

November 8, 2024

Reference No. G4223-24-11

Angela Kroetsch, P.Eng.
Vice-President, Senior Project Manager, Land Development Practice Lead
GEI Consultants Canada Ltd.
330 Trillium Drive, Unit D
Kitchener, Ontario
N2E3J2

RE: Foundation Recommendations
Marsville North Subdivision
Maple Street and 13th Line
Township of East Garafraxa, ON

Dear Ms. Kroetsch,

As requested by GEI Consultants Canada Ltd. (formerly GM BluePlan Engineering Limited), JLP Services Inc. (JLP) carried out a review of the updated grading plans and the observed groundwater levels at the Marsville North Subdivision in the Township of Garafraxa, Ontario.

The purpose of this review is to determine the potential impact of the soil and groundwater conditions at the site and to provide recommendations pertaining to the design and construction of building foundations for the proposed residential subdivision.

The soil and groundwater conditions at the site are referenced to the following documents:

- Geotechnical investigation report titled “Geotechnical Investigation, Marsville North (Marsville Thunderbird) Subdivision, Maple Street, Township of East Garafraxa (Marsville), Ontario”, Reference No. G4223-20-2, dated February 2020, prepared by V.A. Wood (Guelph) Incorporated.
- Geotechnical review report titled “Foundation Recommendations, Marsville North Subdivision, Maple Street and 13th Line, Township of Garafraxa, ON”, Reference No. G4223-22-3, dated April 4, 2022, prepared by JLP Services Inc.
- Grading Plan 1, 2 and 3, Drawing No. 3, 4 and 5, Rev.3, dated May 12, 2022, Project No. 418153, by GM BluePlan Engineering Ltd.
- “Groundwater Level Monitoring Report, Marsville North, Township of Garafraxa, ON”, Project No. 2401738, dated June 10, 2024, prepared by GEI Consultants Canada Ltd.

In general, the soils encountered at the site area comprised of a surficial deposit of topsoil over loose, reworked silt and sand or very loose to compact silt and sand and underlain by deposits of loose to dense silt, loose to compact silt and sand, and/or very stiff to hard silt and clay till on dense sand. The proposed residential dwellings will have no basement and be supported on slab-on-grade (raft) foundations and be serviced with municipal water supply, storm drain leading to a local storm water management facility and a private tertiary wastewater treatment facility.

Considering the soil and groundwater conditions and the updated site grading, we have the following comments and recommendations:

1. The highest observed groundwater levels in the monitoring wells are between Elevations 480.3 and 487.7 across the site.
2. Soil bearing pressures at Serviceability Limit States (SLS) and Ultimate Limit States (ULS) of 75 kPa and 115 kPa, respectively, are available immediately below the existing topsoil and the loose, reworked, upper zone of the native silt and sand or sand deposits.
3. The observed groundwater levels in MW1, MW2 and MW4, installed in the vicinity of the proposed storm water management facility, are up to about 2.0m higher than the top of the overflow weir level (maximum storage level) of Elevation 484.90m, and are about 0.85 to 5.85m higher than the bottom of pond level of Elevation 481.05m. As such, an impermeable liner will be required to separate the storm water collected from the subdivision from the natural groundwater at the site. The impermeable liner will have to resist hydrostatic uplift due to the high groundwater levels in the vicinity.
4. Consideration may be given to raise the site grades in the vicinity of MW2, MW3, MW5 and MW6 to keep the proposed underside of slab-on-grade higher than the observed groundwater level to minimize or eliminate the requirements for permanent underfloor drainage system or waterproofing system.
5. The procedures and recommendations for engineered fill construction are outlined in the geotechnical investigation report referenced above.

A summary of the findings is presented in Table 1 attached.

We trust this report has been completed within our terms of reference, however, should you have any questions or concerns regarding this report, please do not hesitate to contact us.

Yours very truly,

JLP SERVICES INC.



Aakash Kuruvath, M. Eng.
Project Coordinator



Alexander Lee, M. Sc. (Eng.), P.Eng.
Senior Geotechnical Engineer



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**Table 1: Summary of Suitable Founding Levels and Observed Groundwater Levels
Marsville North Subdivision, Township of East Garafraxa**

| Monitoring Well Number | Ground Elevation | Lot Number | Elevation/Depth where 75kPa soil bearing capacity is available | Proposed USF Elevation | Proposed FF Elevation | Observed Highest Groundwater Level | | Observed Highest Water Depth Below USF | Observed Highest Water Depth Below FF | Recommended Construction Method |
|------------------------|------------------|------------|----------------------------------------------------------------|------------------------|-----------------------|------------------------------------|-------------|----------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| | | | | | | Date | Water Level | | | |
| 1 | 485.44 | 4 | 484.8±/0.6± | 484.88 | 487.34 | 03-Nov-20 | 483.5 | 1.38 | 3.84 | USF above suitable bearing level, engineering fill required. |
| | | 5 | | 484.13 | 487.18 | 11-Dec-21 | 481.9 | 2.23 | 5.28 | |
| 2 | 487.29 | 6 | 487.3±/1.0± | 484.57 | 487.41 | 11-Mar-20 | 486.6 | -2.03 | 0.81 | USF in suitable bearing level but below highest observed ground water level, dewatering may be required. |
| | | 7 | | 484.75 | 487.57 | 11-Apr-24 | 486.9 | -2.15 | 0.67 | |
| 3 | 486.30 | 13 | 484.0±/2.3± | 485.57 | 488.45 | 11-Dec-20 | 486.3 | -0.73 | 2.15 | USF above suitable bearing level and below highest observed ground water level, engineered fill and dewatering may be required. |
| | | 14 | | 485.75 | 488.63 | 11-Apr-24 | 486.3 | -0.55 | 2.33 | |
| 4 | 486.29 | 29 | 485.5±/1.3± | 484.52 | 486.90 | 11-Feb-20 | 480.3 | 4.22 | 6.60 | USF in suitable bearing level and above ground water level, no engineered fill required. |
| | | 30 | | 484.66 | 487.50 | 11-Apr-24 | 480.5 | 4.16 | 7.00 | |
| 5 | 488.00 | 21 | 485.7±/2.3± | 485.28 | 488.32 | 11-Mar-20 | 487.6 | -2.32 | 0.72 | USF in suitable bearing level but below ground water level, dewatering may be required. |
| | | 22 | | 485.11 | 488.15 | 11-Apr-24 | 487.7 | -2.59 | 0.45 | |
| 6 | 487.47 | 18 | 486.9±/0.6± | 486.30 | 488.56 | 11-Mar-20 | 487.5 | -1.20 | 1.06 | USF in suitable bearing level but below ground water level, dewatering may be required. |
| | | 19 | | 486.07 | 488.94 | 11-Mar-24 | 487.5 | -1.43 | 1.44 | |