SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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PROJECT NO.: SM 250958-G April 7, 2026

EMSHIH DEVELOPMENTS INC.
895 Brant Street, Suite 7
Burlington, Ontario
L7R 2J6

Attention: Kristina Didiano, MES
Development Manager

GEOTECHNICAL CONSIDERATIONS
PROPOSED RAIL SAFETY BERM AND RETAINING WALL
800 BURLOAK DRIVE
OAKVILLE, ONTARIO

Dear Ms. Didiano,

Further to our discussions and correspondence, SOIL-MAT ENGINEERS & CONSULTANTS LTD. is pleased to provide the following geotechnical considerations with respect to the above noted project. It is understood that a development is proposed at 800 Burloak Drive, in Oakville, Ontario, adjacent to a CN rail line. Based on GO Adjacent Development Guidelines, a 30 metre setback from the property line would be required, with a berm constructed as per Development Guidelines within the noted 30 metre setback. As the neighbouring rail is Canadian National Railway, their standards also need to be met.

From the 'Draft CN Berm Grading drawings prepared by S.LLEWELLYN & ASSOCIATES LIMITED provided to our office [Drawing No. C101, dated December 15, 2025], the proposed berm is noted to be 2.5 metres in height, with slope inclinations noted to be no steeper than 2.5 horizontal to 1 vertical. On the southern face (the side of the berm away from the rail line), a retaining wall is present, noted with a total height tapering up to 2.1 metres in height. While specific details of the wall are not yet known, it is presently anticipated to consist of a pre-cast concrete segmental wall with geogrid inclusions.

DESIGN AND CONSTRUCTION CONSIDERATIONS

Where a geogrid reinforced wall system is selected, it should be constructed in conjunction with the berm, and as such, the berm is anticipated to be constructed with a mixture of soil, as well as geogrid reinforced granular materials. All soil fill should be compacted to a minimum of 95 per cent of its standard Proctor maximum dry density [SPMDD], with the granular backfill compacted as per the retaining wall design, typically 98 percent SPMDD. Any imported fill should have its moisture content within 3 per cent of its optimum moisture content and meet the necessary environmental guidelines.

While the exact specifications for the proposed retaining wall is unknown, it is presently anticipated to consist of a segmental pre-cast block retaining wall, as noted above. The base block should be set on a 150-millimetre-thick levelling course of OPSS Granular 'A' compacted to a minimum of 98 per cent of its standard Proctor maximum dry density [SPMDD].

The retaining wall should be provided with a proper drainage layer leading to a weeping tile at the base of the wall. The drainage layer should consist of a minimum of 19-millimetre crushed clear stone, immediately behind the wall. Understanding geogrid is likely to be included in the design, the use of OPSS Granular B Type II (crushed limestone bedrock) is also acceptable. The weeping tile may consist of a geofabric encased 100-millimetre diameter perforated plastic pipe at the base of the clear stone. A geofabric separator, such as Terrafix 270R or equivalent nonwoven filter fabric, should completely envelop the clear stone deposit to prevent migration of any fine grained soils into the interstitial spaces in the drainage deposit.

As the retained soil within the proposed berm is presently unknown, conservative soil parameters may be assigned during the design process for the subject retaining wall based, also taking into consideration the 2.5 horizontal to 1 vertical slope above the top of the wall (an approximately 22 degree angle), as follows:

Retained Soil Assumptions: γ = 19.5 kN/m^3; ϕ = 28°; c = 0 kPa,
retained soil 22° angle above

Active case: Ka = 0.49
Passive case: Kp = 1.76

It is anticipated that the embedment depth (depth to the underside of the base block) of the proposed retaining wall will be a minimum of approximately 300 millimetres, with the wall founded within native soils or competent engineered fill. Based on a review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soils to consist very stiff silty clay overlying Queenston shale bedrock at relatively shallow depths, consistent with our experience in the area and observations during drilling. Conservative design bearing values of 200 kPa SLS and 300 kPa ULS may be applied to the design of foundations for the new retaining wall structures, based on the assumption any unsuitable surficial fill soils will be removed. Higher bearing capacities would be available with depth as foundations approach the more competent bedrock, however, higher bearing capacities are not anticipated to be required for the proposed retaining wall.

Prior to placement of the granular base, or engineered fill, the exposed subgrade should be stripped of all organic or otherwise unsuitable materials. The exposed subgrade should be should be reviewed by a representative of SOIL-MAT ENGINEERS & CONSULTANTS LTD., immediately prior to the placement of the granular base material. Any encountered unsuitable soils must be sub-excavated and replaced with suitable backfill material. The need for the treatment of softened subgrade will be reduced if construction is undertaken during the dry summer months and careful attention is paid to the compaction operations.

It is recommended that SOIL-MAT ENGINEERS be retained during construction of the retaining wall to provide construction quality control services such as subgrade evaluations and compaction testing, and conduct a general review of the retaining wall installation in accordance with design specifications.

GENERAL CONSIDERATIONS

As noted above, the proposed berm generally meets the GO and CN requirements, with a minimum height of 2.5 metres, and a max slope of 2.5 horizontal to 1.0 vertical. On the southern side of the berm, the proposed wall system slightly 'cuts into' the toe of the berm. However, when designed to support the weight of the sloped berm above, the retaining wall would not fundamentally change the function of the berm. As well, it is understood the 30 metre setback is also to be provided. In the event of derailment, it is understood that the intent of the berm is to absorb the majority of the train's momentum, however movement of the berm may still be possible. Similarly, for what is proposed on this development, the retaining wall isn't intended to act as a crash wall, as it is on the opposite side of the berm, but would still function in a similar manner to aide the berm in absorbing momentum, particularly if the wall is constructed as a segmental unit precast wall with geogrid reinforcement, or a cast in place cantilevered wall system.

We trust that this geotechnical considerations letter is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.



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