COLUMBIA INTERNATIONAL COLLEGE

DRAFT

Tertiary Treatment System Design Report

Project Location:
574 Northcliffe Avenue
Dundas ON L9H 7A9

Prepared for:
Columbia International College Canada
1003 Main Street West
Hamilton, ON

Prepared by:
MTE Consultants Inc.
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

September 25, 2019

MTE File No.: 45800-100

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DRAWINGS

1.0 INTRODUCTION

MTE Consultants Inc. (MTE) was retained by IBI Group to undertake the design of an on-site wastewater treatment and disposal system to service the future Columbia International College located at 574 Northcliffe Avenue in Dundas, Ontario (the “Site”).

The Site is 19.1 ha in size and bound by Northcliffe Avenue to the north, a forested area and Highway 6 to the east, a forested area and Highway 403 to the south and a forested area to the west. Currently, the Site contains the Sisters of St. Joseph Convent building (hereinafter referred to as Convent building), Sisters of the Precious Blood Monastery (hereinafter referred to as the Monastery) and numerous outbuildings. The Site also features a common access road, numerous parking lots, vegetated open spaces, and gardens.

The Convent building contains a combination of bedrooms, offices, reception rooms, parlours, several dining rooms and library. The building also contains an infirmary and chapel. Limited information is known about the Sisters of the Precious Blood Monastery building at this time.

The Convent building will be converted into a private secondary school. A gymnasium complex is proposed to be added to the east of the existing building. Additional details of the proposed addition are contained within the reports prepared by IBI Group. The Monastery will continue to operate without change until the lease for the land expires in 2045. The future plans for the Monastery and surrounding lands are unknown at this time.

The Site is serviced with municipal water and several on-site wastewater systems. MTE has prepared a Geotechnical investigation (July 29, 2019) and Hydrogeological Investigation (September 13, 2019) for this property which provide additional detail regarding the Site; its natural setting; the existing site usage; groundwater flow regimes and the overall assessment.

This report details the existing and proposed wastewater collection, treatment and disposal systems design and shall be submitted to the Ministry of the Environment, Conservation and Parks (MECP) in support of an Environmental Compliance Approval application for wastewater works.

2.0 GEOTECHNICAL INVESTIGATION

In general, the subsurface stratigraphy at the Site consists of a clay layer ranging from 1.7 to 6.7 meters in thickness throughout the Site. A silt layer can be found periodically on the site with a depth ranging from 1.2 to 1.8 meters in thickness beneath the clay layer. The overburden soil is underlain by shale bedrock, which is encountered at depths varying from 1.8 meters to 6.7 meters below ground surface. Topsoil was encountered at all of the drilling locations. Refer to the Hydrogeological Investigation for a thorough discussion of the Site's geotechnical information.

Groundwater level measurements taken from available boreholes and monitoring wells on from 2013 2018 revealed groundwater at depths ranging between 1.3 and greater than 17.7 meters below ground surface.

A soil classification test was undertaken by MTE as part of the geotechnical report. The test results revealed the native soils to be silt and clay. The T-time of the native soil was greater than 50 min/cm. Refer to the geotechnical information included in **Appendix A.**

The condition of the native soils and the proximity of the site to wetland features indicate that a tertiary treatment system complete with shallow buried trenching would be ideal for this property.

The Design Engineer will inspect and certify the contact surface preparation at the time of construction. This inspection will take place prior to placement of any material. This inspection is intended to confirm that the soils and groundwater conditions are as described above and the contact surface has been properly prepared.

3.0 WASTEWATER SYSTEM DESIGN

3.1 Existing Wastewater System Information

The Site currently has two existing major onsite wastewater systems located in various areas of the property as shown on Drawing EC1.1. One wastewater system services the Convent and one system services the Monastery. The system servicing the Convent building includes a treatment system south of the Convent building and two large-scale shallow buried trench disposal beds.

3.1.1 Convent Wastewater System Information

The Convent system consists of a treatment system and two raised shallow buried beds. The treatment system discharges to a pump chamber which feeds the two raised shallow buried beds on the property. An inspection of the existing wastewater systems servicing the Convent building was completed by MTE in the summer of 2019. The

results of these inspections are attached in **Appendix B**.

The system was found to generally be in good condition. It was noted that numerous cleanout ports were missing the protective covers and caps on both the northern and southern beds. The squirt tests did not result in any flow seen out the ball valves on the ends of each run. It was recommended that each run be flushed and another squirt test be conducted.

The southern bed is composed of a raised shallow buried trench disposal bed divided into six (6) cells. Each cell in the southern bed is composed of eight runs ranging in length from 17.8 m to 17.9 m in length. The cells were spaced between 1.7 and 2.4 m on centre.

The northern bed contains a total of ten (10) cells that are dosed by two distribution valves. The east side of the northern bed contains five (5) cells (Cells 7-11) and currently receives treated effluent. The west side of the northern bed contains another five (5) cells (Cells 12-16) which are not currently in use. It is noted the two cells that are separated from the main northern bed (Cells 15 and 16) were constructed on a gravel base rather a sand layer. Each cell in the northern bed is composed of eight runs ranging in length from 17.7 m to 18.0 m in length. The cells were found to be spaced between 1.7 and 2.1 m on centre. The locations of the beds and cell number are shown on Drawing EC1.1.

MTE has conducted historical sampling from the treatment process over the last 17 years to maintain compliance with the existing ECA for the property. The sampling includes the quantity and quality of the wastewater and effluent as well as monitoring wells around the property.

3.1.2 Monastery Wastewater System Information

The second existing on-site wastewater system services the Sisters of the Precious Blood Monastery located at the north portion of the site. There is limited information about the existing system and the existing bed is not contained within the existing ECA for the site. Additional investigations will be completed into the design, capacity and condition of the existing wastewater system.

3.2 Daily Design Wastewater Flow

3.2.1 Convent Design Flow

The maximum daily design wastewater flow for the existing system is listed as 30,000 L/d in the current ECA for the property (**Appendix C**). The ultimate conditions for the School include provision for 1,000 students. The school will be complete with a cafeteria. It has been assumed that 100 students will shower on a daily basis. In addition to the students, there are proposed to be a maximum of 35 non-teaching staff.

The design flow was calculated using the design flows from Table 8.2.1.3 in the OBC.

Table 1: Total Daily Wastewater Flow

Proposed School Occupancy	
Number of Students	1000
Daily per Capita Flow for a Student (with cafeteria)	60 L / d / student
Number of Students who Shower	100
Additional Daily per Capita Flow for a School Showers	30 L / d / student
Proposed Daily Design Flow for Students	63,000 L / d
Number of Non-Teaching Staff	35
Daily per Capita Flow for a Non-Teaching Staff	50 L / d / person
Proposed Daily Design Flow for Non-Teaching Staff	1,750 L / d
Design Flow for the Proposed Wastewater System servicing the Proposed Secondary School	**65,000 L / d**

3.2.2 Monastery Design Flow

The current design and occupation of the Monastery is unknown at the present time. Additional work is underway to determine the current and future sanitary needs of the Monastery.

3.3 Tertiary Treatment System

3.3.1 Convent Treatment System

The current tertiary treatment system has been designed by Waterloo Biofilter for the existing maximum design flow of 30,000 L/d and consists of the following components:

- One (1) 27,000 L pump tank complete with two alternating submersible wastewater pumps and forcemain to a primary/ equalization tank;
- One (1) in-ground 262,000 L primary / equalization two compartment tank complete with two alternating submersible wastewater pumps and a forcemain to the subsurface intermittent sand filter;
- One (1) in-ground sand filter with a surface area of 375 m^2 discharging to a pump tank;
- One (1) 18,000 L pump tank complete with two sets of duplex pumps discharging to the Waterloo Biofilter units;
- One (1) Waterloo Bioflter treatment unit with a capacity of 10,000 L/d recirculates effluent back to the 18,000 L pump tank;
- Two (2) Waterloo Biofilter treatment units each with a capacity of 15,000 L/d and installed in parallel discharging to the disinfection system;

- One (1) UV chamber complete with two (2) UV disinfection units each with a capacity of 15,000 L/d discharging to the dosing tank;
- Final clarification tank with a capacity of 30,500 L; and
- One (1) 27,000 L dosing tank complete with alternating duplex submersible pumps discharging to the shallow buried trench disposal beds.

The system will be modified and components added as required to accommodate the additional treatment requirements and proposed flow rate of 65,000 L/d. The system will continue to conform to the requirements put forth for tertiary treatment systems in Part 8 of the Ontario Building Code. The general system will remain the same with a Waterloo Biofilter treatment units and UV treatment prior to disposal in the shallow buried trenches.

The existing treatment system has been designed to meet the requirements as laid out within the existing ECA. The modifications to the treatment system will meet the proposed effluent concentrations as shown in **Section 5.0**. In order to meet the reduced total nitrogen concentrations,

3.3.2 Monastery Treatment System

The current design of the Monastery treatment system is unknown at the present time. Additional work is underway to determine the current and future treatment needs of the Monastery.

3.4 Leaching Beds

3.4.1 Convent Shallow Buried Trench Leaching Beds

As previously discussed, the site has two existing shallow buried trench leaching beds which are comprised of a total of 11 cells each with 8 runs with a minimum length of 17.7 m. The combined length of existing pressurized distribution pipe in use is 1,558 m (refer to **Appendix B**). There are five (5) additional cells on the property; however, they are not in use. With a design T-time of greater than 50 min/cm, the existing beds have a capacity of 46,728 L/d. Refer to calculations in **Appendix D**.

This capacity was determined by the following formula (OBC):

$$Q = 30\ L$$

where L is the existing distribution piping length (m), and Q is the daily wastewater design flow (L/d). Refer to the calculations in **Appendix D**. The eleven cells in use on the property exceed the number listed within the existing ECA (10 cells). The sizing of each cell is consistent with the ECA information. The ECA lists the capacity of the shallow buried trench disposal beds as 30,000 L/d. The existing beds incorporate a factor of safety of approximately 1.4.

The increased daily design flow for the proposed school, requires additional cells be constructed. The additional cells are proposed to mirror the design of the existing system to allow for consistent dosing. The proposed system will use 13 existing cells (Cells 1, 2, and 5-14) and install eight (8) new cells (Cell 3 and 15-21) for the increased design flow. The factor of safety will remain the same for the property.

Five cells of the existing six cells of the southern bed will remain in service with the proposed gymnasium addition. Due to the setback requirements, existing cell 3 located in the northwestern corner of the bed is too close to the proposed building and will be removed from service. A new cell will be installed to the northwest portion of the bed as shown on Drawing C2.1. The new Cell 3 will consist of twelve -11.8 m runs spaced 2.0 m on centre The mantle will be adjusted based on the additional cell as shown on Drawing C2.1.

At the northern bed, the three cells from the west that are adjacent to the east distribution bed in service will receive flow under the proposed conditions. An additional seven (7) cells (Cells 15-21) will be added to the northern bed to accommodate the increase design flow. The cells will contain eight -17.7 m runs spaced 2.0 m on centre per bed.

With the proposed additions, the school will be serviced by a total of 21 cells with a total distribution length of 2,974 m of shallow buried trench. A factor of safety of 1.4 has been included in this length. Each cell will be dosed with an equal volume on an alternating basis. The distribution system will be reconfigured to allow for equal dosing of all the cells.

Drainage from the northern portion of the property will be routed via swale around the expanded northern bed.

The shallow buried trench system must be installed by a licensed installer as per OBC Section 8.7.6.1. The inspection requirements are listed in **Appendix D**.

3.4.2 Monastery Leaching Bed

The current design of the Monastery leaching bed is unknown at the present time. Additional work is underway to determine the current design and future capacity of the Monastery.

3.5 Clearance Requirements

The following clearances are required for the proposed wastewater disposal system installation:

Table 2: Clearance Requirements

Clearance From	To Septic Tank/Treatment System	To Distribution Piping
Building or Structure	1.5 m	5 m
Potable Water Wells (Drilled)	15 m	15 m
Water Body	15 m	15 m
Property Line	3 m	3 m

All of the proposed wastewater works will conform to the required clearance distances. The wastewater system location is indicated on the enclosed drawing C2.1.

4.0 MONITORING PROGRAM

During the pre-consultation meeting with the MECP, concerns were raised about the concentrations of phosphorus leaving the property and being conveyed to the Long Pond surface water feature owned and operated by the Royal Botanical Gardens. The Long Pond is located on the south side of Highway 403. The MECP also raised concerns about the ability of the existing system to meet the existing total nitrogen objective. The modifications to the treatment system will allow for a lower total nitrogen objective. A limit of 20 mg/L has also been included to ensure compliance with the amended effluent concentrations. The MECP also requested that ammonia be monitored with the proposed works. The CBOD and TSS objectives as listed in the existing ECA will continue to apply to the property. The proposed effluent quality objectives are summarized in Table 3 below.

Table 3: Proposed Effluent Concentrations for Tertiary System

Parameter	***Objective***	***Limit***
CBOD	10 mg/L	
TSS	10 mg/L	
Total N (Nitrate + Nitrite +TKN)	10 mg/L	20 mg/L
Ammonia	2 mg/L	
Phosphorus	1 mg/L	

The proposed effluent monitoring program will consist of monthly grab samples submitted to an accredited laboratory for analysis of the parameters presented in Table 3. The proposed sampling location will be at the end of the Convent building treatment system prior to being pumped to the shallow buried trenches for disposal. The collected samples will be representative of the discharge to the environment from the shallow buried trenches.

Adverse results for any parameter listed in Table 3 should be reported as soon as possible to the MECP but at maximum 10 working days from receipt of the analytical results.

In addition to the effluent monitoring, groundwater monitoring of the same parameters listed in Table 3 shall be conducted on a quarterly basis. Samples shall be taken from the installed monitoring wells throughout the property.

All the results will be recorded and retained for five (5) years from the day of their creation. Results will be summarized and stored on-site for review by MECP upon request.

5.0 CONCLUSIONS

Based on the information provided, it is concluded that:

1. The underlying native soil has a T-time greater than 50 min/cm.
2. A tertiary treatment system complete with shallow buried trench disposal beds is the most suitable wastewater disposal system for this property.
3. The design flow for the wastewater disposal system is 65,000 L/d based on the Site's projected use.
4. The current wastewater treatment system be upgraded to accommodate the increase in design flow and to meet the amended effluent objectives and limits.
5. The proposed raised shallow buried trench disposal beds and treatment system be located more than 30 m away from the dripline.
6. The existing raised shallow buried trench beds are in good condition and suitable for continued use. Due to the time required to acquire the necessary permits, each run shall be tested prior to installation of the proposed cells.
7. It is practical to construct the proposed works in a single construction season.
8. Additional investigation into the design and existing condition of the onsite wastewater system serving the monastery be conducted.

6.0 RECOMMENDATIONS

It is therefore recommended:

In general that:

1. A T-time greater than 50 min/cm be used for design purposes.
2. This report be submitted to the Ministry of Environment, Conservation and Parks in support of an amended Environmental Compliance Approval application.
3. The wastewater treatment and disposal system be installed by a Licensed

Contractor in accordance with the guidelines of the Ontario Building Code (Division B, Part 8).

4. The wastewater disposal system be constructed to the Specifications enclosed and inspected by the Design Engineer in accordance with the enclosed inspection schedule. The wastewater disposal system should be certified by a Professional Engineer licensed in Ontario upon completion.

For the onsite wastewater system servicing the Convent building that:

1. The existing treatment system be upgraded to accommodate a design flow of 65,000 L/d from the proposed secondary school. The current treatment system was sized based on design flow of 30,000 L/d.
2. The disposal area for the central tertiary treatment system consist of a combination of the existing 13 raised shallow buried trench cells and eight new raised shallow buried trench leaching cells. Each existing cell consists of eight (8) runs of 17.7 m distribution pipe. Proposed Cell 3 will be modified to be twelve (12) runs of 11.8 m distribution pipe. Proposed cells 15 – 21 will mirror the construction of the existing cells and have eight (8) runs of 17.7 m distribution pipe. The combined shallow buried trench beds will have a length of 2,974 m of distribution pipe.
3. The additional treatment system components and disposal beds be installed to meet clearance requirements of OBC Section 8.2.1.6.
4. The final surface of the shallow buried trench leaching bed be graded to shed water and to direct surface drainage around the leaching bed area and the completed leaching bed area be top-soiled and seeded or sodded immediately to protect against erosion.

For the onsite wastewater system servicing the Convent building that:

1. An investigation into the design and existing condition of the system be completed. Recommendations will be developed following the investigation.

All of which is respectfully submitted,

MTE CONSULTANTS INC.

DRAFT **DRAFT**

Morgan Crane, E.I.T.
Designer

Dave Wilhelm, P.Eng.
Manager Water/Wastewater

MAC:zeg

APPENDIX A

GEOTECHNICAL INFORMATION

TABLE 6 - INFILTRATION RATES FOR NATIVE SOILS

Borehole Number	Sample Depth (mbgs)	Sample Elevation (masl)	Soil Type	Hydraulic Conductivity K-Value (m/sec)	Infiltration Rate (mm/hr)
BH103-19	0.8 - 1.4	120.8	Silt and Clay	3.0E-11	1
BH105-19	1.5 - 2.1	117.4	Silt, some Clay	6.0E-10	2
BH108-19	2.3 - 2.9	115.7	Clayey Silt	4.9E-11	1

Fill material placement may limit stormwater infiltration potential at the site. Any infiltration gallery must be constructed at least 5 m from any structure and the base of the gallery at least 1 m below any foundation. Insitu infiltration testing at the site is recommended if infiltration galleries are being considered.

For the design of the onsite wastewater treatment and disposal systems, a percolation time (T-time) was assessed based on the soil type determined from the particle size distribution results. The approximate percolation time was determined to be over 50 min/cm for the native soils.

6.10 Construction Inspection and Testing

MTE recommends that geotechnical inspection and testing procedures be conducted throughout the various phases of the project.

Engineer site visits should be conducted to confirm geotechnical bearing resistances for footings. Soil compaction testing should be carried out on structural fill beneath the proposed gymnasium, foundation wall backfill, subslab granular fill, service pipe bedding and trench backfill. Laboratory and field testing of the pavement structure components (granulars and aphaltic concrete) should be conducted, as well as concrete testing for foundations, floors, curbs and sidewalks.

MTE offers soil compaction, concrete, and asphalt testing, as well as soil inspection services through our Stratford office.

APPENDIX B

INSPECTION REPORTS AND EXISTING DISPOSAL BED SIZING CALCULATIONS

ONSITE WASTEWATER SYSTEM INSPECTION REPORT

PROJECT NAME:	**Columbia International College**	**FILE #:**	**C45800-100**
CLIENT:	**Columbia International College**	**INSPECTION DATE:**	**Monday July 8, 2019 and Tuesday July 9, 2019**

Columbia International College will be located at 574 Northcliffe Avenue in Hamilton, Ontatrio. The property currently accommodates the Sisters of St. Joseph of Hamilton. The property is bounded by a Highway 6 to the east, Highway 403 to the south, Sisters of the Precious Blood monastery and existing residential to the north and a forested area to the west. Columbia International College is intending to operate a private school on the property with up to 1000 students.

MTE Consultants Inc. was retained to conduct an assessment of the existing condition and confirm the size of the onsite wastewater disposal beds located on the property. The site has two existing onsite wastewater disposal beds. The largest bed is located in the northwest corner of the property and is broken into 10 cells (hereinafter referred to as the north bed). The other bed on the property is located near the southwest corner of the property and consists of 6 cells (hereinafter referred to as the south bed). Both beds domestic sewage after it has been treated by the Waterloo Biofilter treatment system located along the southern portion of the property.

The disposal beds are fed by effluent pumps and 32 mm forcemains. A valve chamber is located near the distribution valve for the south disposal bed.

The north bed is divided into two sides (east and west) each with five cells. Only the east side of the bed is connected to the pump. The cells are dosed on an alternating basis by an indexing valve located on near the center of the bed. The west side is not used as two of the cells were installed with the incorrect material underneath the shallow buried trenches. The south bed was installed after the west side of the north bed was discontinued and consists of six cells.

Attachment 1 contains the north bed onsite wastewater system inspection and **Attachment 2** contains the south bed onsite wastewater system inspection.

The treatment system was not assessed as part of this work. The system is routinely serviced and inspected by Waterloo Biofilter and has a rated capacity of 30,000 Lpd.

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ATTACHMENT 1

NORTH BED ONSITE WASTEWATER SYSTEM INSPECTION

ONSITE WASTEWATER SYSTEM INSPECTION REPORT

ONSITE WASTEWATER SYSTEM INSPECTION – NORTH BEDS:

- North Disposal Bed – East Distribution :

  Bed Surface Drainage: **X** Good ☐ Poor

  Visible Breakouts: ☐ Yes **X** No

  Number of Cells: 5
  Size of Bed: Length (m) _17.8-18.0 m_
  Spacing (m) _1.7-2.2 m_
  Number of Runs per cell : _8_

- North Disposal Bed – West Distribution :

  Bed Surface Drainage: **X** Good ☐ Poor

  Visible Breakouts: ☐ Yes **X** No

  Number of Cells: 5
  Size of Bed: Length (m) _17.7-18.0 m_
  Spacing (m) _1.8-2.1 m_
  Number of Runs per cell : _8_

COMMENTS:

- Forcemains feeding beds are 32 mm diameter.
- Pressurized lines to each shallow buried trench are 25 mm (1") in diameter
- Disposal bed is a raised shallow buried trench with 25 mm (1") PVC distribution pipe.
- Missing covers and caps on the numerous ball valves
  - Some ball valves extend higher than the covers
  - Some ball valves are damaged to installed height
- Squirt test was attempted on the east disposal bed and flow was not seen out of any of the pipes
- Small leak noticed on one of the feed lines from the distribution valve
- Only the east distribution bed receives treated sewage, the west distribution bed has been replaced by the southern disposal bed.
- End caps were not present on shallow buried trench runs. Some soil was noted to be present within the ends of the trenches.
- No geotech fabric was present on top of the shallow buried trench runs
- No standing water was visible in the sand layer.
- There was no significant biomat observed in the sand layer.
- The header pipe and distribution pipe in northeast, northwest, southeast and southwest corners of the disposal bed are in good condition.
- Disposal bed cover was approximately 0.3 m topsoil over trenches and sand.
- No ponding or wet areas were observed on the surface of the disposal bed.
- There was no evidence of breakout.

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- The number of runs/ cells in the north disposal bed was consistent with the historical information.

In general, the north disposal bed is in good condition. Lines shall be flushed and squirt test completed to comment on the pressurization system.

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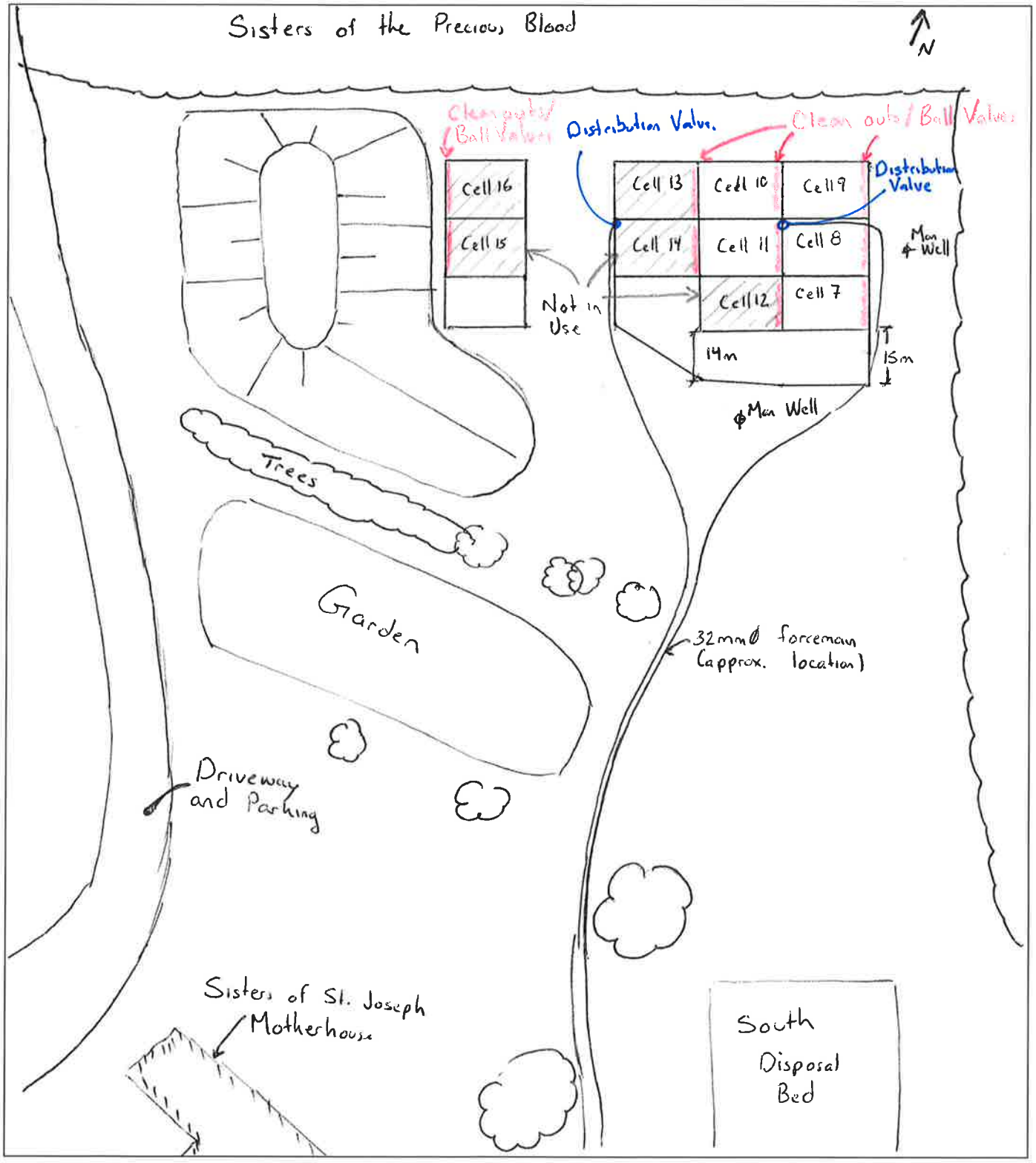
ONSITE WASTEWATER SYSTEM INSPECTION REPORT

SITE SKETCH:



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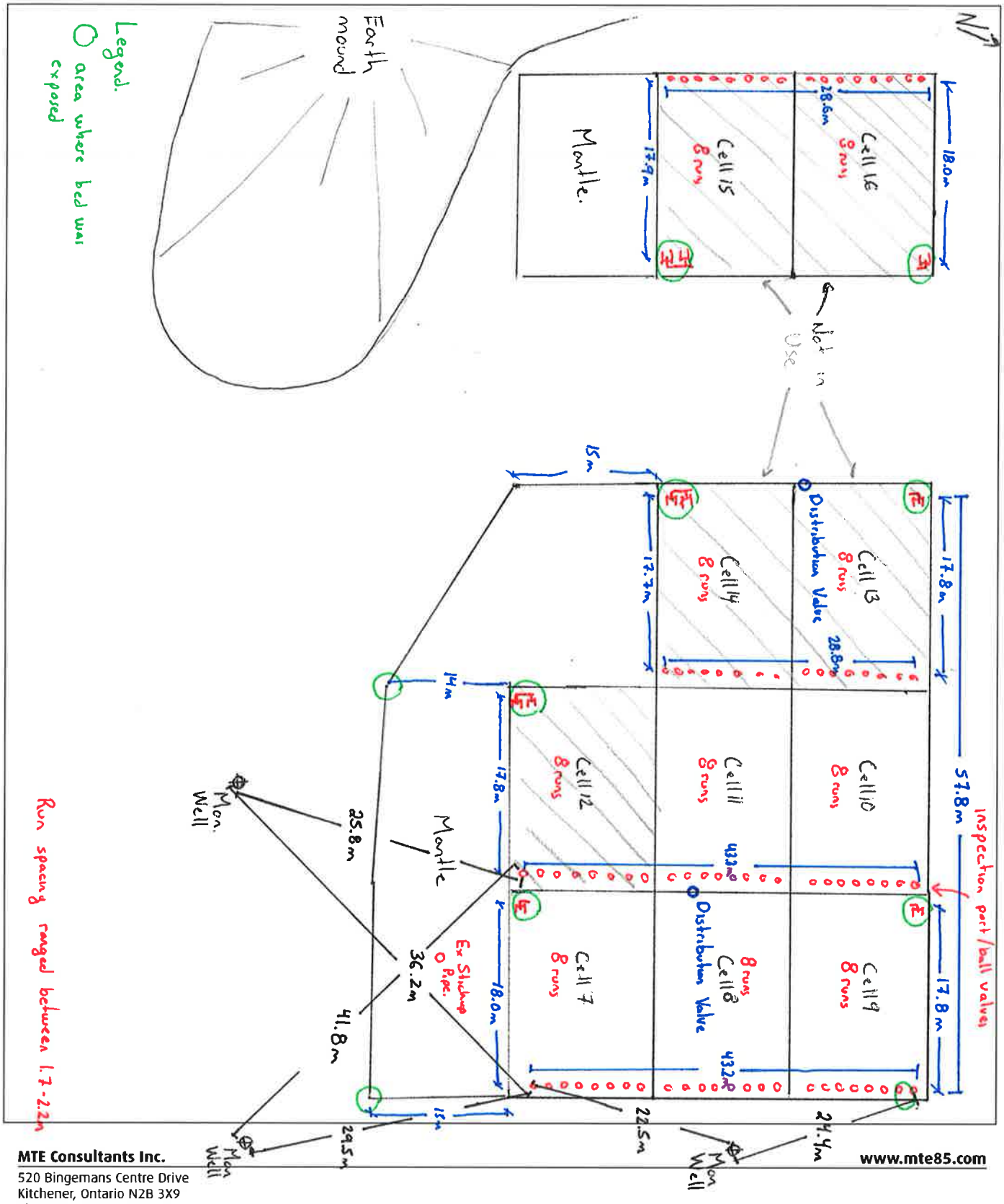
SITE SKETCH:



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ONSITE WASTEWATER SYSTEM INSPECTION REPORT

Northern Bed Shallow Buried Trench System Photos:

Disposal Bed Area

Temporary Sediment Stockpile

Shallow buried trench and ball valve

Damaged ball valves missing covers

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ONSITE WASTEWATER SYSTEM INSPECTION REPORT

East Distribution Valve

West Distribution Valve

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ATTACHMENT 2

SOUTH BED ONSITE WASTEWATER SYSTEM INSPECTION

ONSITE WASTEWATER SYSTEM INSPECTION REPORT

ONSITE WASTEWATER SYSTEM INSPECTION – SOUTH BED:

- South Disposal Bed:

Bed Surface Drainage: **X** Good ☐ Poor

Visible Breakouts: ☐ Yes **X** No

Number of Cells: 5

Size of Bed: Length (m) _17.8-17.9 m_

Spacing (m) _1.7-2.4 m_

Number of Runs per cell : _8_

COMMENTS:

- Forcemains feeding beds are 32 mm diameter.
- Pressurized lines to each shallow buried trench are 25 mm (1") in diameter
- Disposal bed is a raised shallow buried trench with 25 mm (1") PVC distribution pipe.
- Missing covers on numerous ball valves
    - Most ball valves are buried within their enclosures
- Squirt test was attempted on the south disposal bed and flow was not seen out of the exposed ball valves at the end of three runs
- Distribution valve was found submerged.
    - Maintenance personnel were going to investigate and fix the issue after the assessment. Evidence of leak in the seal was detected during inspection.
- End caps were present on shallow buried trench runs.
- Geotech fabric was present on top of the shallow buried trench runs
- No standing water was visible in the sand layer.
- There was no significant biomat observed in the sand layer.
- The header pipe and distribution pipe in northeast, northwest, southeast and southwest corners of the disposal bed are in good condition.
- Disposal bed cover was approximately 0.3 m topsoil over trenches and sand.
- No ponding or wet areas were observed on the surface of the disposal bed.
- There was no evidence of breakout.
- The number of runs/ cells in the south disposal bed was consistent with the historical information.
-

In general, the north disposal bed is in good condition. Lines shall be flushed and squirt test completed to comment on the pressurization system following maintenance on the distribution valve.

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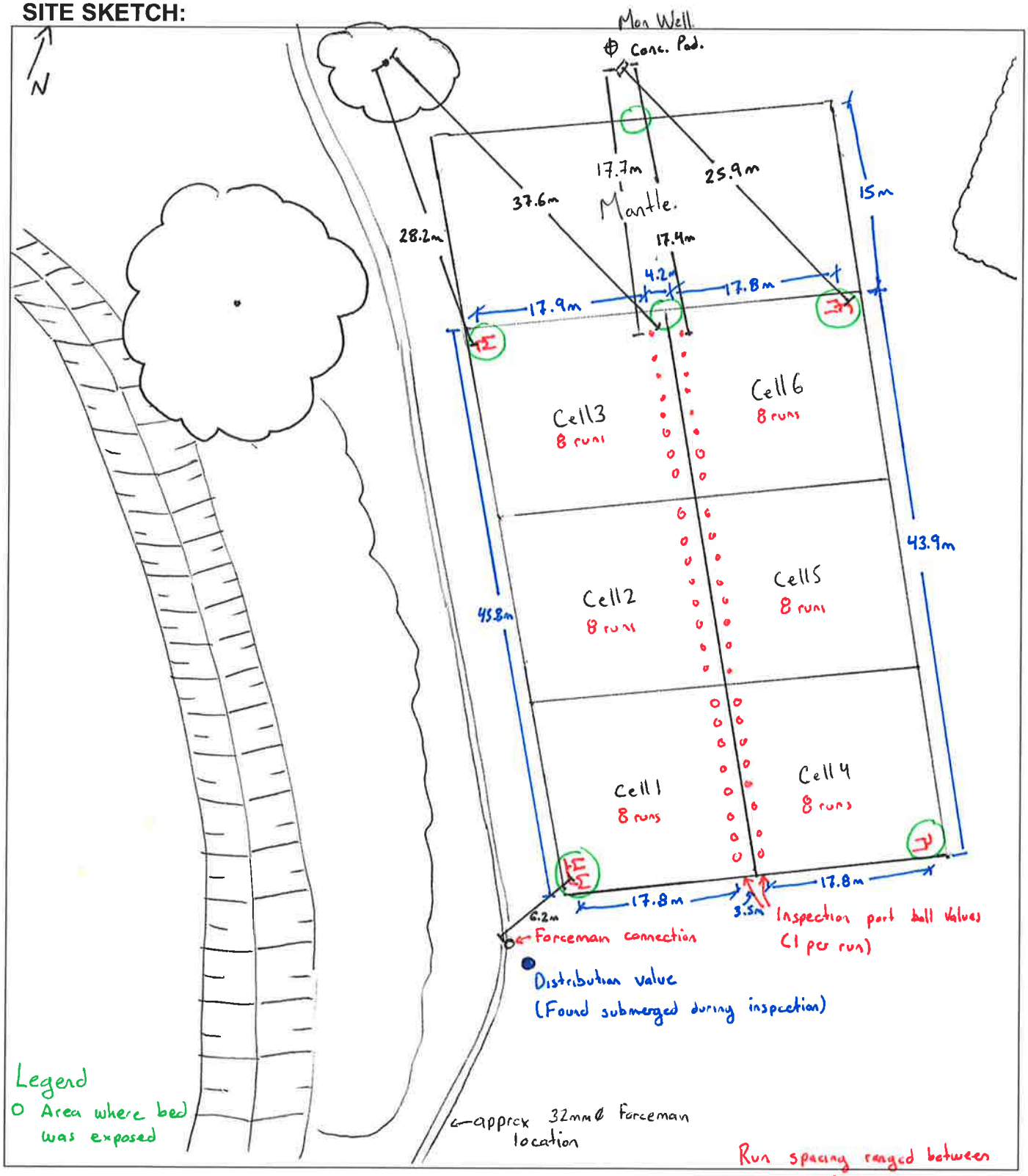
ONSITE WASTEWATER SYSTEM INSPECTION REPORT

SITE SKETCH:



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ONSITE WASTEWATER SYSTEM INSPECTION REPORT

Southern Bed Shallow Buried Trench System Photos:

Bed Surface

Bed Surface

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ONSITE WASTEWATER SYSTEM INSPECTION REPORT

Submerged distribution valve

Distribution Valve Chamber and Forcemain Connection

Shallow buried trench with geotech fabric

Shallow buried trench with geotech fabric

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ONSITE WASTEWATER SYSTEM INSPECTION REPORT

	
Buried Ball Valve on the End of trench run (Typical)	**Buried Ball Valve following expose on the End of trench run (Typical)**

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www.mte85.com

Columbia International College
WASTEWATER TREATMENT SYSTEM ASSESSMENT
Hamilton ON

Project Number:	45800-100
Date:	September 12, 2019
Design By:	MAC
File:	Q:\45800\100\45800-100 Wastewater Treatment System Capacity Assessment.xls

CONVENTIONAL SEPTIC SYSTEM
Ontario Building Code - Division B, Part 8

Address: 574 Northcliffe Ave

1) Summary of Existing Conditions

Number of Cells:	11		
Run Spacing:	2.0	*m*	Spacing ranged from 1.7 to 2.4 m
Run Length:	17.7	*m*	Lengths range from 17.7 to 18.0 m
Number of Runs per cell:	8		
Mantle Length:	15.0	*m*	
Bed Length:	20	*m*	
Bed Width:	15	*m*	

2) Percolation Time, T *(min/cm)*

	"T" Time *min/cm*
a) Native soil (per Geotechnical Engineer's report)	>50
b) Imported fill	10

Design Percolation Time ("T" Time) **T = >50 *min/cm***

3) Existing Bed Sizing

Number of Cells

Number of Cells	Number of Runs	Run Length *m*	Bed Length *m*	Bed Width *m*	Total Area m^2
11	8	17.7	20.0	15.0	300

Cell Summary	**8**	**17.7**	***m* runs**
		300	**m^2 total bed area**
		141.6	**m total length of distribution pipe**

Bed Summary	**88**	**17.7**	***m* runs**
		4625	**m^2 total bed area**
		1558	**m total length of distribution pipe**

4) Provided Daily Capacity, Q (L)

Factor of Safety (FS) 1.0

Design Equation:
L = Q / 30 * FS

Rearranged for Q:
Q = L * 30 / (FS) 46728 *Lpd*

Existing Daily Capacity Provided **L = 46728 *Lpd***

APPENDIX C

EXISTING ENVIRONMENTAL COMPLIANCE APPROVAL

Content Copy Of Original

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 0852-A9CJV2
Issue Date: September 22, 2016

The Sisters of St. Joseph of the Diocese of Hamilton
P.O. Box 155, LCD1
Hamilton, Ontario
L8L 7V7

Site Location: Sisters of St. Joseph
574 Northcliffe Ave
City of Hamilton,
L9H 7L9

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the upgrade of the existing subsurface disposal works for the collection, transmission, treatment and disposal of domestic sewage, to service The Sisters of St. Joseph's Motherhouse (Facility), with a design maximum flow of 30,000 litres per day, consisting of the following:

PROPOSED WORKS

Proposed Sewage Pump Tank

- one (1) 18,000 L pump tank, located downstream of an existing intermittent sand filter, equipped with a high level alarm, secured watertight access openings above the ground surface, receiving effluent from the intermittent sand filter;

- one (1) set of duplex pumps, having a minimum capacity of 10,000 L/day, operating on an alternating timer, dosing wastewater to Waterloo Biofilter #1;

- one (1) set of duplex pumps, having a minimum capacity of 30,000 L/day, operating on an alternating timer, dosing wastewater to Waterloo Biofilters #2 and #3;

Proposed Waterloo Biolfilter Treatment Units (#1, #2, #3)

- one (1) Waterloo Biolfilter treatment unit #1(Model 50), to receive a maximum capacity of 10,000 L/d and recirculating effluent via gravity back to inlet of the above noted pump tank;

- two (2) Waterloo Biolfilter treatment units #2 and # 3 (Model 50), installed in parallel, each receiving a maximum capacity of 15,000 L/d, discharging effluent to an disinfection system as described below;

Proposed Ultraviolet Disinfection (UV) Effluent System

- one (1) 0.91 m diameter UV chamber, installed immediately downstream of the Waterloo Biofilter Units #2 and #3, equipped with two (2) UV disinfection units (Polylok PL-UV1 or equivalent), each unit

having a minimum capacity of 15,000 L/d, discharging effluent to an existing dosing tank as described below;

PREVIOUS WORKS

Existing Sewage Pump Tank

- one (1) in-ground 27,000 L pump tank, equipped with two (2) alternating submersible sewage dosing pumps (one standby), each with a rated capacity of 4.17 L/s at a 4.0 m TDH, a high level alarm, and a secured watertight access opening above the ground surface, receiving effluent from the Facility, discharge sewage to the Primary/Equalization Tank;

Existing Primary/Equalization Tank

- one (1) in-ground converted 262,000 L capacity primary/equalization, two-compartment tank equipped with a high level alarm, a watertight access riser to grade, and two alternating (2) submersible sewage pumps, each with a rated capacity of 2.45 L/s at a TDH of 10.22 m, discharging effluent to the subsurface intermittent sand filter;

Existing Intermittent Single Pass Sand Filter

- one (1) in-ground intermittent single pass sand filter, having a surface area of 375 m 2 , consisting of two (2) zones, each comprised of six (6) cells, discharging effluent via gravity to the dosing tank;

Existing Dosing Tank

- one (1) in-ground 27,000 L dosing tank, equipped with a duplex submersible sewage dosing pumps (one standby), each with a rated capacity of 2.05 L/s at 16.25 m TDH, a high level alarm, and a secured watertight access opening above the ground surface, dosing effluent to the leaching beds;

Existing Shallow Buried Trenches Leaching Beds

- a raised shallow buried trenches system, consisting of two (2) 5-way distribution valves, evenly discharging effluent over the two (2) leaching beds, comprising ten (10) 20 m x 15 m cells, each cell installed with eight (8) runs 25 mm dia, each 17.4 m long pressurized perforated distributing piping, spaced at a minimum centre-line distance of 2.0 m apart, having a total length of distributing piping of 1,392 m; overlying on a 300 millimetres deep sand media layer on native soil, and including mantles with extending area of 100 m x 15 m;

For the purpose of this environmental compliance approval, the following definitions apply:

"Approval" means this entire Approval document and any Schedules to it, including the application and Supporting Documentation.

"BOD5" (also known as TBOD 5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demand;

"CBOD5" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

"Daily Concentration" means the concentration of a contaminant in the effluent discharged over any single day, as measured by a composite or grab sample, whichever is required;

"Director" means a person appointed by the Minister pursuant to Section 5 of the EPA for the purposes

of Part II.1 of the EPA.

"District Manager" means the District Manager of the Hamilton District Office.

"E. Coli" refers to the thermally tolerant forms of Escherichia that can survive at 44.5 degrees Celsius;

"EPA" means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended.

"Licensed Installer" means a person who holds a licence under Article 2.12.3.1 of the Ontario Building Code.

"Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf.

"OBC" means the Ontario Building Code.

"Owner" means Sisters of St. Joseph and its successors and assignees.

"OWRA" means the Ontario Water Resources Act, R.S.O. 1990, c. O.40, as amended.

"Previous Works" means those portions of the sewage works previously constructed and approved under an Approval;

"Professional Engineer" means a person entitled to practice as a Professional Engineer in the Province of Ontario under a licence issued under the Professional Engineers Act.

"Proposed Works" means the sewage works described in the Owner's application, this Approval, to the extent approved by this Approval.

"Substantial Completion" has the same meaning as "substantial performance" in the *Construction Lien Act*;

"Works" means the sewage works described in the Owner's application, and this Approval, and includes both Proposed Works and Previous Works.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

(1) The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this Approval.

(3) Where there is a conflict between a provision of any submitted document referred to in this Approval and the Conditions of this Approval, the Conditions in this Approval shall take precedence,

and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(4) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

(5) The requirements of this Approval are severable. If any requirement of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this Approval shall not be affected thereby.

2. EXPIRY OF APPROVAL

(1) The approval issued by this Approval will cease to apply to those parts of the Works which have not been constructed within five (5) years of the date of this Approval.

3. CHANGE OF OWNER

(1) The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within 30 days of the change occurring:

(a) change of Owner;

(b) change of address of the Owner;

(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act* , R.S.O. 1990, c.B17 shall be included in the notification to the District Manager;

(d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the *Corporations Information Act* , R.S.O. 1990, c. C39 shall be included in the notification to the District Manager;

(2) In the event of any change in ownership of the Works, other than a change to a successor municipality, the Owner shall notify in writing the succeeding owner of the existence of this Approval, and a copy of such notice shall be forwarded to the District Manager and the Director.

4. UPON THE SUBSTANTIAL COMPLETION OF THE WORKS

(1) Upon the Substantial Completion of the Proposed Works,the Owner shall prepare a statement, certified by a Professional Engineer, that the works are constructed in accordance with this Approval, and upon request, shall make the written statement available for inspection by Ministry personnel.

(2) Within six (6) months of the Substantial Completion of the Proposed Works, a set of as-built drawings showing the works “as constructed” shall be prepared. These drawings shall be kept up to date through revisions undertaken from time to time and a copy shall be retained at the Works for the operational life of the Works.

5. OPERATIONS AND MAINTENANCE

(1) The Owner shall ensure that at all times, the Works and related equipment and appurtenances which are installed or used to achieve compliance with this Approval are properly operated and maintained.

(2) The Owner shall sign a Service and Maintenance Agreement with the manufacturer of the Waterloo Biolfilter treatment unit or its authorized agent. The maintenance agreement must be retained at the site for as long as the Works are in operation, kept current and made available for inspection by the Ministry staff.

(3) The Owner shall receive from the manufacturer or distributor of Waterloo Biolfilter treatment unit printed literature that describes the unit in detail and provides complete instructions regarding the operation, servicing, and maintenance requirements of the unit and its related components necessary to ensure the continued proper operation in accordance with the original design and specifications.

(4) The Owner shall ensure that the treatment system is at minimum inspected annually by the Waterloo Biolfilter treatment unit authorized personnel, and maintained according to the manufacturer's recommendations.

(5) The Owner shall ensure that the primary/equalization tank is pumped out every 3-5 years or when the tank is 1/3 full of solids.

(6) The Owner shall ensure that grass-cutting is maintained regularly over the subsurface disposal leaching bed, and that adequate steps are taken to ensure that the area of the underground works is protected from vehicle traffic.

(7) The Owner shall visually inspect all Works during each operating season, and ensure that in the event a break-out is observed from the subsurface disposal bed(s), the sewage discharge to the bed(s) is discontinued and the incident immediately reported verbally to the District Manager, followed by a written report within seven (7) days. The Owner shall ensure that during the time remedial actions are taking place the sewage generated at the site shall not be allowed to discharge to a surface water body or to the environment, and safely collected and disposed of through a licensed waste hauler to an approved waste disposal site.

6. EFFLUENT OBJECTIVES

(1) The Owner shall use best efforts to design, construct and operate the Works with the objective that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent discharging to the shallow buried trenches.

Table 1 - Effluent Objective (at dosing tank upstream of shallow buried trenches)

Effluent Parameter	**Concentration Objective** (milligrams per litre unless otherwise indicated)
CBOD5	10
Total Suspended Solids	10
Total Nitrogen (Nitrate + Nitrite + Ammonia)	20
E. coli	400 organisms/100 mL (Monthly *Geometric* Mean Density)

(2) The Owner shall include in all reports submitted in accordance with Condition 8 a summary of the efforts made and results achieved under this Condition.

7. MONITORING AND RECORDING

The Owner shall, upon commencement of operation of the Works, carry out the following monitoring program:

(1) All samples and measurements taken for the purposes of this Approval are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) For the purposes of this condition, the following definitions apply:

(a) Monthly means once every month;
(b) Quarterly means once every three months;

(3) Samples shall be collected at the following sampling points, at the frequency specified, by means of the specified sample type and analyzed for each parameter listed and all results recorded:

Table 2 - Effluent Monitoring	
Frequency	Monthly
Sample Type	Grab
Parameters	CBOD5, Total Suspended Solids, Total Nitrogen, *E. coli*
Sampling Point	sample of treated disinfected effluent to be collected at dosing tank upstream of the shallow buried trenches

Table 3 - Groundwater Monitoring	
Frequency	Quarterly (in April, July, October and January)
Sample Type	Grab
Parameters	CBOD5, Total Suspended Solids, Total Nitrogen*, E. coli*
Sampling Point	Monitoring well MW1, MW2, MW3, MW4, MW5, MW6, MW7, MW8 and MW9

(4) The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's Procedure F-10-1, “Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended from time to time by more recently published editions;

(b) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition), as amended from time to time by more recently published editions;

(5) The measurement frequencies specified in subsection (2) in respect to any parameter are minimum

requirements which may, after 24 months of monitoring in accordance with this Condition, be modified by the Director in writing from time to time.

(6) Inspections of the Works must be carried out on a monthly basis to identify breakouts and any other visible discrepancy together with daily visual monitoring.

(7) The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this Approval.

(8) The Owner shall employ any measurement devices to accurately measure quantity of effluent being discharged to the existing leaching bed, including but not limited to water meters, event counters, running time clocks, or electronically controlled dosing, and shall record the daily volume of effluent being discharged through the subsurface disposal system with comparison to the approved design capacity.

8. REPORTING

(1) One week prior to the start up of the operation of the Works, the Owner shall notify the District Manager (in writing) of the pending start up date.

(2) In addition to the obligations under Part X of the Environmental Protection Act , the Owner shall, within ten (10) working days of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

(3) The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

(4) The Owner shall prepare a performance report, on an annual basis, on or before January 31st of each year. The first such report shall cover the first annual period following the commencement of operation of the Works and subsequent reports shall be submitted to cover successive annual periods following thereafter. The annual performance report shall be kept available at the site and upon request it shall be submitted to the District Manager. The reports shall contain, but shall not be limited to, the following information:

(a) a summary and interpretation of all monitoring data, including an overview of the success and adequacy of all Works;

(b) a description of any operating problems encountered and corrective actions taken at any sewage Works located at the property;

(c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works;

(d) a summary of all spill or abnormal discharge events; and

(e) any other information the District Manager requires from time to time.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the Works are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this Approval the existence of this Approval.

2. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

4. Condition 4 is included to ensure that the works are constructed, and may be operated and maintained such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented.

5. Condition 5 is included to require that the Works be properly operated, maintained, and equipped such that the environment is protected.

6. Condition 6 is imposed to establish non-enforceable effluent quality objectives which the Owner is obligated to use best efforts to strive towards on an ongoing basis.

7. Condition 7 is included to enable the Owner to evaluate and demonstrate the performance of the Works, on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives and effluent limits specified in the Approval and that the Works does not cause any impairment to the environment.

8. Condition 8 is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this Approval, so that the Ministry can work with the Owner in resolving any problems in a timely manner.

SCHEDULE A

1. Application for Approval of Sewage Works submitted by Sisters of St. Joseph, prepared by Professional Engineer Dave Wilhelm of MTE Consultants Inc dated March 30, 2015 , and all the correspondence and support documentation submitted during the review process.

2. Application for Approval of Sewage Works submitted by Sisters of St. Joseph, prepared by The Walter Fedy Partnership, Architects and Engineers dated February 25, 2003, and enclosed Pre-submission Hydrogeological Report For Sewage Disposal System prepared by Frontline Environmental Management.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 2829-5M9F4V issued on May 29, 2003.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*****
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 22nd day of September, 2016

Fariha Pannu, P.Eng.

Director
appointed for the purposes of Part II.1 of
the *Environmental Protection Act*

CM/
c: District Manager, MOECC Hamilton - District
Dave Wilhelm, P.Eng. MTE Consultants Inc.

APPENDIX D

PROPOSED DISPOSAL BED SIZING CALCULATIONS

Columbia International College
WASTEWATER TREATMENT SYSTEM DESIGN
Hamilton, ON

Project Number:	45800-100
Date:	September 12, 2019
Design By:	MAC
File:	Q:\45800\100\45800-100 Wastewater Treatment System Design_Rev1.xls

TERTIARY TREATMENT WITH SHALLOW BURIED TRENCHES
Ontario Building Code - Division B, Part 8

Address: 574 Northcliffe Ave

	"T" Time *min/cm*
1) Percolation Time, T *(min/cm)*	
a) Native soil (per Geotechnical Engineer's report)	>50
b) Imported fill	10

Design Percolation Time ("T" Time)	**T =**	**51**	***min/cm***

2) Daily Design Flow, Q (*L*)

Number of Students in the Main School Building:	**1000**	***Students***
Daily Flow for Students	**30**	***Lpd/ student***
Daily Flow for Students with a Cafeteira	**30**	***Lpd/ student***
Total Daily Flow from Students in the propsoed school	**60,000**	***Lpd***
Number of Student who shower per day	**100**	***Students***
Daily Flow for Students with with showers	**30**	***Lpd/ student***
Total Daily Flow from Student showers	**3,000**	***Lpd***
Number of Non-Teaching Staff	**35**	***Staff***
Daily Flow for non-teaching staff in a school (per 8 hour shift)	**50**	***Lpd***
Total Daily Flow from Non-Teaching Staff	**1,750**	***Lpd***

Total Daily Design Sewage Flow	**Q =**	**65,000**	***Lpd***

3) Treatment Unit

Waterloo Biofilter Treatment System (additional details to follow)

4) Number of Cells

Existing Cells to be used:	13 Cells
New Cells to be constructed:	8 Cells
Number of Cells in the System:	21 Cells

5) Shallow Buried Trench Length, L *(m)*

Factor of Safety (FS) 1.4

L = Q / 75 * FS	(1 < T ≤ 20)	
L = Q / 50 * FS	(20 < T ≤ 50)	
L = Q / 30 * FS	(50 < T < 125)	2968.3 *m*

Total Design Length	**L =**	**2968.3 *m***
Design Length per cell	**L =**	**141.3 *m***

6) Cell Sizing

Run Spacing:	2.0 *m*
Outside Spacing:	1.0 *m*
Typical Section Length:	0.1 *m*
Maximum Run Length:	30.0 *m*

Number of Runs	Run Length *m*	Bed Length *m*	Bed Width *m*	Total Area m^2
8	**17.7**	**19.7**	**18.0**	**355**
9	15.8	17.8	20.0	356
10	14.2	16.2	22.0	356
11	12.9	14.9	24.0	358
12	**11.8**	**13.8**	**26.0**	**359**

For Existing Cells 1-2, 4-14 and Proposed Cells 15-21

20 cells of	**8**	**17.7**	***m* runs**
		355	**m^2 total bed area**
		142	**m total length of distribution pipe**

For Proposed Cell 3

Provide	**12**	**11.8**	***m* runs**
		359	**m^2 total bed area**
		142	**m total length of distribution pipe**

Summary of Existing and Proposed Cells

A total of	**160**	**17.7**	***m* runs**
and	**12**	**11.8**	***m* runs**
		8812	**m^2 total bed area**
		2974	**m total length of distribution pipe**

APPENDIX E

WASTEWATER SYSTEM SPECIFICATIONS

WASTEWATER SYSTEM SPECIFICATIONS

1.0 SCOPE OF WORK

Supply all materials, labour and incidentals necessary to complete the Class IV Wastewater Disposal system including:

1.1 installation of upgrades to Level IV treatment unit;
1.2 installation of 38mm diameter forcemain between treatment units and shallow buried trenching as required;
1.3 installation of access risers and lids on tanks, as required;
1.4 design and installation of shallow buried trenches in accordance with Division B, Part 8, Ontario Building Code;
1.5 installation of pumps and controls as required; and
1.6 fine grading and restoration of all disturbed areas with topsoil and seed or sod.

2.0 CONTROL OF WORK

2.1 All work to be performed in accordance with the most recent revisions of the OBC.
2.2 The Level IV treatment system chosen for installation must conform with the OBC, Division B, Part 8, Table 8.6.2.2.A. and be approved under the OBC for installation (e.g. BMEC or BNQ certified).
2.3 Final location and elevation of all works to be established on-site by Design Engineer.
2.4 Contractor to arrange for Engineer inspection of the system. Two inspections are required as per Inspection Schedule, enclosed.

3.0 PIPING

3.1 Gravity Sewer — 100 mm diameter PVC to CSA B182.1 in Granular 'A' bedding. Connect building drain to treatment system. All gravity sewers to have a minimum slope of 1.0%.

3.2 Forcemain — 38mm diameter PVC or HDPE. Connect pump chamber to shallow buried trenches as required.

3.3 Shallow Buried Trench — BioDiffuser Leaching Chamber. Design and constructed by a licensed installer as per OBC, Clause 8.7.6.1.

4.0 TANKS

4.1 Treatment Unit — Level IV Treatment Unit per OBC.Elevation set to receive gravity drainage from

		building sewer (minimum 1.0% slope). Level IV treatment unit shall be per Waterloo Biofilter, with a rated capacity of 65,000 Lpd complete with a _____ L pump chamber; and timed dosing pump system.
4.2	Risers	Extend access hatches to grade with precast concrete access risers complete with concrete lid. Grout seal all piping connections and riser joints with non-shrink grout. Minimum depth of cover above tank to be 300 mm. Alternate: Polylok PVC Risers.
4.3	Covers	Covers shall be solid cast iron manhole frame and covers with no openings. Alternate: Polylok bolt down RP/PVC assembly.
4.4	Pump Chamber	_____ L precast concrete pump chamber installed on leveled and compacted Granular 'A'. Elevation set to receive gravity drainage (minimum 2.0% slope) from the septic tank.
4.5	Balancing Tank	_____ L (_____ lGal) precast concrete balancing tank installed on leveled and compacted Granular 'A'. Elevation set to receive gravity drainage from the Level IV treatment system (minimum 1.0% slope). Unit Precast or approved equivalent.
4.6	Distribution Valve	Hydraulically actuated distribution valve with even number of outlets; K-rain 640Z or approved equivalent.

5.0 PUMP

5.1	Effluent Pump	Two (2) Submersible effluent pumps, sized and supplied by Level IV Treatment supplier. Install in pump chamber with controls as specified.
5.2	Effluent Controls	On/Off/High Level Float switch, elapsed timer meter, visual and audible alarms. All system controls and alarms to be mounted on the exterior basement wall of the proposed residence. Both visual and audible alarms are required complete with alarm silence button.

6.0 AS CONSTRUCTED DRAWINGS

		building sewer (minimum 1.0% slope). Level IV treatment unit shall be per Waterloo Biofilter, with a rated capacity of 65,000 Lpd complete with a _____ L pump chamber; and timed dosing pump system.
4.2	Risers	Extend access hatches to grade with precast concrete access risers complete with concrete lid. Grout seal all piping connections and riser joints with non-shrink grout. Minimum depth of cover above tank to be 300 mm. Alternate: Polylok PVC Risers.
4.3	Covers	Covers shall be solid cast iron manhole frame and covers with no openings. Alternate: Polylok bolt down RP/PVC assembly.
4.4	Pump Chamber	_____ L precast concrete pump chamber installed on leveled and compacted Granular 'A'. Elevation set to receive gravity drainage (minimum 2.0% slope) from the septic tank.
4.5	Balancing Tank	_____ L (_____ lGal) precast concrete balancing tank installed on leveled and compacted Granular 'A'. Elevation set to receive gravity drainage from the Level IV treatment system (minimum 1.0% slope). Unit Precast or approved equivalent.
4.6	Distribution Valve	Hydraulically actuated distribution valve with even number of outlets; K-rain 640Z or approved equivalent.

5.0 PUMP

5.1	Effluent Pump	Two (2) Submersible effluent pumps, sized and supplied by Level IV Treatment supplier. Install in pump chamber with controls as specified.
5.2	Effluent Controls	On/Off/High Level Float switch, elapsed timer meter, visual and audible alarms. All system controls and alarms to be mounted on the exterior basement wall of the proposed residence. Both visual and audible alarms are required complete with alarm silence button.

6.0 AS CONSTRUCTED DRAWINGS

6.1 Prior to final inspection, provide Owner/Builder with marked up plans showing exact locations of all system components with dimensions to permanent features; all operating manuals and other manufacturer's literature for the system components.

APPENDIX F

WASTEWATER SYSTEM INSPECTIONS

WASTEWATER SYSTEM INSPECTIONS

1.0 SUBGRADE PREPARATION

Inspection of subgrade prior to the placement of any fill. Subgrade shall be level and excavated to the dimensions illustrated on the approved plan. Work includes the removal of all trees, roots, vegetation, topsoil, and other soils until an acceptable subgrade soil is encountered

2.0 SEPTIC SYSTEM COMPONENTS

Prior to backfilling the shallow buried trenching, the Contractor must contact the Design Engineer and the Municipality representative to carry out an inspection of all treatment system components including Level IV treatment system, pumps and controls; sand filter and distribution pipes in the shallow buried trenches.

A “squirt” test must be performed to ensure that the pressure supplied by the dosing pump is enough to generate a minimum squirt height of 0.6 m at the last hole furthest from the distribution box.

45800-100-EC1.1

EXISTING CONDITIONS PLAN

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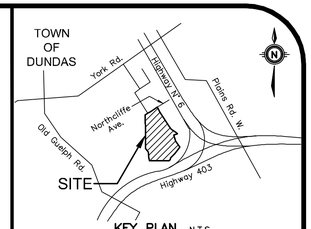
MTE FILE No:

September 25, 2019 – 4:52 p.m. — Plotted By: abolean

LEGEND OF EXISTING FEATURES

- SITE BOUNDARY
- 326.00 — EXISTING CONTOURS
- Ex. 375mmø STM — Ex. MH — EXISTING STORM SEWER
- EXISTING BUILDING
- EXISTING FENCE
- (TOP) / (BOTTOM) — EXISTING EMBANKMENT (SLOPE AS NOTED)
- DISTRIBUTION PIPE
- SHALLOW BURIED TRENCH CELLS NOT IN USE
- 15m DRIPLINE BUFFER
- 30m DRIPLINE BUFFER
- X — REMOVALS



KEY PLAN N.T.S.

GEODETIC BM ELEV. = m

SITE BENCHMARK ELEV. = 120.114 m

TOP OF CONCRETE NAIL LOCATED IN THE ASPHALT DRIVEWAY NORTH WEST OF THE MOST NORTHERN CORNER OF THE TWO (2) STOREY BUILDING.

NOTE TO CONTRACTOR :

DO NOT SCALE DRAWINGS.

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.

No.	REVISION	BY	DATE
1.	ISSUED FOR REVIEW	AXN	SEP.13/19
2.			
3.			
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8.			

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COLUMBIA INTERNATIONAL COLLEGE CANADA
1003 MAIN STREET WEST HAMILTON, ON

PROJECT
C.I.C. ON-SITE WASTEWATER TREATMENT SYSTEM EXPANSION
574 NORTHCLIFFE AVENUE DUNDAS, ON

DRAWING
EXISTING CONDITIONS AND REMOVALS PLAN

Project Manager: A. NASEEM	Project No.: 45800-100
Design By: MAC	Checked By: DJW
Drawn By: AXB	Checked By: MAC
Surveyed By: OTHERS	Drawing No.: EC1.1
Date: Jul.12/19	
Scale: 1:500	Sheet of

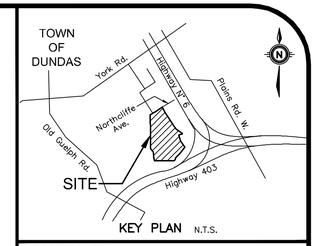
45800-100-C2.1
MTE FILE No:
ON-SITE WASTEWATER TREATMENT PLAN
P:\P\45800\100\45800-100-C2

LEGEND OF EXISTING FEATURES

- SITE BOUNDARY
- 326.00 — EXISTING CONTOURS
- Ex. 375mm ø STM. — Ex. MH — EXISTING STORM SEWER
- EXISTING BUILDING
- EXISTING FENCE
- (TOP) / (BOTTOM) — EXISTING EMBANKMENT (SLOPE AS NOTED)
- DISTRIBUTION PIPE
- 15m DRIPLINE BUFFER
- 30m DRIPLINE BUFFER

LEGEND OF PROPOSED FEATURES

- DISTRIBUTION PIPE
- SEDIMENT CONTROL FENCE (SEE DETAIL)
- DIRECTION OF DRAINAGE/SWALE



KEY PLAN N.T.S.

GEODETIC BM ELEV. = m

SITE BENCHMARK ELEV. = 120.114m
TOP OF CONCRETE NAIL LOCATED IN THE ASPHALT DRIVEWAY NORTH WEST OF THE MOST NORTHERN CORNER OF THE TWO (2) STOREY BUILDING.

No.	REVISION	BY	DATE
8.			
7.			
6.			
5.			
4.			
3.			
2.			
1.	ISSUED FOR REVIEW	AXN	SEP.13/19

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PROJECT
C.I.C. ON-SITE WASTEWATER TREATMENT SYSTEM EXPANSION
574 NORTHCLIFFE AVENUE DUNDAS, ON

DRAWING
ON-SITE WASTEWATER TREATMENT PLAN

Project Manager: A. NASEEM	Project No.: 45800-100
Design By: MAC	Checked By: DJW
Drawn By: AXB	Checked By: MAC
Surveyed By: OTHERS	Drawing No.: C2.1
Date: Jul.26/19	
Scale: 1:500	Sheet of

September 25, 2019 — 4:52 p.m. — Plotted By: abalean