APPENDIX B

BACKGROUND REVIEW

MEMORANDUM

To: The Town of Blue Mountains

From: Jamie Witherspoon, P.Eng.

Date: October 25, 2022

Re: 21-2061 – Long Point Road Sanitary Sewer and Craigleith Wastewater Treatment Plant Upgrades Municipal Class - Background Review

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The following memorandum is intended to be an interim update to review the available background information for the Long Point Road sanitary sewer and Craigleith Wastewater Treatment Plant Upgrades Municipal class EA. This information will be integrated into the final project report.

1 INTRODUCTION

1.1 Background

The Town of Blue Mountains (The Town) is a lower tier municipality within the County of Grey and is located on the southern shore of Georgian Bay. The Town's sanitary sewer collection and pumping infrastructure within the Craigleith area requires upgrades and enhancements to meet the projected demands of growth. Therefore, the Town has initiated a Municipal Class Environmental Assessment (Class EA) to evaluate and select the preferred solution to address the need for a gravity sewer, lift station, and a septage receiving station at the Town's Craigleith Wastewater Treatment Plant (WWTP).

The intent of this study is to support the Town in the development and assessment of technical solutions in line with the Town's goals and objectives. Each solutions will be assessed considering natural, social, technical and economic environments, and the preferred solution will be selected in consultation with regulatory agencies and the public to allow for the Town to proceed to implementation with a clearly identified scope, cost and risk in order to maximize value for the system.

1.2 Project Objectives

The primary project objectives will include the followings:

- Determine design demands for current and full build out of the Sewershed
- Develop technical solutions for the extension of the existing gravity sewer on the southern boundary of the intersection of Grey Road 21 and Highway 26 to the Craigleith WWTP.
- Develop technical solutions for the construction of a new lift station and septage receiving station to accommodate imminent near-term and build out needs.
- Generate evaluation criteria to assess the proposed alternatives in terms of technical feasibility, operational constraints, environmental impacts, social impacts, cultural/archaeological impacts, and construction and economical considerations

2 BACKGROUND REVIEW

2.1 Reference Material

The reference material used for the development of the study included:

- Class Environmental Assessment for the Craigleith Sewage Treatment Plant Expansion – Environmental Study Report, November 2009
- Grey County Road 21 – Trunk Sewer Record of Drawings, September 2011
- Functional Servicing and Stormwater Management Report - C.F. Crozier & Associates Inc, July 2018
- Castle Glen Development – Notice of Study Addendum Commencement, March 2022
- Windfall Functional Servicing Report - Tatham Engineering, June 2020
- Highway 26 Flow Monitoring – Tatham Engineering, January 2020.

2.2 Existing Sanitary Sewer

The existing County Road 21 Trunk Sewer was designed to collect and convey wastewater from existing and proposed development lands located within the Town adjacent to and upstream of Grey Road 21 (Osler Bluff Road).

Construction of approximately 2.5 km of the trunk sewer was completed in 2012. The sanitary sewer starts as a 450mm near County Road 19 and increases to a 525mm sewer at the corner of County Road 21 and Highway 26. The sanitary sewer then decreases to 300mm and extends west to the existing Craigleith Sewage Lift Station prior to being pumped to the Craigleith WWTP via dual force mains.

Additional information of the existing sanitary sewer and serviced area have been included in our Technical Memorandum #2.

2.3 Existing Craigleith Sewage Treatment Plant

The Craigleith Sewage Treatment Plant is an extended aeration treatment plant with a rated capacity of 8,133 m^3/day or 11,141 units based on the five-year rolling average daily flow (ADF) of 0.730 m^3/unit/day. Table 2-1 summarizes the annual average day flows (ADF) and the peak day flows (PDF) recorded at the plant in from 2020 to 2016.

The Craigleith Sewage Treatment Plant is equipped with:

- Screens and grit removal
- Three (3) aeration tanks
- Alum addition
- Three (2) secondary clarifiers
- Four (4) gravity sand filters
- UV Disinfection system
- Two-stage aerobic digester

Table 2-1 - Historical sewage flow and loads at the Craigleith Sewage Treatment Plant

	2020	2019	2018	2017	2016
Flow (m^3/d)					
Average	4,145	3,440	3,284	3,383	3,204
Peak	10,558	8,931	10,491	8,956	12,428
Sewage Loads (Kg/d)					
BOD	-	487	-	432	455
TSS	-	664	-	571	579
TP	-	7.99	-	10.3	9.5
TKN	-	62	-	61.5	48

The extended aeration is a modification of the conventional activated sludge treatment process. This form of treatment was selected to allow for the fluctuating loads associated with the recreational/seasonal residential area serviced by the plant, and to limit the quantity of sludge generated by the plant.

The selected treatment process produces a very low volume of sludge compared to a conventional activated sludge plant. Due to the sensitivity of the receiving body of water (the Mary Ward shoals area of Georgian Bay), the treatment process is required to produce a high-quality effluent with an extremely low level of phosphorus. In order to reduce phosphorus to the required level, it is necessary to apply a chemical coagulant (aluminum sulphate) and to provide tertiary treatment of the plant effluent prior to discharge. The tertiary treatment in this plant is achieved through the use of gravity sand filters. Effluent from the Craigleith STP is pumped through a 3,000 m long outfall into Nottawasga Bay (Georgian Bay).

The sludge and scum that have been collected in the clarifiers are pumped to the digestion process. Craigleith STP is equipped with a two-stage aerobic digester, with an approximate volume of 462 m^3 in the first stage and 231 m^3 in the second stage. The aerobic digester is equipped with coarse bubble diffused aeration system and supernatant decanting facility. A biosolids storage facility stores stabilized biosolids prior to application to agricultural fields.

2.4 Existing Septage and Leachate Pumping Station

The Craigleith Septage and Leachate Pumping Station (SLS) is located on Lakeshore Road East, Town of Blue Mountain and was originally constructed and commissioned in 1985. The SLS is currently operated under Amended Certificate of Approval # 6412-6FHR7G (CofA). The CofA indicates that the station has a design peak flow capacity of 180 L/s. The SLS is the main lift station for all the sanitary collection system servicing the Craigleith area and is the sole SLS discharging sewage to the Craigleith Sewage Treatment Plant.

The existing Septage and Leachate Pumping Station is an exterior station added to the Pumping Station in 2009 and it is located at the western exterior wall of the facility. In particular,

- **The septage receiving station** is characterized by an analog screen data logger and control panel, a 100 mm diameter pipe with an electric actuated valve, magnetic flow meter and wall-mounted transmitter.
- **The leachate receiving station** is characterized by a 150 mm diameter pipe, without controls or flow measurements.

A review of background information suggested that the volume of septage is approximately a third of the volume of leachate. Specifically, the receiving station collects between 283 m^3/month to 1,553 m^3/month of septage, and 635 m^3/month to 5,506 m^3/month of leachate. Both the septage and leachate are discharged through hatches into the wet well where a channel monster grinder is installed.

2.5 Subconsultant Investigations

2.5.1 Archaeological Study

Within the study area, the Archaeological Assessment (Stage 1) identified:

- **Areas of Archaeological Potential:** These areas include densely wooded areas, manicured yard situated around the Craigleith WWTP and overgrown vegetation. Test pit survey at five-metre intervals will be required during Stage 2 AA to confirm the archeological potential of those areas.
- **Physical Features of No or Low Archaeological Potential:** Those areas include the tributaries draining into Lake Huron (Georgian Bay) and a pond. Although exhibiting low to no archaeological potential, on-site confirmation and documentation of the actual condition and exact extent of these features will be required during a Stage 2 AA.
- **Identified Deep and Extensive Disturbances:** The construction of these features would have resulted in severe damage to the integrity of any archaeological resources which may have been present within their footprints and, as such, are exempt from Stage 2 survey. On-site confirmation and documentation of the actual condition and exact extent of the disturbances will, however, be required during a Stage 2 AA.

A map of the aforementioned areas has been reported in Figure 2-1.

Figure 2-1 - Stage 1 AA results of the study area

2.5.2 Ecological Study

An ecological study of the project area and adjacent lands was undertaken to assess the potential impact of proposed changes to terrestrial natural heritage features. For this purpose, Species at Risk (SAR) Survey was carried out to provide detailed and reliable information on SAR presence or absence, suitable habitat, habitat features, and to ensure that proposed works do not contravene the Endangered Species Act (ESA).

The SAR assessment field investigation reported that although the tree species are suitable roosting habitat species, the overall roost quality of the trees is poor and therefore the Site does not provide suitable SAR bat maternity roosting habitat. However, to prevent a contravention of the ESA (2007) tree/vegetation removals can be undertaken between October 1st and March 31st, which is outside of the bat timing window (April 1 to September 30).

Endangered, rare or threatened species were not identified during the site investigation; however, the forested habitats found adjacent of the Site and the woodland on the south portion of the WWTP property provide moderate habitat potential for Canada Warbler, Eastern Wood-Pewee and Wood Thrush, all species of Special Concern on the Species at Risk in Ontario List. Per the Migratory Birds Convention Act (MBCA), tree/vegetation removals shall occur outside the active breeding bird period

identified as April 1 to August 31. For additional details, the ecological report has been included in **Appendix C.**

3 PROBLEMS IDENTIFICATION

3.1 Sanitary Sewer and Sewage Pumping Station

Craigleith Wastewater Treatment Plant collection system has approximately 5,000 units connected to it, and it consists of 48 kilometers of pipe network. Due to the upcoming growth of the Craigleith area and adjacent areas, the current sanitary sewer needs to be upgraded to meet future growth. To this end, it is fundamental to accurate determine future raw sewage flows in order to properly meet the upstream capacity requirements for the future growth. The project area also experiences seasonal population variations which significantly impact the wastewater generation rate.

With regard to the Craigleith Pumping Station, the following are the main challenges that needs to be addressed at the facility:

- **Existing Capacity:** The existing lift station was not intended to convey County Rd 21 sanitary flow permanently. Therefore, it does not have sufficient capacity to service the projected amount of wastewater for the service area, which includes Craigleith and the development areas of Osler Bluff and Castle Glen, as well as lands that front the servicing in the Town of Collingwood and the Township of Clearview.
- **Operational Challenges:** The existing pumps at the facility are operating outside of the recommended operating range about 90% of the time which leads to recirculation and seal failure. A highly inefficient pump will waste energy when moving fluid in a system, resulting in higher electricity costs to power the pump. Currently, the sewage pumping operation represents 63% of the energy consumed at the Craigleith SLS being the largest energy consumer of the facility.

3.2 Septage and Leachate Receiving Station

The following are the main challenges associated with the septage and leachate receiving station at the Craigleith Pumping Station:

- Access to the facility

The existing Craigleith Main Lift Station is an exterior station located proximate to both current and future residential properties and near to the Highway 26 in a location where septage hauling vehicles need to complete relatively complex movements to navigate the site. Background information suggested that approximately 700 round trips are made annually by the haulage trucks from the Landfill to the Craigleith Pumping Station which results in a significant amount of traffic in the area. The truck traffic also impacts the Georgian Trail crossing in the vicinity of the facility. Furthermore, as the residential area to the south of the Craigleith pumping station is expected to increase, the truck traffic for the disposal of leachate would be a source of logistic difficulties in the area.

- Odour complaints

Septage has an offensive odour, and septage processing can release odours to the atmosphere. As the facility is designed to receive septage and leachate, given the current proximity of houses, this activity

resulted in an increase in odour complaints. Although attempts have been made to reduce the odour and associated complaints, there has been limited success with aeration and chemical treatments. Due to the expected growth of residential units to the south of the pumping station, it is anticipated that the amount of odour complaints would increase.

- Operational challenges

Treatment operation and maintenance: The strength of raw septage in comparison to raw domestic sewage is one of the biggest challenges faced during treatment. Indeed, septage contains significant levels of grease, scum, grit, rocks, rags, plastics and other debris. The high solids content causes significant ragging and subsequent downtime of pump and treatment equipment while the high concentrations of nutrients may cause corrosion in the pipes and processing equipment. Cleaning and maintaining process equipment is fundamental. However, the existing receiving station does not have means to remove rocks, large debris and rags which cause problems with operation of the grinder and clog the sewage pump impellers. Periodically, the grinder unit is removed from the wet well and shipped to the manufacturer for replacement of its grinding parts. Removing and reinstalling the grinder is time consuming and costly. Pump impellers have been replaced frequently. Both pumps need to be taken out of service on a regular basis for maintenance.

Inability to balance flow into the system: The bulk delivery of leachate in large truck load quantities at the facility does not allow for good mixing and dilution of the waste. Furthermore, in the past years, both the Town's wastewater treatments plants have been negatively impacted to the delivery of leachate in truck load quantities to the point of threatening the Town's ability to maintain compliance with the Plants' Environmental Compliance Approvals. As leachate from "young" wastes is characterized by high chemical oxygen demand (COD) and biological oxygen demand (BOD) values (and by high ratios of BOD to COD), low pH and initially high in metals, the delivery of leachate in truck load quantities creates a situation where the Plant's biology is impacted due to the shock loading of high strength wastewater.

4 SUMMARY

The following is a summary of the background review and investigations to date relative to the criteria and constraints for the Class EA Report:

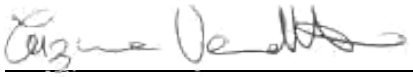
- Contributing Area to the County Road 21 Trunk Sewer: 920 ha
- Existing County Road 21 Sanitary Sewer Capacity (80% Full) – 220 L/s
- Natural Environmental Constraints:
    - Linear Infrastructure: The SAR assessment field investigation reported that the overall roost quality of the trees is poor and therefore the Site does not provide suitable SAR bat maternity roosting habitat. However, to prevent a contravention of the ESA (2007), tree/vegetation removals shall occur between October 1st and March 31st.
    - Wastewater Treatment Plant Site: Rare or threatened species were not identified during the site investigation; however, the woodland on the south portion of the WWTP property provide moderate habitat potential for Canada Warbler, Eastern Wood-Pewee and Wood Thrush which are species of Special Concern on the Species at Risk in Ontario List. Tree/vegetation removals shall occur outside the active breeding bird period identified as April 1 to August 31.

- Archaeological Constraints
  - Linear Infrastructure: Disturbances were documented within the roadbed and gravel shoulders of Long Point Road, Brophy's Lane and Highway 26, the gravel and asphalt driveways, and concrete culverts. On-site confirmation and documentation of the actual condition and exact extent of the disturbances will be required during a Stage 2 AA.
  - Wastewater Treatment Plant Site: Densely wooded areas and manicured yard situated around the Craigleith WWTP will require a Test pit survey at five-metre intervals during Stage 2 AA to confirm the archeological potential of those areas.
- Geotechnical/Hydrogeological Conditions
  - The proximity of Georgian Bay to the project area results in concerns related to the possibility of localized dewatering areas during potential excavation due to the proximity of Georgian Bay to the site.
  - Bedrock conditions are identified near the connection point of Grey Rd and Highway 26. Therefore, there are concerns with respect to constructability and hydrogeological impacts of the proposed site and the impact of bedrock on construction.
  - Geotechnical investigations are in progress to identify potential dewatering requirements and bedrock conditions. Findings from the geotechnical investigations will be added to the report at a later date.

5 NEXT STEPS

This memorandum is intended as an interim deliverable to document the background information for the Class EA process. This information will be integrated into the Project File.

WT INFRASTRUCTURE



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