PATERSON GROUP

memorandum

re: **Geotechnical Recommendations for Parking Lot Expansion**
2370 Walkley Road – Ottawa – Ontario

to: Richcraft Properties Ltd. - **Ms. Fairouz Wahab** – FWahab@richcraft.com

date: March 6, 2023

file: PG6595-MEMO.01

Further to your request, Paterson Group (Paterson) prepared this memorandum to provide our geotechnical recommendations pertaining to the proposed parking lot expansion to be located at the aforementioned site.

During the preparation of the memo, Paterson reviewed the following drawing prepared by Stantec:

- ❑ Site Servicing and Grading Plan – Revision 1 dated January 30, 2023
  Drawing No. SSGP-1, Project No. 160401534

Based on our review of this drawing, the proposed development consists of expanding the asphalt-paved parking lot at the south end of the site to provide additional parking for transport trucks. This involves the entombment of an existing watercourse within a 1,350 mm diameter storm pipe.

Available Subsurface Information

In reviewing available subsurface information from the vicinity of the site, the subsurface profile generally consists of an approximate 0.5 to 1 m thickness of fill, composed of silty sand with crushed stone, which is underlain by a silty clay deposit.

Available geological mapping indicates that the bedrock at the subject site consists of shale of Carlsbad formation with an overburden drift thickness of about 3 to 5 m.

Geotechnical Recommendations

The subject site is considered suitable for the proposed development, from a geotechnical perspective. Our detailed geotechnical recommendations for pavement design, pipe bedding and backfill, permanent slopes, temporary excavation side slopes, groundwater control, and winter construction are provided in the following subsections.

Pavement Design

The pavement design for the proposed parking lot expansion is provided in Table 1 below.

Table 1 - Recommended Pavement Structure – Access Lanes, Loading Areas and Heavy Truck Parking

Thickness (mm)	Material Description
40	**Wear Course** - Superpave 12.5 Asphaltic Concrete
50	**Binder Course** - Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
450	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placedover fill or in situ soil.	

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type I or II material.

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of the material's standard Proctor maximum dry density (SPMDD) using suitable compaction equipment.

Where the proposed asphalt surface, recommended above, meets the existing asphalt surface, the following joint transition detail should be employed:

- A 300 mm wide section of the existing asphalt should be saw cut from the existing pavement edge to provide a sound surface to abut the proposed pavement structure.

- It is recommended to mill a 300 mm wide and 40 mm deep section of the existing asphalt at the saw cut edge.

Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications and Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa.

A minimum of 150 mm of OPSS Granular A should be placed for bedding for sewer pipes when placed on a soil subgrade. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to a minimum of 300 mm above the obvert of the pipe, should consist of OPSS Granular A (concrete or PSM PVC pipes) or sand (concrete pipe). The bedding and cover materials should be placed in maximum 225 mm thick lifts and compacted to 98% of the material's SPMDD.

The trench backfill material within the frost zone (about 1.8 m below finished grade) and above the cover material should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD. All cobbles larger than 200 mm in their longest direction should be segregated from re-use as trench backfill.

Permanent Slopes

The Site Servicing and Grading Plan drawing, referenced above, indicates new permanent slopes at the southern boundary of the site ranging from approximately 3H:1V to 5H:1V.

These permanent slopes have been reviewed, and are considered acceptable, from a geotechnical perspective.

Temporary Excavation Side Slopes

The side slopes of the excavations in the soil and fill overburden materials should be cut back at acceptable slopes, as described below. The subsoil at this site is considered to be mainly Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by "cut and cover" methods and excavations will not be left open for extended periods of time.

Groundwater Control

It is anticipated that groundwater infiltration into the excavations should be low to moderate and controllable using open sumps. The contractor should be prepared to direct water away from all subgrades, regardless of the source, to prevent disturbance to the founding medium.

For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

Winter Construction

Precautions must be taken if winter construction is considered for this project. The subsoil conditions at this site consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum of the pipe should be protected from freezing temperatures using straw, propane heaters and tarpaulins or other suitable means.

In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time that sufficient soil cover has been placed in order to prevent freezing at the founding level of the pipe.

Trench excavations and pavement construction are also difficult activities to complete during freezing conditions without introducing frost into the subgrade or in the excavation walls and bottoms. Precautions should be taken if such activities are to be carried out during freezing conditions. Additional information could be provided, if required.

Conclusion

When construction of the proposed development is proceeding, Paterson should be notified in order to review the excavated subgrades and to perform compaction testing on fill materials.

We trust that this Information satisfies your immediate requirements.

Best Regards,

Paterson Group Inc.

Killian Bell, B.Eng.

Scott S. Dennis, P.Eng.