



**re: Grading and Site Servicing Review**  
**Proposed Industrial Development**  
**6160 Thunder Road, Ottawa, Ontario**

**to: Avenue31. – Geoff Boole - [gboole@ave31.com](mailto:gboole@ave31.com)**

**date: August 12, 2024**

**file: PG5161-MEMO.04 Revision 1**

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Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide the geotechnical design summary details for the proposed residential development. The following memorandum should be read in conjunction with Paterson Report PG5161-1 Revision 4, dated August 9, 2024.

## **1.0 Background Information**

Generally, the soil profile at the test hole locations consists of fill and/or topsoil overlying a layer of silty sand, in turn overlying a deep silty clay deposit. Due to the presence of a silty clay deposit a permissible grade raise restriction was provided for the site. Based on the above-mentioned geotechnical report a permissible grade raise of 0.9 m is recommended for grading within 6 m of the proposed building's footprint and a permissible grade raise of 1.5 m is recommended for access lanes, storage and parking areas.

## **2.0 Grading Plan Review**

Paterson reviewed the following Grading Plans prepared by LRL Engineering for the proposed Industrial development to be located at the aforementioned site as part of the geotechnical assessment:

- Project No. 200578 - Drawings No. C301 -C305 Revision 3 – Grading and Drainage Plan dated August 8, 2024.
- Project No. 200578 - Drawings No. C401 -C304 Revision 3 – Servicing Plan dated August 8, 2024.

Based on our review of the above-noted drawing, the proposed grading for the Industrial building and the VIC Structure exceeds the permissible grade raise recommendations provided in the geotechnical report. Our grading summary and lightweight fill recommendations are presented in Table 1 – Soil Matrix Summary attached.





## **2.1 Light Weight Fill Recommendations**

### **2.1.1 Below Slab on Grade Structures**

The LWF EPS blocks should be comprised of EPS 19 under the slab on grade structures below office spaces. The LWF blocks should be comprised of EPS 22 under the slab on grade below the VC structure and EPS 29 should be used under the slab on grade where heavy equipment may travel (Garage).

Around the buildings, the LWF EPS blocks should be a minimum of 1 m thick and extend a minimum of 2.4 m outside the foundation walls. Between 2.4 to 4.8 m outside the foundation walls, a minimum of 0.6 m thick EPS LWF blocks should be installed. And between 4.8 to 6 m outside the foundation walls, a minimum of 0.3 m thick EPS LWF blocks should be installed. Refer to Figure 1 attached to the end of the memorandum for detailed drawings.

### **2.1.2 Below Pavement and Landscaped Areas**

Below the pavement and landscaped areas, the LWF EPS blocks should be comprised of EPS 19 and EPS 15 blocks respectively and should be placed as per the marked-up site plan attached to the end of this memorandum.

### **2.1.3 General Recommendations**

- All the EPS LWF blocks should be covered with a polyethylene sheet and surrounded with a non-woven geotextile such as Terrafix 270R.
- Within and around the buildings, the LWF should be placed against the foundation wall, above the footing, and a minimum of 300 mm below the finish surface or 400 mm below the slab on grade.
- The Lightweight Fill material backfill material should consist of EPS 19 under pavement and parking structures and EPS 12 around the remainder of the foundation under landscaped area.
- Within the slab on grade structures, the 400 mm fill layer on top of the LWF can consist of OPSS Granular A.
- Within landscaped areas, the 300 mm fill layer on top of the LWF can consist of in-situ fill material covered with a minimum of 100 of topsoil.
- Within the pavement areas, the 300 mm fill layer on top of the LWF can consist of OPSS Granular A or Granular B type II.

Lightweight fill material specifications and cover recommendations are provided in Figure 1 attached to the current report.

Paterson should review the LWF placement and complete compaction testing on any imported fill during the construction activities.



## 2.2 Settlement Surcharge

Due to the smaller permissible grade raise exceedance in the paved an storage area, a settlement surcharge program can also be conducted within the noted areas in light green (refer to attached mark-up) on the attached site plan. It is recommended to pre-grade the proposed parking and storage areas with approved fill and surcharge the area to a minimum of 0.6 m over the proposed final grade, over an anticipated period of six (6) to eight (8) months. Paterson shall monitor the settlement of the ground to confirm settlement rates and completion of the surcharge program. The completion of a successful surcharge program would eliminate the need for LWF within these areas.

Following a successful surcharge expected total settlement will be within expected range described below.

## 3.0 Site Servicing Plan Review

In the gravel storage area, it is expected that approximately 25 to 50 mm of settlement can be expected over time. Therefore, the to maintain minimum drainage slope along the servicing lines some catchbasins will require LWF. A minimum of 0.6 m of EPS 19 extending 1.2 m around the catchbasin should be used to protect the structures as indicated on the attached plan.

### 3.1 Frost Protection

Based on our review of the Site Servicing Plans, it was noted that some portions of the proposed storm service lines will have less than 2.1 m of soil cover above the invert elevation of the pipes. Where insufficient soil cover (i.e.- less than 2.0 m) is available, the following frost protection criteria outlined in Table 1 below.

Table 1: Frost Protection Recommendations		
Soil Cover Provided D (mm)	Insulation Dimensions (mm)	
	Thickness (mm)	Length (mm)
1,100 to 1,400	75	Extend 900 mm horizontally beyond the edge face of the pipe
1,400 to 1,700	50	Extend 600 mm horizontally beyond the edge face of the pipe
1,700 to 2,000	50	Extend 300 mm horizontally beyond the edge face of the pipe

The rigid insulation should be placed 150 mm above the pipe on top of a compacted Granular A backfill and should have a minimum of 150 mm of Granular A backfill above the rigid insulation. Rigid insulation placed underneath roadways less than 1.2 m from the surface should consist of high density extruded polystyrene HI-40 or better. The insulsation should be coordinated with the proposed LWF insulation under pavement areas. Any portion of the storm service pipe installed at a depth of 2.0 m below finished grade or deeper is considered acceptable from a geotechnical perspective.



We trust that the current submission meets your immediate requirements.

Best Regards,

**Paterson Group Inc.**

Pratheep Thirumoolan, M.Eng



Joey R. Villeneuve, M.A.Sc., P.Eng, ing.

**Attachments**

- Figure 1 – EPS Block Installation
- LWF Requirement Markup

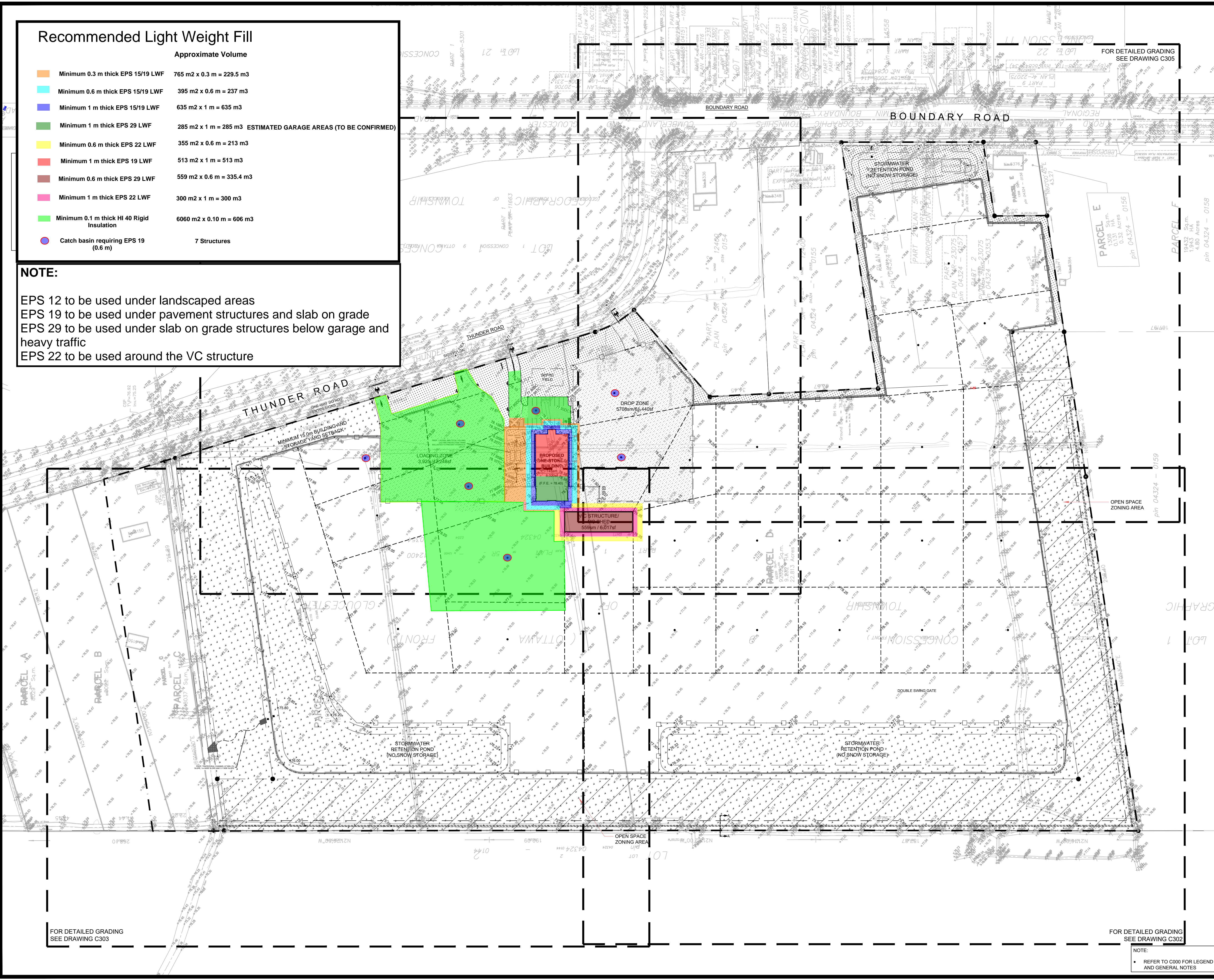




# Recommended Light Weight Fill

	Approximate Volume
Minimum 0.3 m thick EPS 15/19 LWF	765 m <sup>2</sup> x 0.3 m = 229.5 m <sup>3</sup>
Minimum 0.6 m thick EPS 15/19 LWF	395 m <sup>2</sup> x 0.6 m = 237 m <sup>3</sup>
Minimum 1 m thick EPS 15/19 LWF	635 m <sup>2</sup> x 1 m = 635 m <sup>3</sup>
Minimum 1 m thick EPS 29 LWF	285 m <sup>2</sup> x 1 m = 285 m <sup>3</sup> ESTIMATED GARAGE AREAS (TO BE CONFIRMED)
Minimum 0.6 m thick EPS 22 LWF	355 m <sup>2</sup> x 0.6 m = 213 m <sup>3</sup>
Minimum 1 m thick EPS 19 LWF	513 m <sup>2</sup> x 1 m = 513 m <sup>3</sup>
Minimum 0.6 m thick EPS 29 LWF	559 m <sup>2</sup> x 0.6 m = 335.4 m <sup>3</sup>
Minimum 1 m thick EPS 22 LWF	300 m <sup>2</sup> x 1 m = 300 m <sup>3</sup>
Minimum 0.1 m thick HI 40 Rigid Insulation	6060 m <sup>2</sup> x 0.10 m = 606 m <sup>3</sup>
Catch basin requiring EPS 19 (0.6 m)	7 Structures

**NOTE:**  
 EPS 12 to be used under landscaped areas  
 EPS 19 to be used under pavement structures and slab on grade  
 EPS 29 to be used under slab on grade structures below garage and heavy traffic  
 EPS 22 to be used around the VC structure



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 IN THE EVENT THE CLIENT, THE CLIENT'S CONTRACTORS OR SUBCONTRACTORS, OR ANYONE FOR WHOM THE CLIENT IS LEGALLY LIABLE MAKES OR PERMITS TO BE MADE ANY CHANGES TO ANY REPORTS, PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DOCUMENTS PREPARED BY LRL ASSOCIATES LTD. (LRL) WITHOUT OBTAINING LRL'S PRIOR WRITTEN CONSENT, THE CLIENT SHALL ASSUME FULL RESPONSIBILITY FOR THE RESULTS OF SUCH CHANGES. THEREFORE THE CLIENT AGREES TO WAIVE ANY CLAIM AGAINST LRL AND TO RELEASE LRL FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH UNAUTHORIZED CHANGES.

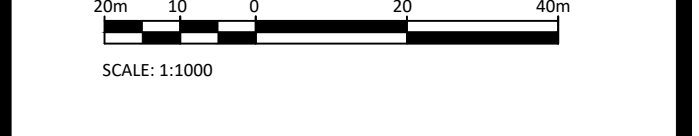
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CONTRACTOR IS ADVISED TO COLLECT INFORMATION ON SOIL CONDITIONS BEFORE START OF CONSTRUCTION.

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CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.



No.	REVISIONS	BY	DATE
03	ISSUED FOR PRICING	V.J.	08 AUG 2024
02	ISSUED FOR APPROVAL	V.J.	24 MAY 2023
01	ISSUED FOR APPROVAL	V.J.	25 NOV 2021

NOT AUTHENTIC UNLESS SIGNED AND DATED

**LRL**  
 ENGINEERING | INGENIERIE  
 5430 Canotek Road | Ottawa, ON, K1J 9G2  
 www.lrl.ca | (613) 842-3434

CLIENT: AVENUE 31

DESIGNED BY: V.J.      DRAWN BY: M.L.      APPROVED BY: V.J.

PROJECT: INDUSTRIAL PARK  
 6160 THUNDER RD AND 5368 BOUNDARY RD  
 OTTAWA, ON

DRAWING TITLE: GRADING AND DRAINAGE - OVERALL PLAN

PROJECT NO.: 200578  
 DATE: NOVEMBER 2020

**C301**

FOR DETAILED GRADING SEE DRAWING C303

FOR DETAILED GRADING SEE DRAWING C302

NOTE:  
 REFER TO C000 FOR LEGEND AND GENERAL NOTES