Preliminary Septic Design Report – Teviotdale Industrial Subdivision

Submitted to:

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1. Introduction

GEI Consultants Canada Ltd (formerly GM BluePlan Engineering Limited) was retained by Frontiers Design Build to provide the preliminary design of septic systems for a proposed industrial subdivision in Teviotdale, in the Town of Minto. The property is located at 6739 Wellington Road 109. The property is approximately 8.20 hectares in size and is currently vacant. The subdivision is proposed to consist of 12 lots for industrial use, ranging in size from 0.405 hectares to .810 hectares.

The purpose of this report is to describe the design of the proposed sewage systems to support the application for a Draft Plan of subdivision. Soil testing information, performed by Chung & Vander Doelen Engineering Ltd. (CVD), is included in the application under separate cover.

The design is generally based on information provided by the Client with respect to the assumed usage of the lots in the development. Individual designs will need to be submitted as part of the building permit application for each lot at the time of building, and designs will be required to comply with Part 8 Sewage Systems in the latest version of the Ontario Building Code (OBC).

2. Geotechnical Characterization

CVD conducted soil sampling on the subject property in April of 2024. Sample were analyzed for grain size distribution by CVD to determine hydraulic conductivity and percolation T-time. The particle size distribution determined that the coefficient of permeability for the site was generally in the range of $<1.0 \times 10^{-6}$ cm/second, and CVD has recommended using a T-time exceeding 50 mins/cm for design purposes. For preliminary design purposes, the T-time will be assumed to be 51 mins/cm.

3. Design Calculations

3.1. Design Flows

Estimated design flows for the lots were determined in compliance with OBC Table 8.2.1.3.B. For the purposes of this report, it was assumed that the lots would consist of small machine shops and equipment assembly type usages, and therefore the 'Factory' designation was selected. It was further assumed that each lot would consist of a business that had 15 employees engaged in manufacturing and will include showers. The summary of assumed flows is as follows:

Table 1: Peak Day Design Flow Calculations

Description	Units	Quantity	Calculated Flow L/day)
Factory, including showers	Employees	15	1,875

Therefore, system will be designed based on an assumed sewage flow rate of 1,875 L/day.

3.2. Septic Tank

Based on OBC sentence 8.2.2.3, the working capacity of a septic tank for non-residential occupancies shall be the greater of:

- 3,600 L
- 3 x Daily Flow = 3 x 1,875 L/d = 5,600 L

Therefore, septic tanks must have a minimum volume of 5,600 L. A standard sized double compartment 1,500-gallon (5,680L) septic tank will provide the necessary volume.

3.3. Leaching Bed Design

Because the native soil T-time is high at more than 50 minutes/cm, it is expected that systems will be designed as fill-based leaching beds to be constructed in sand fill with a mantle, as per OBC 8.7.4. The sand fill shall meet the requirements of CSA Standard A23.1 (ASTM C-33) with a T-time not exceeding 8 min/cm, and the mantle shall consist of sand fill a minimum of 250mm in depth extending a minimum of 15m past the end of the distribution piping. Sand fill beneath the absorption trenches shall be a minimum of 900m in depth to native soil.

Total distribution pipe length within the beds is calculated as per OBC 8.7.3.1, using the T-time of the sand fill:

Length = Q T / 200 = 1,875 * 8 / 200 = 75m

Since the total length of distribution piping is less than 150m, as per OBC 8.6.1.3 dosing is not required. Distribution piping will consist of 3 runs of 75mm perforated pipe 25m in length each, spaced at 1.6m centre to centre.

The loading area must meet the allowable loading requirements stipulated in OBC Table 8.7.4.1.; for native soil T-time exceeding 50 min/cm, the maximum allowable loading rate is 4 L/sq.m./day.

Loading Area = 1,875 L/day / 4 L/sq.m./day = 470 sq.m.

Selected footprint for the total loading area will include a sand mantle of 22m in length and 10m in width. Including the area for the distribution pipes, the leaching bed will be a total of 47m in length by 10 metres wide for a total loading area of 470 sq.m.

Including setbacks to buildings and property line, as required by OBC, and including a 5m x 10m allowance area for the septic tank, the total area required on each lot for septic servicing purposes is approximately 900 m^2. This area represents 22% of the smallest lot in the proposed development, and only 11% of the largest. Therefore, in our opinion the proposed lots are of sufficient size to permit septic servicing in compliance with OBC based on an assumed usage as detailed above.

We trust the above to be in order for Draft Plan Approval purposes. If you require further information or have any questions, please contact the undersigned.

All of which is respectfully submitted.

GEI Consultants Limited

Per:

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