Sewers

The two proposed connection locations, Highway 26 at Knight Home Centre and Montgomery Street at the Georgian Trail are on the same sewer line. The wastewater drainage from Highway 26 at Knights Home Centre travels down St. Vincent Street to Mongomery Street, before traveling along Montgomery Street to the intersection with the Georgian Trail.

The addition of wastewater flow from the Parkridge Meaford Development to the existing 250mm diameter sewermain on Highway 26 at Knights Home Centre does not result in any surcharging of the sewer based on the model results. However, the results indicate near-full use of the potential capcity available. The 250mm sewer along Highway 26 has a slope of 0.3%, based on Manning's calculation, assuming a a roughness (n-value) of 0.013, this sewer has capacity up to 35 L/s. The sewer downsizes to a 200mm sewer at St. Vincent Euphrasia with a minimum slope of 0.9% and a corresponding capacity of 34 L/s again assuming an n-value of 0.013. These bottlenecks leave little room for potential increase in peak flows and eliminate the potential for any future development connection at this location. Once reaching the intersection of St. Vincent Street and Highway 26 the sewer increses back in diameter to 250mm but with increased slope, minimum capacity in the sewermain past this location is 64 L/s.

The addition of wastewater flow from the Parkridge Meaford Development to the existing 250mm diameter sewermain at the intersection of Mongomery Street and the Georgian Trail does not result in any surcharging of the sewer based on model results. The sewers downstream of this location are more than sufficient, with use remaining below 50% of available capacity.

Based on the findings, both options are viable options for connection to the wastewater collection system however the the Mongomery Street and Georgian Trail location is recommended. The Highway 26 and Knights Home Centre location is viable however the development will use all available capacity and should fouling develop in the sewer, effectively increasing the sewer roughness, the sewer will no longer have sufficient capacity for the projected peak day.

5.2 Wastewater Pumping

Both input locations selected for the Parkridge Meaford Deavelopment would impact flows observed at sewage pumping station (SPS) 2, at the wastewater treatment plant (WWTP) site. The station has a firm capacity of 147 L/s. The peak flow to the wastewater pumping station increases peak flows modeled to the station to 55 L/s, still well within the station capacity.

6. Summary

Based on our review of servicing the proposed Parkbridge Meaford Development from the existing water distribution system, a water booster pumping station dedicated to the proposed development would be required to provide acceptable pressures at the site. With respect to location for the required booster pump station, while having the booster pumping station located somewhere prior to the site would provide better suction pressures, it would be possible to locate it at the entrance to the site, prior to any services. The sizing of the trunk main(s) to the site will determine how far into the site it could be located. If the trunk main between the existing connection point and the site consists of twinned 150mm diameter mains, it would need to be right at the entrance to the site.

A comparison was completed of different potential scenarios for the watermain connecting the proposed development site to the existing system: twin 150 trunk mains, a combination of 150mm and 200mm twin trunk mains and a single 250mm trunk main. It was noted that the pressures are significantly better with either a combination 150mm diameter / 200mm diameter trunk mains or a 250mm diameter trunk main.

We also note that a quick review of topography along the proposed route indicates that there are elevations up to 5m higher than the proposed site entrance. A node representing this elevation point was included in the modelling and under Ultimate PH conditions the pressure at this node was 118kPa. Should the Municipality consider servicing the proposed Parkbridge Meaford site with twin 150mm diameter watermains the highest elevation between the connection point at the existing distribution system and the proposed site should be confirmed, as it impacts pressures in the trunk main servicing the site. The pressures between the connection point and the proposed entrance to the site could be as low as 100kPa. This is lower than the generally recommended minimum of 140kPa under emergency conditons.

While servicing the site with twinned 150mm diameter watermains to the entrance of the site results in very low pressures along the transmission main, it is possible to service the site this way as there are no services along the trunk main. However, if one of the two 150mm diameter trunk mains was off line, there would be insufficient pressures at the site entrance under a demand condition greater than average day demand (the pressures would be sufficient on the inlet side of a booster pump station at the site entrance under average day demand with one of the two proposed 150mm diameter trunk mains off-line).

In addition, a water reservoir would be required to provide greater than 45L/s available fire flows to the site under existing conditions and greater than 29L/s theoretical available fire flow under ultimate build out conditions. The location and type of the storage will impact how much fire flow can be provided to different areas of the potential development. The types of potential storage include: a grade level reservoir that is gravity fed from the Meaford distribution system prior to an on-site booster pumping station that would provide fire flow via high lift pumps, a standpipe that would require water be pumped both into and out of it, an elevated tank that would require water to be pumped into it, but would provide floating storage. The internal servicing, including watermain layout and diameter, will also impact how much fire flow can be provided to different areas of the potential development.

We further reiterate that upgrades are currently being designed for the water supply system, and as part of the upgrades a smaller highlift pump will be included at the Water Treatment Plant. This proposed highlift pump can provide water for the existing system and approximately

an additional 740 equivalent residential units. Beyond the 740 additional units, the Town will need to review a solution to provide water supply to the distribution system. With the revised strategy to service the water distribution system the existing highlift pumps are too large, even with a variable frequency drive, to provide supply at an acceptable pressure.

Both locations selected for connection to the wastewater system are capable of conveying peak flows from the proposed development, however the Mongomery Street/ Georgian Trail location is preferred. The Highway 26 and Knights Home Centre location is not preferred because existing sewer capacity is nearly equivalent to the proposed flows and sewer capacity would be approaching 100%, The Montgomery and Georgian Trail location has much greater available capacity and much less risk of surcharging problems in the future caused by sewer fouling. Both locations selected will drain through SPS 2; the station has more than sufficient capacity to manage the proposed flows. The sanitary flow from the proposed development was modeled as a plug load input to the potential connection points. Delivery method to the system makes no impact to the sewer analysis.

Please do not hesitate to contact the undersigned if you have any questions with respect to this submission.

Yours truly

AINLEY & ASSOCIATES LIMITED



Heidi Ferris, P.Eng.
Project Engineer

Encl.
c.c.



Connection Point @ Knights Home Building Centre

Existing Grade: 218.00
Invert elevation: 215.90
Pipe Diameter: 250mm

At Site Entrance

Existing Grade: 229.60
Approx. Invert elevation: 227.60 (Assume 1.7m cover)
Distance from Connection: 2,635.89m

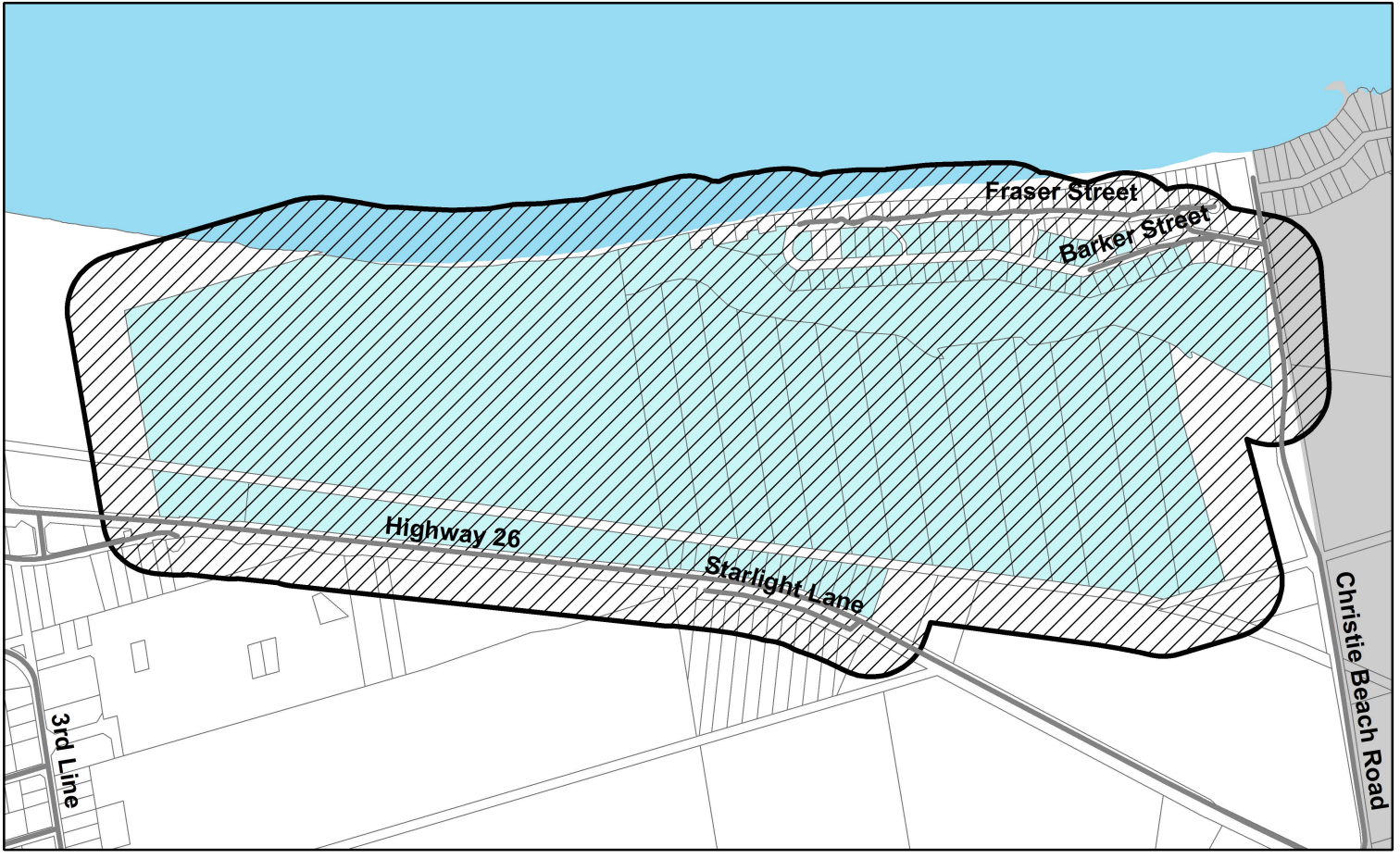
At Center of Site

Existing Grade: 230.05
Approx. Invert elevation: 228.05 (Assume 1.7m cover)
Distance from Connection: 3,701.93m

Notes

*The proposed reservoir location is at an elevation between 255.00 and 260.00 based on Grey County GIS Mapping.

*The site generally slopes south-west to north-east with grades ranging from 218.00 to 231.00 (Not including lands along Barker Street, which would be at a lower elevation).


Fraser Street
Barker Street
Highway 26
Starlight Lane
3rd Line
Christie Beach Road

MODELLING PARAMETERS FOR PARKBRIDGE MEAFORD - WATERMAIN

Project: Parkbridge Meaford (1046-4273)

Date: May 25, 2020

Assumptions:

1. Assuming 900 units and 3ha commercial area per latest Parkbridge concept plan.
2. Fire Flow: MECP calculations including commercial area based on residential equivalent per MECP guidelines
3. Fire Flow: FUS calculations based on assumed townhomes layout - refer to FUS calculations
4. Fire Storage Requirements: Calculated using MECP formula (A + B + C) where A = Fire storage (Fire Flow); B = Equalization (25% of MDD) and C = Emergency Storage (25% of A+B)
5. Servicing Design Criteria assumptions further outlined in background calculations.
6. Assume installation of twin transmission watermain for servicing connection - TBC with Meaford
7. Assume pressure required at connection point to be within MECP Guidelines.

General parameters:	
Existing grade at entrance to site:	229.60
Existing grade at central connection point (e.g. location of reservoir / booster pump station for site servicing):	230.05
Existing grade at eastern limits of site:	224.70
General grade range throughout site servicing areas (assuming areas below ridge will not be serviced):	218.00 - 231.00

Water Servicing Scenarios - Modelling Parameters		
	Low-demand Scenario	**High-demand Scenario**
Unit Count	**900**	**1000**
Fire Flow (assumptions)	**MECP Guidelines**	**FUS Guidelines (Assuming Townhomes)**
Demand Parameters	**Meaford Demand Parameters** - 2.4 persons/unit - 300 L/persons*day - MDF 1.67	**MECP Demand Parameters** - 3.5 persons/unit - 450 L/persons*day - MDF 2.00
Output	**MDD =** 1,220m^3/day **FF =** 100L/sec (Per MECP) **MDD + FF =** 1,940m^3/day **Fire Storage req'ts =** 1,285m^3	**MDD =** 3,320m^3/day **FF =** 158L/sec (Per FUS) **MDD + FF =** 4,458m^3/day **Fire Storage req'ts =** 2,458m^3

Routing & Connection Options	**Georgian Trail**	**Hwy 26**
Connection at Knights Home Centre - 250mm dia. w/m (existing pipe) - Existing grade: 218.00 - Invert elevation: 215.90	Pipe length to site connection point (centre of site) = 3,702m	Pipe length to site connection point (centre of site) = 3,745m

Open to consideration of alternative points of connection if deemed more suitable (e.g. Montgomery etc.)

Project: Parkbridge Meaford
Project No.: 1046-4273
Date: 15-May-20
By: SO

Parkbridge Meaford Development - Water Design Criteria
Low-Demand Scenario

Site Area		**143**	**ha**
Number of Residential Units and Land Usage			
Future Parkbridge Meaford Units:		**900**	**units**
Commercial Developed Area:		3	**ha**
Person Per Residential Unit (Per discussions with Municipality of Meaford)		2.4	persons/unit
Residential Population		**2,160**	**persons**
Domestic Water Design Flows			
Residential (per discussions with Municipality of Meaford)		300	L/C-day
Commercial (per MOE Design Guidelines for Water Works, 2008)		28	m^3/(ha*day)
Total Domestic Water Design Flows			
Average Residential Daily Flow		8	L/sec
Average Daily Commercial Flow		0.94	L/sec
ADD		730	m^3/day
Max Day Peak Factor (Per discussion with Municipality of Meaford)		1.67	
Max Day Demand Flow		**14**	L/sec
MDD		**1,220**	m^3/day
Peak Hour Factor (Per MOE Table 3-1)		3.38	
Peak Hour Flow		**29**	L/sec
Water Supply Requirements			
MDD		**1,220**	m^3/day
Fire Flow	100 **L/sec at approx. 2,207 pop'n for 2 hours per MOE guidelines**	**720**	m^3/day
	Total	**1,940**	m^3/day
Fire Storage Requirements			
MOE Formula (A+B+C)			
A	Fire Storage (Fire flow)	**720**	m^3
B	Equalization (25% of MDD)	**305**	m^3
C	Emergency (25% of A+B)	**260**	m^3
	Total	**1,285**	m^3

Parkbridge Meaford Due Dilligence
Fire Protection Volume Calculation
CFCA File: 1046-4273

Water Supply for Public Fire Protection - 1999
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

1. An estimate of fire flow required for a given area may be determined by the formula:

$$F = 220 * C * \sqrt{A}$$

where

F = the required fire flow in litres per minute

C = coefficient related to the type of construction
- = 1.5 for wood frame construction (structure essentially all combustible)
- = 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
- = 0.8 for non-combustible construction (unprotected metal structural components)
- = 0.6 for fire-resistive construction (fully protected frame, floors, roof)

A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building considered.

Wood Frame Constrution C = 1.5

Area	420	100%	Area	420.00	*Assumed 1,500sq.ft (approximately 140sq.m) per unit, 3 units continuously connected without fire suppression

Therefore F= 7,000 L/min (rounded to nearest 1000 L/min)

Fire flow determined above shall not exceed:
- 30,000 L/min for wood frame construction
- 30,000 L/min for ordinary construction
- 25,000 L/min for non-combustible construction
- 25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Non-Combustible	-25%	Free Burning	15%
Limitied Combustible	-15%	Rapid Buring	25%
Combustible	No Charge		

Non-combustible & Low fire Hazard occupancy for dwe 25% reduction

1,750 L/min reduction

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above maybe reduce by up to 50% for complete automatic sprinkler protection.

No sprinkler system Assume 0% reduction

0 L/min surcharge / reduction

Water Supply for Public Fire Protection - 1999
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 45 metres by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) esposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation	Charge	Separation	Charge
0 to 3 m	25%	20.1 to 30 m	10%
3.1 to 10 m	20%	30.1 to 45 m	5%
10.1 to 20 m	15%		

Exposed buildings

Name	**Distance**			
Side yard	1.2	25%	1312.5	*Assumed min. 1.2 metre separation
Side yard	1.2	25%	1312.5	*Assumed min. 1.2 metre separation
Rear yard	15	15%	787.5	*Assumed 15-metre rear separation
Front	20	15%	787.5	*Assumed 20-metre front separation
			4,200	**L/min Surcharge**

Determine Required Fire Flow

No.1	7,000			
No. 2	1,750	reduction		
No. 3	0	reduction		
No. 4	4,200	surcharge		
Required Flow:	**9,450**	**L/min**	or	158 L/s
				2,496 USGPM

Determine Required Fire Storage Volume

Flow from abov	9,450	L/min	
Required durati	2.0	hours	
Therefore:	1,134,000	Litres or	
	1,134	cu.m.	is the required fire storage volume.

Required Duration of Fire Flow	
Flow Required L/min	Duration (hours)
2,000 or less	1.0
3,000	1.25
4,000	1.5
5,000	1.75
6,000	2.0
8,000	2.0
10,000	2.0
12,000	2.5
14,000	3.0
16,000	3.5
18,000	4.0
20,000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32,000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 and over	9.5

Calculation Check

Office of the Fire Marshall - Fire Protection Water Supply Guideline for Part 3 in the OBC (October 1999)

$$Q = KVS_{TOT}$$

Q = minimum supply of water in litres (L)
K = water supply coefficient
V = total building volume in cubic metres
S_{TOT} = total of spatial coefficient values from property line exposures on all sides

K =	23	Group C building with combustible construction (Table 1)
V =	1260	Assumed 140 m2 (1500 sqft) unit footprint with 3 continuously connected units and a 3.0-m height
S_{TOT} =	2	Max spatial coefficient (Figure 2)

Q = 57960 L

Based on ranges listed in Table 2, the required minimum water supply flow rate is **2700 L/min**

45 L/s

Project: Parkbridge Meaford
Project No.: 1046-4273
Date: 15-May-20
By: SO

Parkbridge Meaford Development - Water Design Criteria
High-Demand Scenario

Site Area		**143**	**ha**
Number of Residential Units and Land Usage			
Future Parkbridge Meaford Units:		**1,000**	**units**
Commercial Developed Area:		3	**ha**
Person Per Residential Unit (Per MECP Typical)		3.5	persons/unit
Residential Population		**3,500**	**persons**
Domestic Water Design Flows			
Residential (per MOE Design Guidelines for Water Works, 2008)		450	L/C-day
Commercial (per MOE Design Guidelines for Water Works, 2008)		28	m^3/(ha*day)
Total Domestic Water Design Flows			
Average Residential Daily Flow		18	L/sec
Average Daily Commercial Flow		0.94	L/sec
ADD		1,660	m^3/day
Max Day Peak Factor (Per MOE Table 3-1)		2.00	
Max Day Demand Flow		**38**	L/sec
MDD		**3,320**	m^3/day
Peak Hour Factor (Per MOE Table 3-1)		3.00	
Peak Hour Flow		**58**	L/sec
Water Supply Requirements			
MDD		**3,320**	m^3/day
Fire Flow 158 **L/sec per FUS assuming Townhomes development**		**1,138**	m^3/day
	Total	**4,458**	m^3/day
Fire Storage Requirements			
MOE Formula (A+B+C)			
A Fire Storage (Fire flow)		**1,138**	m^3
B Equalization (25% of MDD)		**830**	m^3
C Emergency (25% of A+B)		**490**	m^3
	Total	**2,458**	m^3

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

MEMO

Date: June 29, 2023

To: Shawn Carey, Director of Operations, Town of The Blue Mountains

From: Jane Wilson, Senior Environmental Engineer, J.L. Richards & Associates Limited

CC: Allison Kershaw, Manager of Water and Wastewater Services, Town of The Blue Mountains

Subject: Parkbridge Meaford Development, Water and Wastewater Analysis
Water Modelling Analysis

JLR No.: 27550-023

1.0 BACKGROUND

A Master Servicing Study is currently being undertaken for a proposed development (Parkbridge Meaford development) in the Municipality of Meaford, adjacent to the Town of The Blue Mountains (the Town). Crozier Consulting Engineers (Crozier), on behalf of Parkbridge Meaford, has requested the Town investigate the potential opportunity to service the development. The Town has retained J.L. Richards & Associates Limited (JLR) to conduct a water and wastewater modelling assessment to identify the infrastructure impacts in the Town related to the proposed development.

The proposed Parkbridge Meaford development is located west of the Town, adjacent to the Lora Bay community. The development is anticipated to have a maximum day demand (MDD) flow of 33 L/s. Based on discussions with the Town and Crozier, it is understood that if the Town would only supply the MDD to the development, and peak hour demand and emergency supply would be supplied from other sources. It is also understood that if serviced, the development could be connected to the Town's water system at the Town-Meaford boundary along Christie Beach Road at 39th Side Road.

This memo has been prepared to summarize the results of the water modelling analysis and identify the infrastructure upgrades that will be required to the Town's water supply and distribution system. A conceptual level Opinion of Probable Construction Cost (OPCC) for the identified upgrades is also provided.

2.0 SUMMARY OF WATER MODELLING ANALYSIS

A hydraulic assessment was conducted by C3 Water Inc. (C3) to determine the impacts of the Parkbridge Meaford development on the Town's water infrastructure. The results of this analysis are detailed in the *Parkbridge Development Hydraulic Analysis* (C3, 2023) technical memorandum which is appended to this document (Appendix A). A summary of recommended upgrades following the hydraulic assessment are summarized in Table 1 and Table 2. The locations of the analysed watermains are shown in Figure 1 and Figure 2.

Table 1. Facility Upgrades Summary (based on information provided in C3, 2023)

Description	Firm Capacity Pre-Parkbridge Development	Firm Capacity Post-Parkbridge Development	Difference in Capacity
Thornbury WTP	252.2 L/s	285.2 L/s	33 L/s
10th Line BPS	186 L/s	219 L/s	33 L/s

Table 2. Watermain Upgrade Summary (based on information provided in C3, 2023)

Description	Location	Upgrade Required (Y/N)	Existing Diameter (mm)	New Diameter (mm)	Length (m)
Watermain 1	Peel St S (WTF to Timber Ln)	N	400	N/A	210
Watermain 2	Peel St S (Timber Ln to High Bluff Ln)	Y	300	400	280
Watermain 3	High Bluff Ln (Peel St S to 10th Line)	Y	300	400	1150
Parkbridge 1	Christine Beach Rd (10th Line to 39th Side Rd)	N	200	N/A	250
Parkbridge 2	39th Side Rd (10th Line towards Schooners Ln)	N	250	N/A	285

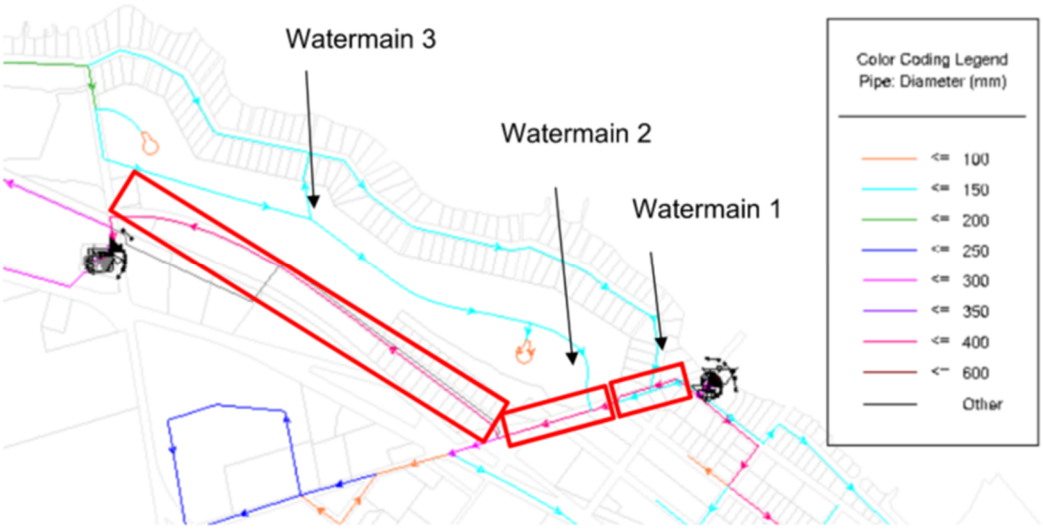


Figure 1. Zone 1 Model Results Locations (C3, 2023)

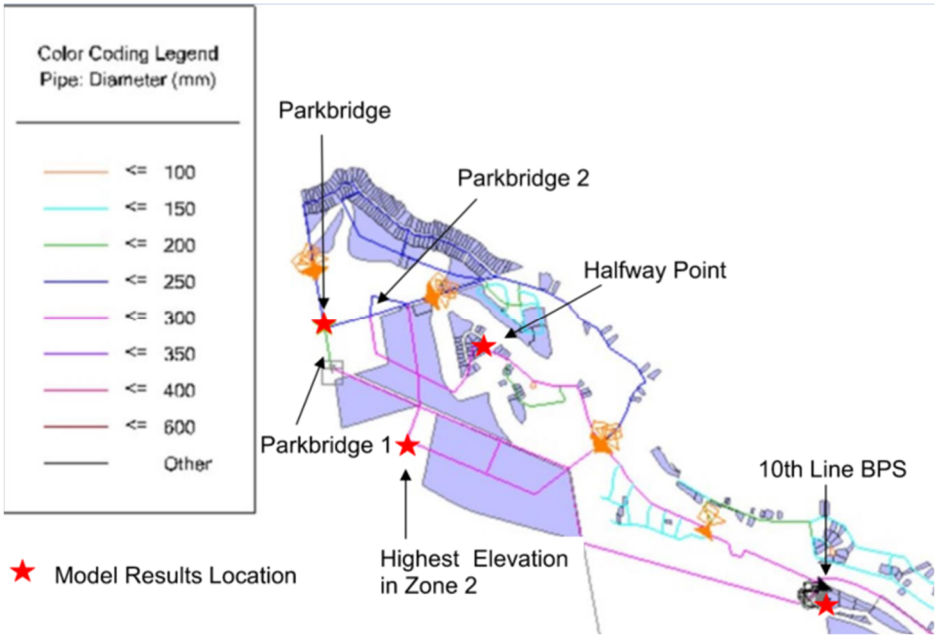


Figure 2. Zone 2 Model Results Locations (C3, 2023)

3.0 OPINION OF PROBABLE CONSTRUCTION COSTS

3.1 Supply of Water Agreement

A formal agreement between the Town and the Municipality of Meaford would be required for the sale of water from the Town to the Parkbridge Meaford development. As part of the agreement, terms, conditions and provisions for the selling and purchase of water would need to be established and agreed to by Councils of both municipalities. It is also noted that the Town of The Blue Mountains is currently contemplating a water supply agreement with Town of Collingwood, which if implemented may impose additional conditions on the sale of water to another municipality.

Components of the agreement are anticipated to include, and not be limited to:

- Term of the agreement and renewal periods
- Minimum and maximum daily demand
- Metering requirements
- Financial arrangements
    - Connection capital cost (additional required works and utilization of existing and planned infrastructure)
    - Supply rate
    - Administration fee
    - Annual adjustments

The following sections provide additional information regarding the financial components of the agreement. This memorandum is not intended to be exhaustive, and all costs and cost sharing basis are subject to further review and approval by Council through a supply of water agreement.

3.2 Connection Capital Costs Associated with Identified Infrastructure Upgrades

A conceptual level OPCC was developed for each of the identified upgrades detailed in Section 2 and Appendix A. Two cost estimates were developed: the “Pre-Parkbridge Development” OPCC identifies costs of water infrastructure upgrades under the build-out water demand assuming Parkbridge Meaford is not connected to the Town’s water supply, and the “Post-Parkbridge Development” OPCC identifies costs of water infrastructure upgrades under the build-out water demand assuming Parkbridge Meaford is connected to the Town’s water supply. The costing completed as part of this analysis is conceptual in nature – all design parameters (e.g., pipe size, pump size, etc.), should be confirmed during detailed design.

Costing for the 10th Line Booster Pumping Station (BPS) upgrades was based on the Class ‘D’ OPCC provided in the Draft Preliminary Design Report (PDR) for the 10th Line BPS Upgrades (JLR, May 2023). For the “Post-Parkbridge Development” OPCC, the PDR OPCC was updated to reflect an increase in required pump size due to the added demand of the Parkbridge Meaford development. The OPCC for 10th Line BPS includes the costs of the upgrades of the BPS only and does not include costs associated with the existing BPS infrastructure or upgrades to the 10th Line Reservoir.

Costing for identified watermain upgrades were based on the required length and diameter of watermain required, both pre- and post- development. Costing for watermain upgrades were developed based on past experience on similar projects, professional judgement, and equipment costs provided by suppliers.

Costing for water supply assume that the Thornbury Water Treatment Plant (WTP) will be expanded to meet the build-out water demand and increased demand from the development. If another supply option is chosen as identified as preferred as part of the East Water Supply Class EA (e.g., if additional water supply is purchased from Collingwood), the costs of water supply to the development would need adjustment. Costing for upgrades to the Thornbury WTP was based on a $325 per capita unit cost based on the Water Supply & Treatment development charge presented in the Town’s current Development Charges Background Study (Hemson Consulting Ltd., 2019). Total costs for WTP upgrades assume a residential population of 3,190 persons based on information provided by Croziers on February 16, 2023.

A summary of the conceptual OPCC for the required infrastructure upgrades in the Town due to the Parkbridge-Meaford development is provided in Table 3. Detailed OPCC tables are provided in Appendix B. Cost allocation between the Town and Municipality of Meaford will require further review. This allocation will need to account for infrastructure listed below and for existing and planned infrastructure which does not require upsizing.

Table 3. Conceptual OPCC for Required Water Infrastructure Upgrades in the Town to Service Parkbridge Meaford

Infrastructure	Pre- Parkbridge Development		Post- Parkbridge Development	
	Size	Cost(1)	Size	Cost(1)
10th Line BPS Upgrades	185.7 L/s(2)	$2,280,000	218.7 L/s(3)	$2,350,000
Watermain Upgrades	Watermain 2: 300 mm (280 m length) Watermain 3: 300 mm (1150 m length)	$0(4)	Watermain 2: 400 mm (280 m length) Watermain 3: 400 mm (1150 m length)	$2,760,000
Thornbury WTP Upgrades(5)	252.2 L/s(6)	$5,120,000	285.2 L/s(7)	$6,160,000
Total Costs		**$7,400,000**		**$11,270,000**

Table Notes:
(1) Costs include contractor overhead and profit, mobilization, bond, and insurance, general allowances (e.g., provisions for temporary services, record drawings, cleaning), and construction contingency.
(2) Town of The Blue Mountains 10th Line BPS future conditions MDD plus fire flow.
(3) Town of The Blue Mountains 10th Line BPS future conditions MDD plus fire flow, plus Parkbridge MDD.
(4) For the purposes of this analysis, no costs for upgrades of the existing 300 mm Watermain 2 and Watermain 3 have been carried. Upgrades have been proposed for sections of the watermain on Peel Street under a separate project, however the design of these upgrades has not been finalized and therefore have not been included in this analysis.
(5) Costs assume the Thornbury WTP will be expanded to meet demand. If another supply option is identified as preferred (e.g., additional supply is purchased from Collingwood), costs for water supply to the development will need to be adjusted.
(6) Thornbury WTP Build-out MDD, assuming the Thornbury WTP is expanded to meet the build-out demand of the Town.
(7) Thornbury WTP Build-out MDD plus Parkbridge MDD.

3.3 Connection Capital Costs Associated with Utilization of the Town's Existing Water Supply System

In addition to the Municipality of Meaford's share of the additional infrastructure works required to supply the development, compensation to the Town would also be required for capacity utilization of the Town's existing and planned infrastructure which does not require upsizing. The Municipality of Meaford's share of costs associated with the Town's existing system will need to be negotiated with the Town as part of the final water supply agreement; however, it is anticipated that these distribution system costs could range between $1,500 to $8,500 per capita based on the Town's current Development Charges Background Study (Hemson Consulting Ltd., 2019).

3.4 Water Supply Rate and Additional Fees

A water supply rate will also need to be negotiated which will be charged by the Town to the Municipality of Meaford for the supply, treatment, and transmission of water to the Parkbridge Meaford development. This water supply rate will incorporate the Municipality of Meaford's share of operating and maintenance costs (e.g., labour, materials, power, asset renewal and replacement, etc.) associated with the treatment and supply of the water. This rate will be charged per cubic meter of water supplied to the Municipality of Meaford and will be subject to annual adjustments.

In addition to the water supply rate, it is anticipated that an administration fee will be charged to the Municipality of Meaford per cubic meter of water supplied by the Town to reflect the administrative costs related to the operation of the treatment and transmission infrastructure. Similar to the water supply rate, this administration fee would need to be negotiated and agreed upon as part of the water supply agreement.

4.0 CONCLUSION AND NEXT STEPS

The costs presented in this memorandum are conceptual in nature and do not constitute an agreement with the Town. As outlined in the previous sections, if the alternative to supply water to the development from the Town is advanced, a formal water supply agreement would need to negotiated and agreed to by the Councils of both the Town of The Blue Mountains and the Municipality of Meaford.

We appreciate the opportunity to engage with Crozier and Parkbridge Meaford to examine the potential opportunity to service the Parkbridge Meaford Development.

J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:



Gillian Pfeiffer, EIT
Environmental Engineering Intern

Reviewed by:



Jane Wilson, P.Eng.
Associate, Senior Environmental Engineer

Appendix A:
Parkbridge Development Hydraulic Analysis (C3 Water Inc.)

TECHNICAL MEMORANDUM

To:	**Jane Wilson, M.Sc., P.Eng.**	Company:	**Town of the Blue Mountains**
From:	**Sam Ziemann, P.Eng.**	Project Ref. #:	**75-41-231753**
	c.519-404-4529		
Copy:		Date:	**June 28, 2023**
Subject:	**Parkbridge Development Hydraulic Analysis**		

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Town of the Blue Mountains

Parkbridge Development Hydraulic Analysis

C3 WATER INC.

June 28, 2023

VERSION	DATE	DESCRIPTION OF REVISIONS	REVISED BY	REVIEWED BY
1	June 28, 2023	Draft TM	Tais Santiago Sabrina Chang	Sam Ziemann

SIGN OFF

This document, entitled "***Technical Memorandum – Parkbridge Development Hydraulic Analysis*"**, was prepared by C3 Water Inc. for the **Town of the Blue Mountains**.

C3W certifies that the information contained in this report is accurate, complete and in accordance to the terms of our engagement. This assessment is based, in part, on information provided by others. Unless specifically noted, C3W has assumed that this information is correct, and has relied on it in the development of conclusions.

The material herein reflects C3 Water's best judgement based upon the information available at the time of preparation. Any use which a third party makes of this report or any reliance on or decisions made based on it, are the responsibilities of such third parties. C3 Water Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based upon this report.

DATE: June 28, 2023

SEAL

Prepared by: **Sabrina Chang, EIT, Water Specialist,**
C. 519-998-8873

SEAL

Reviewed by: **Sam Ziemann, P.Eng., President,**
C. 519-404-4529

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1.0 INTRODUCTION

C3 Water (C3W) has been requested by J.L. Richard's & Associates Limited (JLR) to conduct a watermain hydraulic assessment of the proposed Parkbridge Development and its impact on the existing distribution system. The Parkbridge Development is located in Lora Bay on the west side of the Town of the Blue Mountains (Town) in Pressure Zone (PZ) 2. Figure 1-1 below provides an overview of the development area.



Figure 1-1. Parkbridge Development Area

The purpose of this technical memorandum (TM) is to determine the impact of the new Parkbridge Development on the Town's infrastructure during full buildout conditions. The Town's existing WaterCAD model developed for the East Side Storage Environmental Assessment (EA) has been used for the basis of this analysis.

2.0 MODEL DEMANDS

Water demands for the proposed development were provided by the Town. The conditions for future servicing of the Parkbridge development include supplying average day demand (ADD) and maximum day demands (MDD). Peak hour demand and emergency supply will be supplied from other sources within the development.

Water demands for the Parkbridge Development are provided in Table 2-1. The MDD scenario was modelled to determine the worst-case impact to the Town's infrastructure.

Table 2-1. Parkbridge Development Demand

Parkbridge Development	L/s
ADD	16.6
MDD	33.0
PHF	75.0

3.0 MODEL OVERVIEW

3.1 Model Updates

The Town's existing WaterCAD model recently updated for the Town's East Side Storage EA was used for the model analysis. The base model scenario for full buildout conditions was used to represent the pre-development conditions. The assumption was made that any future infrastructure included in the full buildout scenario would be constructed including the Pressure Reducing Valves (PRVs) located in PZ 2. The west side storage option in Lora Bay was not online for the analysis.

A preliminary design report for the PZ 2 10th Line Booster Pumping Station Upgrades (JLR, May 2023) was referenced to incorporate upgrades to the 10th Line facility into the Town's model. Based on the recommendations of the report, the 10th Line booster pumping station (BPS) was upgraded to a firm capacity of 186.0 L/s, which includes four (4) booster pumps with a design point of 62 L/s at 62 m total dynamic head (TDH). Additionally, a flow control valve was added to the fill line of the 10th Line BPS to control the filling of the new 800 m^3 reservoir recommended in the pre-design report.

The 10th Line BPS controls are based on discharge pressure (kPa) at the 10th Line Hydropneumatic Tank, with pump controls ranging from 440 kPa to 650 kPa as shown in Table 3-1. Parameters in the modelled 10th Line Hydropneumatic Tank were additionally adjusted to match the updated desired 62.0 m TDH of the 10th Line BPS. Table 3-2 summarizes the modifications implemented. The 10th Line BPS is designed to maintain a hydraulic gradeline (HGL) of 265.8 masL in PZ 2.

Table 3-1. 10th Line BPS Controls

Pump	Design Point	Actions
HLP1	62.0 L/s @ 62.0 m	Open if pressure at Hydropneumatic Tank is below 600 kPa
		Close if pressure at Hydropneumatic Tank is above 650 kPa
HLP2		Open if pressure at Hydropneumatic Tank is below 585 kPa
		Close if pressure at Hydropneumatic Tank is above 595 kPa
HLP3		Open if pressure at Hydropneumatic Tank is below 565 kPa
		Close if pressure at Hydropneumatic Tank is above 590 kPa
HLP4		Open if pressure at Hydropneumatic Tank is below 440 kPa
		Close if pressure at Hydropneumatic Tank is above 550 kPa

Table 3-2. Hydropneumatic Tank Parameter

Hydropneumatic Tank	Level (m)	HGL (m)
Minimum	44.0	242.8
Maximum	67.0	265.8
Initial	60.0	258.8

A 48-hour extended period simulation (EPS) was run under MDD conditions for both pre-development and post-development conditions to assess the impact of the Parkbridge Development on Town infrastructure. The results from the 24-48 hour period are used for reporting and analysis. The following locations were selected for model analysis:

- Pressure Zone 1
  - Watermain 1 (400mm),
  - Watermain 2 (300mm),
  - Watermain 3 (300mm), as shown in Figure 3-1.
- Pressure Zone 2
  - 10th Line BPS,
  - Parkbridge Development,
  - Parkbridge 1 WM (10th Line from Peel St S to Beaver St S)
  - Parkbridge 2 WM (Peel St S from 10th Line to Alice St W)
  - A halfway point from the 10th Line BPS to Parkbridge Development
  - The highest elevation point in PZ2, as shown in Figure 3-2.

Table 3-3: Watermain Analysis Summary

Description	Location	Diameter (mm)	Length (m)
Watermain 1	Peel St S (WTF to Timber Ln)	400	210
Watermain 2	Peel St S (Timber Ln to High Bluff Ln)	300	280
Watermain 3	High Bluff Ln (Peel St S to 10th Line)	300	1150
Parkbridge 1	Christie Beach Rd (10th Line to 39th Side Rd)	200	250
Parkbridge 2	39th Side Rd (10th Line toward Schooners Ln)	250	285

The ground elevations of the selected data points are summarized in Table 3-4.

Table 3-4: Data Point Ground Elevations

Description	Elevation (mASL)
10th Line BPS	194.20
Parkbridge Development	220.48
Midway Point	210.00
High Point	228.00

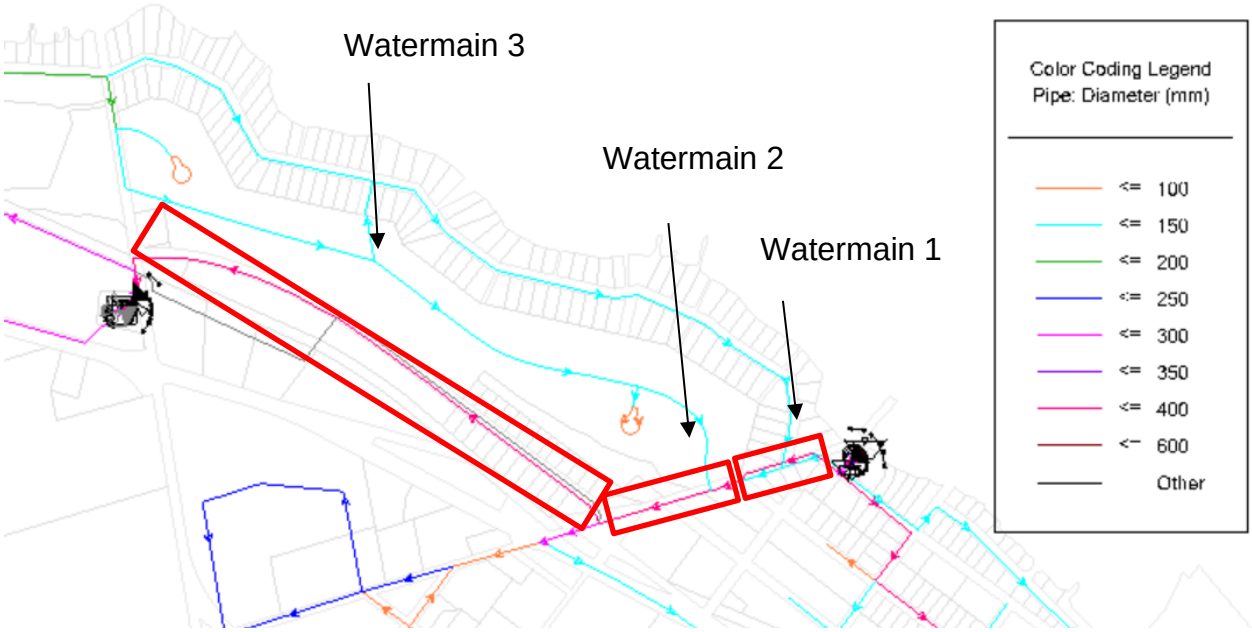


Figure 3-1. Zone 1 Model Results Locations

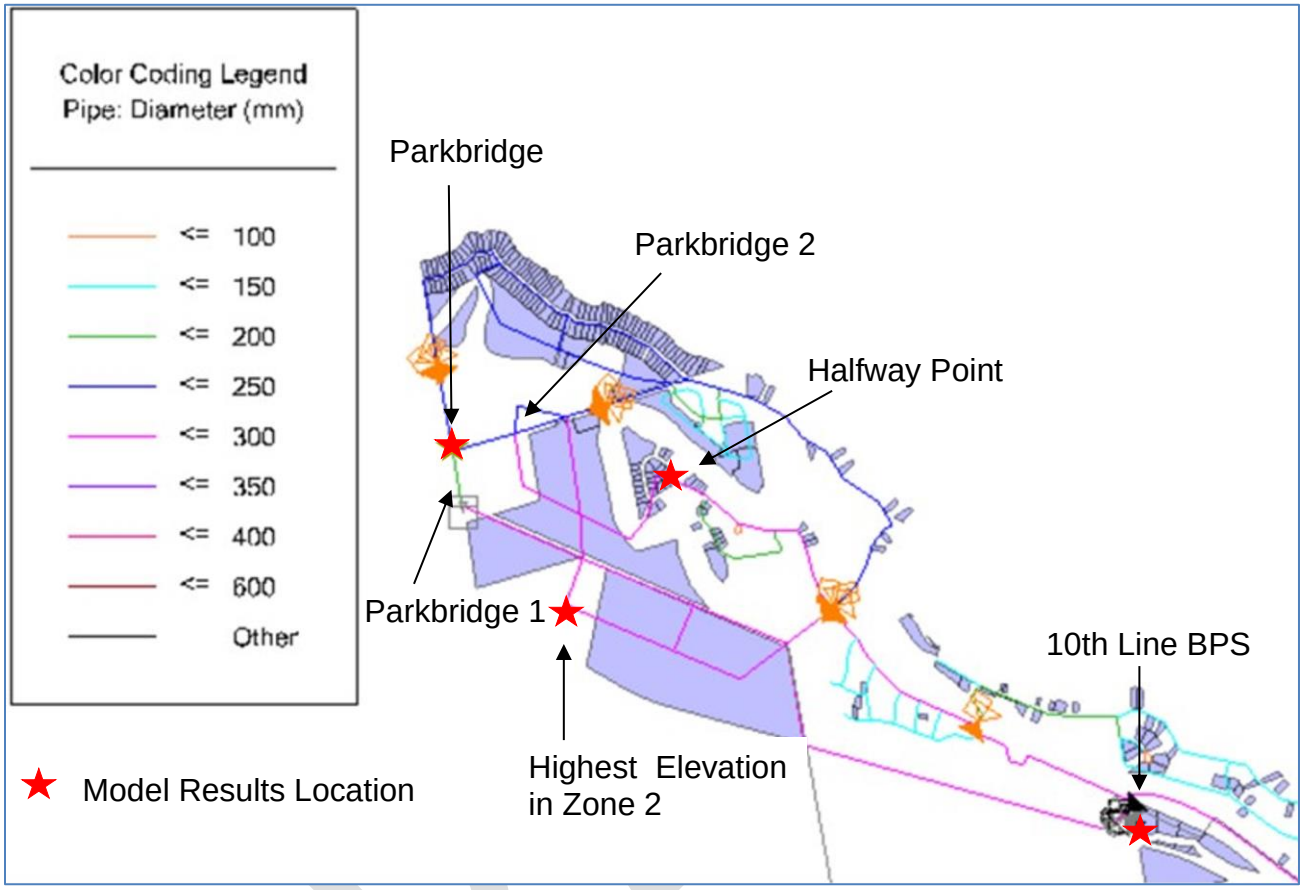


Figure 3-2. Zone 2 Model Results Locations

3.2 Pre-Development (Full Buildout) Results

The Thornbury Water Treatment Facility (WTF) capacity under pre-development full buildout conditions is 252.2 L/s, as determined through the East Side Storage EA. The 10th Line BPS was upgraded to include four (4) pumps as stated in the 10th Line BPS pre-design report. Table 3-4 summarizes all upgrades implemented to the model.

Table 3-5. Zone 1 - Pre-Development Infrastructure

Description	Pre-Development
WTF Capacity	252.2 L/s
10th Line BPS	Firm Capacity: 186.0 L/s Four (4) BPS pumps: 62 L/s @ 62m TDH
10th Line Storage	800 m^3 Reservoir
Transmission WM (WTF to 10th Line)	300mm (Existing)

3.2.1 Zone 1

The transmission main from the Thornbury WTF to the 10th Line BPS comprises of three (3) segments of watermains:

- A 400 mm watermain right at the discharge of the WTF (Watermain 1),
- A 300 mm watermain that carries water from the WTF into Zone 1 and toward the 10th Line BPS (Watermain 2)
- A 300 mm watermain that carries water to the suction of the 10th Line BPS (Watermain 3)

Headloss results for the three (3) watermain segments are presented in Figure 3-3. Headlosses above 2.0 m/km for watermains 2 and 3 are seen under pre-development conditions. Headlosses for watermain 1 are below 1 m/km during the pre-development MDD scenario. The preferred headloss gradient for watermains is less than 2 m/km; however, for short stretches of watermain such as watermain 2 and 3, this is not a significant concern.

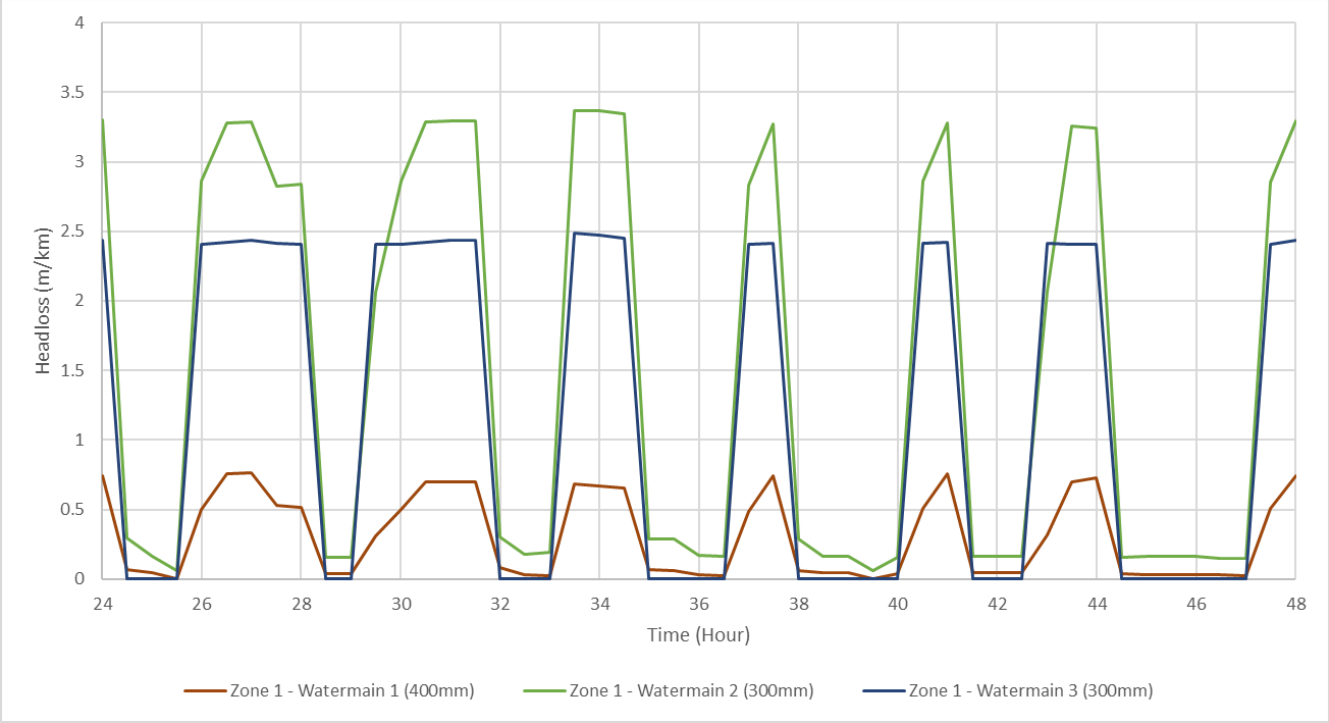


Figure 3-3. Zone 1- Pre-Development Headloss Gradient

3.2.2 Zone 2

Figure 3-4 shows pressure results for various locations throughout Pressure Zone 2. The pressures range from 300 to 700 kPa during the MDD scenario. These pressures vary due to the difference in ground elevations, as summarized in Table 3-4. As expected, the highest elevation point in the pressure zone has the lowest system pressure of 300 to 350 kPa as shown in Figure 3-4. Overall, the trends in the system pressures are consistent throughout the pressure zone and pressures fall within the Town's design criteria of 280-700 kPa.

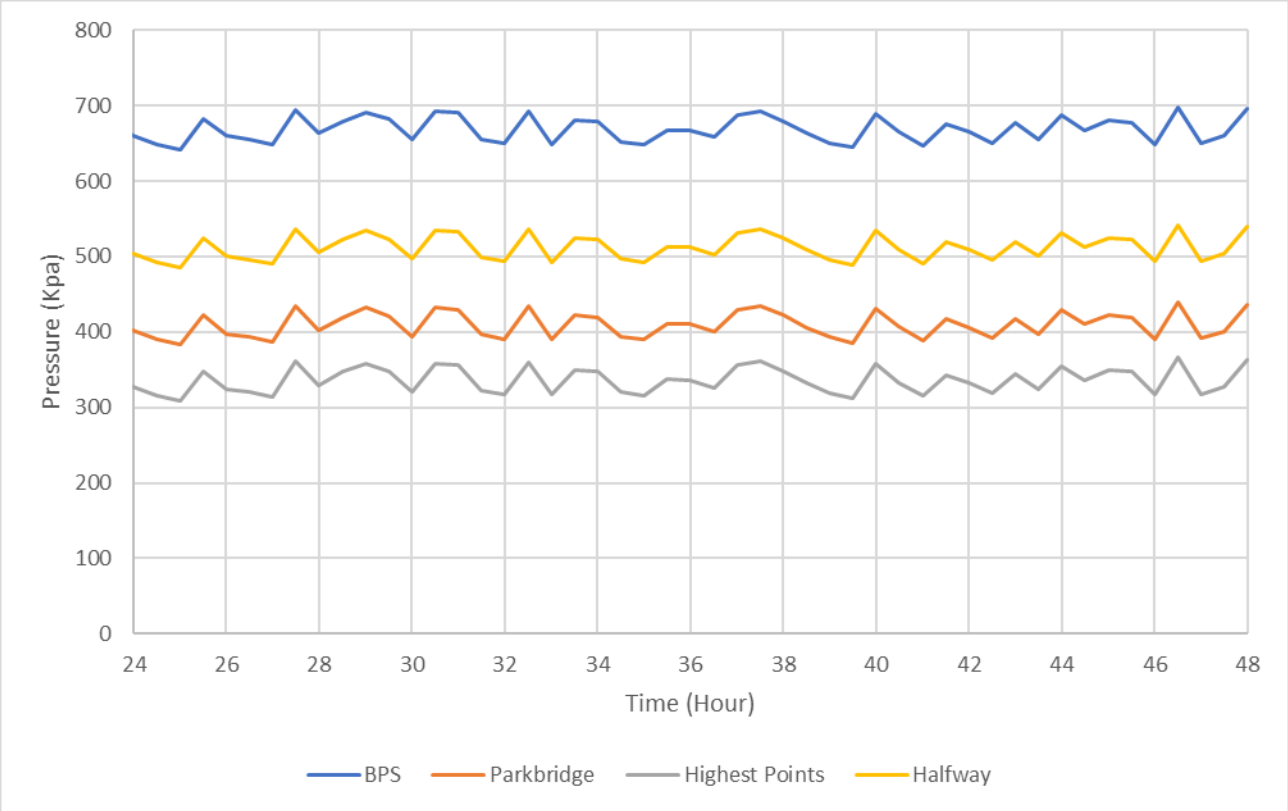


Figure 3-4. Zone 2 - Existing Pre-Development Pressures

Figure 3-5 and Figure 3-6 illustrate the watermain headloss gradient for the model outputs and across PZ2. The headloss gradient is below 1.0 m/km during pre-development MDD conditions.

DRAFT

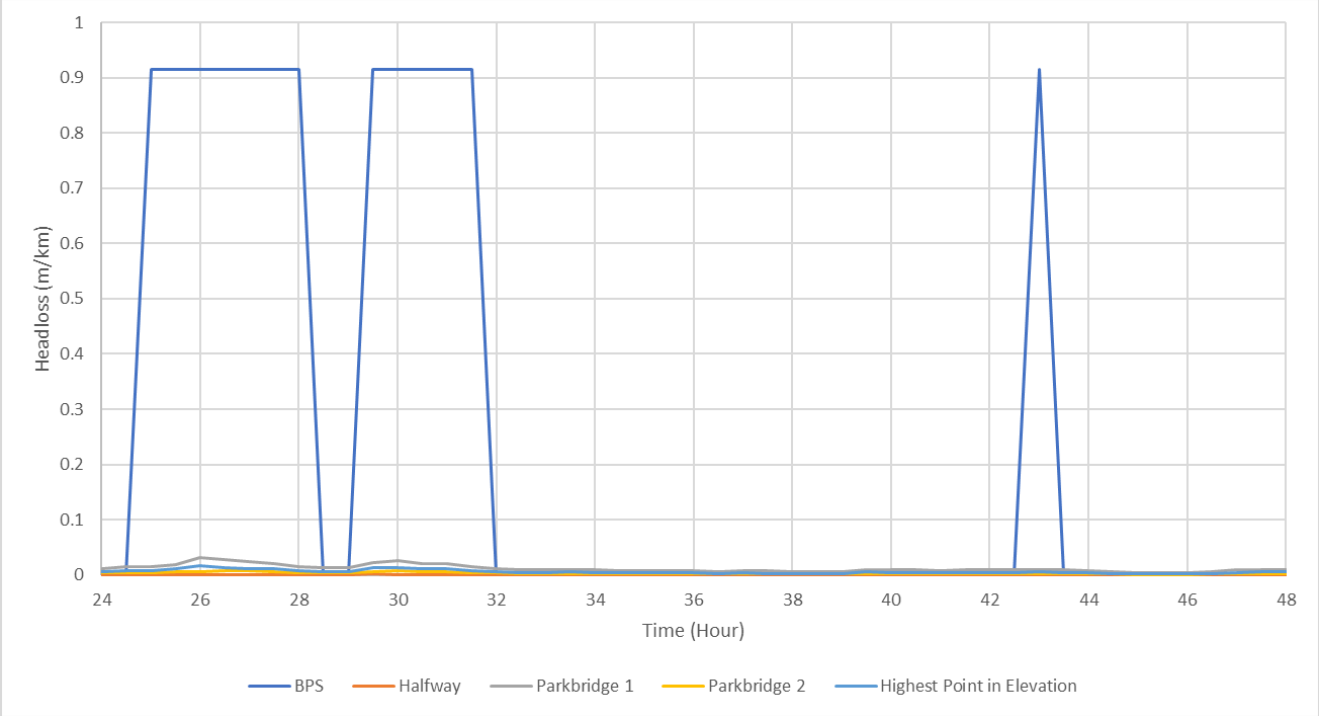


Figure 3-5. Zone 2 - Pre-Development Headloss Gradient

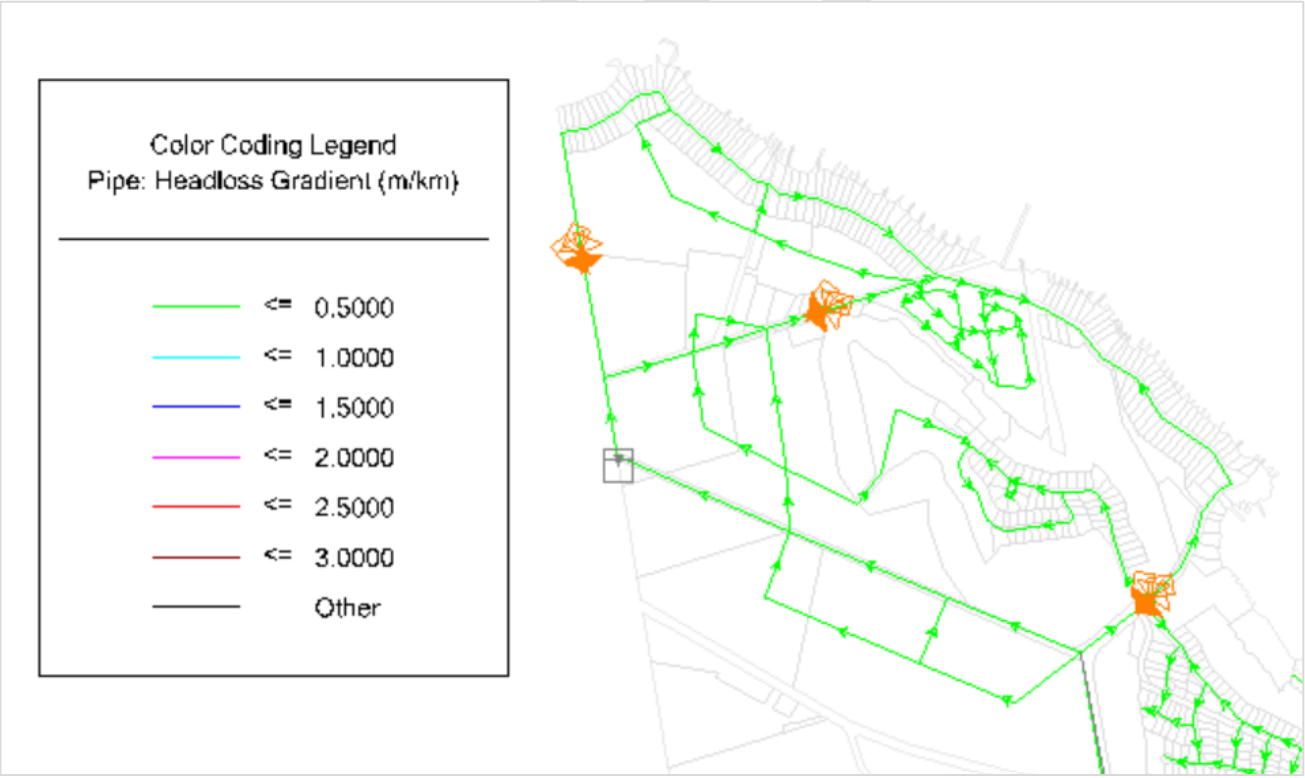


Figure 3-6. Zone 2 - Existing Pre-Development Headloss Gradient

3.3 Post-Development

An increase in WTF capacity to 285.2 L/s was implemented to accommodate the 33.0 L/s demand assigned to the Parkbridge Development. The firm capacity of the 10th Line BPS is 186.0 L/s under pre-development conditions; therefore, an increase of 33.0 L/s is needed to supply MDD to future development. Post-Development results were analyzed to review if the development impacts the system with no infrastructure upgrades (other than supply).

Table 3-6. Zone 1 - Post-Development Infrastructure

Description	Post-Development Value
WTF Capacity	285.2 L/s
10th Line BPS Firm Capacity	219.0 L/s

3.3.1 Zone 1

The addition of the 33 L/s demand assigned to the Parkbridge development resulted in an increase in the headloss gradient seen across Zone 1 as shown in Figure 3-7. Headloss gradients reached 5.9 m/km, 6.4 m/ km and 1.4 m/km for watermains 3, 2, and 1, respectively.

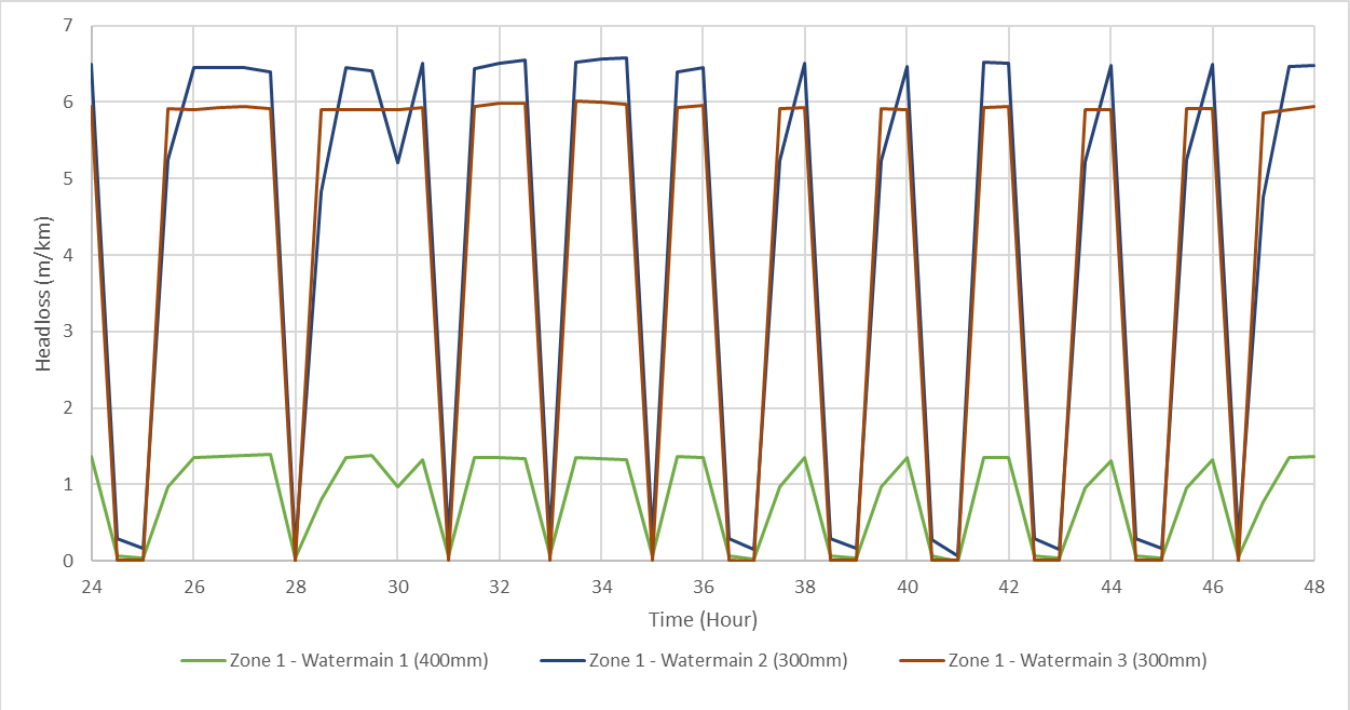


Figure 3-7. Zone 1 - Post-Development Headloss Gradient

In order to improve the headloss gradients for watermains 2 and 3, an upgrade to the infrastructure is recommended. Upsizing both watermain 2 and 3 from a 300 mm to a 400 mm diameter pipe was applied for this analysis and reduced the headloss in the watermains to below

2m/km as shown in Figure 3-8. Note that the upgrades to these watermain sections could also include twinning of the watermain and is at the discretion of the developer to determine.

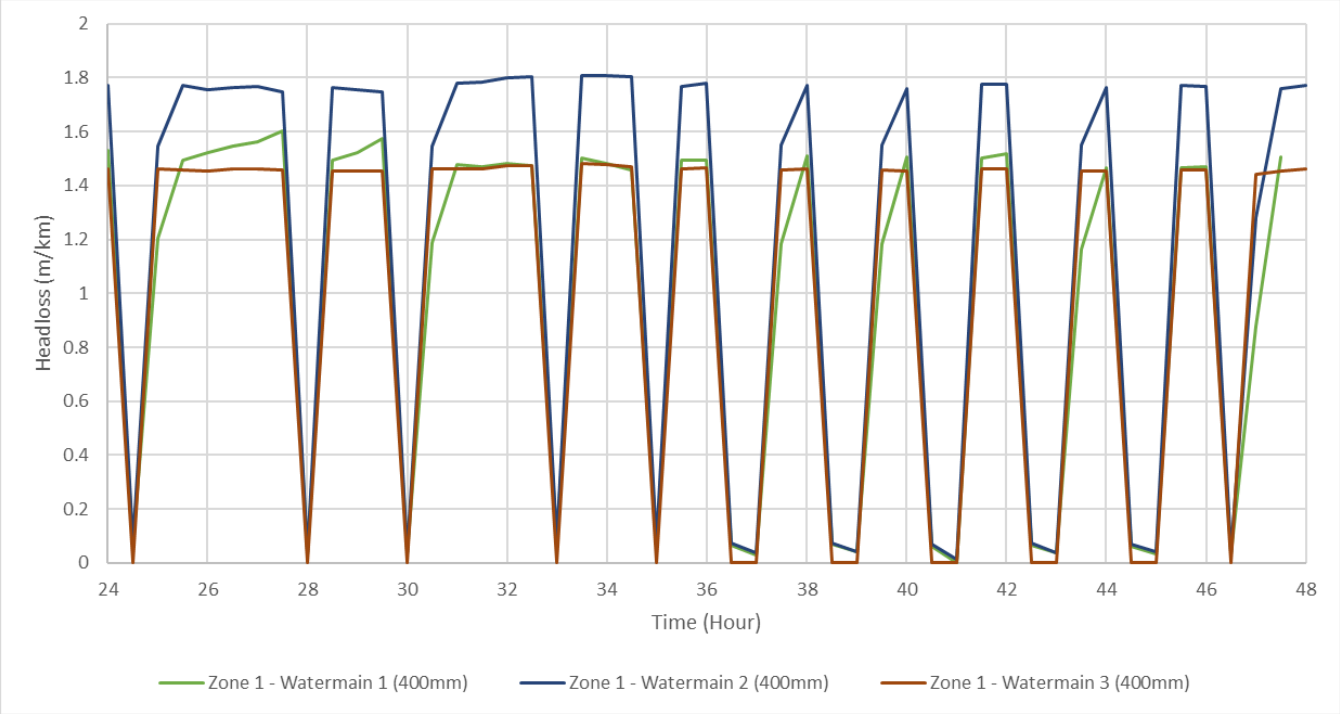


Figure 3-8. Zone 1 - Post-Development Headloss Gradient with Upgraded Watermains

3.3.2 Zone 2

Similar to pre-development conditions, pressure results ranged from 292 kPa to 699 kPa for post-development conditions as shown in Figure 3-9. An increase in headloss gradients across watermains for the 10th Line BPS and watermains directly supplying the Parkbridge property were observed, as shown in Figure 3-10. High headlosses within BPS suction and discharge headers are typical and headlosses below 3m/km are not of concern and do not warrant an upgrade. Although there is an increase in headlosses seen for watermains directly supplying the Parkbridge development, these values are still within a reasonable range below 1.5 m/km; therefore, no upgrades to these watermains are required.

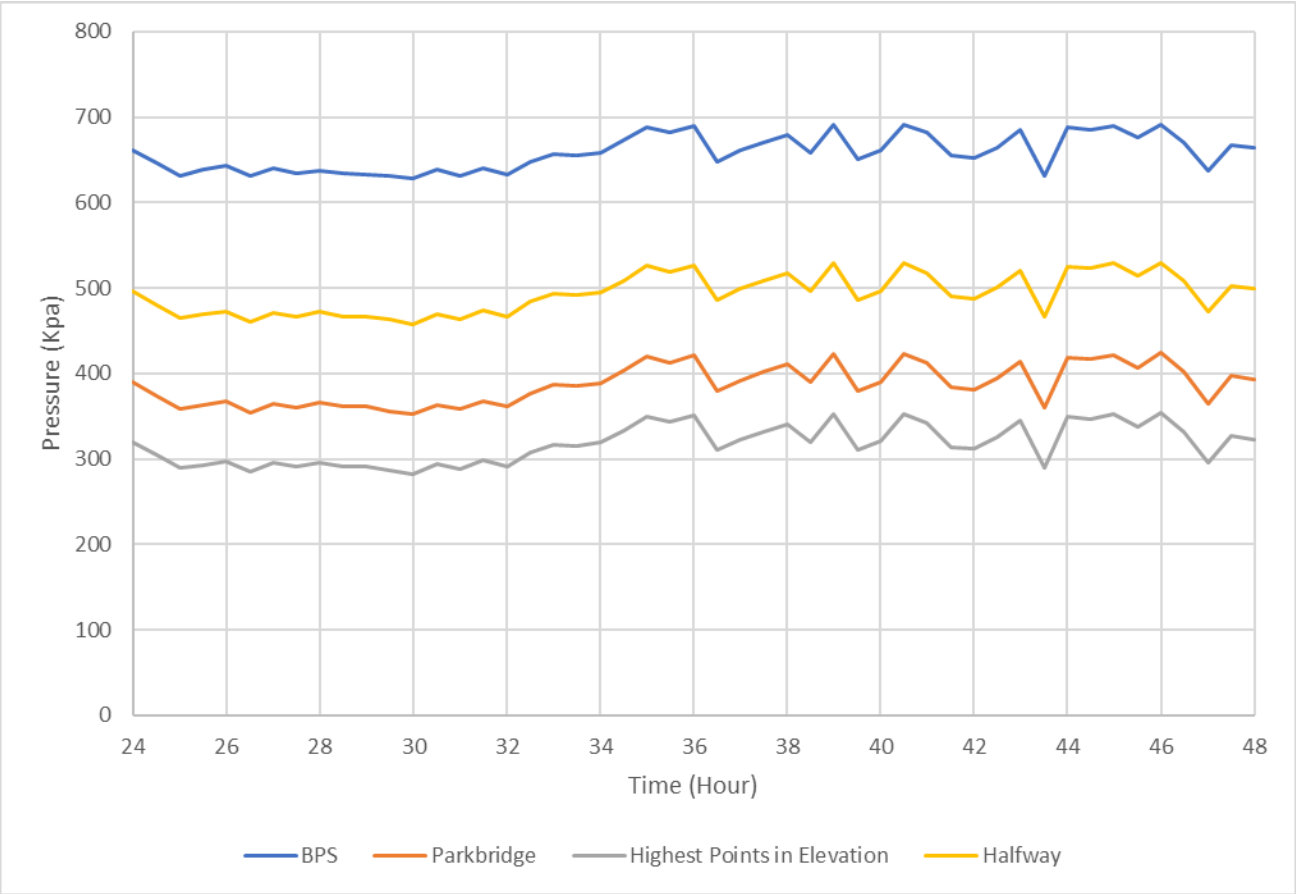


Figure 3-9. Zone 2 - Post-Development Pressure (Existing Infrastructure)

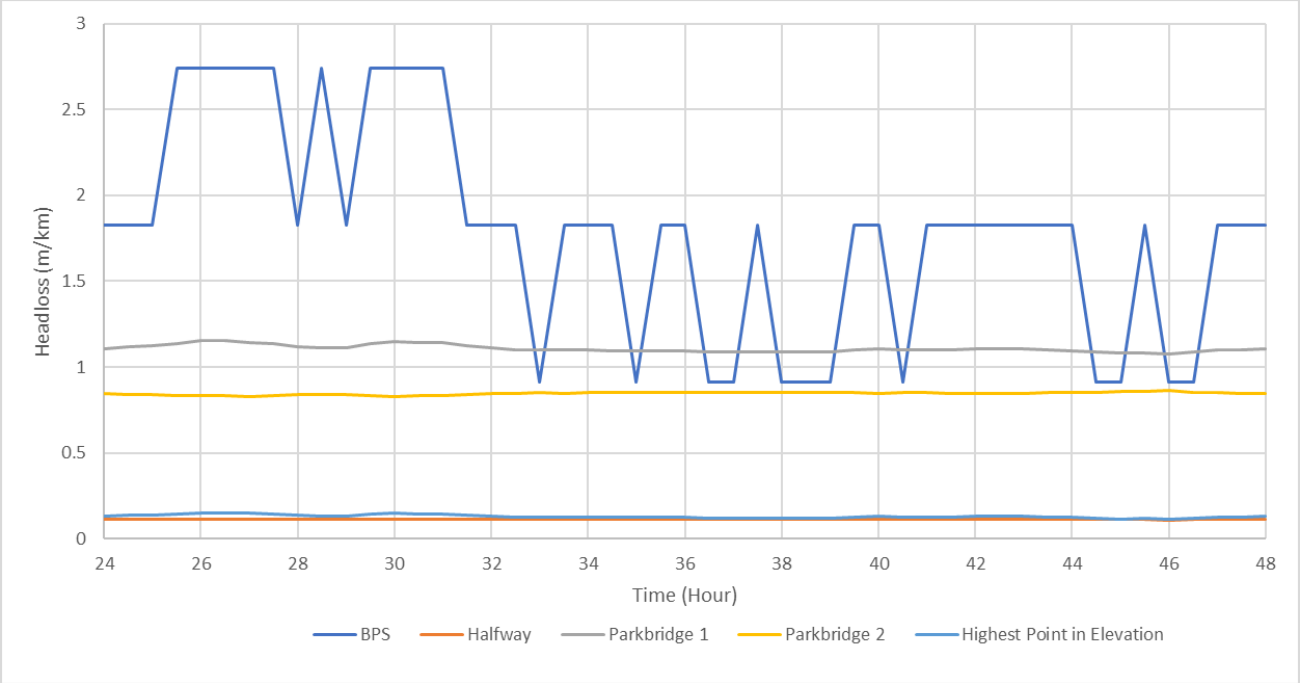


Figure 3-10. Zone 2 - Post-Development Headloss

4.0 RECOMMENDED UPGRADES

The addition of the Parkbridge Development will result in an increase in headloss across watermains throughout PZ1 and PZ2, with upgrades required for 1.4 km of the transmission main from the Thornbury WTF to 10th Line BPS. The supply capacity of the Thornbury WTF and the firm capacity of the 10th Line BPS need to be upgraded to accommodate the demands assigned to the development.

A summary of watermain upgrades is listed in Table 4-1 below. An upgrade to watermains 2 and 3 are required. Modelling and costing were completed to upgrade the watermains by upsizing to a 400mm watermain, however, the developer could also upgrade the watermains by twinning these sections.

Table 4-1. Watermain Upgrade Summary

Description	Location	Diameter (mm)	Length (m)	Upgrade Required (Y/N)
Watermain 1	Peel St S (WTF to Timber Ln)	400	210	N
Watermain 2	Peel St S (Timber Ln to High Bluff Ln)	300	280	Y
Watermain 3	High Bluff Ln (Peel St S to 10th Line)	300	1150	Y
Parkbridge 1	Christie Beach Rd (10th Line to 39th Side Rd)	200	250	N
Parkbridge 2	39th Side Rd (10th Line toward Schooners Ln)	250	285	N

Post-development conditions include an increase in WTF capacity to 285.2 L/s and in the 10th Line BPS firm capacity to 219.0 L/s to accommodate the 33.0 L/s demand assigned to the Parkbridge development. A summary of facility upgrades is provided in Table 4-2 below.

Table 4-2. Facility Upgrades Summary

Description	Existing Firm Capacity	Required Firm Capacity	Upgrade Required (Y/N)
Thornbury WTF	252.2	285.2	Y
10th Line BPS	186.0	219.0	Y

Costs related to infrastructure upgrades can be found in the JLR Technical Memorandum.

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

MEMO

Appendix B:
Detailed OPCC Tables

10th Line Booster Pumping Station Upgrades - Conceptual OPCC - Pre-Development

Description	Class 'D' Opinion of Probable Cost - 30% Preliminary Design
Process/Mechanical	$670,000
Architectural	$50,000
Structural	$60,000
Electrical	$710,000
Sub-total – Basic Facility Cost (A)	**$1,490,000**
General's Contractor Overhead (10% of "A")	$149,000
General's Contractor Profit (5% of "A")	$74,500
Mobilization, Bond and Insurance (2% of "A")	$29,800
Provisions for Temporary Services (Pumping, Power, etc) (10% of "A")	$149,000
Allowances (Record Drawings, Cleaning, etc.) (0.5% of "A")	$7,450
Total Estimated Construction Costs (B) – LEVEL D ESTIMATE	**$1,899,750**
Construction Contingency (Change Orders) (20% of "B")	$379,950
Total Estimated Construction Capital Costs (LEVEL D) – Excluding Engineering and HST (Rounded)	**$2,280,000**

10th Line Booster Pumping Station Upgrades - Conceptual OPCC - Post-Development

Description	Class 'D' Opinion of Probable Cost - 30% Preliminary Design
Process/Mechanical	$710,000
Architectural	$50,000
Structural	$60,000
Electrical	$710,000
Sub-total – Basic Facility Cost (A)	**$1,530,000**
General's Contractor Overhead (10% of "A")	$153,000
General's Contractor Profit (5% of "A")	$76,500
Mobilization, Bond and Insurance (2% of "A")	$30,600
Provisions for Temporary Services (Pumping, Power, etc) (10% of "A")	$153,000
Allowances (Record Drawings, Cleaning, etc.) (0.5% of "A")	$7,650
Total Estimated Construction Costs (B) – LEVEL D ESTIMATE	**$1,950,750**
Construction Contingency (Change Orders) (20% of "B")	$390,150
Total Estimated Construction Capital Costs (LEVEL D) – Excluding Engineering and HST (Rounded)	**$2,350,000**

Transmission Watermain Upgrades - Conceptual OPCC - Pre-Development

Description	Class 'D' Opinion of Probable Cost - 30% Preliminary Design
Watermain 2 Upgrades	$0
Watermain 3 Upgrades	$0
Sub-total – Basic Facility Cost (A)	**$0**
General's Contractor Overhead (10% of "A")	$0
General's Contractor Profit (5% of "A")	$0
Mobilization, Bond and Insurance (2% of "A")	$0
Provisions for Temporary Services (Pumping, Power, etc) (10% of "A")	$0
Allowances (Record Drawings, Cleaning, etc.) (0.5% of "A")	$0
Total Estimated Construction Costs (B) – LEVEL D ESTIMATE	**$0**
Construction Contingency (Change Orders) (20% of "B")	$0
Total Estimated Construction Capital Costs (LEVEL D) – Excluding Engineering and HST (Rounded)	**$0**

Transmission Watermain Upgrades - Conceptual OPCC - Post-Development

Description	Class 'D' Opinion of Probable Cost - 30% Preliminary Design
Watermain 2 Upgrades	$360,000
Watermain 3 Upgrades	$1,440,000
Sub-total – Basic Facility Cost (A)	**$1,800,000**
General's Contractor Overhead (10% of "A")	$180,000
General's Contractor Profit (5% of "A")	$90,000
Mobilization, Bond and Insurance (2% of "A")	$36,000
Provisions for Temporary Services (Pumping, Power, etc) (10% of "A")	$180,000
Allowances (Record Drawings, Cleaning, etc.) (0.5% of "A")	$9,000
Total Estimated Construction Costs (B) – LEVEL D ESTIMATE	**$2,295,000**
Construction Contingency (Change Orders) (20% of "B")	$459,000
Total Estimated Construction Capital Costs (LEVEL D) – Excluding Engineering and HST (Rounded)	**$2,760,000**

Thornbury WTP Upgrades - Conceptual OPCC - Pre-Development

Description	Class 'D' Opinion of Probable Cost - 30% Preliminary Design
Increase Thornbury WTP Capacity (252.2 L/s)	$5,120,000
Total Estimated Construction Capital Costs (LEVEL D) – Excluding Engineering and HST	**$5,120,000**

*Based on DC Charge of $325/capita for Water Supply and Treatment

Thornbury WTP Upgrades - Conceptual OPCC - Post Development

Description	Class 'D' Opinion of Probable Cost - 30% Preliminary Design
Increase Thornbury WTP Capacity to 252.2 L/s PLUS additional 33 L/s (285.2 L/s total)	$6,160,000
Total Estimated Construction Capital Costs (LEVEL D) – Excluding Engineering and HST	**$6,160,000**

*Based on DC Charge of $325/capita for Water Supply and Treatment

J.L.Richards

MEMO

Date: August 15, 2023

To: Shawn Carey, Director of Operations, Town of The Blue Mountains

From: Jane Wilson, Senior Environmental Engineer, J.L. Richards & Associates Limited

CC: Allison Kershaw, Manager of Water and Wastewater Services, Town of The Blue Mountains

Subject: Parkbridge Meaford Development, Water and Wastewater Analysis
Wastewater Modelling Analysis

JLR No.: 27550-023

1.0 BACKGROUND

A Master Servicing Study is currently being undertaken for a proposed development (Parkbridge Meaford development) in the Municipality of Meaford, adjacent to the Town of The Blue Mountains (the Town). Crozier Consulting Engineers (Crozier), on behalf of Parkbridge Meaford, has requested the Town investigate the potential opportunity to service the development. The Town has retained J.L. Richards & Associates Limited (JLR) to conduct a water and wastewater modelling assessment to identify the infrastructure impacts in the Town related to the proposed development.

The proposed Parkbridge Meaford development is located west of the Town, adjacent to the Lora Bay community. The development is anticipated to have an average daily flow of 17 L/s and a peak daily sanitary flow of 77 L/s. It has also been assumed that if serviced, the development could be connected to the Town's sanitary system at the intersection of 39th Sideroad and Sunset Boulevard.

This memo has been prepared to summarize the results of the wastewater modelling analysis and identify the infrastructure upgrades that will be required to the Town's wastewater collection and treatment system. A conceptual level Opinion of Probable Construction Cost (OPCC) for the identified upgrades is also provided.

2.0 SUMMARY OF WASTEWATER MODELLING ANALYSIS

A modelling assessment was conducted by Civica Infrastructure Inc. (Civica) to determine the impacts of the Parkbridge Meaford development on the Town's wastewater infrastructure. The results of this analysis are detailed in the *Parkbridge Meaford Wastewater Analysis* (Civica, 2023) technical memorandum which is appended to this document (Appendix A).

The modelling analysis was conducted between the Parkbridge connection point, and the intersection of Peel Street S and Arthur Street W. Additional infrastructure upgrades beyond the modelled area may be required, which will be confirmed through the ongoing Wastewater Master Plan currently being undertaken by the Town. Additionally, the proposed infrastructure upgrades determined as part of this modelling analysis are preliminary in nature and may change based on the results of the ongoing Master Plan.

A summary of recommended sanitary collection upgrades based on the wastewater analysis is summarized in Table 1. The locations of the proposed upgrades are shown in Figure 5 of Appendix A.

Table 1. Wastewater Collection System Upgrade Summary (based on information provided in Civica, 2023)

Description	Location	Existing Diameter (mm)	New Diameter (mm)	Length (m)
Sewermain 1	East Ridge Drive (WWSTR30 to WWSTR60)	375	450	730
Sewermain 2	Georgian Trail (WWSTR70 to WWSTR74)	375	450	185

In addition to the wastewater collection system upgrades, the capacity of the Thornbury Wastewater Treatment Plant (WWTP) will also need to be expanded to accommodate the additional sewage from the Parkbridge Meaford Development. For the purposes of this assessment, it has been assumed that the Thornbury WWTP must be expanded to accommodate an additional residential population of 3,190 persons based on information provided by Croziers on February 16, 2023.

3.0 OPINION OF PROBABLE CONSTRUCTION COSTS

3.1 Wastewater Servicing Agreement

A formal agreement between the Town and the Municipality of Meaford would be required for the wastewater servicing of the Parkbridge Meaford development by the Town. As part of the agreement, terms, conditions and provisions for the supply and purchase of wastewater services would need to be established and agreed to by Councils of both municipalities.

Components of the wastewater servicing agreement are anticipated to include, and not be limited to:

- Term of the agreement and renewal periods
- Minimum and peak daily flows
- Flow measurement requirements
- Financial arrangements
    - Connection capital cost (additional required works and utilization of existing and planned infrastructure)
    - Servicing and treatment rate
    - Administration fee
    - Annual adjustments

The following sections provide additional information regarding the financial components of the agreement. This memorandum is not intended to be exhaustive, and all costs and cost sharing basis are subject to further review and approval by Council through a wastewater servicing agreement.

3.2 Connection Capital Costs Associated with Identified Infrastructure Upgrades

A conceptual level OPCC was developed for each of the identified upgrades detailed in Section 2 and Appendix A. Two cost estimates were developed: the “Pre-Parkbridge Development” OPCC identifies costs of wastewater infrastructure upgrades under the build-out wastewater demand assuming Parkbridge Meaford is not connected to the Town’s wastewater system, and the “Post-Parkbridge Development” OPCC identifies costs of wastewater infrastructure upgrades under the build-out wastewater demand assuming Parkbridge Meaford is connected to the Town’s wastewater system.

The costing completed as part of this analysis is conceptual in nature – all design parameters (i.e., pipe size), should be confirmed during detailed design. Costing for the identified forcemain and sewermain upgrades was based on the required length and diameter of pipe required, both pre- and post- development. Costing for forcemain and sewermain upgrades were developed based on past experience on similar projects, professional judgement, and equipment costs provided by suppliers.

Costing for increasing the capacity of the Thornbury WWTP was based on a $3,181 per capita unit cost based on the Thornbury Sewage Treatment Plant development charge presented in the Town’s current Development Charges Background Study (Hemson Consulting Ltd., 2019). Total costs for WWTP upgrades assume a residential population of 3,190 persons.

A summary of the conceptual OPCC for the required wastewater infrastructure upgrades in the Town due to the Parkbridge-Meaford development is provided in Table 2. Detailed OPCC tables are provided in Appendix B. Cost allocation between the Town and Municipality of Meaford will require further review. This allocation will need to account for infrastructure listed below and for existing and planned infrastructure which does not require upsizing (refer to section 3.3).

Table 2. Conceptual OPCC for Required Wastewater Infrastructure Upgrades in the Town to Service Parkbridge Meaford

Infrastructure	Pre- Parkbridge Development		Post- Parkbridge Development	
	Size	Cost(1)	Size	Cost(1)
Sewermain Upgrades	Sewermain 1: 375 mm (729 m length) Sewermain 2: 375 mm (185 m length)	$0(2)	Sewermain 1: 450 mm (730 m length) Sewermain 2: 450 mm (185 m length)	$3,390,000(3)
Thornbury WWTP Upgrades	N/A	N/A(2)	Increase WWTP Capacity by 3,190 persons	$10,150,000 (5)
Total Costs		**$0**		**$13,540,000**

Table Notes:
(1) Costs include contractor overhead and profit, mobilization, bond, and insurance, general allowances (e.g., provisions for temporary services, record drawings, cleaning), and construction contingency.
(2) Under the pre-Parkbridge scenario, no upgrades are anticipated for the existing 375 mm Sewermain 1 and Sewermain 2.
(3) Costs of sewermain upgrades include restoration and maintenance hole adjustments.
(4) The required capacity increase and associated costing under the pre-Parkbridge scenario (i.e., build-out) will be determined as part of the ongoing Wastewater Master Plan for the Town of The Blue Mountains.
(5) Based on a $3,181 per capita unit cost based on the Thornbury Sewage Treatment Plant development charge presented in the Town's current Development Charges

3.3 Connection Capital Costs Associated with Utilization of the Town's Existing Wastewater Collection System

In addition to the Municipality of Meaford's share of the additional infrastructure works required to service the development, compensation to the Town would also be required for capacity utilization of the Town's existing and planned infrastructure which does not require upsizing. The Municipality of Meaford's share of costs associated with the Town's existing system will need to be negotiated with the Town as part of the final wastewater servicing; however, it is anticipated that these collection system costs could range between $1,800 to $10,800 per capita based on the Town's current Development Charges Background Study (Hemson Consulting Ltd., 2019).

3.4 Wastewater Collection and Treatment Rate and Additional Fees

A wastewater collection and treatment rate will also need to be negotiated which will be charged by the Town to the Municipality of Meaford for the collection and treatment of sewage from the Parkbridge Meaford development. This rate will incorporate the Municipality of Meaford's share of operating and maintenance costs (e.g., labour, materials, power, asset renewal and replacement, etc.) associated with the collection and treatment of the sewage. This rate would be charged per cubic meter of sewage collected from the Municipality of Meaford and will be subject to annual adjustments.

In addition to the wastewater collection and treatment rate, it is anticipated that an administration fee will be charged to the Municipality of Meaford per cubic meter of sewage collected from the Municipality of Meaford to reflect the administrative costs related to the operation of the treatment and collection infrastructure. Similar to the wastewater collection and treatment rate, this administration fee would need to be negotiated and agreed upon as part of the wastewater servicing agreement and may be subject to annual adjustments.

4.0 CONCLUSION AND NEXT STEPS

The costs presented in this memorandum are conceptual in nature and do not constitute an agreement with the Town. As outlined in the previous sections, if the alternative to supply wastewater servicing to the development from the Town is advanced, a formal wastewater servicing agreement would need to negotiated and agreed to by the Councils of both the Town of The Blue Mountains and the Municipality of Meaford.

We appreciate the opportunity to engage with Crozier and Parkbridge Meaford to examine the potential opportunity to service the Parkbridge Meaford Development.

J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:



Gillian Pfeiffer, EIT
Environmental Engineering Intern

Reviewed by:



Jane Wilson, P.Eng.
Associate, Senior Environmental Engineer

Appendix A:
Parkbridge Meaford Wastewater Analysis (Civica Infrastructure Inc.)

MEMORANDUM

CIVICA
Water Management Solutions

DATE: AUGUST 11, 2023 **PROJECT NO.:** TBM22-0006

TO: JANE WILSON, P.ENG. **FROM:** ALAN VILLALOBOS

CC: GILLIAN PFEIFFER, MATTHEW MALONE

SUBJECT: PARKBRIDGE MEAFORD WASTEWATER ANALYSIS

Civica Infrastructure Inc. (Civica) was retained by J.L. Richards & Associates Limited to assess the wastewater infrastructure impacts in the Town of Blue Mountains related to the proposed Parkbridge Meaford development.

The following sections summarize the technical analysis of the existing sanitary sewer system downstream of the proposed site.

1. Introduction

This report summarizes the sanitary servicing analysis for the proposed 143ha Parkbridge Meaford development. The development of this capacity analysis involved the collection and analysis of background data, including review of the future growth areas, rain and flow monitoring and the calibration of the sanitary model in PCSWMM.

The proposed development site will consist of 1,300 units and 2 ha of commercial area. The proposed sanitary flows will connect into the Town's sanitary system at the intersection of 39th Sideroad and Sunset Blvd. The sanitary capacity analysis was evaluated from the proposed connection point on Sunset Blvd to the intersection of Peel St S and Arthur St W. **Figure 1** illustrates the tributary drainage area and **Figure 2** shows the flow conveyance path.

2. Capacity Analysis Approach

The existing model was calibrated for both dry- and wet-weather flow using rain and flow data obtained from the on-going flow monitoring program. The flow data was collected and analyzed for model calibration from July 2022 to June 2023 at manhole (MH) WWST61 at the intersection of Rankin's Cres and John Watt Wy; and at MH WWST96 at the intersection of Peel St S and Arthur St W.

Once the model was calibrated, two scenarios were developed, and the system's capacity was evaluated:

- Pre-Development Scenario – Accounts for the ultimate buildout population and exclude flows from the Parkbridge Meaford development.
- Post-Development Scenario – Same as pre-development but includes 77 L/s from the proposed Parkbridge Meaford development**.** The peak flow from the proposed development was added to the upstream sewers on Sunset Blvd.

For the future population, the Town's per-capita design rate of 350 L/c/d and the infiltration allowance of 0.28 L/s/ha was applied.

For both scenarios, the system was analyzed under dry weather flow and during the Town's 25-year design storm.

3. Existing Sanitary System Performance

Under the Pre-Development scenario, the sanitary sewer performance under the Town's 25-year design storm is depicted in **Figure 3.** As shown, the sanitary sewer system is predicted to have no surcharge.

For Post-Development conditions and under the 25-year design storm, downstream of the Sunset Sanitary Pumping Station (SPS) along East Ridge Dr and Georgian Trail are experiencing surcharging conditions, as shown in **Figure 4.** However, the sanitary system upstream of the Sunset SPS operates under free-flow conditions. The HGL profiles can be found attached at the end of the document.

4. Proposed Sanitary Sewer Improvements

Sewer upgrades were evaluated to minimize the risk of sewer surcharge triggered by the ultimate buildout population and the Parkbridge Meaford development. A total of 915 m of sanitary sewers are proposed to be upgraded from 375mm to 450mm. The preferred remedial measures for the study area can be seen in **Figure 5** and are also listed in **Table 1.**

For the purposes of this report, all recommended pipe replacements refer to replacing an existing pipe with a larger sized pipe (i.e. upsizing/upgrading). Furthermore, it has been assumed that all proposed solution will be located within the Town's right-of-way.

Figure 6 shows the system performance for post-development conditions and with the implementation of the proposed sewer upgrades.

5. Conclusion

Based on the analysis and assumptions presented in the report, the findings can be summarized as follows.

1. The existing PCSWMM model was calibrated using flow data from the on-going Water & Wastewater Master Plan.
2. The calibrated model was updated to create a pre-development scenario which includes the future growth in the Town but excludes the Parkbridge Meaford development.
3. A post-development scenario was created from the pre-development scenario and adds 77 L/s from the proposed Parkbridge Meaford development.
4. The downstream sanitary sewer system operates under free-flow conditions during dry- and wet-weather conditions.
5. To accommodate the future population and the proposed development, it is recommended to upsize approximately 1 km of sanitary gravity sewers.
6. The proposed solution may change based on updates and results of the on-going Master Plan.



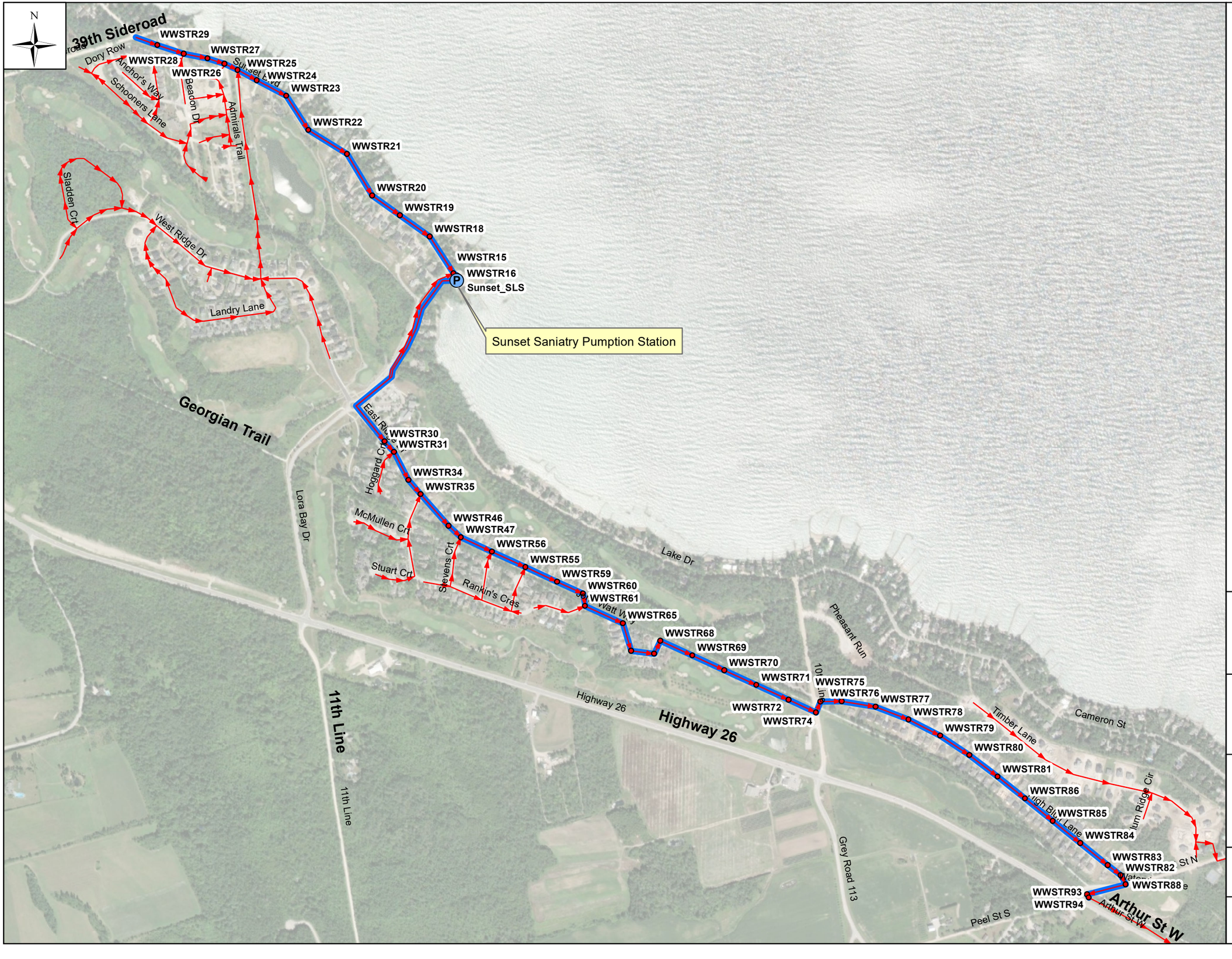
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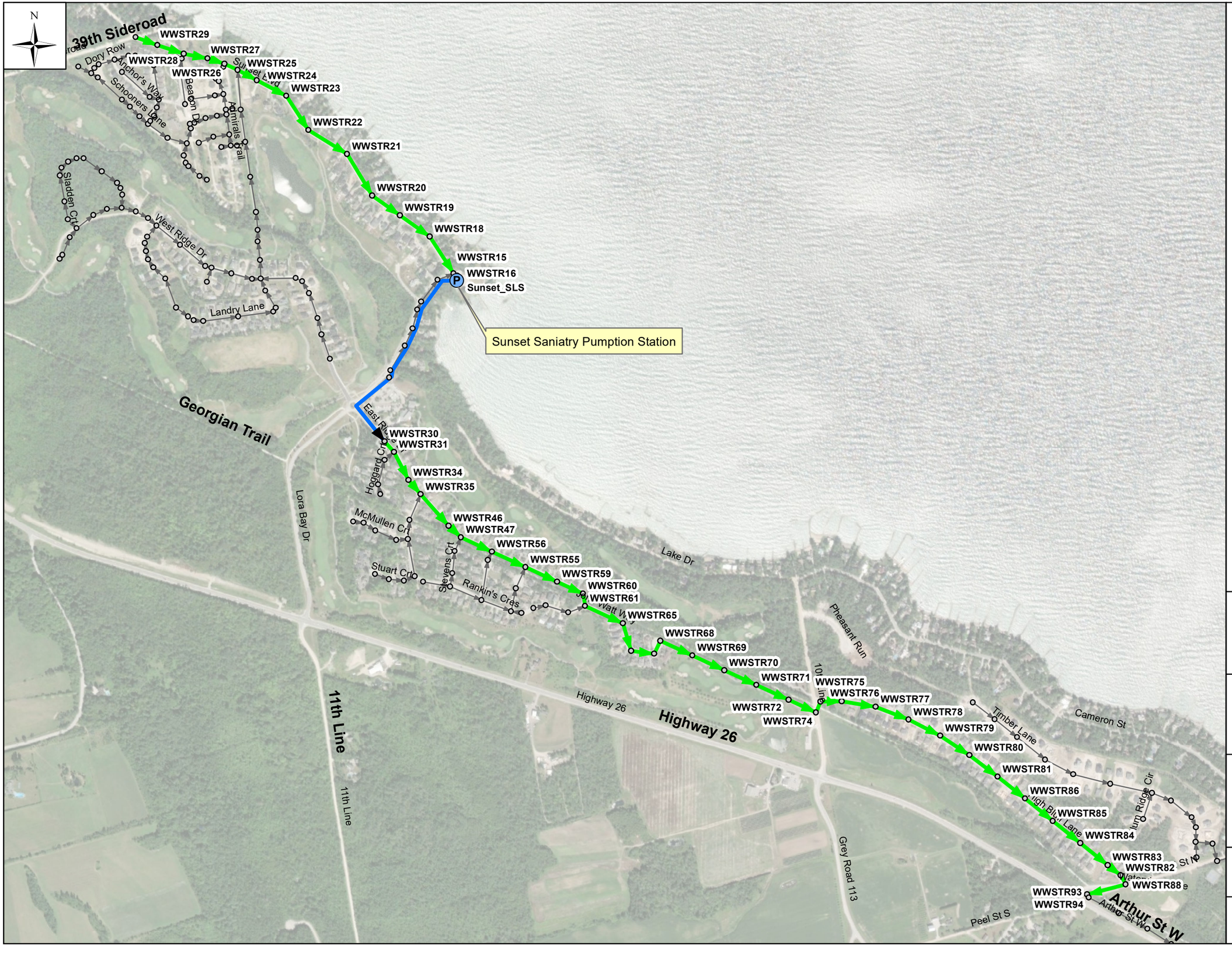
Town of Blue Mountains

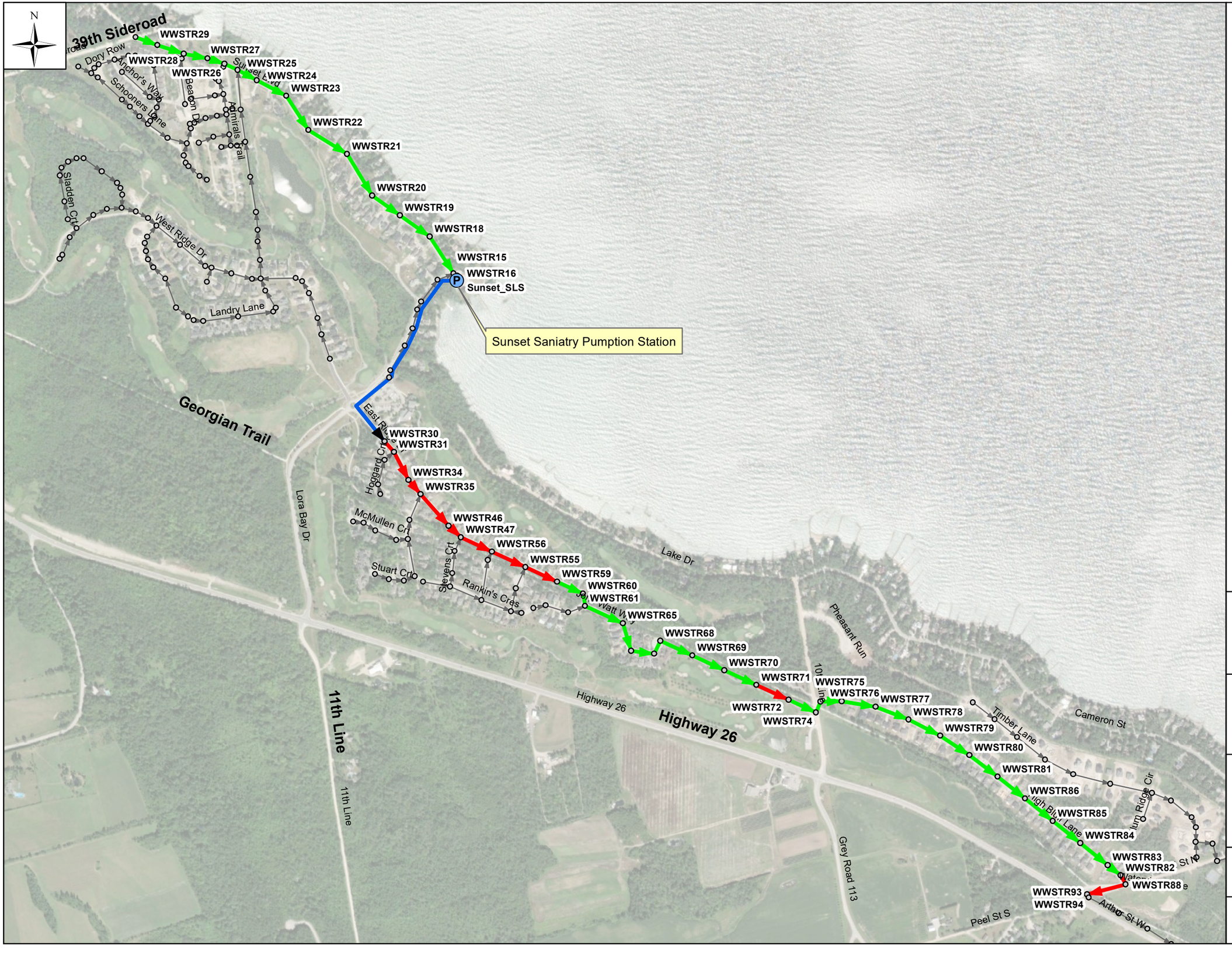
Figure 1:
Future Conditions with Parkbridge Sanitary Tributary Drainage Area

Drawn By: J.H. Date: Aug 11, 2023

0 125 250 500 Meters


N
39th Sideroad
WWSTR29
WWSTR27
WWSTR28
WWSTR25
WWSTR26
WWSTR24
WWSTR23
WWSTR22
WWSTR21
WWSTR20
WWSTR19
WWSTR18
WWSTR15
WWSTR16
Sunset_SLS
Sunset Saniatry Pumption Station
Dory Row
Anchor's Way
Schooners Lane
Beadon Dr
Admirals Trail
Sunset Blvd
Sladden Crt
West Ridge Dr
Landry Lane
Georgian Trail
WWSTR30
WWSTR31
WWSTR34
WWSTR35
WWSTR46
WWSTR47
WWSTR56
WWSTR55
WWSTR59
WWSTR60
WWSTR61
WWSTR65
WWSTR68
WWSTR69
WWSTR70
WWSTR71
WWSTR72
WWSTR74
WWSTR75
WWSTR76
WWSTR77
WWSTR78
WWSTR79
WWSTR80
WWSTR81
WWSTR86
WWSTR85
WWSTR84
WWSTR83
WWSTR82
WWSTR88
WWSTR93
WWSTR94
Hoggard Crt
McMullen Crt
Stuart Crt
Stevens Crt
Rankin's Cres
Watt Way
Lora Bay Dr
11th Line
Highway 26
Lake Dr
Pheasant Run
Grey Road 113
Timber Lane
Cameron St
Plum Ridge Cir
Peel St S
Arthur St W
Legend
Sanitary Pumping Station
Sanitary Manholes
Sanitary Sewers
Sanitary Sewers Conveyance Flow
CIVICA
Town of Blue Mountains
Figure 2:
Sanitary Sewers
Conveyance Flow
Drawn By: J.H.
Date: Aug 11, 2023
0
125
250
500
Meters


N
39th Sideroad
WWSTR29
WWSTR27
WWSTR28
WWSTR25
WWSTR26
WWSTR24
WWSTR23
WWSTR22
WWSTR21
WWSTR20
WWSTR19
WWSTR18
WWSTR15
WWSTR16
Sunset_SLS
Sunset Saniatry Pumption Station
Dory Row
Anchor's Walk
Schooners Lane
Beacon Dr
Admirals Trail
Sladden Crt
West Ridge Dr
Landry Lane
Georgian Trail
WWSTR30
WWSTR31
WWSTR34
WWSTR35
Hoggard Crt
Lora Bay Dr
McMullen Crt
Stevens Crt
Stuart Crt
Rankin's Cres
WWSTR46
WWSTR47
WWSTR56
WWSTR55
WWSTR59
WWSTR60
WWSTR61
WWSTR65
WWSTR68
WWSTR69
WWSTR70
WWSTR71
WWSTR72
WWSTR74
Lake Dr
Pheasant Run
10th Line
WWSTR75
WWSTR76
WWSTR77
WWSTR78
WWSTR79
WWSTR80
WWSTR81
WWSTR86
WWSTR85
WWSTR84
WWSTR83
WWSTR82
WWSTR88
WWSTR93
WWSTR94
Timber Lane
Cameron St
Jury Ridge Cir
Highway 26
11th Line
Grey Road 113
Peel St S
Arthur St W
Legend
Sanitary Pumping Station
Sanitary Manholes
Sanitary Sewers
Forcemains
Sanitary Sewers:
Surcharge
Not Surcharge
CIVICA
Town of Blue Mountains
Figure 3:
Pre-Development Model Results
- 25 Year Design Storm
Drawn By: J.H.
Date: Aug 11, 2023
0
125
250
500
Meters



Legend

- Sanitary Pumping Station
- Sanitary Manholes
- Sanitary Sewers
- Forcemains

Sanitary Sewers:

- Surcharge
- Not Surcharge

CIVICA

Town of Blue Mountains

Figure 4:
Post-Development Model Results
- 25 Year Design Storm

Drawn By: J.H. Date: Aug 11, 2023

0 125 250 500 Meters

N

39th Sideroad

WWSTR29
WWSTR27
WWSTR28
WWSTR25
WWSTR26
WWSTR24
WWSTR23
WWSTR22
WWSTR21
WWSTR20
WWSTR19
WWSTR18
WWSTR15
WWSTR16
Sunset_SLS

Dory Row
Anchor's Way
Schooners Lane
Beacon Dr
Admirals Trail
Sunset Blvd
Sladden Crt
West Ridge Dr
Landry Lane

Sunset Saniatry Pumption Station

Georgian Trail

WWSTR30
WWSTR31
WWSTR34
WWSTR35
WWSTR46
WWSTR47
WWSTR56
WWSTR55
WWSTR59
WWSTR60
WWSTR61
WWSTR65
WWSTR68
WWSTR69
WWSTR70
WWSTR71
WWSTR72
WWSTR74

Hoggard Crt
McMullen Crt
Stuart Crt
Stevens Crt
Rankin's Cres
Watt Way
Lora Bay Dr
Lake Dr

Upsizing from 375 mm to 450 mm (730 m)

Upsizing from 375 mm to 450 mm (185 m)

11th Line
Highway 26
Grey Road 113
Peel St S
Arthur St W

WWSTR75
WWSTR76
WWSTR77
WWSTR78
WWSTR79
WWSTR80
WWSTR81
WWSTR86
WWSTR85
WWSTR84
WWSTR83
WWSTR82
WWSTR88
WWSTR93
WWSTR94

Pheasant Run
Timber Lane
Cameron St
Jura Ridge Cir
High Bluff Lane

Legend

- Sanitary Pumping Station
- Sanitary Manholes
- Sanitary Sewers
- Forcemains

Sanitary Sewers Improvements:

- Sewer Upsizing

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Town of Blue Mountains

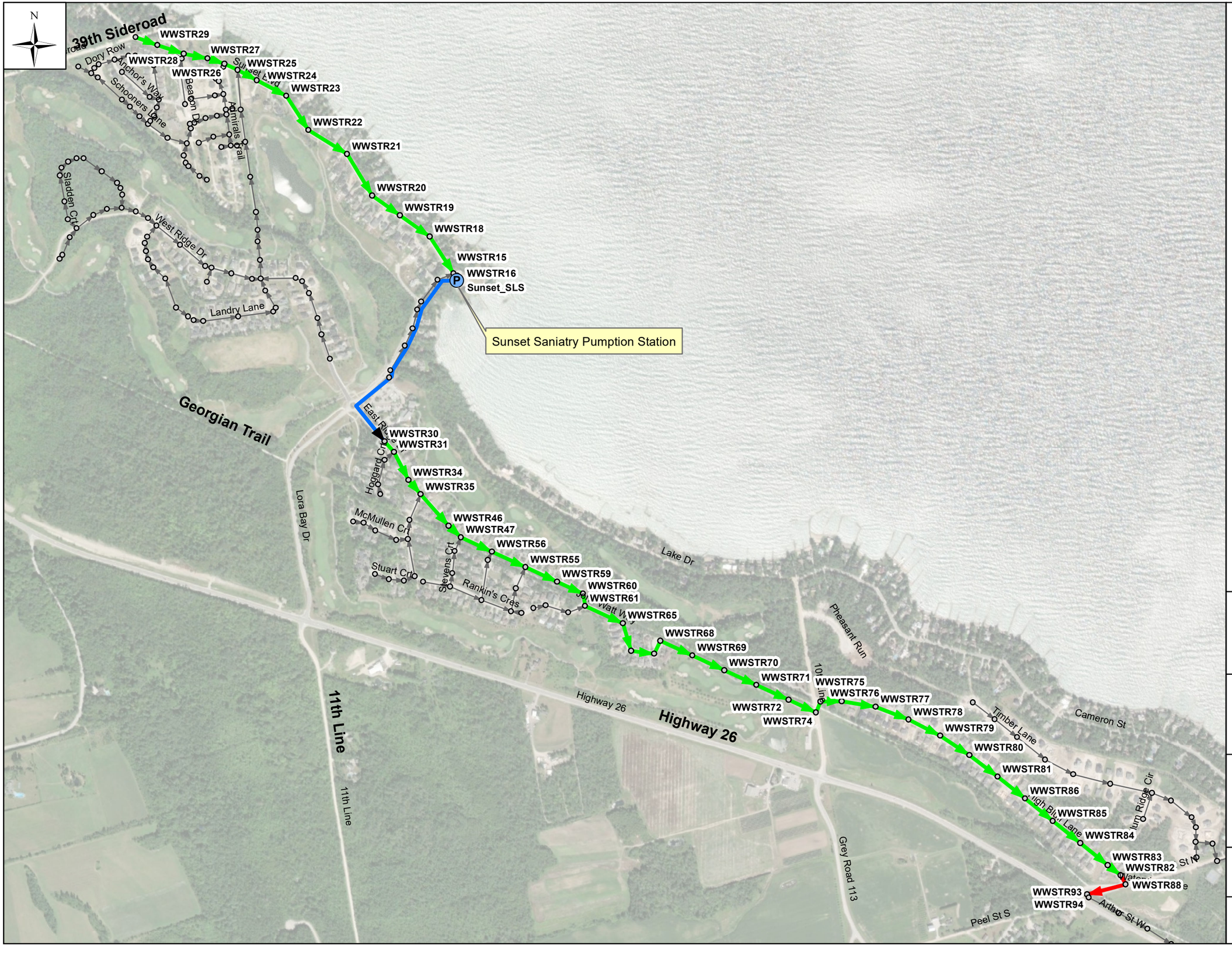
Figure 5:
Post-Development Preferred Solutions

Drawn By: J.H. Date: Aug 11, 2023

0 125 250 500 Meters

Table 1: Proposed Sewer Upgrades

Upstream Node ID	Downstream Node ID	Shape	Length (m)	US Invert Elevation (m)	DS Invert Elevation (m)	Existing Diameter (mm)	Proposed Diameter (mm)	Notes
WWSTR30	WWSTR31	CIRCULAR	39.629	207.360	207.330	375	450	Upsize sewer from 375 mm to 450 mm
WWSTR31	WWSTR34	CIRCULAR	89.848	207.270	207.110	375	450	Upsize sewer from 375 mm to 450 mm
WWSTR34	WWSTR35	CIRCULAR	52.523	207.100	207.040	375	450	Upsize sewer from 375 mm to 450 mm
WWSTR35	WWSTR46	CIRCULAR	119.461	207.040	206.580	375	450	Upsize sewer from 375 mm to 450 mm
WWSTR46	WWSTR47	CIRCULAR	47.509	206.550	206.480	375	450	Upsize sewer from 375 mm to 450 mm
WWSTR47	WWSTR56	CIRCULAR	96.529	206.440	206.280	375	450	Upsize sewer from 375 mm to 450 mm
WWSTR56	WWSTR55	CIRCULAR	104.375	206.260	206.100	375	450	Upsize sewer from 375 mm to 450 mm
WWSTR55	WWSTR59	CIRCULAR	98.865	206.100	205.950	375	450	Upsize sewer from 375 mm to 450 mm
WWSTR59	WWSTR60	CIRCULAR	80.718	205.940	205.810	375	450	Upsize sewer from 375 mm to 450 mm
WWSTR71	WWSTR72	CIRCULAR	99.966	198.980	198.710	375	450	Upsize sewer from 375 mm to 450 mm
WWSTR72	WWSTR74	CIRCULAR	85.020	198.700	198.480	375	450	Upsize sewer from 375 mm to 450 mm



Legend

- Sanitary Pumping Station
- Sanitary Manholes
- Sanitary Sewers
- Forcemains

Sanitary Sewers:

- Surcharge
- Not Surcharge

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Town of Blue Mountains

Figure 6:
Post-Development and Preferred Solution Model Results - 25 Year Design Storm

Drawn By: J.H. Date: Aug 11, 2023

0 125 250 500 Meters

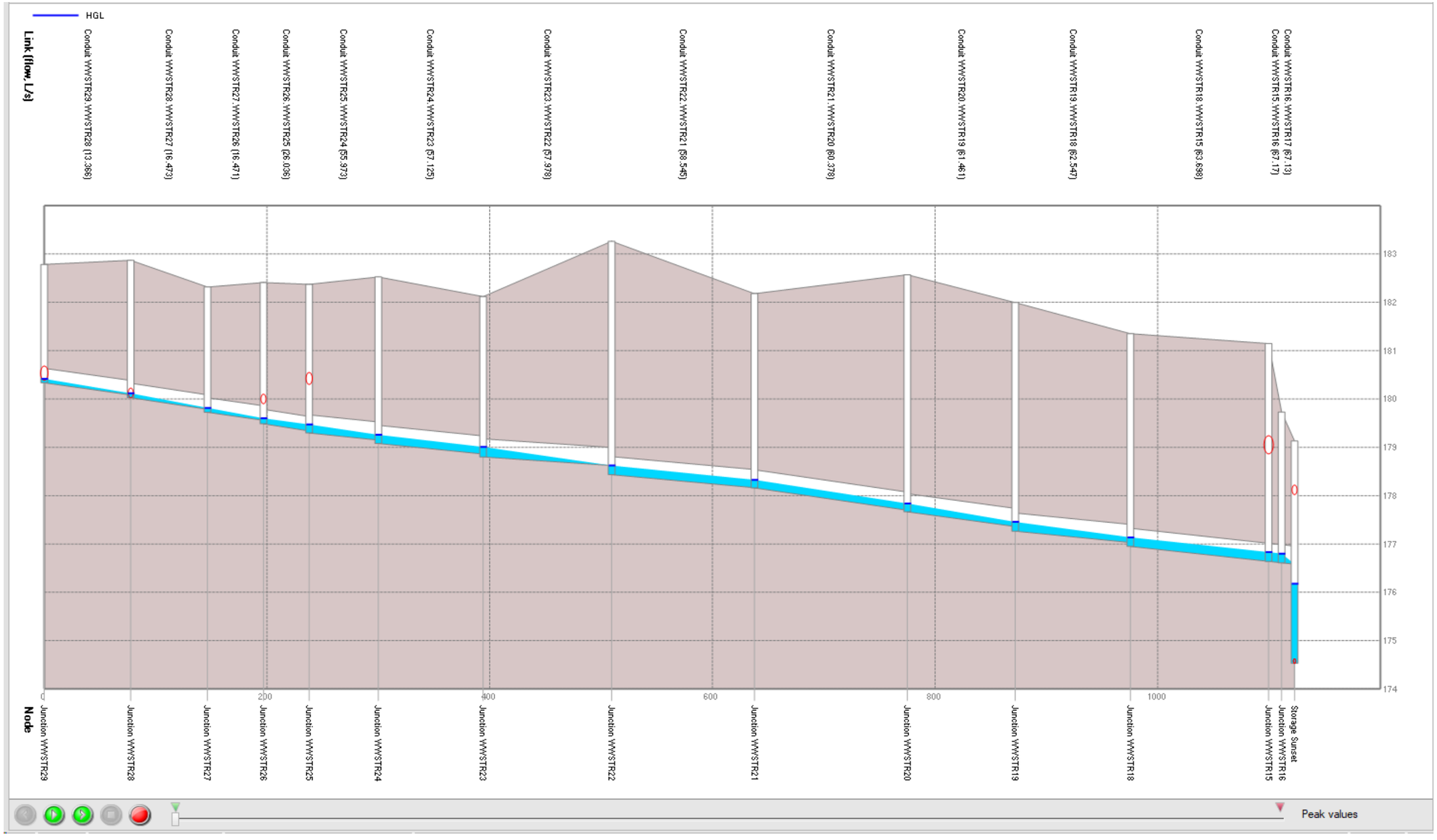


Figure 7: Pre-Development HGL. From WWSTR29 to Sunset SPS:

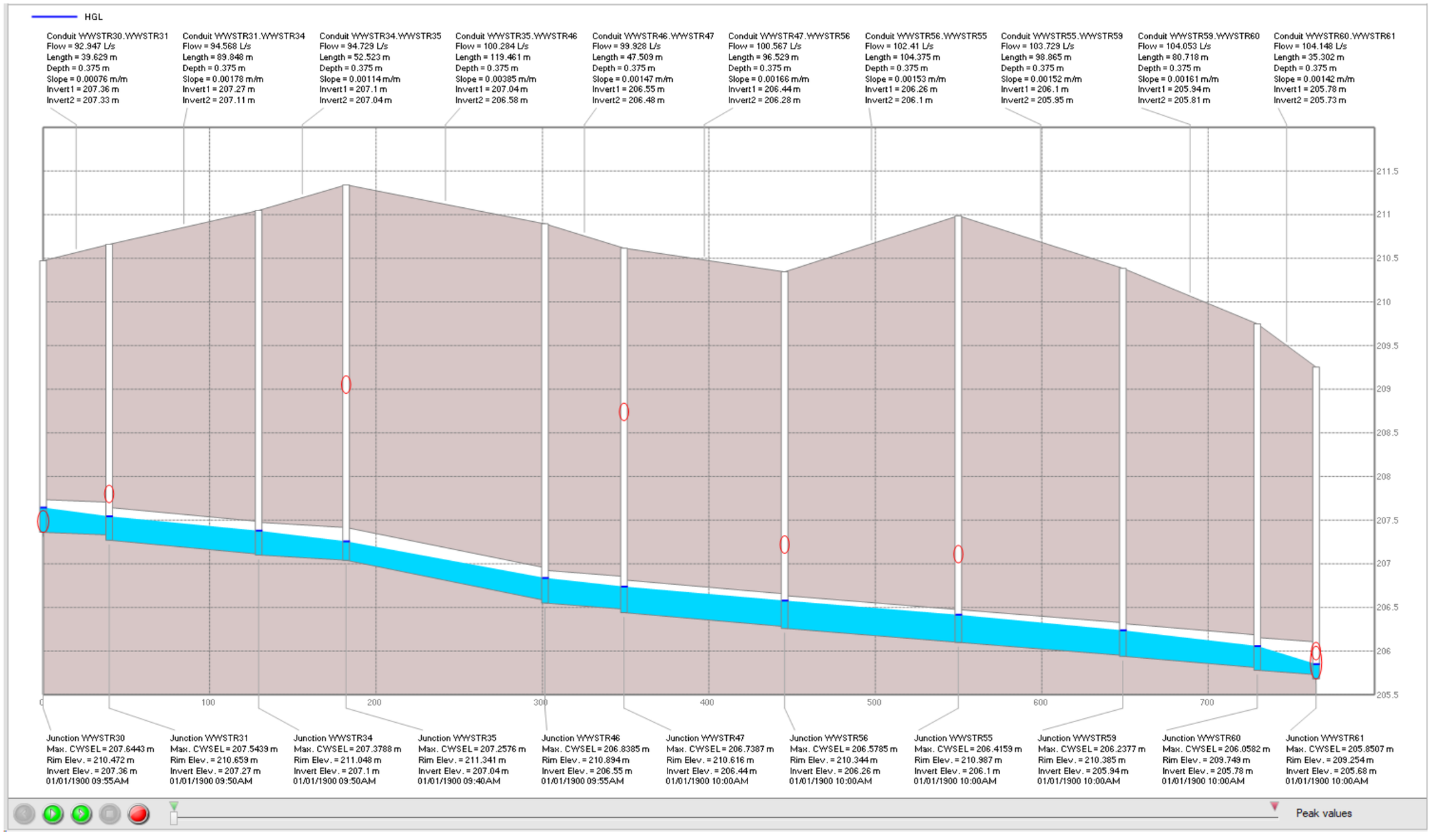


Figure 8: Pre-Development HGL. From Sunset PS to WWSTR61

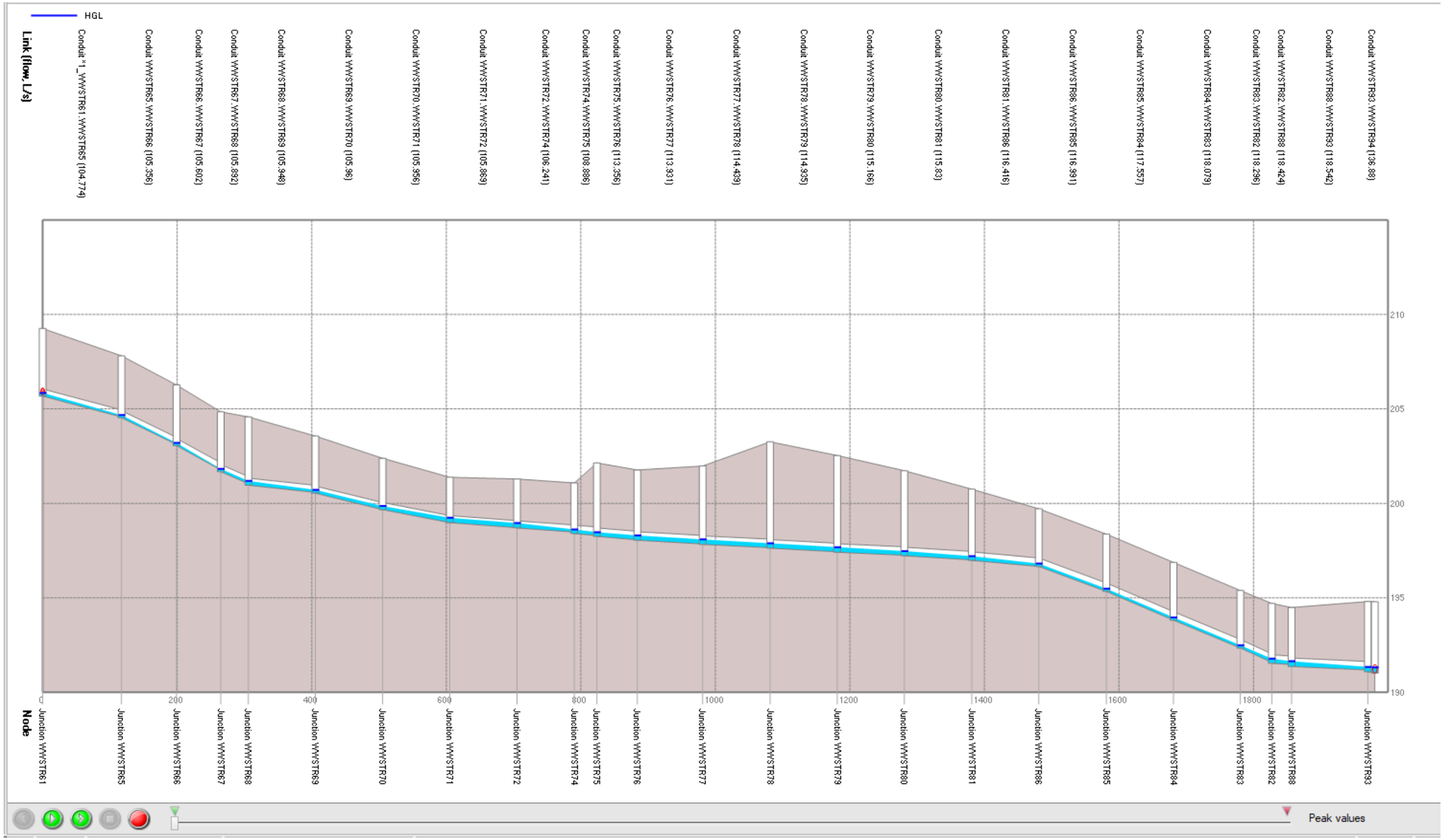


Figure 9: Pre-Development HGL. From WWSTR61 to WWSTR94

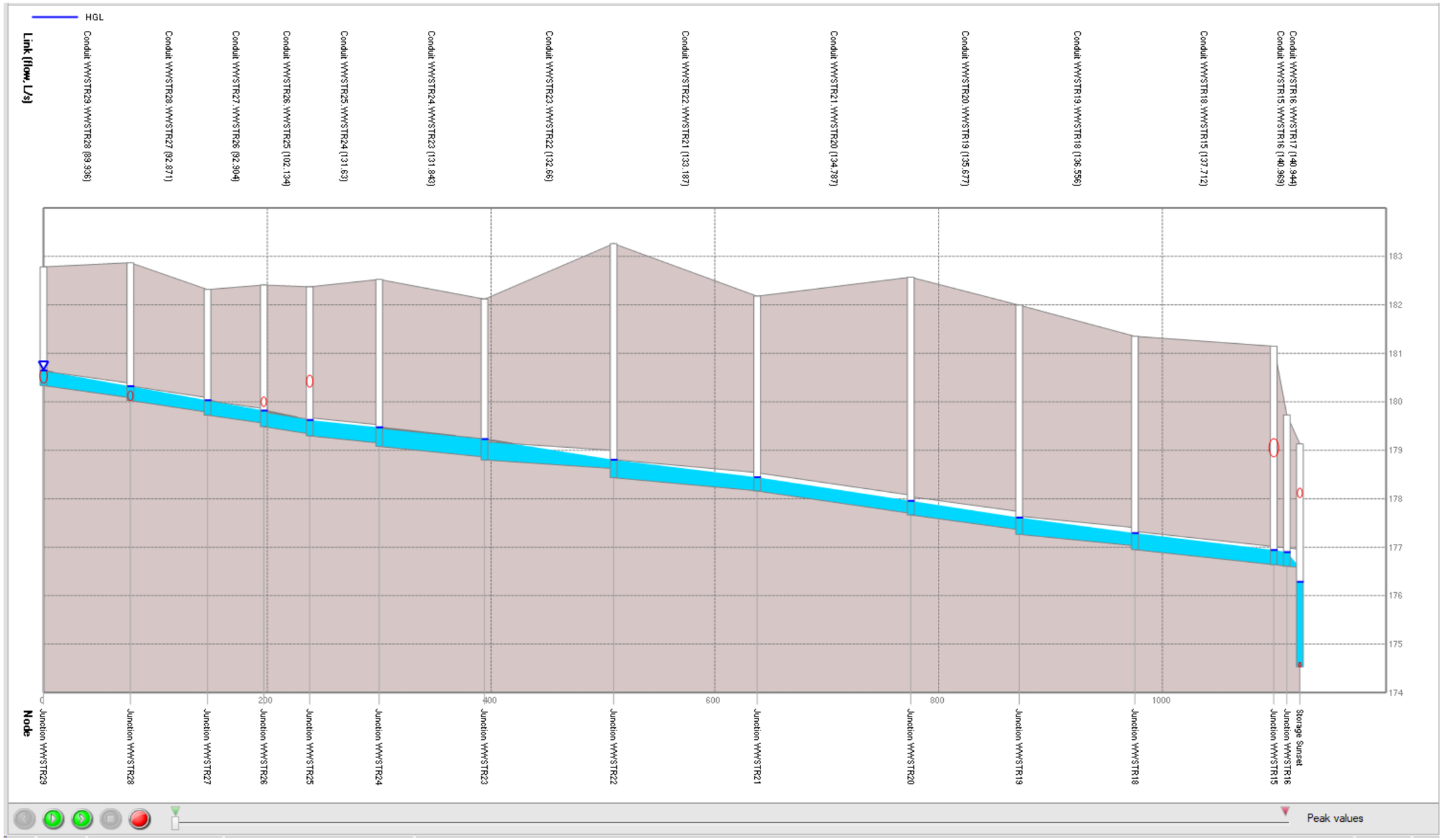


Figure 10: Post-Development HGL. From WWSTR29 to Sunset SPS

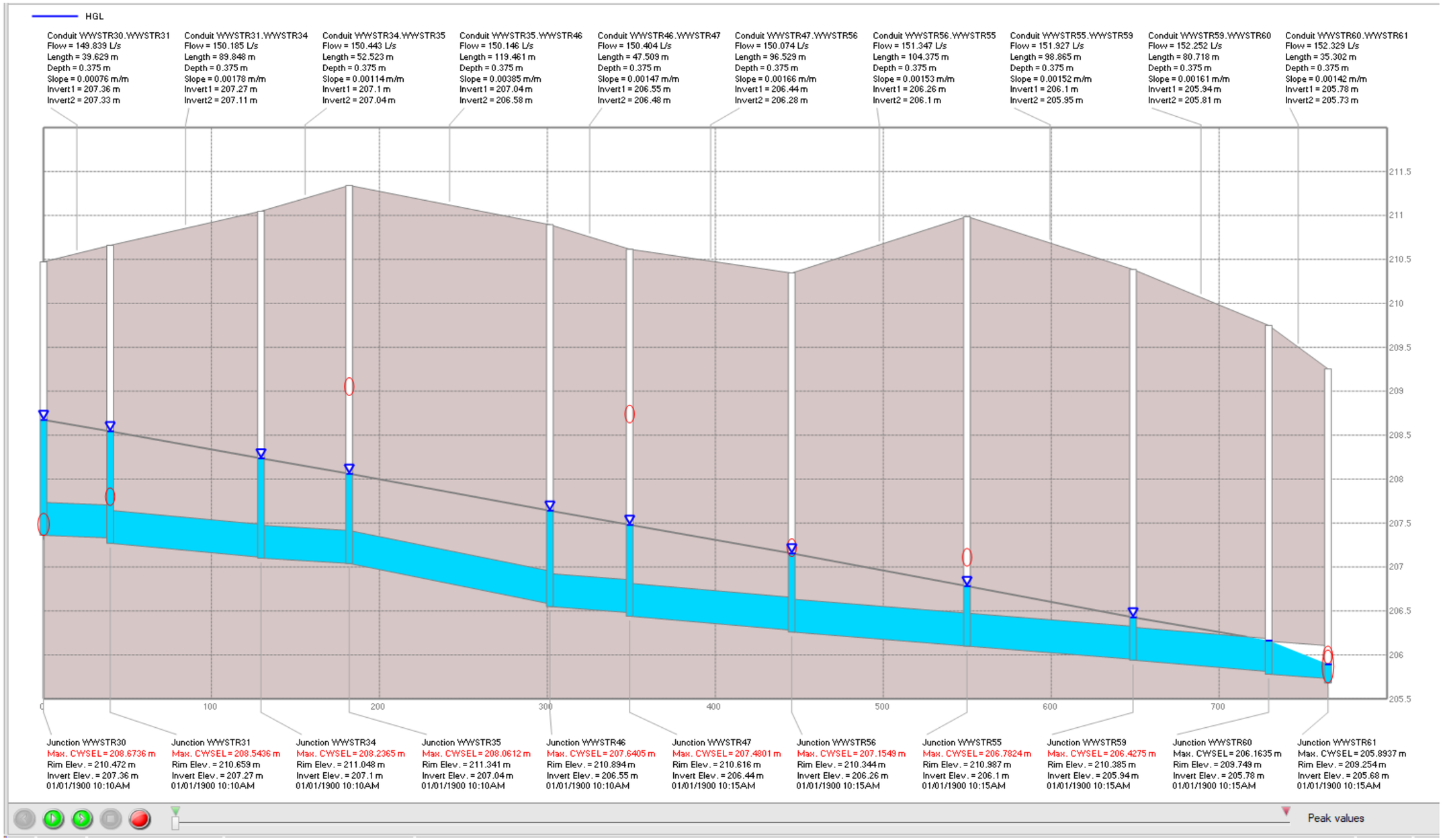


Figure 11: Post-Development HGL. From Sunset SPS to WWSTR61.

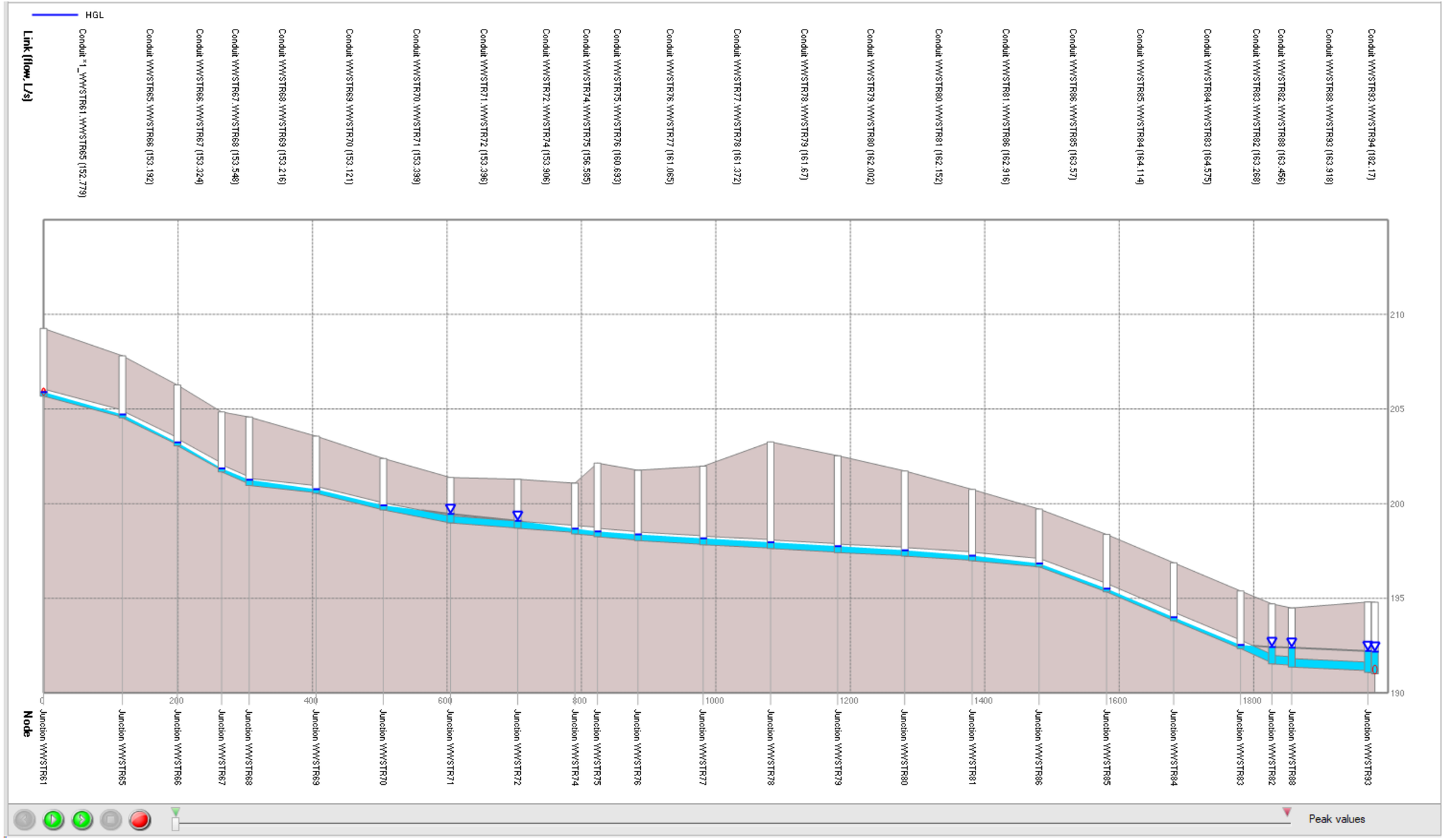


Figure 12: Post-Development HGL. From WWSTR61 to WWSTR94.

Appendix B:
Detailed OPCC Tables

Sewermain Upgrades - Conceptual OPCC - Pre-Development

Description	Class 'D' Opinion of Probable Cost - 30% Preliminary Design
Sewermain 1 Upgrade - WWSTR30 to WWSTR60	$0
Sewermain 2 Upgrade - WWSTR70 to WWSTR74	$0
Sub-total – Basic Facility Cost (A)	**$0**
General's Contractor Overhead (10% of "A")	$0
General's Contractor Profit (5% of "A")	$0
Mobilization, Bond and Insurance (2% of "A")	$0
Provisions for Temporary Services (Pumping, Power, etc) (10% of "A")	$0
Allowances (Record Drawings, Cleaning, etc.) (0.5% of "A")	$0
Total Estimated Construction Costs (B) – LEVEL D ESTIMATE	**$0**
Construction Contingency (Change Orders) (20% of "B")	$0
Total Estimated Construction Capital Costs (LEVEL D) – Excluding Engineering and HST (Rounded)	**$0**

Sewermain Upgrades - Conceptual OPCC - Post-Development

Description	Class 'D' Opinion of Probable Cost - 30% Preliminary Design
Sewermain 1 Upgrade - WWSTR30 to WWSTR60	$1,760,000
Sewermain 2 Upgrade - WWSTR70 to WWSTR74	$450,000
Sub-total – Basic Facility Cost (A)	**$2,210,000**
General's Contractor Overhead (10% of "A")	$221,000
General's Contractor Profit (5% of "A")	$110,500
Mobilization, Bond and Insurance (2% of "A")	$44,200
Provisions for Temporary Services (Pumping, Power, etc) (10% of "A")	$221,000
Allowances (Record Drawings, Cleaning, etc.) (0.5% of "A")	$11,050
Total Estimated Construction Costs (B) – LEVEL D ESTIMATE	**$2,817,750**
Construction Contingency (Change Orders) (20% of "B")	$563,550
Total Estimated Construction Capital Costs (LEVEL D) – Excluding Engineering and HST (Rounded)	**$3,390,000**

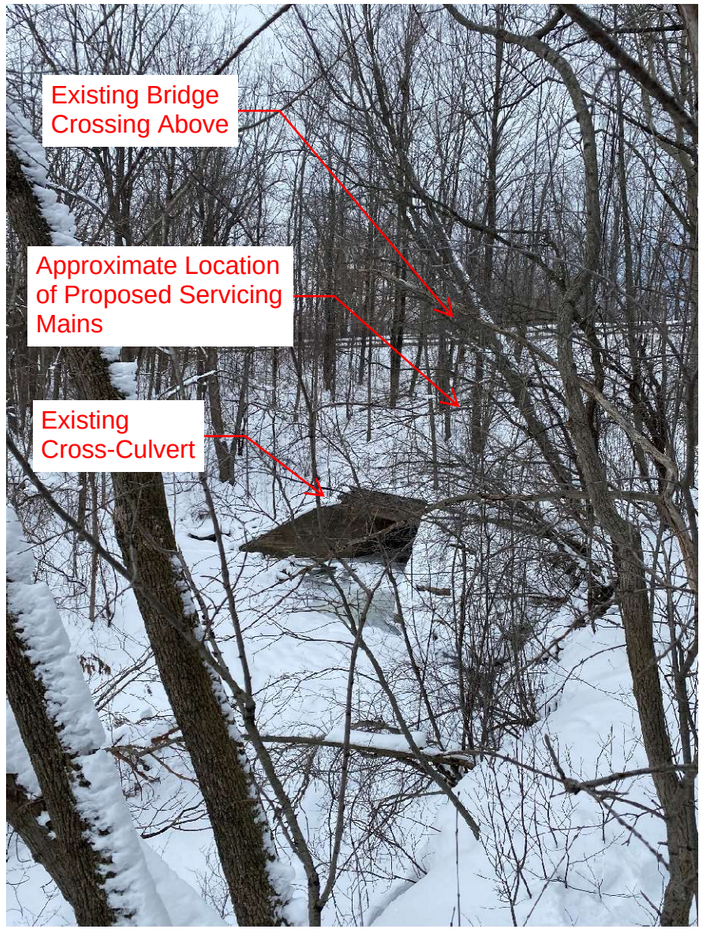
APPENDIX H

Workman's Creek Crossing

Workman's Creek Crossing



Georgian Trail Crossing above Workman's Creek.



Side-view of Workman's Creek Culvert Crossing of Georgian Trail (Upstream Face)

Note: The proposed watermain and sanitary sewers will be constructed above the existing culvert crossing at Workman's Creek.

APPENDIX I

DLW Engineering Services Memo

DLW ENGINEERING SERVICES LIMITED
1900 Dundas Street West
Suite A242 T 905.822.0163
Mississauga, Ontario L5K 1P9 C 647.627.3982

MEMORANDUM - DRAFT

DATE	June 27, 2023
TO	Sarah O'Neill, Jon Proctor, Jonathon Kerschbaumer, George Cooper: C.F. Crozier & Associates
SUBJECT	**Parkbridge Meaford Southeast Claybanks Water and Wastewater Servicing Municipality of Meaford**
FROM	Stephen O'Brien, P.Eng.
PROJECT NUMBER	CFC012

DLW Engineering Services Limited was retained to provide an assessment of the water and wastewater servicing of the proposed Parkbridge Meaford development. The development consists of 1,350 residential units and 2 hectares of commercial development.

WATER SERVICING

Site Area – 135 ha
Commercial Development Area– 2 ha
Commercial Water Consumption Rate – 28 m^3/ha/d
Number of residential units – 1350
Residential density 2.4 persons/unit
Residential water consumption rate 350 Lpcd
Residential Population = 1,350 units x 2.4 ppu = 3,240 persons
Commercial equivalent Population = 44 persons
Total Equivalent Population – 3,284 persons
Minimum Rate Factor = 0.5
Maximum Day Factor = 2.0
Peak Hour Factor = 3.0
Assume Fire Flow 150 L/s for 2 hours (MECP based on equivalent population = 113 L/s for 2 hrs. Crozier assumption of 150 L/s for 2 hrs)

Water Design Flows

Residential Average Day Flow = 350 Lpcd x 3,1240 = 1,134 m^3/d = 13.13 L/s
Commercial Average Day Flow = 2 ha x 28 m^3/ha/d = 56 m^3/d = 0.65 L/s

Average Day Flow (ADF) = 1,134 m^3/d + 56 m^3/d = 1,190 m^3/d = 13.77 L/s
Minimum Day Flow = 1,134 m^3/d x 0.5 = 567 m^3/d = 6.56 L/s
Maximum Day Flow (MDF) = 1,190 m^3/d x 2 = 2,380 m^3/d = 27.55 L/s
Peak Hour Flow (PHF) = 1,190 m^3/d x 3 = 3,570 m^3/d = 41.32 L/s
Fire Flow (FF) = 12,960 m^3/d = 150 L/s
Maximum Day + Fire Flow = 12,960 m^3/d + 2,380 m^3/d = 15,340 m^3/d = 177.55 L/s

Water Treatment

The Meaford WTP has a rated capacity of 26,848 m^3/d and it is reported in the April 2015 Water and Wastewater Servicing Master Plan that over the last 3 years (presumably 2012-2014) the plant has been working at 2,374 m^3/d or 8.8% of its rated capacity. Based on the rate of growth in Meaford since the completion of the Master Plan, we presume that there is still significant excess capacity within the Meaford WTP. Thus, the Meaford WTP should have plenty of capacity to accommodate the maximum day demand of 2,380 m^3/d from the Parkbridge Meaford development.

Water Transmission Main

A 7.6 km long transmission main will be required between the Meaford WTP and the proposed Parkbridge Meaford reservoir. We understand that 3.1 km of this feedermain already exists and can be used. Therefore a 4.5 km additional feedermain is required. The transmission main will be between 150-200mm diameter. A single transmission main is envisioned. However, the municipality may require a twinned feedermain to ensure security of supply to this development. The transmission main will cost approximately $2.8 - 4.2 million if a single feedermain is required (depending on the number of trenchless crossings) or an additional $1.4 million if a dual feedermain is required.

Water Storage

Equalization Storage = 595 m^3
Fire Storage = 1,080 m^3
Emergency Storage = 419 m^3
Total Water Storage Requirement = 2,094 m^3

The reservoir configuration at the Parkbridge Meaford development could be either of the following:

- Inground Concrete Reservoir ($4M) with associated High Lift Pumping Station with jockey, duty and fire pumps ($3.5M)
- Elevated Storage Tank ($3M) fed directly from the Meaford WTP ($1.5-2M for pumps sized for proposed MDD at Meaford WTP)
- Using existing pumps at Meaford WTP, and adding a Booster Pumping Station ($2M) sized for proposed MDD within the development which will feed an Elevated Storage Tank ($3M)

The least cost option would be the provision of an elevated storage tank which will be fed directly from the Meaford WTP. The booster pumping station with elevated storage tank is a little more expensive than the first option, and more cost effective than the inground storage with associated high lift pumping station. However, the inground storage option allows the reservoir to be constructed in stages which could spread out the capital cost of this infrastructure over multiple design phases within this development.

Water Servicing Recommendation

Based on the background information there is sufficient water production capacity in the Meaford WTP to service the Parkbridge Meaford development. Treated water from the Meaford WTP will be pumped through a 150-200mm diameter feedermain at the proposed maximum day demand flow rate of 2,380 m^3/d (27.55 L/s) to the Parkbridge Meaford Reservoir. The reservoir will be sized for approximately 2,100 m^3. Based on the information from provided by Crozier, the pumps at the Meaford WTP are sufficiently sized to deliver the water to the proposed Parkridge Meaford Reservoir if it located at or below grade at the subject site but will require a booster pumping station to fill an elevated tank.

WASTEWATER SERVICING

Site Area – 135 ha
Developed Site Area – 85.8 ha (60% of developable area)
Commercial Development Area– 2 ha
Commercial Water Consumption Rate – 28 m^3/ha/d
Number of residential units – 1350
Residential density 2.4 persons/unit
Residential water consumption rate 350 Lpcd
Residential Population = 1,350 units x 2.4 ppu = 3,240 persons
Average Infiltration and Inflow Allowance = 90 Lpcd
Peak Infiltration and Inflow Allowance = 227 Lpcd
Harmon Peaking Factor = 3.43
Maximum Day Factor = 2.0

Wastewater Design Flows

Average Dry Weather Flow = 1,190 m^3/d (13.77 L/s)
Average Wet Weather Flow (ADF) = 1,482 m^3/d (17.15 L/s)
Maximum Day Flow = 2,963 m^3/d (34.3 L/s)
Peak Dry Weather Flow = 4,062 m^3/d (47.02 L/s)
Peak Wet Weather Flow (PWWF) = 4,798 m^3/d (55.53 L/s)
Peak Instantaneous Flow (PIF) = 5,331 m^3/d (61.7 L/s)

Wastewater treatment plants are typically sized for the Average Day Flows (ADF) and the plants have to be able to accommodate the peak instantaneous flows (PIF). Sewage Pumping Stations are typically based on Peak Wet Weather Flows (PWWF).

Wastewater Treatment plant

The Meaford WWTP is a high rate activated sludge wastewater treatment plant with ultraviolet disinfection with discharge into Georgian Bay. The plant was designed in 1969 and consists of a single coarse bar screen, followed by two parallel trains of circular aerobic tanks with fine bubble diffusers and circular clarifiers, flow monitoring through a parshall flume, and ultraviolet disinfection. The plant is equipped with a septage and leachate receiving system which flows must be accommodated within the liquid and solids treatment systems of the plant. The municipality reports that the plant is not equipped with specific phosphorus removal facilities. The outfall is a 600mm diameter pipe that extends 450m into Georgian Bay. The plant uses aerobic digestion of biosolids which is then subsequently land applied.

The Meaford WWTP has a rated capacity of 3,910 m^3/d. According to the November 30, 2020 Meaford WWTP Servicing Allocation Report, based on flows up to 2019 the plant was operating at 75.8% of its capacity and once unconnected but approved lots are connected, the WWTP will be operating at 82% of its rated capacity. This results in 704 m^3/d unallocated capacity within the existing WWTP. The Parkbridge Meaford development will consume 1,482 m^3/d (17.15 L/s) capacity at the Meaford WWTP. Thus, the development will require that the planned expansion of the WWTP be completed to accommodate the full build-out of the Parkbridge Meaford development.

An onsite wastewater treatment system is one potential option for servicing the Parkbridge Meaford development. In this option, all flow will be directed to a proposed wastewater treatment plant located within the development. The wastewater treatment plant will likely need to be an enhanced tertiary wastewater treatment plant with phosphorus removal. We have assumed a Biological Nutrient Removal (BNR) plant followed by membrane bioreactors (MBR). This is a higher level of treatment than the current plant but would address the operational issues that they are currently struggling with on the existing facility, plus deal with the nitrogen limits that would

need to be met for a subsurface discharge outlet. The land area requirement for the mechanical plant would be approximately 1 hectare for the liquid and solids stream processes of the plant.

The plant could discharge into Georgian Bay but that would require the completion of a Schedule C Class EA. A subsurface discharge could be considered and would circumvent the Schedule C Class EA as the planning would be included in the private development planning application. Additionally, an expansion to the Meaford WWTP would necessitate an Assimilative Capacity Assessment in Georgian Bay and would likely result in not only phosphorus removal but likely a conversion of the plant to a tertiary treatment system. However, a subsurface discharge will require an additional 6-8 hectares of land to accommodate the tile fields depending on the soils and hydrogeological conditions of the area designated for the tile fields. A BNR-MBR plant with tile field discharge will have a capital cost of approximately $30-35 million. A surface discharge option will likely be in the range of $25-30 million. Should a lower level of treatment be acceptable for the MECP and the Conservation authority, there may be some savings that could be achieved in the design of this plant.

It is worth noting that one other potential wastewater servicing option would be to connect to the Town of Blue Mountain wastewater system. However, the specific requirements to connect to this system and associated costs are not known and can't be estimated at this time without further evaluation of the Blue Mountain wastewater servicing system.

Wastewater Pumping Station

The development will generate peak wet weather sewage flows of 55.5 L/s. Flows from the development will be directed to the Parkbridge Meaford SPS which will pump the sewage through a 4.5 km long forcemain towards the Meaford WWTP. This SPS will consist of an approximately 10 m deep, 3600mm diameter wet well with three submersible sewage pumps. Each pump will be sized for 28 L/s at 43m TDH. The pumps will pump through a 4.5km long, 250mm diameter forcemain. The pumps will be driven by 40 hp pumps equipped with variable frequency drives. The station will be equipped with a comminutor, odour control unit and standby generator.

A submersible sewage pumping station of this size will cost approximately $1.5-2 million depending on emergency storage requirements and subsurface soils and groundwater conditions. Should the municipality require a control building to house the electrical panels, and odour control system the cost of the station will increase to $3.5-4 million assuming an exterior generator set with weatherproof enclosure. Alternatively, a wet well/dry well station with all equipment located within the building will cost approximately $7-8 million.

Wastewater Forcemain

We are proposing approximately 3.4 km of forcemain from the proposed SPS location to and along the Georgian Trail and from there we are proposing approximately 1.6 km of gravity sewer to connect in at Montgomery Street. The 3.4 km long, 250mm diameter single forcemain will cost approximately $2.1 – 3.2 million depending on the number of trenchless crossings of roads and watercourses. The requirement of a twinned forcemain will add approximately $1-1.5 million to the capital cost of the forcemains.

Wastewater Servicing Recommendation

The wastewater servicing recommendation will be one of three options:

1. A sewage pumping station located on the Parkbridge Meaford development and forcemain to the existing Meaford WWTP which will need to be expanded to accommodate the full Parkbridge Meaford development flows.
2. A sewage pumping station located on the Parkbridge Meaford development and much shorter forcemain (than Option 1) to the proposed WWTP which will also be located on the Parkbridge Meaford development site, an effluent forcemain to the surface discharge location and an outfall.
3. A sewage pumping station located on the Parkbridge Meaford development and a much shorter forcemain (than Option 1) to the proposed WWTP which will also be located on the Parkbridge Meaford development site, and a short effluent forcemain to a tile field also located on the Parkbridge Meaford development site.

APPENDIX J

Cost Estimates

CROZIER CONSULTING ENGINEERS

Project No.: 1046-4273
Project Name: Parkbridge Meaford
Date: 20-Oct-2023
Prepared by: JK
Checked By: SO

PARKBRIDGE - EXTERNAL SITE WATER/SANITARY SERVICING

PRELIMINARY OPINION OF PROBABLE COSTS

(1) General Notes:

(a)	The material enclosed reflects best judgment in light of the information available at the time of preparation. Any use which a third party makes of this information, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Crozier Consulting Engineers accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this material.
(b)	This Opinion of Probable Costs (OPC) is considered preliminary and hence is subject to change following detailed design and agency approval.
(c)	This OPC was developed for the external servicing (water and sewer) of a 1250 unit development of Single Family/Semi-Detached units and 100 units for the existing lower lots along Fraser Street and Barker Street. This OPC is subject to change based on the detailed design process and agency comments.
(d)	Population estimates and demand calculations for The Municipality of Meaford and the Town of The Blue Mountains (TOBM) have been determined from Municipal Engineering Design Guidelines & Relevant Master Servicing Studies and are as follows: Meaford: Population: 2.4 persons/unit. Demand Calculations: 450 L/C/day TOBM: Population: 2.15 person/unit. Demand Calculations: 350 L/C/day
(e)	Mobilization and Demobilization costs have not been considered in the Site Preparation costs.
(f)	Estimates and unit prices are based on recent tender results (2022/2023) for similar construction projects completed in the Grey County Areas and high-level costing from local Contractors. These prices do not include HST and represent present day (2023) values.
(g)	Costs of upgrading or extending utilities are not considered as part of this OPC.
(h)	Due to COVID-19, the Construction Industry has seen large fluctuations in material, and labour pricing. While C.F. Crozier & Associates Inc. has prepared this Preliminary Opinion of Probable Costs to the best of our ability, the costs of the items included in this OPC may continue to fluctuate until the time of Construction.

(2) Design Assumptions:

(a)	OPTION 1 consists of a single watermain and a forcemain sanitary sewer routed along Georgian Trail and connecting into existing Town of Meaford services on Montgomery Street. This option assumes a single forcemain runs from the Site to Montgomery Street. The minimum proposed watermain is a single 250mm watermain running from the Site to Montgomery Street.
(b)	OPTION 2 consists of a single watermain and a single forcemain sewer routed along Georgian Trail and connecting into existing Town of Meaford services at Highway 26. This options assumes a single forcemain runs from the Site to Highway 26. The minimum proposed watermain is a 250mm watermain running from the Site to Highway 26.
(c)	OPTION 3 consists of a single watermain and a single forcemain sewer routed along the Georgian Trail and Sideroad 39 to existing Town of The Blue Mountains services on Sunset Blvd. This options assumes a single forcemain runs from the Site to the existing Town of The Blue Mountains municipal infrastructure on Sunset Blvd. The minimum proposed watermain is a 200mm watermain running from the Site to the existing Watermain on Sunset Blvd.
(d)	OPTION 4 consists of a proposed Onsite Tile Field Wastewater Treatment Plant (WWTP) and Onsite Water Treatment Plant (WTP).
(e)	OPTION 5 consists of a proposed Onsite Surface Discharge WWTP and Onsite WTP
(f)	Location of the proposed Sewage Pumping Station is assumed to be north central in the site, near the existing house. Location to be confirmed through site plan refinement and detailed design.
(g)	This estimate assumes a Submersible Sewage Pump Station will be acceptable to the Municipality. This estimate assumes odour control will be required due to the proximity to residential units. The infrastructure solution for odour control is to be confirmed with the Municipality through design.
(h)	Location of Storage Reservoir/Booster Station are assumed to be central to the site near the Georgian Trail. Location to be confirmed through site plan refinement and detailed design.

CROZIER CONSULTING ENGINEERS

Project No.: 1046-4273
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Date: 20-Oct-2023
Prepared by: JK
Checked By: SO

PARKBRIDGE - EXTERNAL SITE WATER/SANITARY SERVICING

PRELIMINARY OPINION OF PROBABLE COSTS

(i)	This estimate leverages conceptual cost estimates prepared by J.L. Richards prepared as part of their Water Modelling Analysis (June 29, 2023) and Wastewater Modelling Analysis (August 15, 2023).
(j)	This estimate assumes that watercourse crossings can be prepared with temporary diversion (e.g. Assume sand bagging, coffer dam and temporary diversion via pumping) or directional drilling. Further assumes that drain chambers will not be required for forcemain crossings of watercourses.
(k)	This estimate assumes that the work area available along the Georgian Trail will be sufficient for contractor staging, based on prelmiinary conceptual discussions with Contractors (B&J Contracting), and no allowance has been made for clearing and grubbing and reinstatement of trees if required. The construction method along the Georgian Trail assumes a combination of directional drilling and open cut trenching to minimize the disturbed area.
(l)	DC charges per Meaford DC By-Law #2021-13 and the 2023 Municipality of Meaford Development Charges (Assume Service Area 2, water and sanitary servicing) are $2,318 per unit for water and $9,366 per unit for sanitary (Single and Semis) = 1250 singles/semis x $11,684 = $14,605,000.00 Development Charges and potential development credits would need to be coordinated in consultation with the Municipality. DC charges were not included in this cost estimate.
(m)	DC charges per TOBM DC By-Law #2019-17 and the 2023 Town of The Blue Mountains Development Charges Pamphlet (Assume Lora Bay Service Area 1, water and sanitary servicing) are $13,546 per unit for water and $23,292 per unit for sanitary (Single and Semis) = 1250 singles/semis x $36,838 = $46,047,500.00. Additionally, the J.L. Richards Water and Wastewater modelling memos indicated that "compensation to the Town would also be required for capacity utilization of the Town's existing and planned infrastructure which does not require upsizing. It is anticipated these distribution system costs could range between (water: $1,500 to $8,500 per capita; wastewater: $1,800 to $10,800 per capita) based on the Town's current Development Charges Background Study" Development Charges and potential development credits would need to be coordinated in consultation with the Municipality. DC charges were not included in this cost estimate.
(n)	Estimates for the Proposed onsite infrastuructre including Sanitary Pumping Station, Water Reservoir and Booster Pumping Station are based on similar project costs and the Memo completed by DLW Engineering Services.
(o)	External and proposed wastewater and watermain costing are based on discussions with a 3rd party contractor (B&J Contracting).
(p)	Existing Meaford Wastewater Treatment Plant Upgrade costs for Meaford are derived from the construction costs proposed in the PIC for the Expansion of Meaford Wastewater Treatment Plant Class EA (October 12, 2023). The costs related to the expansion for the ultimate flows for the existing plant expansion have been scaled to provide a preliminary cost associated with treatment of ultimate design flows from the Parkbridge Meaford site. Further discussions with the Municipality and their Consulting Engineer Ainley are required to refine the anticipated costs through the design process.
(q)	Existing Wastewater Treatment Plant Upgrades for the TOBM Option were provided in the J.L. Richards Wastewater Modelling Memo, however the basis of these costs is the DC Charges related to the wastewater plant. For a more direct comparison between the Meaford and TOBM alternatives, the construction costs for the proposed expansion of the Thornbury Wastewater Treatment Plant was scaled similarly to the approach used for the Meaford WWTP expansion cost number, with an inflation adjustment, and this number was used as the preliminary cost associated with treatment of ultimate design flows from the Parkbridge Meaford site. Further discussions with the Municipality and their Consulting Engineer J.L. Richards are required to refine the anticipated costs through the design process.
(r)	The J.L. Richards Wastewater Modelling Memo and OPC only identified infrastructure upgrades to the intersection of Peel Street S and Arthur Street W, and notes that additional infrastructure upgrades beyond the modelled area may be required and would be confirmed through the ongoing Wastewater Master Plan. Therefore, this OPC includes potential costing for existing Municipal wastewater sewer upgrades in TOBM downstream of this point, including preliminary potential costing for sewer upsizing and an existing sanitary pumping station. These costs should be refined further with J.L. Richards and the Town. These cost estimates are based on previous project tenders.
(s)	Onsite wastewater treatment option costing derived from external consultant (DLW) and equipment replacement pricing.

CROZIER CONSULTING ENGINEERS

Project No.: 1046-4273
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PARKBRIDGE - EXTERNAL SITE WATER/SANITARY SERVICING

PRELIMINARY OPINION OF PROBABLE COSTS

(t)	The J.L. Richards Water Modelling Memo and OPC identified future planned transmission mains along 39th Sideroad, Christie Beach Road, and Sunset Boulevard as part of the planned ultimate buildout per the TOBM's Westside Storage Class EA. No costs related to the proposed water transmission line along are indicated in the memo from J.L. Richards as this proposed infrastructure is reuqired as part of the ultimate buildout and no upsizing is required to accommodate the Parkbridge Meaford development's flows. Therefore, no costs associated wiht the construction of these proposed transmission lines has been included, and it is assumed that the costs are covered under existing DC charges for TOBM.
(u)	Total dollar values plus contingencies identified in the final cost summaries of this OPC are rounded up to the nearest $500,000.
(3) Exclusions:	
(a)	No allowance has been included for a temporary trail diversion. Construction along the Georgian Trail is proposed for winter months with minimal trail activity. If it is found that trail diversions are required during construction, diversion routes will be prepared during detailed design in consultation with the Municipality and Georgian Cycle & Ski Trail Association.
(b)	No internal costs including internal earthworks, internal servicing, and internal roadworks are considered for this OPC.
(c)	Sewer costs do not account for bedrock removal or dewatering via pumps or well point system (if applicable).
(d)	Assumed that no deep manholes/drop structures are required.
(e)	No allowance for soft costs/development fees have been made.
(f)	No allowance has been made for costs associated with permitting fees or agency review fees to the relevant agencies (GSCA, MTO, Municipality etc.), professional fees, external consultant fees (i.e. geotechnical or survey), and fees associated with the testing or monitoring of soil disposal for the proposed works.
(g)	The presented estimate excludes any costs associated with Low Impact Development infrastructure.

CROZIER CONSULTING ENGINEERS

Project No.: 1046-4273
Project Name: Parkbridge Meaford
Date: 20-Oct-2023
Prepared by: JK
Checked By: SO

PARKBRIDGE - EXTERNAL SITE WATER/SANITARY SERVICING

PRELIMINARY OPINION OF PROBABLE COSTS

ITEM	DESCRIPTION	CAPITAL COST
	OPTION 1 - Meaford VIA Georgian Trail to Montgomery	
A	**SCHEDULE A: SANITARY SEWERS (OPTION 1 - COMBINATION FORCEMAIN AND GRAVITY SEWER)**	
A1)	Wastewater Infrastructure	
a)	Proposed Wastewater Sewers (2o)	$ 4,750,000
b)	Proposed Wastewater Pumping Station (2n)	$ 4,000,000
c)	Existing Meaford Wastewater Upgrades (WWTP) (2p)	$ 51,000,000
	Total Wastewater	**$ 59,750,000**
	Total Wastewater +30% Range	**$ 78,000,000**
B	**SCHEDULE B: WATERMAIN (OPTION 1 - SINGLE 250MM TRUNK MAIN TO MONTGOMERY STREET)**	
B1)	Water Supply Infrastructure	
a)	Proposed External Watermain (2o)	$ 4,863,000
b)	Proposed Water Reservoir & Booster Station (2n)	$ 7,500,000
c)	Existing Water Upgrades - Montgomery St (2o)	$ 250,000
	Total Water	**$ 12,613,000**
	Total Water + 30% Range	**$ 16,500,000**
	Total Wastewater + Water	**$ 72,363,000**
TOTALS	**Total Wastewater + Water + 30% Range**	**$ 94,500,000**
	OPTION 2 - Meaford VIA Georgian Trail to Highway 26	
A	**SCHEDULE A: SANITARY SEWERS (OPTION 2 - FORCEMAIN ONLY)**	
A1)	Wastewater Infrastructure	
a)	Proposed Wastewater Forcemain (2o)	$ 4,942,500
b)	Proposed Wastewater Sanitary Pumping Station (2n)	$ 4,000,000
c)	Existing Meaford Wastewater Upgrades (WWTP) (2p)	$ 51,000,000
	Total Wastewater	**$ 59,942,500**
	Total Wastewater +30% Range	**$ 78,000,000**
B	**SCHEDULE B: WATERMAIN (OPTION 2 - SINGLE 250MM TRUNK MAIN TO MONTGOMERY STREET)**	
B1)	Water Supply Infrastructure	
a)	Proposed External Watermain (2o)	$ 4,863,000
b)	Proposed Water Reservoir & Booster Station (2n)	$ 7,500,000
c)	Existing Water Upgrades - Montgomery St (2o)	$ 250,000
	Total Water	**$ 13,000,000**
	Total Water + 30% Range	**$ 17,000,000**
	Total Wastewater + Water	**$ 72,942,500**
TOTALS	**Total Wastewater + Water + 30% Range**	**$ 95,000,000**

CROZIER CONSULTING ENGINEERS

Project No.: 1046-4273
Project Name: Parkbridge Meaford
Date: 20-Oct-2023
Prepared by: JK
Checked By: SO

PARKBRIDGE - EXTERNAL SITE WATER/SANITARY SERVICING

PRELIMINARY OPINION OF PROBABLE COSTS

OPTION 3 - TOBM VIA Sideroad 39

A	**SCHEDULE A: SANITARY SEWERS (OPTION 3 - FORCEMAIN ONLY)**	
A1	Wastewater Infrastructure	
a)	Proposed Wastewater Pumping Station (2n)	$ 4,000,000
b)	Proposed External Wastewater Sewers (2o)	$ 2,500,000
c)	Existing External Sunset BLVD Wastewater (SPS) (2n)	$ 8,000,000
d)	Existing TOBM Wastewater Upgrades Sewers (2o)	$ 3,390,000
e)	Existing TOBM Wastewater Upgrades (WWTP) (2q)	$ 28,000,000
	Total Wastewater	**$ 46,000,000**
	Total Wastewater +30% Range	**$ 60,000,000**
B	**SCHEDULE B: WATERMAIN (OPTION 3 - SINGLE 200MM TRUNK MAIN)**	
B1	Water Supply Infrastructure	
a)	Proposed External Watermain (2o)	$ 1,900,000
b)	Proposed Water Reservoir & Booster Station (2n)	$ 7,500,000
c)	Existing TOBM Water Upgrades (2o)	$ 3,870,000
	Total Water	**$ 13,500,000**
	Total Water + 30% Range	**$ 18,000,000**
	Total Wastewater + Water	**$ 59,500,000**
TOTALS	**Total Wastewater + Water + 30% Range**	**$ 78,000,000**

OPTION 4 - On-Site Option 1 (Tile Field WWTP)

A	**SCHEDULE A WASTEWATER OPTION**	
A1	On-Site Tile Field Wastewater Treatment Plant (2s)	
a)	Proposed Sanitary Pumping Station	$ 8,000,000
b)	Tile Field Wastewater Treatment Plant	$ 35,000,000
	Total Wastewater	**$ 43,000,000**
	Total Wastewater +30% Range	**$ 56,000,000**
B	**SCHEDULE B WATER OPTION**	
B1	On-Site Water Treatment Plant (2s)	
a)	On-Site Water Treatment Plant	$ 15,000,000
	Total Water	**$ 15,000,000**
	Total Water + 30% Range	**$ 19,500,000**
	Total Wastewater + Water	**$ 58,000,000**
TOTALS	**Total Wastewater + Water + 30% Range**	**$ 75,500,000**

CROZIER CONSULTING ENGINEERS

Project No.: 1046-4273
Project Name: Parkbridge Meaford
Date: 20-Oct-2023
Prepared by: JK
Checked By: SO

PARKBRIDGE - EXTERNAL SITE WATER/SANITARY SERVICING

PRELIMINARY OPINION OF PROBABLE COSTS

OPTION 5 - On-Site Option 2 (Surface Discharge WWTP)

A	**SCHEDULE A WASTEWATER OPTION**		
A1	On-Site Surface Discharge Wastewater Treatment Plant (2s)		
a)	Proposed Sanitary Pumping Station	$	8,000,000
b)	Surface Discharge Wastewater Treatment Plant	$	30,000,000
c)	Georgian Bay Outlet and In-Water Works	$	10,000,000
	Total Wastewater	**$**	**48,000,000**
	Total Wastewater +30% Range	**$**	**62,500,000**
B	**SCHEDULE B WATER OPTION**		
B1	On-Site Water Treatment Plant (2s)		
a)	On-Site Water Treatment Plant	$	15,000,000
	Total Water	**$**	**15,000,000**
	Total Water + 30% Range	**$**	**19,500,000**
	Total Wastewater + Water	**$**	**63,000,000**
TOTALS	**Total Wastewater + Water + 30% Range**	**$**	**82,000,000**

CROZIER CONSULTING ENGINEERS

Project No.: 1046-4273
Project Name: Parkbridge Meaford
Date: 20-Oct-2023
Prepared by: JK
Checked By: SO

PARKBRIDGE - EXTERNAL SITE WATER/SANITARY SERVICING

PRELIMINARY OPINION OF PROBABLE COSTS

OPINION OF PROBABLE CONSTRUCTION COSTS

OPTION 1 - Meaford VIA Georgian Trail to Montgomery		
SCHEDULE A: SANITARY SEWERS	$	78,000,000
SCHEDULE B: WATERMAIN (OPTION 1 - SINGLE 200MM TRUNK MAIN)	$	16,500,000
	$	**94,500,000**
OPTION 2 - Meaford VIA Georgian Trail to Highway 26		
SCHEDULE A: SANITARY SEWERS (OPTION 2 - FORCEMAIN ONLY)	$	78,000,000
SCHEDULE B: WATERMAIN (OPTION 2 - SINGLE 250MM TRUNK MAIN TO MONTGC	$	17,000,000
	$	**95,000,000**
OPTION 3 - TOBM VIA Sideroad 39		
SCHEDULE A: SANITARY SEWERS (OPTION 3 - FORCEMAIN ONLY)	$	60,000,000
SCHEDULE B: WATERMAIN (OPTION 3 - SINGLE 200MM TRUNK MAIN)	$	18,000,000
	$	**78,000,000**
OPTION 4 - On-site Option 1 (Tile Field WWTP)		
SCHEDULE A: WASTEWATER OPTION	$	56,000,000
SCHEDULE B: WATER OPTION	$	19,500,000
	$	**75,500,000**
OPTION 5 - On-site Option 2 (Surface Discharge WWTP)		
SCHEDULE A: WASTEWATER OPTION	$	62,500,000
SCHEDULE B: WATER OPTION	$	19,500,000
	$	**82,000,000**

Project No.: 1046-4273
Project Name: Parkbridge Meaford
Date: 2023-10-10
Prepared by: CV

PARKBRIDGE - PROPOSED TRANSPORTATION IMPROVEMENTS

PRELIMINARY OPINION OF PROBABLE COSTS

1. This Opinion of Probable Costs (OPC) is considered preliminary in absence of detailed site topographic survey, site specific groundwater and geotechnical investigation and hence are subject to change following detailed design and agency approval.
2. This OPC was developed for the proposed transportation improvements related to roadway access required to service a 1250 unit development of units as per the Demonstration Plan.
3. **RECOMMENDED OPERATIONAL TRANSPORTATION IMPROVEMENTS** consists of the warranted and operationally recommended Transportation improvements, including a right hand turn lane and signalization at the intersection of Hwy 26 and Christie Beach Road, a Left Hand Turn Lane and signalization at Access A (near the commercial / mixed-use hub), and a Right Hand Turn Lane and Left Hand Turn Lane at Access C (western access to the development)
4. No internal costs including internal earthworks, roadway works, and internal servicing are considered for this OPC.
5. No allowance for utilities relocation has been included.
6. No allowance for installation and removal of temporary signals has been included.
7. No allowance for soft costs/development fees have been made.
8. No allowance has been made for costs associated with fees to the relevant agencies (GSCA, MTO, Municipality etc.)
9. Unit prices are based on typical prices in the Southern Georgian Bay area.
10. Due to COVID-19, the Construction Industry has seen large fluctuations in material, fuel pricing volatility, and labour pricing. While C.F. Crozier & Associates Inc. has prepared this Opinion of Probable Costs to the best of our ability, the costs of the items included in this OPC may continue to fluctuate until the time of Construction.
11. This Opinion of Probable Costs is preliminary and based on best judgement in light of information available at the time of preparation. As such, our findings should not be considered to be definitive and may be subject to change following future investigations or by detailed engineering designs.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	PRELIMINARY TOTAL
	Recommended Operational Transportation Improvements				
A	**SCHEDULE A: ROADWORKS (WARRANTED)**				
A1	Roadworks for Right-Turn Lane at Hwy 26 and Christie Beach Intersection	1	LS	$ 440,000.00	$ 440,000.00
A2	Roadworks for Left-Turn Lane at Access A	1	LS	$ 590,000.00	$ 590,000.00
A3	Roadworks for Left-Turn Lane and Right-Turn Lane at Access C	1	LS	$ 840,000.00	$ 840,000.00
				Total	**$ 1,870,000.00**
B	**SCHEDULE B: TRAFFIC SIGNALS (WARRANTED)**				
B1	Supply & Install Traffic Signals at Hwy 26 and Christie Beach Intersection				
a)	Supply and Install Traffic Signals and Illumination	1	LS	$ 590,000.00	$ 590,000.00
				Total	**$ 590,000.00**
C	**SCHEDULE C: TRAFFIC SIGNALS (OPERATIONALLY PREFERRED)**				
C1	Supply & Install Traffic Signals at Access A				
a)	Supply and Install Traffic Signals and Illumination	1	LS	$ 590,000.00	$ 590,000.00
				Total	**$ 590,000.00**

OPINION OF PROBABLE CONSTRUCTION COSTS

Recommended Operational Transportation Improvements

SCHEDULE A: ROADWORKS (WARRANTED)		$ 1,870,000.00
SCHEDULE B: TRAFFIC SIGNALS (WARRANTED)		$ 590,000.00
SCHEDULE C: TRAFFIC SIGNALS (OPERATIONALLY PREFERRED)		$ 590,000.00
	SUBTOTAL	**$ 3,050,000.00**
	Contingency Allowance (25%)	$ 770,000.00
	TOTAL ESTIMATED CAPITAL COSTS	**$ 3,820,000.00**

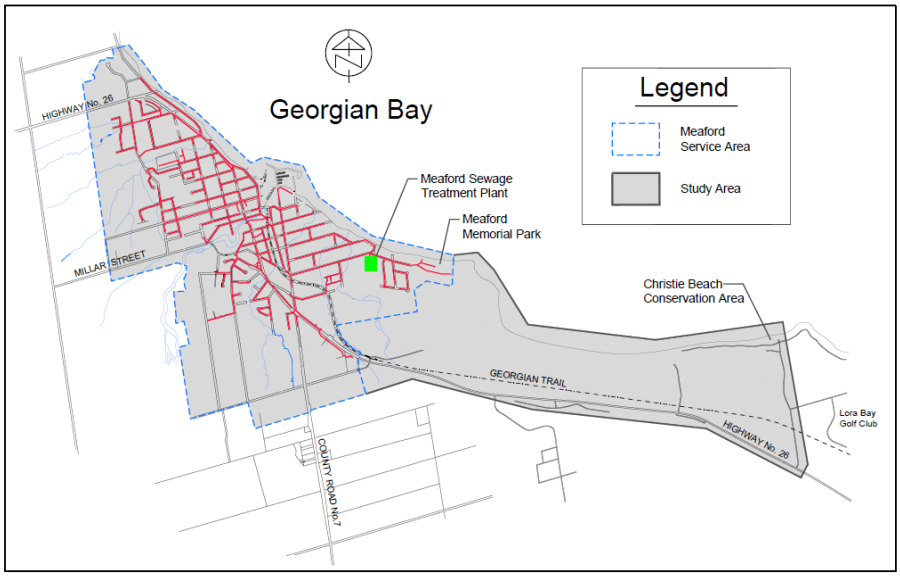
APPENDIX K

Copy of Meaford WWTP EA Addendum Notice of Commencement

Municipality of Meaford
Class Environmental Assessment
Meaford Wastewater Treatment Plant
NOTICE OF STUDY COMMENCEMENT

The Study

The Meaford Wastewater Treatment Plant (WWTP) was originally constructed in 1969 and since then has undergone a number of upgrades and modifications, with the most recent working being completed to retrofit the clarifier in 2020. A Class Environmental Assessment (EA) was completed in 2007 to address the long-term wastewater treatment requirements based on planned future growth. The previously filed 2007 Class EA recommended expansion of the existing WWTP, optimizing the existing WWTP processes, and reducing inflow and infiltration (I&I) and improve water conservation. The Class EA filed in 2007 has now expired, the Municipality of Meaford has determined the need to prepare a Class EA Addendum. The intent of the Addendum is to confirm or amend the preferred solution(s) identified in the original Class EA by addressing advances in technology, adjustments to phasing due to new population/flow projections, and to convey this information to a list of stakeholders and interested parties that has expanded since 2007. The Municipality of Meaford has retained Ainley Group to complete and document the Class EA Addendum in accordance with the Municipal Class Environmental Assessment Document, October 2000, as amended in 2015. The Meaford WWTP is located on a 3.9 Ha parcel of land at 35 Grant Avenue. The study area is defined as the current servicing area and surrounding areas projected for growth along Highway 26.



How to Get Involved

Public consultation is a key component of the Class EA process. Additional information will be made available once the 2007 Class EA's recommended solution(s) have been investigated and evaluated. Advance notice will be provided to allow all interested parties an opportunity to comment. For further information regarding the project, please contact either of the following members of the study team:

Chris Collyer
Manager/Chief Operator, Environmental Services
Municipality of Meaford
21 Trowbridge Street West, Meaford
519 538-1060 ext. 1500
ccollyer@meaford.ca

Preya Balgobin, P.Eng.
Senior Project Manager
Ainley Group
195 County Court Blvd., Brampton
(905) 452-5172 Ext. 209
balgobin@ainleygroup.com

Any input received during this process will be maintained on file for use during the project and may be included in project documentation. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

This notice was issued on September 9, 2021 and September 16, 2021.

FIGURES



Legend

= SUBJECT LANDS

Project

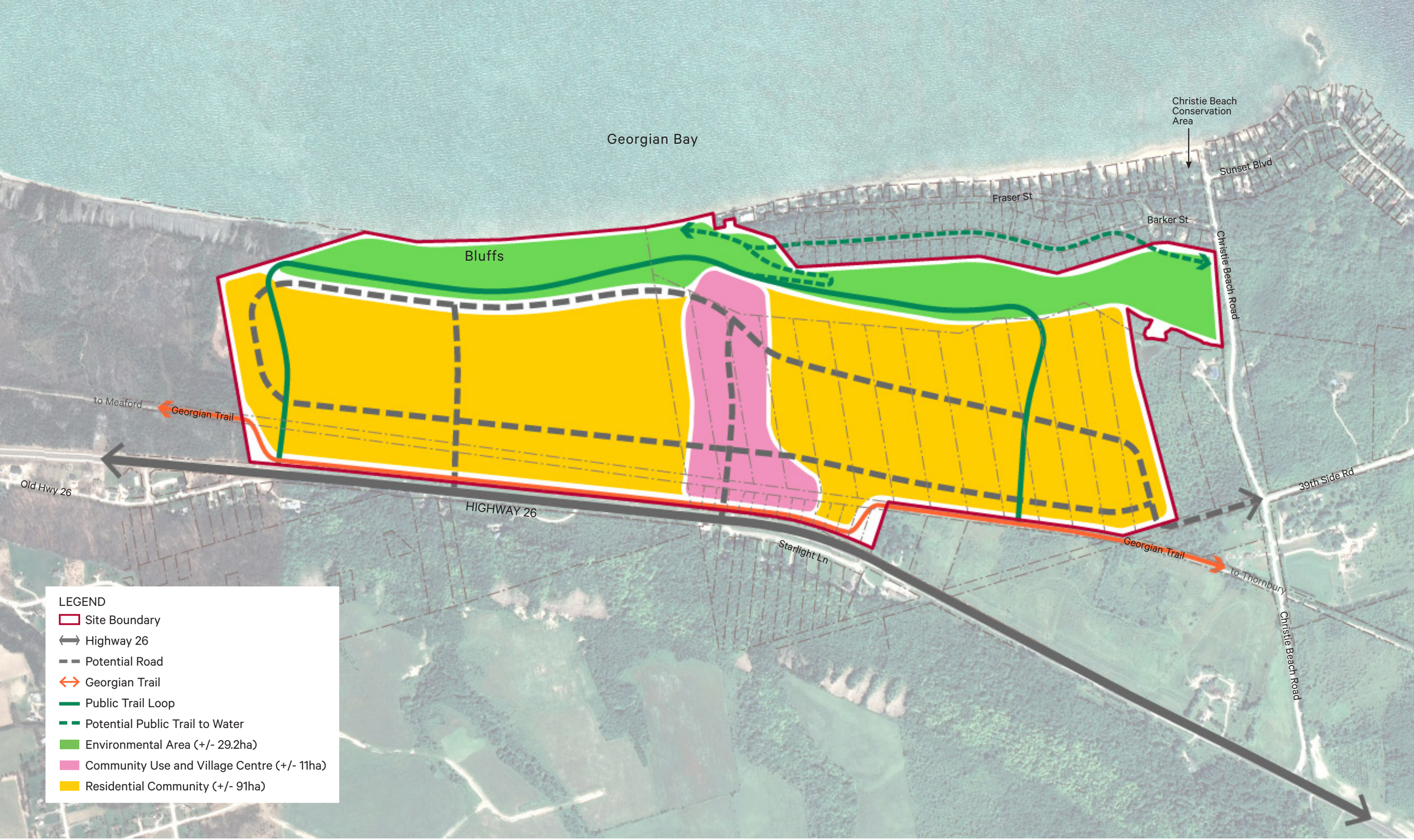
PARKBRIDGE MEAFORD
MUNICIPALITY OF MEAFORD

Drawing

SITE LOCATION

CROZIER CONSULTING ENGINEERS

Drawn By	N.L.	Design By	N.L.	Project	1046-4273
Scale	N.T.S.	Check By	J.K.	Drawing	FIG. 1



SvN
110 Adelaide St. E.
Toronto, Canada
M5C 1K9
416.593.6499
www.svn-ap.com

Christie Beach
Parkbridge Meaford Development
Master Plan
Meaford, Ontario

Community Structure Plan

ver. 21J

January 24, 2024

A01



Community Demonstration Plan

1. Community facility
2. Village green and retail/service commercial hub
3. Georgian Trail
4. Main spine
5. Views from bluffs
6. Bluff top trail loop
7. Other community trails
8. Potential trail to water
9. Local parks
10. Stormwater ponds
11. Residents recreation

Unit Summary

Total Units	+/- 1250
Single Detached	68%
Town House	28%
Mixed Use	4%

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Christie Beach
Parkbridge Meaford Development
Master Plan
Meaford, Ontario

Demonstration Plan

ver. 21J

January 24, 2024

A02



Village Centre and Community Hub Demonstration Plan

1. Community facility
2. Village green
3. Plaza for events and markets
4. Georgian Trail (Proposed)
5. Gerogian Trail activity node
6. Retail/service commercial
7. Patio and spill out space
8. Seating and trail amenities
9. Main spine
10. Special paving treatment
11. Trails
12. Watercourse with renaturalization
13. Residential

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Christie Beach
Parkbridge Meaford Development
Master Plan
Meaford, Ontario

Conceptual Village Centre Plan

ver. 21J

January 24, 2024

A03

34m
GEORGIAN TRAIL

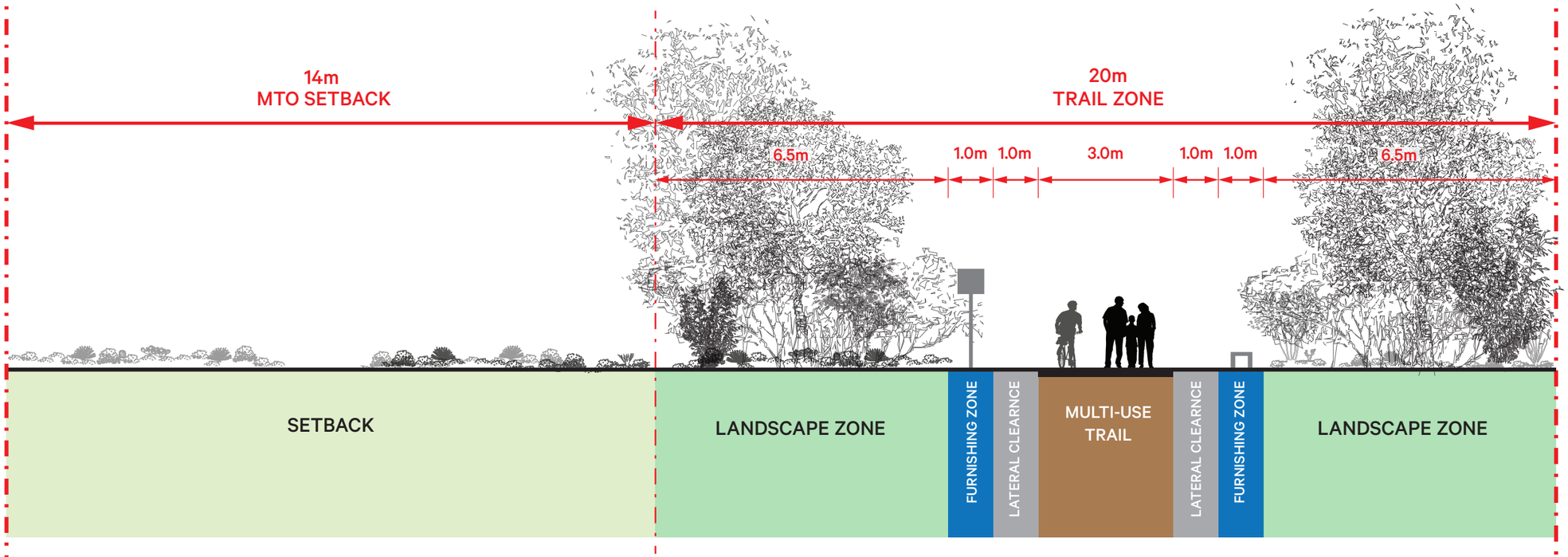
14m
MTO SETBACK

20m
TRAIL ZONE

HWY 26

COMMUNITY

6.5m | 1.0m | 1.0m | 3.0m | 1.0m | 1.0m | 6.5m



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Christie Beach
Parkbridge Meaford Development
Master Plan
Meaford, Ontario

Potential Georgian Trail - Cross Section

ver. 21J

January 24, 2024

A04



NOTES:
- LOCATION OF THE ON-SITE STORAGE AND BOOSTER PUMPING STATION IS SUBJECT TO CHANGE AS CONCEPT PLAN FOR DEVELOPMENT IS FINALIZED.
- TRUNK WATERMAIN ROUTE TO BE LOCATED WITHIN THE GEORGIAN TRAIL CORRIDOR

200 0m 200 400 600 800
SCALE: 1:10 000

LEGEND

SUBJECT LANDS

PR. TRUNK WATERMAIN ALIGNMENT MEAFORD

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART WITHOUT PRIOR WRITTEN CONSENT OF THIS OFFICE IS STRICTLY PROHIBITED.
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4. DO NOT SCALE THE DRAWINGS.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

TEMPORARY BENCHMARKS

Town

No.	ISSUE	DATE: MM/DD/YYYY
0	ISSUED FOR 1st DRAFT	10/13/2023

Engineer

Engineer

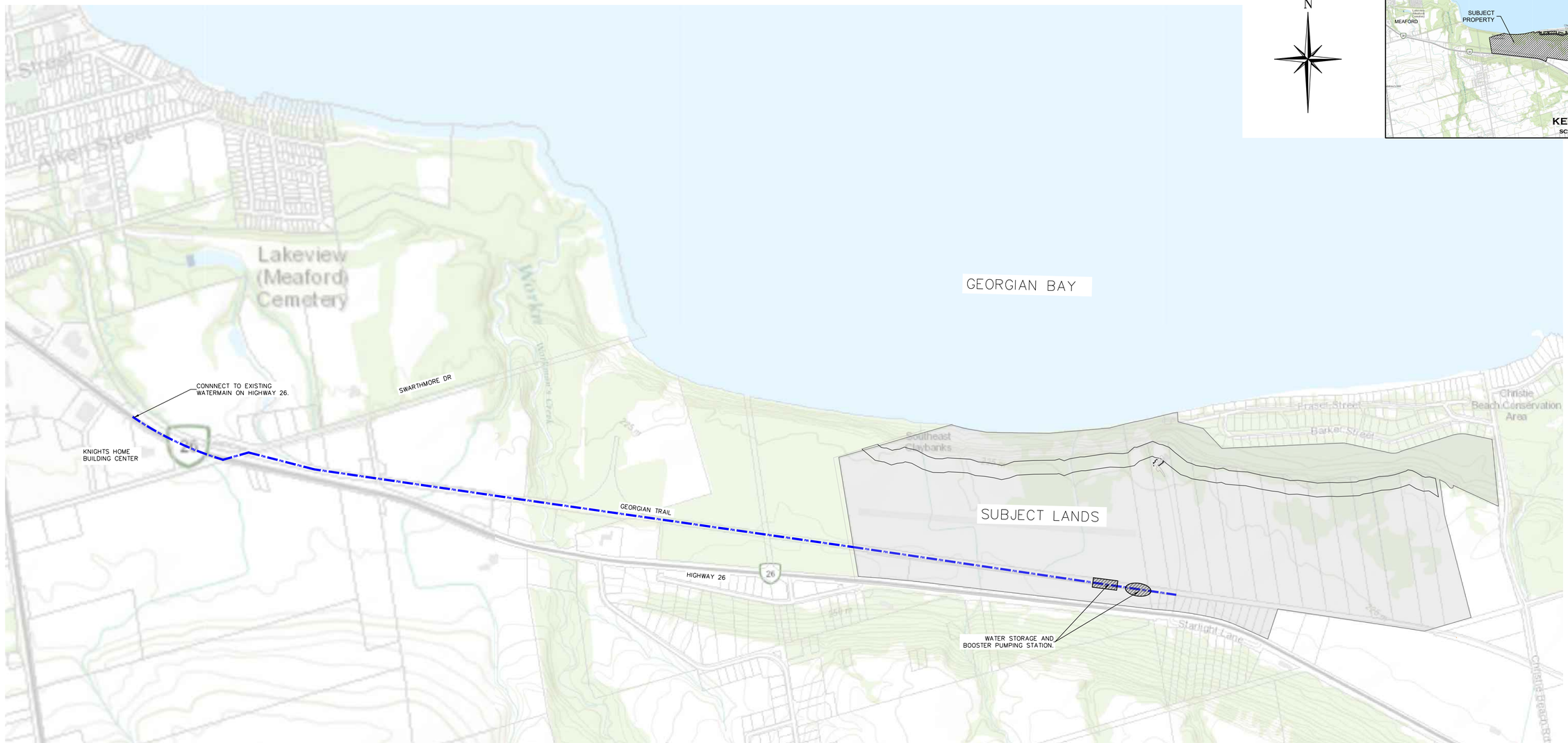
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project
PARKBRIDGE MEAFORD
MUNICIPALITY OF MEAFORD

Drawing
WATERMAIN OPTION D1A
CONNECTION TO MEAFORD
VIA GEORGIAN TRAIL TO MONTGOMERY ST

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
COLLINGWOOD, ON, L9Y 1A1
705-446-3510 T
705-446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project
JE	JE	1046-4273
Check By	Check By	Scale / Drawing
SO/JP	SO/JP	1:10000 / OPT D1A



NOTES:
- LOCATION OF THE ON-SITE STORAGE AND BOOSTER PUMPING STATION IS SUBJECT TO CHANGE AS CONCEPT PLAN FOR DEVELOPMENT IS FINALIZED.
- TRUNK WATERMAIN ROUTE TO BE LOCATED WITHIN THE GEORGIAN TRAIL, SWARTHMORE DRIVE, AND HIGHWAY 26.

150 0m 150 300 450 600
SCALE: 1:7500

LEGEND
SUBJECT LANDS
PR. WATERMAIN ALIGNMENT

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TEMPORARY BENCHMARKS

Town

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Engineer

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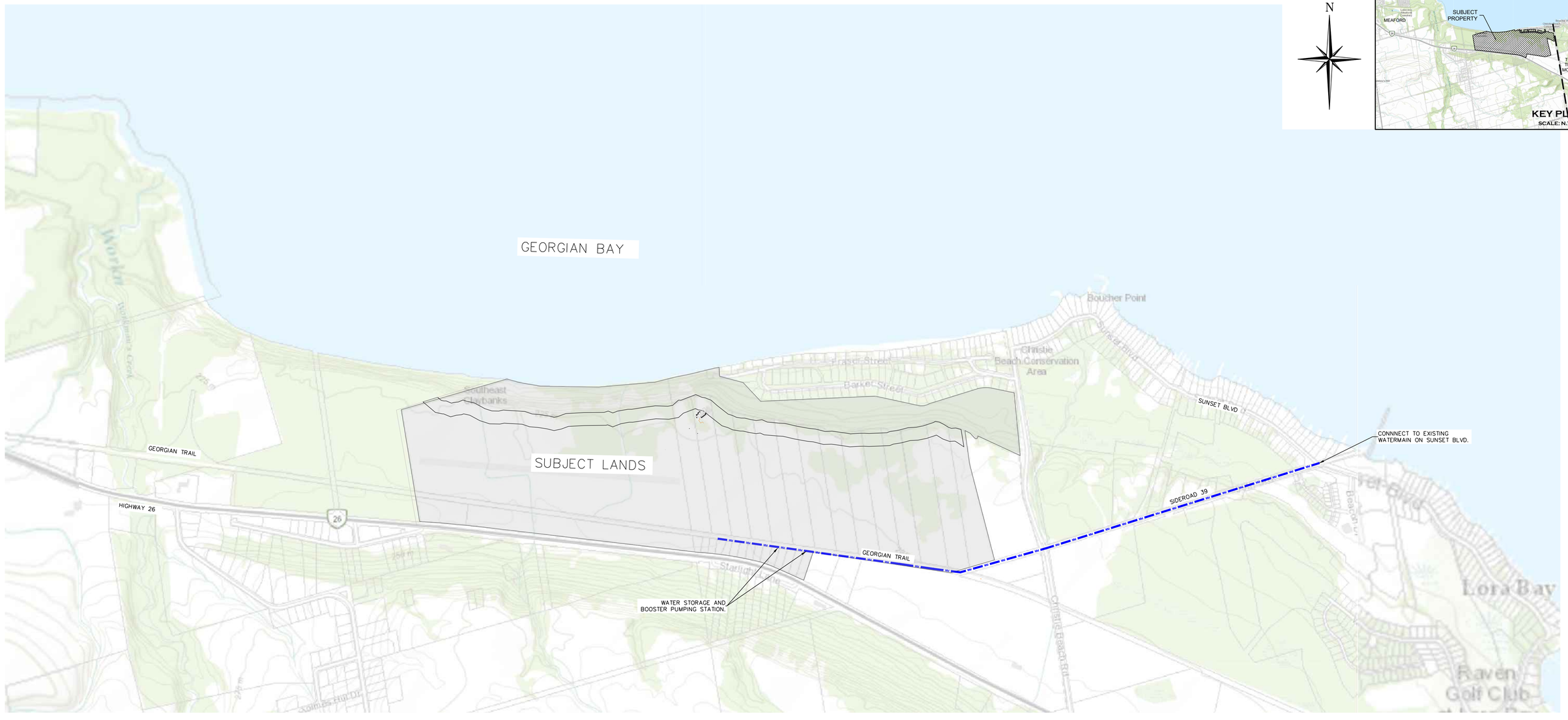
Engineer

Project
PARKBRIDGE MEAFORD
MUNICIPALITY OF MEAFORD

Drawing
SANITARY OPTION D1B
CONNECTION TO MEAFORD VIA GEORGIAN TRAIL TO KNIGHTS HOME BUILDING CENTER

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
COLLINGWOOD, ON, L9Y 1A1
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705-446-3520 F
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INFO@CFCROZIER.CA

Drawn By	Design By	Project
JE	JE	1046-4273
Check By	Check By	Scale H: 1:7500 V: 1:375 / Drawing
SO/JP	SO/JP	OPT D1B



NOTES:
- LOCATION OF THE ON-SITE STORAGE AND BOOSTER PUMPING STATION IS SUBJECT TO CHANGE AS CONCEPT PLAN FOR DEVELOPMENT IS FINALIZED.
- TRUNK WATERMAIN ROUTE TO BE LOCATED WITHIN THE GEORGIAN TRAIL & SIDEROAD 39.

10 0m 10 20 30 40
SCALE: 1:500

LEGEND

SUBJECT LANDS

PR. WATERMAIN ALIGNMENT

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TEMPORARY BENCHMARKS

Town

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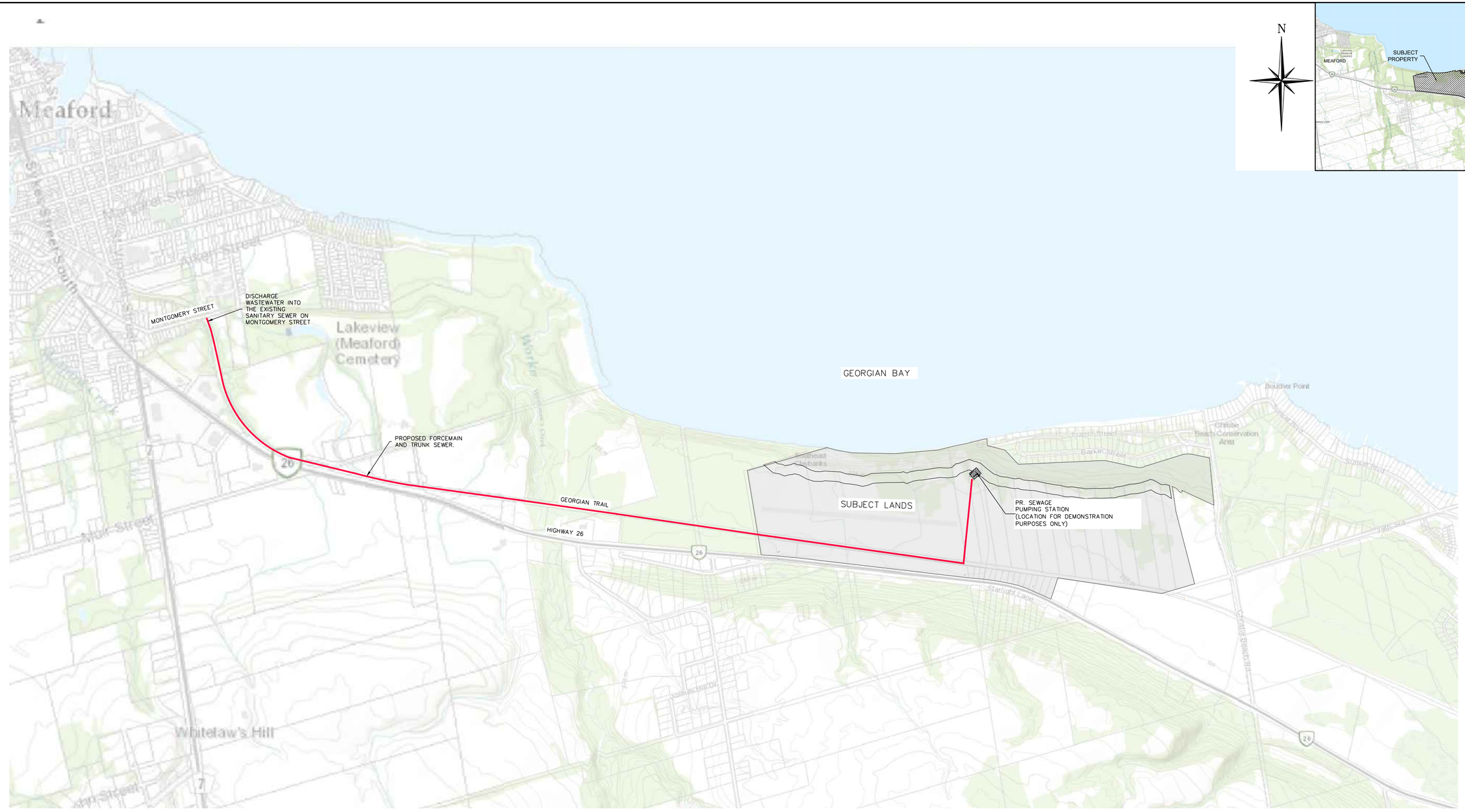
Engineer

Project
PARKBRIDGE MEAFORD
MUNICIPALITY OF MEAFORD

Drawing
WATERMAIN OPTION D2
CONNECTION TO TOBM
VIA 39th STREET

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
COLLINGWOOD, ON, L9Y 1A1
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705-446-3520 F
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INFO@CFCROZIER.CA

Drawn By	Design By	Project
JE	JE	1046-4273
Check By	Check By	Scale / Drawing
SO/JP	SO/JP	OPT D2



NOTES:
- LOCATION OF THE SEWAGE PUMPING STATION IS SUBJECT TO CHANGE AS THE CONCEPT PLAN FOR THE DEVELOPMENT IS FINALIZED.
- FORCEMAIN AND SEWER ROUTES TO BE LOCATED WTHIN THE GEORGIAN TRAIL CORRIDOR.
- EXPANSION OF THE MEAFORD WWTP IS REQUIRED TO SUPPORT THE DEVELOPMENT. A SEPARATE ENVIRONMENTAL ASSESSMENT IS BEING COMPLETED BY THE MUNICIPALITY OF MEAFORD

200 0m 200 400 600 800
SCALE: 1:10000

LEGEND

SUBJECT LANDS

CONCEPTUAL FORCEMAIN AND SEWER ALIGNMENT MEAFORD

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TEMPORARY BENCHMARKS

Town

No.	ISSUE	DATE: MM/DD/YYYY
0	ISSUED FOR 1st DRAFT	10/13/2023

Engineer

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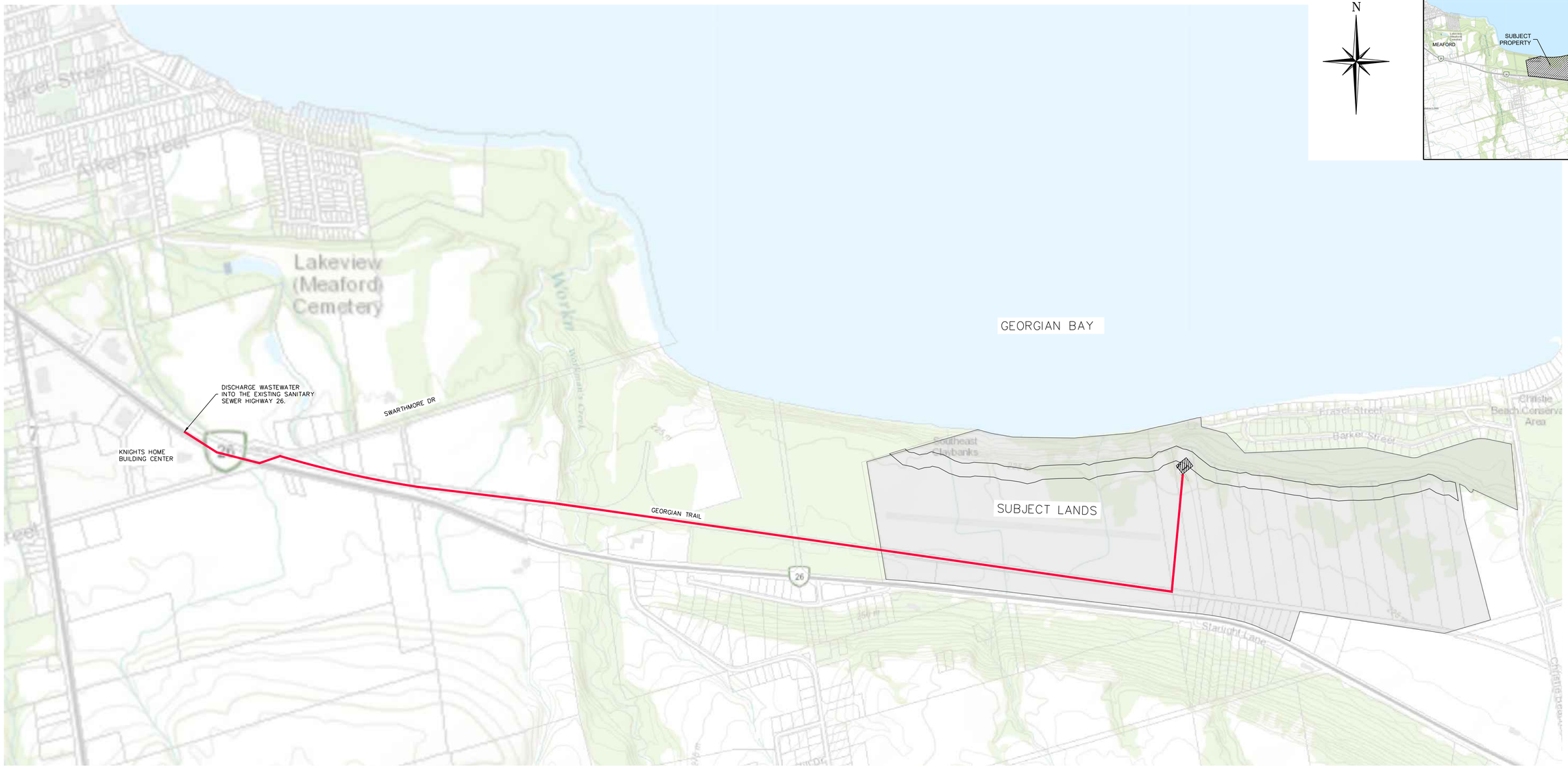
Engineer

Project
PARKBRIDGE MEAFORD
MUNICIPALITY OF MEAFORD

Drawing
SANITARY OPTION D1A
CONNECTION TO MEAFORD
VIA GEORGIAN TRAIL TO MONTGOMERY STREET

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INFO@CFCROZIER.CA

Drawn By	Design By	Project
JE	JE	1046-4273
Check By	Check By	Scale / Drawing
SO/JP	SO/JP	1:10000 / OPT D1A



NOTES:
- LOCATION OF THE SEWAGE PUMPING STATION IS SUBJECT TO CHANGE AS THE CONCEPT PLAN FOR THE DEVELOPMENT IS FINALIZED.
- FORCEMAIN AND SEWER ROUTES TO BE LOCATED WTHIN THE GEORGIAN TRAIL CORRIDOR, SWARTHMORE DRIVE, AND HIGHWAY 26 ROW.
- EXPANSION OF THE MEAFORD WWTP IS REQUIRED TO SUPPORT THE DEVELOPMENT. A SEPARATION ENVIRONMENTAL ASSESSMENT IS BEING COMPLETED BY THE MUNICIPALITY OF MEAFORD

LEGEND

SUBJECT LANDS

CONCEPTUAL FORCEMAIN AND SEWER ALIGNMENT

10 0m 10 20 30 40
SCALE: 1:500

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TEMPORARY BENCHMARKS

Town

No.	ISSUE	DATE: MM/DD/YYYY
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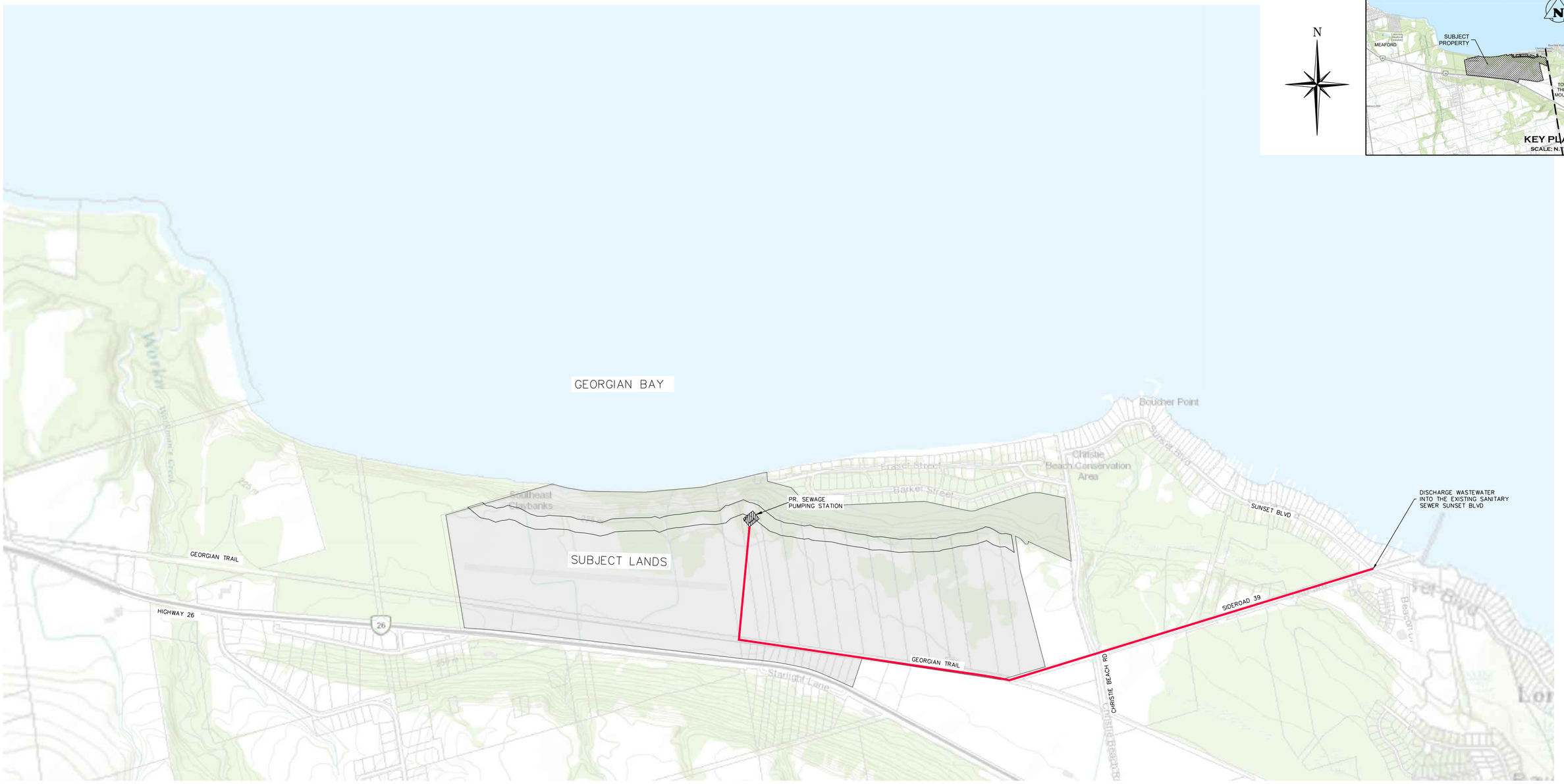
Engineer

Project
PARKBRIDGE MEAFORD
MUNICIPALITY OF MEAFORD

Drawing
OPTION D1B
CONNECTION TO MEAFORD VIA THE GEORGIAN TRAIL TO KNIGHTS HOME BUILDING CENTER

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
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Drawn By	JE	Design By	JE	Project	1046-4273
Check By	SO/JP	Check By	SO/JP	Scale	
				Drawing	OPT D1B



NOTES:
- LOCATION OF THE SEWAGE PUMPING STATION IS SUBJECT TO CHANGE AS THE CONCEPT PLAN FOR THE DEVELOPMENT IS FINALIZED.
- FORCEMAIN AND SEWER ROUTES TO BE LOCATED WTHIN THE EXISTING ROW.
- EXPANSION OF THE TOBM WWTP IS REQUIRED TO SUPPORT THE DEVELOPMENT. DESIGN OF THE WWTP EXPANSION HAS BEEN INITIATED WTH CONSTRUCTION SCHEDULED TO BE COMPLETE BY LATE 2024.

LEGEND

SUBJECT LANDS

CONCEPTUAL FORCEMAIN AND SEWER ALIGNMENT

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TEMPORARY BENCHMARKS

Town

No.	ISSUE	DATE: MM/DD/YYYY
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Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Engineer

Project
PARKBRIDGE MEAFORD
MUNICIPALITY OF MEAFORD

Drawing
OPTION D2
CONNECTION TO TOBM
VIA GEORGIAN TRAIL TO SIDEROAD 39

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
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705-446-3520 F
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Drawn By	Design By	Project
JE	JE	1046-4273
Check By	Check By	Scale / Drawing
SO/JP	SO/JP	OPT D2

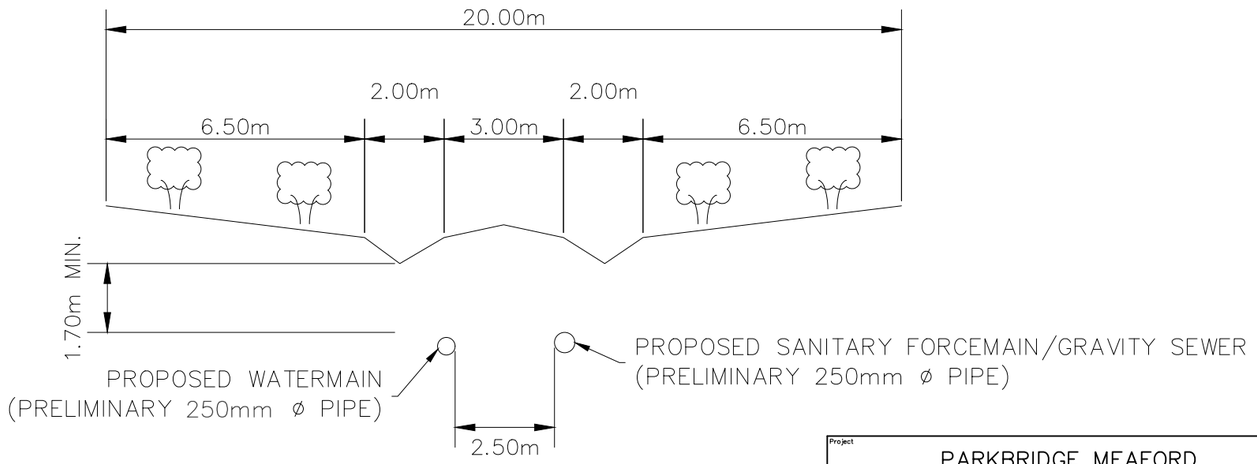


GEORGIAN TRAIL WEST OF CHRISTIE BEACH (FACING WEST)



GEORGIAN TRAIL EAST OF SWARTHMORE DRIVE (FACING EAST)

20.0m GEORGIAN TRAIL TYPICAL CROSS SECTION



NOTES:

1. ALL DISTURBED AREA WITHIN THE LIMITS OF CONSTRUCTION OF THE TRAIL SHALL BE RESTORED BACK TO EXISTING OR BETTER CONDITIONS.
2. DISTURBED AREAS SHALL BE CONTAINED WITHIN THE LIMIT OF THE TRAIL AND DITCHES WHERE FEASIBLE, TO MINIMIZE DISTURBANCE TO EXISTING VEGETATION.
3. PROPOSED SIZE AND ALIGNMENT OF WATERMAIN AND SANITARY FORCEMAIN WILL BE CONFIRMED THROUGH THE DETAILED DESIGN STAGE.
4. INSTALLATION ALONG THE GEORGIAN TRAIL COULD BE COMPLETED WITH A COMBINATION OF CONVENTIONAL AND TRENCHLESS TECHNOLOGIES TO MINIMIZE DISTURBANCE WHERE FEASIBLE.

Project
PARKBRIDGE MEAFORD
MUNICIPALITY OF MEAFORD

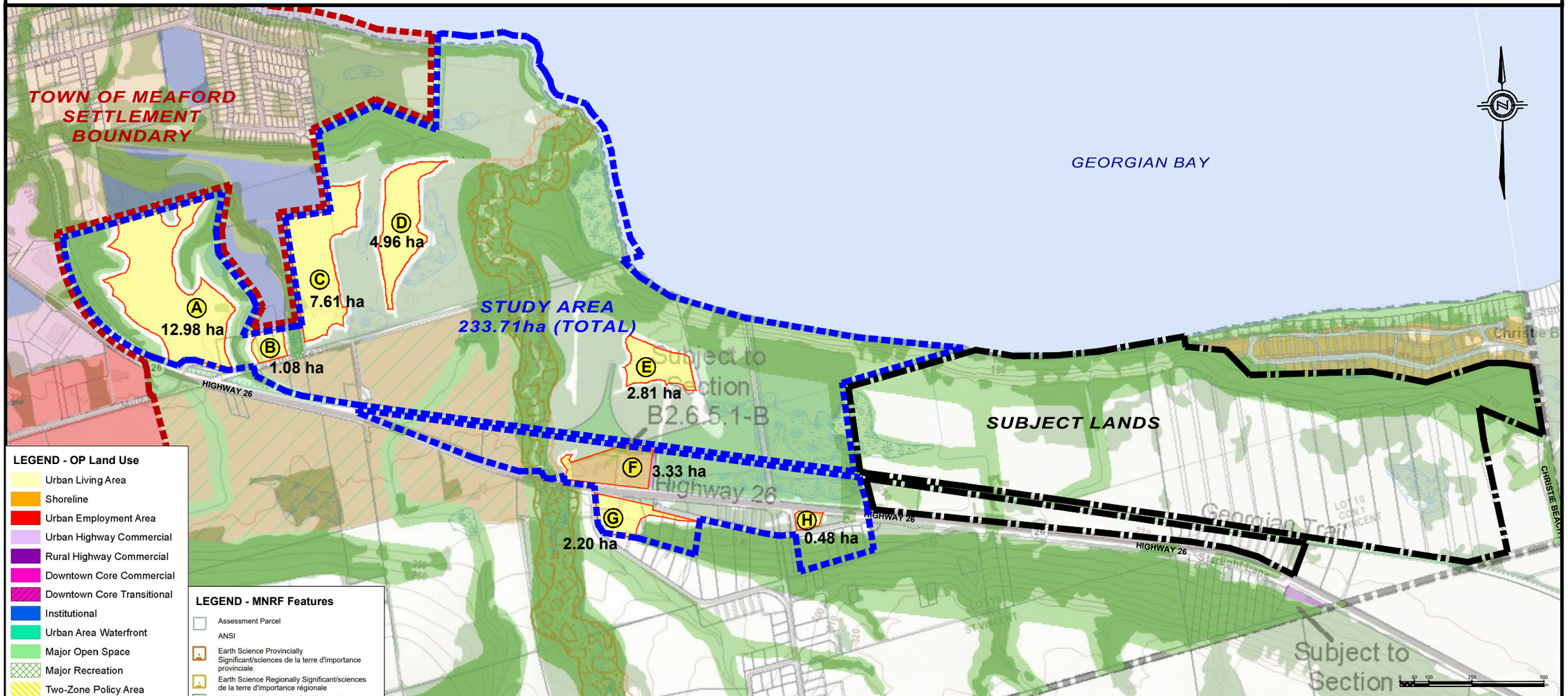
Drawing
PRELIMINARY GEORGIAN TRAIL
CROSS-SECTION

CROZIER CONSULTING ENGINEERS

Drawn By	M.C.	Design By	J.K.	Project	1046-4273
Scale	1:150	Date	MAR/12/2024	Check By	J.K.	Drawing	FIGURE 12

Comprehensive Review: Developable Land Inventory - Municipality of Meaford

County of Grey



LEGEND - OP Land Use

- Urban Living Area
- Shoreline
- Urban Employment Area
- Urban Highway Commercial
- Rural Highway Commercial
- Downtown Core Commercial
- Downtown Core Transitional
- Institutional
- Urban Area Waterfront
- Major Open Space
- Major Recreation
- Two-Zone Policy Area
- Rural
- Special Policy Area
- Agricultural
- Specialty Agricultural
- EP_Amend
- Waste Disposal Site - Closed
- Subject to Official Plan Section
- Schedule Boundary
- River/Stream

LEGEND - MNRF Features

- Assessment Parcel
- ANSI
- Earth Science Provincially Significant/sciences de la terre d'importance provinciale
- Earth Science Regionally Significant/sciences de la terre d'importance régionale
- Life Science Provincially Significant/sciences de la vie d'importance provinciale
- Life Science Regionally Significant/sciences de la vie d'importance régionale
- Evaluated Wetland
- Provincially Significant/considérée d'importance provinciale
- Non-Provincially Significant/non considérée d'importance provinciale
- Unevaluated Wetland
- Woodland
- Conservation Reserve
- Provincial Park
- Natural Heritage System

Development Area	Area (ha)
A	12.98 ha
B	1.08
C	7.61
D	4.96
E	2.81
F	3.33
G	2.20
H	0.48
TOTAL	35.45 ha

BOUSFIELDS inc.

22277 13sk July, 2023