patersongroup memorandum

consulting engineers

re:	**Geotechnical Response to Peer Review Comments** **Proposed High-Rise Building** **1040 Somerset Street West - Ottawa**
to:	Claridge Homes - **Mr. Vincent Dénommé** - vincent.denomme@claridgehomes.com
date:	October 4, 2021
file:	PG2674-MEMO.10

Paterson Group Inc. (Paterson) prepared the current memo to provide our responses to the geotechnical peer review comments in the letter entitled “Peer-Review of Geotechnical Report and Shoring Plans” prepared by DST Consulting Engineers Inc. (DST) and dated September 3, 2021. This memo should be read in conjunction with the current Geotechnical Investigation Report (Paterson Group Report PG2674-2 Revision 4 dated October 4, 2021), and the current Construction Methodology Report (Paterson Group Memorandum PG2674-MEMO.07 Revision 2 dated October 4, 2021).

Responses to the comments regarding the shoring design will be provided by others in a separate letter.

Geotechnical Investigation Report - Comments 1 to 4

These items have been closed as noted in the above mentioned letter.

Geotechnical Investigation Report - Comment 5

Comment 5: *The report includes slope stability evaluations under both static and seismic conditions for the west slope of the O-Train corridor indicating only a marginal safety factor against potential instability under the static condition. More detailed evaluation of the impact of the proposed construction methodology such as proposed dewatering, installation of sheet piles and tie backs, and equipment travel or operation on the stability of the existing and proposed slopes is therefore recommended.*

Paterson Response August 12, 2021: For the permanent condition, once construction has been completed, the proposed development will not induce new loads on the existing slope, as the new walkway along the eastern boundary of the site will be cantilevered over the slope.

For the temporary condition during construction, dewatering is not expected due to the use of steel sheet piles as the temporary shoring system along the east side of the excavation. However, even in the event that some dewatering was to occur during the construction period, this would only act to improve the factor of safety of the slope.

Other construction activities such as sheet pile installations, tieback installations, and equipment travel are not expected to negatively the existing slope stability.

DST Comment August 26, 2021: *DST recommends that an evaluation of the slope stability be performed for several possible scenarios anticipated during the proposed construction near the West slope of the O-Train corridor. At a minium the slope stability analyses should include the impacts of the construction equipment during the proposed pile driving operations.*

Response: Please refer to Figure 8 in Appendix 2 of the updated Geotechnical Investigation Report (Paterson Group Report PG2674-2 Revision 4 dated October 4, 2021), which provides the slope stability analysis for temporary equipment surcharge loading on the slope during construction. As noted in the report, the factor of safety of 1.3 under static conditions for this scenario represents a stable slope condition under temporary equipment surcharge loading. As the equipment surcharge loading is a very temporary condition, analyzing this scenario under seismic conditions is not considered to be required.

Geotechnical Investigation Report - Comment 6

Comment: *The Geotechnical Investigation recommends that the existing bridge abutment should be investigated. This additional investigation is required to ensure the bridge is not undermined. If the shoring intercepts the zone of influence of the bridge, then the shoring will need to be designed to accommodate, or underpinning used, and/or applicable monitoring implemented.*

Paterson Response August 12, 2021: The existing bridge abutment will be investigated at the start of construction, and if the temporary shoring system intercepts the zone of influence of the bridge, then the design of temporary shoring system will be revised to account for this, and applicable monitoring would be implemented.

DST Comment August 26, 2021: *DST recommends that the investigation of the existing bridge abutment and possible shoring and monitoring requirements should be performed at the design stage and not at the time of construction.*

Response: As requested, additional test pits have been completed at the west abutment of the Somerset Street overpass, in order to evaluate the foundation conditions of this structure. The results of these test pits are included in the current Geotechnical Investigation Report, and will be provided to the shoring designer for their review as it pertains to the design of the temporary shoring system.

Geotechnical Investigation Report - Comment 7

Comment: *The Geotechnical Investigation recommends that the 1372 mm PCCP watermain be monitored using inclinometers and hand surveying within valve chambers. However, no valve chambers appear to be located adjacent to the Site. Given the proximity of the waterman to the shoring wall, and the tie backs proposed below the watermain, DST recommends that the watermain monitoring include utility monitoring points placed directly on top of the watermain with the use of settlement rods for direct reading. Additionally, vibration monitors should be placed on the utility itself. Review and Alert limits for the settlement monitoring and vibration monitoring will need to be aligned to the sensitivity of the utility based on the construction impact assessment recommended above. Such monitoring should be specified in a formal Risk Management Plan prepared by a Professional Engineer.*

Paterson Response August 12, 2021: In lieu of inclinometers, 2 utility monitoring points will be installed directly on top of the 1,372 mm diameter watermain, adjacent to the western boundary of the site subject site. Further, the vibration monitors can also be setup directly on the 1,372 mm diameter watermain.

Refer to the *Construction Methodology Report for the Protection of City Infrastructure* (Paterson Group Memo PG2674-MEMO.07 dated June 14, 2021) for the specific settlement and vibration criteria for this watermain.

DST Comment August 26, 2021: *The comment was intended to address the monitoring requirements of the watermain only. We agree that the addition of the two utility monitoring points to be installed directly on top of the 1,372 mm diameter watermain and the proposed settlement and vibration monitoring with the review and alert limits to be specified. In addition to this, the originally proposed monitoring of inclinometers should continue to be included, along with any shoring monitoring required by the Shoring Engineer to support their shoring design, construction, and performance.*

Response: As requested, the 2 utility monitoring points at the top of the 1,372 mm diameter watermain will be supplemented with 2 inclinometers installed behind the west shoring face and ajdacent to the watermain.

This is reflected in the current Geotechnical Investigation Report (Paterson Group Report PG2674-2 Revision 4 dated October 4, 2021), and the current Construction Methodology Report (Paterson Group Memorandum PG2674-MEMO.07 Revision 2 dated October 4, 2021).

Geotechnical Investigation Report - Comment 8

This item has been closed as noted in the above mentioned letter.

Geotechnical Investigation Report - Comment 9

Comment: *Long-term lowering of the groundwater at this Site is a concern. The Geotechnical Investigation requires a bento-mat installed on the rock face to ensure a water-tight bathtub design. This design detail requires significant detailing to address specific areas such as the rock ledge, the shoring and whalers, and the tie backs. If the installation and/or detailing is not done properly, this will have long-term settlement affects on surrounding structures due to lowering of the groundwater. As this is a critical item, DST recommends that this installation be inspected and certified by a Quality Verification Engineer (QVE) as part of proposed construction monitoring.*

Paterson Response August 12, 2021: Waterproofing and foundation drainage details for the bedrock ledge are provided on Sketch SK 1 in Appendix 2 of the updated Geotechnical Investigation Report (Paterson Group Report PG2674-2 Revision 3 dated August 12, 2021) and are also attached following this memo.

Above the bedrock ledge, the temporary shoring system will be setback 1 m from the bedrock face. Therefore, above the bedrock, where the walers and tieback anchors will be located, it is anticipated that the waterproofing and foundation drainage will be installed directly against the exterior of the concrete foundation wall, and not using a blind-side application directly against the temporary shoring system. Therefore, specific detailing of the waterproofing and drainage board installations around walers, tieback anchors, etc. is not applicable.

Paterson will make regular inspections during the installation of the waterproofing system in order to ensure conformance with our recommendations.

DST Comment August 26, 2021: *Proposed waterproofing detail was received and we have no further comments. However, DST recommends that the Geotechnical Engineer include an assessment of the effects of the temporary construction dewatering should significant dewatering occur (ie. greater than 200,000 litres per day) on the clayey soils surrounding the site, given the proposed construction duration until the excavation is waterproofed and backfilled.*

Response: The temporary shoring system and foundation waterproofing details have been designed to minimize dewatering of adjacent structures during the temporary and permanent conditions, respectively.

However, even in the unlikely event that significant dewatering (greater than 200,000 litres per day) were to occur at adjacent properties, given that the silty clay encountered at the subject site is very stiff to stiff, it is expected that settlement of adjacent structures and utilities in this scenario would be negligible (less than 5 mm).

We trust that this information satisfies your immediate requirements.

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