June 5, 2019
MTE File No.: 31950-507

Sent via email: mike.crough@ibigroup.com

Mr. Mike Crough
IBI GROUP
Suite 200, East Wing
360 James Street North
Hamilton, ON L8L 1H5

Dear Mr. Crough:

Re: Preliminary Wastewater Treatment and Disposal System Capacity Review
Sisters of St. Joseph Convent
574 Northcliffe Avenue, Hamilton, Ontario

1.0 INTRODUCTION

MTE Consultants Inc. (MTE) was retained by the Sisters of St. Joseph of Hamilton (SOSJ) to complete a wastewater treatment and disposal system capacity review for a proposed development located at 574 Northcliffe Avenue in Hamilton, Ontario (hereby referred to as the "Site"). The proposed development includes the conversion of an existing on-site structure into a private secondary school, complete with aboveground parking, a cafeteria, and a future gymnasium facility. The purpose of this assessment is to estimate capacity requirements associated with the proposed development.

For the readers' benefit, the Ontario Ministry of the Environment, Conservation, and Parks (MECP) was previously named the Ontario Ministry of the Environment (MOE) and the Ontario Ministry of the Environment and Climate Change (MOECC). For ease of discussion in this letter, "MECP" is used to represent this provincial ministry and is inclusive of MOE and MOECC.

This letter makes reference to and should be read in conjunction with the following documents:

- *Motherhouse Sewage Treatment and Disposal System Design Brief* prepared by The Walter Fedy Partnership (Walter Fedy) dated March 2003; and
- *Wastewater Treatment System Capacity Review – Temporary Use Letter* prepared by MTE dated January 29, 2019.

2.0 BACKGROUND

As previously described, the Sisters of St. Joseph Motherhouse facility is located at 574 Northcliffe Avenue in Hamilton. This 19.61 hectare property is located northwest of the major intersection of Highways 6 and 403, and is shared by the Precious Blood Monastery and the Sisters of St. Joseph Motherhouse. The site is adjacent to Cootes Paradise and overlooks Long Pond, a naturalized area of the Royal Botanical Gardens to the south.

The Site, comprised of the SOSJ motherhouse building and the adjacent green space, is currently serviced by an on-site wastewater system (the "Works") which discharges to two subsurface disposal beds (North Bed and South Bed) and has a rated capacity of 30,000 L/day. The existing Works operates under the Amended Environmental Compliance Approval (ECA) #0852-A9CJV2. The location of the Site and approximate extents of the disposal beds has been illustrated on **Figure 1**. The current use at the Site is a religious motherhouse that includes 22 full-time residents and 34 staff members; including around the clock care for certain elderly residents. It is noted that Sisters of the Precious Blood Monastery is located in the northern of the Site, however this structure is serviced by a separate sewage disposal system and is therefore not included within the scope of this letter.

The proposed expansion of the Works is associated with the proposed conversion of the existing motherhouse structure into a private secondary school by Columbia International College (CIC). It is understood that the IBI Group (IBI) is currently preparing a Temporary Use By-Law application to allow for the conversion of the motherhouse to an interim overnight student dormitory/residence, for an initial maximum period of three years. However, ultimately, the long term use for the Site includes changing the use to a private secondary school.

3.0 PRELIMINARY WASTEWATER TREATMENT SYSTEM CAPACITY REVIEW

The objective of this capacity review is to estimate capacity requirements associated with the proposed private secondary school and assess wastewater system expansion options and strategies, if needed.

3.1 Daily Design Flow

Based on information provided to MTE by IBI and CIC, the motherhouse structure is to initially be converted to an interim overnight student dormitory/residence capable of accommodating 138 students and 19 on-site shift staff for maximum of three years. The Site will then be converted into a private secondary school which includes a newly constructed cafeteria and a proposed gymnasium facility. It is understood that the private secondary school is expected to have any occupancy of 1,000 students and 35 non-teaching staff.

As part of this capacity review, MTE carried out a comparison of design flow estimates for the interim overnight student dormitory and long term secondary school scenario in order to identify which of the two scenarios was expected to generate greater daily sewage flows. Based on values presented in the *Wastewater Treatment System Capacity Review – Temporary Use* letter (MTE, 2019), MTE estimates the interim overnight student dormitory/residence scenario will generate daily sewage flows of approximately 42,600 L/day. A summarized breakdown of the interim overnight student dormitory/residence has been presented in **Table 1**:

TABLE 1: TOTAL DAILY SEWAGE FLOW – INTERIM DORMITORY/RESIDENCE

Occupant Type	Quantity	OBC Flow Design (L/d)	OBC Design Total (L/d)
Student/Overnight Residence	138	300	41,400
House Parents	5	75	375
Security Staff	2	75	150
Kitchen Staff*	3	75	225
SOSJ Administration Staff	6	75	450
		TOTAL	**42,600**

NOTE: * - assumes six staff with half shifts for a full-time equivalent of three employees

Design flows associated with the secondary school are based on values published in the Ontario Building Code (OBC). The OBC design criteria for students are 30 L/day (which accounts for their teacher as well) and 50 L/day for non-teaching employees. Furthermore, the daily design flow increases by 30/L/student to account for the presence of a cafeteria and an additional 30/L/student to account for the construction of the gymnasium facility. However, for the purpose of this assessment, MTE has assumed that a maximum of 60 students/day would utilize the shower facilities. A summarized breakdown of this design flows has been presented in **Table 2**:

TABLE 2: TOTAL DAILY SEWAGE FLOW – PRIVATE SECONDARY SCHOOL

Occupant Type	Quantity	OBC Flow Design (L/d)	OBC Design Total (L/d)
Students	1,000	30	30,000
With addition of cafeteria	1,000	30	30,000
With addition of gymnasium	60*	30	1,800
Non-teaching employee	35	50	1,750
		TOTAL	**63,550**

NOTE: * - MTE assumes that 60 students/day would utilize the shower facilities

Based on the proposed occupants and published OBC design flow values, MTE estimates the proposed private secondary school will generate daily sewage flows of approximately 65,000 L/day (value rounded up to be conservative). Estimated daily sewage values therefore exceed the current 30,000 L/day capacity of the Works. As a result, expansions to the Works will be required to meet the anticipated 35,000 L/day increase in demand.

3.1 Septic Tank

As per section 8.2.2.3 of the OBC, the minimum capacity of the septic tank for a non-residential site shall not be less than three (3) times the daily design sewage flows. Therefore the required minimum total volume capacity of the septic tank(s) to service the site including the new building addition is 195,000 litres. Based on this value, alterations will have to be made to the existing on-site tanks to satisfy the OBC requirements.

3.2 Disposal Beds

Given the estimated increase in wastewater flows (35,000L/day) and the existing conditions of the Site, MTE recommends the use of shallow buried trench disposal beds to minimize the footprint of the disposal bed(s). Based on this, MTE estimates that an area of approximately 4,000 m^2 will be required to construct new disposal beds capable of satisfying the design flow. A review of the **Figure 1,** and drawing C2-1 of the *Motherhouse Sewage Treatment and Disposal System Design Brief*, identified two potential bed locations (Expansion Bed 1 and 2) with a combined total area in excess of 4,000 m^2. Expansion Bed 1 (EB1) is proposed to be located in the northwest portion of the site, west of the existing North Bed. Expansion Bed 2 (EB2) is proposed to be located in the east portion of the Site and is south of the existing North Bed. The approximate locations of these proposed expansion beds are illustrated on **Figure 2**. Based on preliminary calculations, it is expected that sufficient space is available on the Site to accommodate the proposed expansions to the existing wastewater treatment system and disposal beds.

3.3 Required Approvals

On-site wastewater systems with a capacity greater than 10,000 L/day are classified as Large Subsurface Sewage Disposal Systems (LSSDS) and require an ECA through the MECP. As previously noted, the Site currently has an ECA for the existing LSSDS (ECA #0852-A9CJV2). It was determined that expansions to the existing LSSDS are required as part of the Site conversion process. As such, an expansion of the existing LSSDS to accommodate for the increased design flow would therefore require an Amendment to the existing ECA. The steps required to amend the ECA are outlined as follows:

i. Preliminary engineering to confirm the footprint required and assist in developing the long term site layout (Site Plan);
ii. Hydrogeological Assessment including Reasonable Use Nitrate Impact Assessment to confirm wastewater system effluent criteria;

iii. Site Plan Approval through City of Hamilton;
iv. Conservation Authority Approval of proposed site alterations;
v. Detailed engineering design of expansion to the Works; and
vi. Application for an Amended ECA.

It should be noted that the ECA Amendment process is required by the MECP and generally required 12 to 18 months or more to complete.

3.4 Conclusions

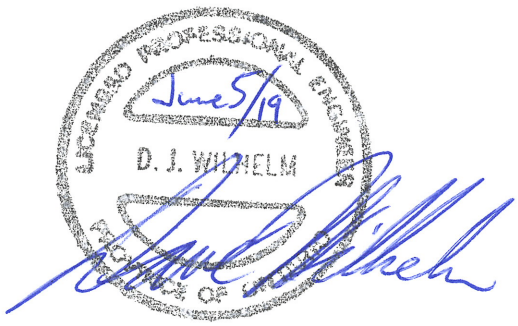
MTE carried out a preliminary capacity review of the existing wastewater treatment system in support of a proposed secondary school, complete with a cafeteria and gymnasium facility. The proposed school was modelled to accommodate 1,000 students and 35 non-teaching staff. MTE estimates daily design flows of approximately 65,000 L/day based on the Ontario Building Code. The Site currently has an existing wastewater treatment and disposal system with a rated capacity of 30,000 L/day which will require expansion in order to satisfy the estimated 35,000 L/day increase in demand. Expansions to the existing system include the construction of two (2) shallow buried trench disposal beds with a combined total area of approximately 4,000 m^2 and alterations to the existing septic tank in order to hold a minimum total volume of 195,000 litres.

Based on the preliminary calculations outlined in this assessment, MTE has confirmed that there is sufficient space available on the Site to accommodate an expanded wastewater treatment and disposal system capable of servicing the proposed development. The proposed expanded Works would have sufficient capacity for the 138 students during the interim residential dormitory period and the 1,000 students associated with the long term private secondary school.

We trust that the information provided above meets your present requirements. Should you have any questions concerning this letter, please do not hesitate to contact the undersigned at your convenience.

Yours truly,

MTE CONSULTANTS INC.



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FAH:dem
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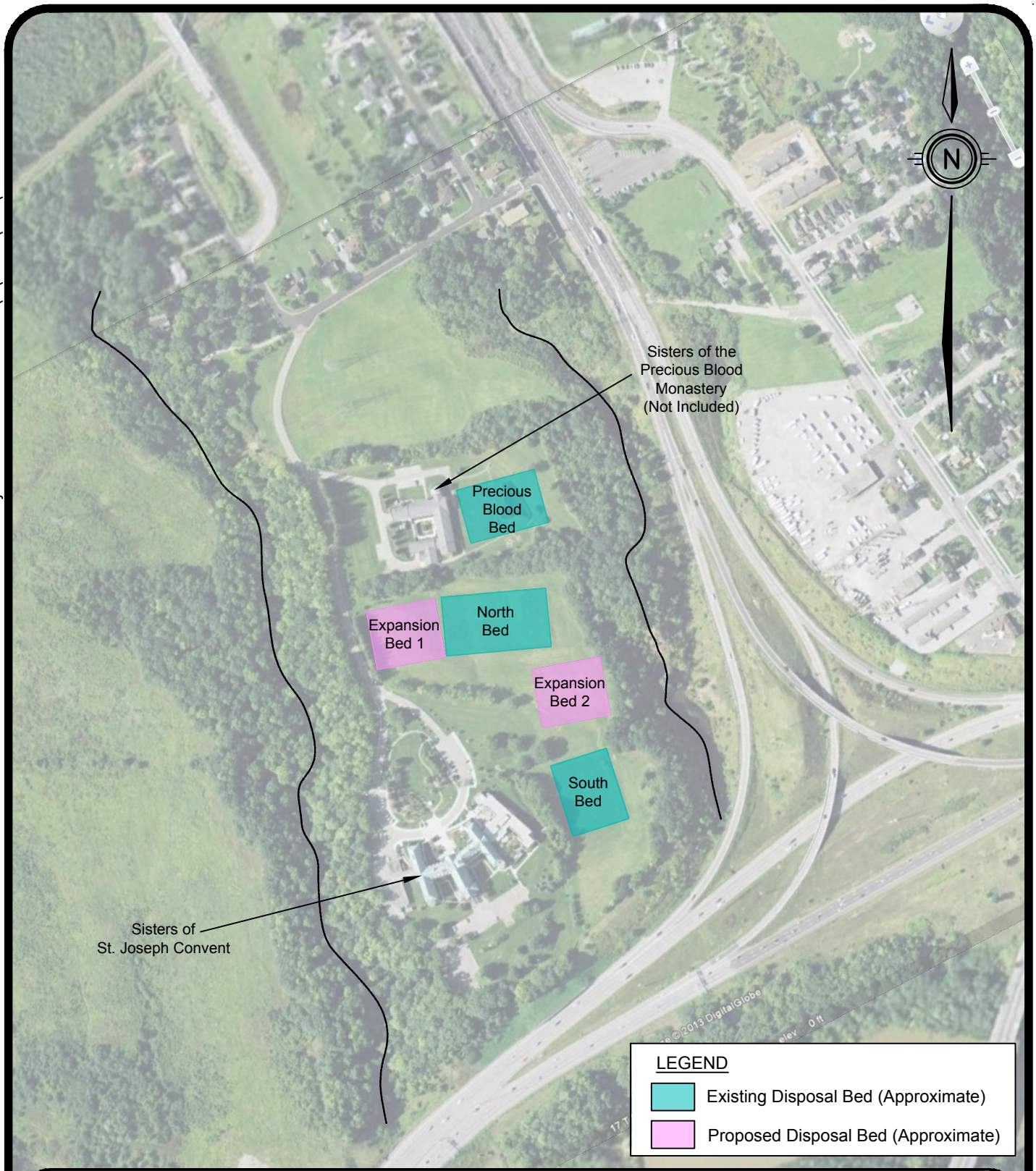
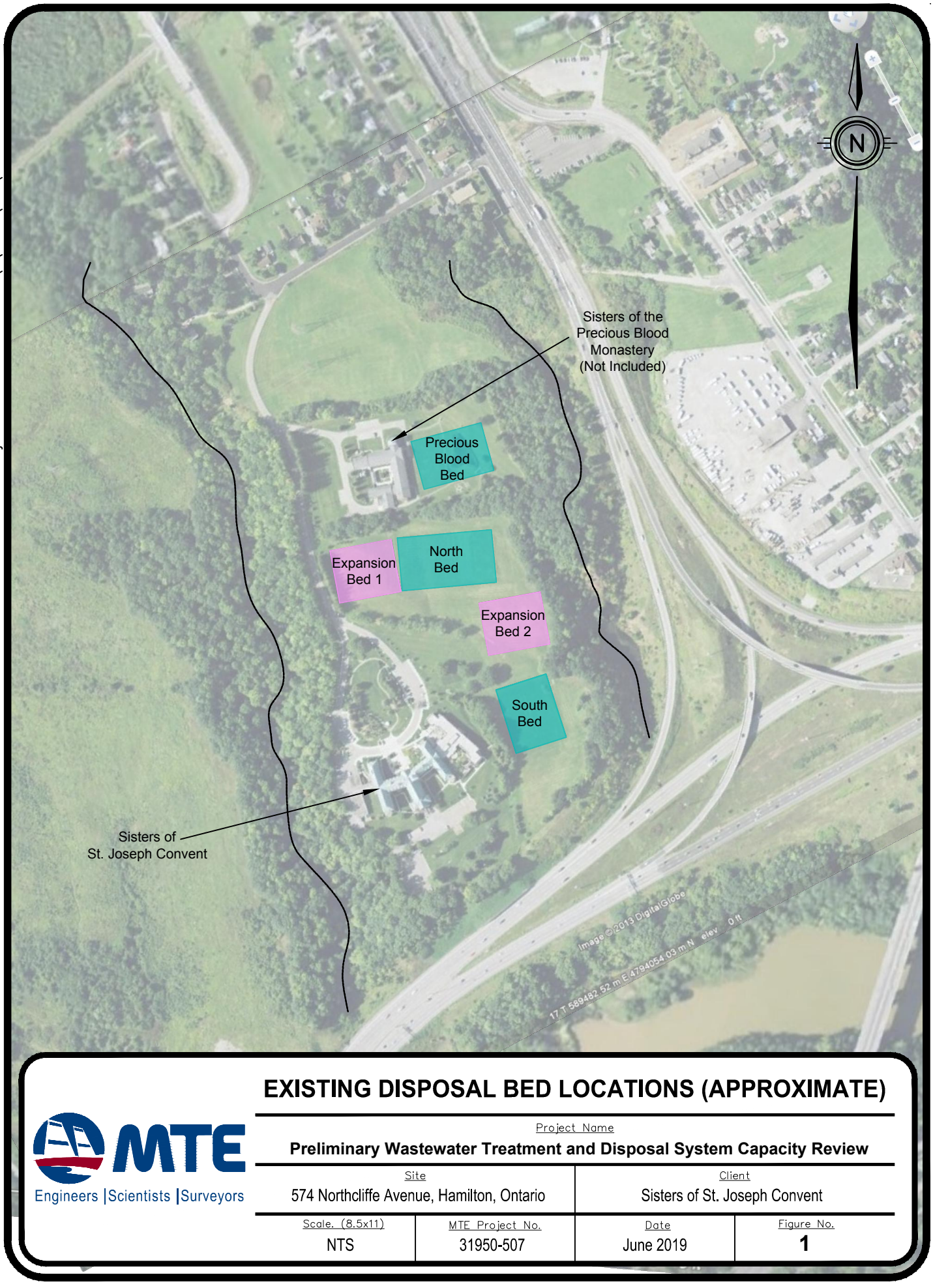
ATTACHMENTS



PROPOSED DISPOSAL BED LOCATIONS (APPROXIMATE)

MTE
Engineers | Scientists | Surveyors

Project Name			
Preliminary Wastewater Treatment and Disposal System Capacity Review			
Site		Client	
574 Northcliffe Avenue, Hamilton, Ontario		Sisters of St. Joseph Convent	
Scale. (8.5x11)	MTE Project No.	Date	Figure No.
NTS	31950-507	June 2019	**2**



EXISTING DISPOSAL BED LOCATIONS (APPROXIMATE)

MTE
Engineers | Scientists | Surveyors

Project Name
Preliminary Wastewater Treatment and Disposal System Capacity Review

Site	Client
574 Northcliffe Avenue, Hamilton, Ontario	Sisters of St. Joseph Convent

Scale. (8.5x11)	MTE Project No.	Date	Figure No.
NTS	31950-507	June 2019	1