PATERSON GROUP

memorandum

re: **Grading and Site Servicing Plan Review**
Proposed Commercial Development
3700 Twin Falls Place, Block 2 – Ottawa, Ontario

to: CSV Architects – **Darryl Hood** – hood@csv.ca

date: April 7, 2025

file: PG7255-MEMO.01

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a review, from a geotechnical perspective, of the grading and site servicing plans for the proposed commercial development to be located at the aforementioned site. This memorandum should be read in conjunction with the Geotechnical Investigation Report (Paterson Group Report PG7255-1 dated October 7, 2024.)

1.0 Grading Plan Review

Paterson reviewed the following grading plan prepared by Egis Group, regarding the aforementioned site:

- ❑ Site Grading Plan – Gastops Ltd. Headquarters, Riverside South Business Park, Ottawa, ON – Project No. CO-24-2748 – Drawing No. C101 – Revision 1 dated February 10, 2025.

Based on our review of the above-noted grading plan, the proposed grade raises within the aforementioned site are within the recommended permissible grade raise of 2.0 m. No exceedances were noted in the immediate area of the proposed building. Therefore, the proposed grade raises are acceptable, from a geotechnical perspective, and will not require the use of lightweight fill.

Protection of Footings Against Frost Action

Perimeter footings of heated structures are recommended to be insulated against the deleterious effects of frost action. A minimum 1.5 m thick soil cover, or an equivalent combination of soil cover and foundation insulation, should be provided in this regard.

Exterior unheated footings, such as isolated piers, are more prone to deleterious movement associated with frost action than the exterior walls of the structure, and require additional protection, such as soil cover of 2.1 m, or an equivalent combination of soil cover and foundation insulation.

Based on our review, the underside of the proposed footing level for heated and unheated footings for the structure is not presented on the above-noted drawing.

It is recommended that Paterson review the proposed footing levels and/or insulation details once the final detail design drawings are available for the above noted items, prior to construction to ensure the effects of frost action are mitigated appropriately.

2.0 Site Servicing Plan Review

Paterson reviewed the following general plan of services prepared by Egis Group, regarding the aforementioned site:

- Site Servicing Plan – Gastops Ltd. Headquarters, Riverside South Business Park, Ottawa, ON – Project No. CO-24-2748 – Drawing No. C102 – Revision 1 dated February 10, 2025.

Based on our review of the above-noted site service plan, when assuming an approximate USF depth of 1.5 m, it should be noted that all services will be constructed outside the lateral zones of the proposed footings of the building and are considered to be acceptable from a geotechnical perspective. However, insufficient frost protection has been provided for the proposed storm and sanitary sewer pipes as well as the proposed culvert structures throughout the subject site. It should be noted that the elevation for the proposed connection to the existing watermain pipe was not available on the above-mentioned drawing. The watermain connection elevation should be reviewed by Paterson when available.

Reference should be made to Figure 1 – Markup Site Servicing Plan for the Location of Pipes and Culverts Where Insulation Will Be Required, attached to this memorandum.

It should be noted that the aforementioned storm and sanitary sewer pipes are located within the frost zone, which is 2.1 m below the finished grade. In the following section, frost protection of the site servicing is recommended where insufficient frost cover has been provided.

Any portion of the services installed at a depth of 2.1 m below the finished grade or deeper are considered to have sufficient soil cover for frost protection. Where insufficient soil cover is present above the invert of storm and sanitary sewer pipes, the following frost protection criteria should be followed:

Table 1 - Rigid Insulation Recommendations for Sanitary and Storm Sewer Pipes with Reduced Soil Cover

Thermal Condition	Soil Cover Provided (mm)	Insulation Dimensions	
		Thickness (mm)	Extension (mm)
Unheated	1800 to 2100	25	Extend 300 mm horizontally beyond the outer edge of the pipe
	1500 to 1800	50	Extend 600 mm horizontally beyond the outer edge of the pipe
	1200 to 1500	75	Extend 900 mm horizontally beyond the outer edge of the pipe
	900 to 1200	100	Extend 1200 mm horizontally beyond the outer edge of the pipe
	600 to 900	125	Extend 1200 mm horizontally beyond the outer edge of the pipe
	300 to 600	150	Extend 1500 mm horizontally beyond the outer edge of the pipe

Notes:
- All designs are based on a freezing index of 1000°C-days
- The rigid insulation thicknesses and extensions provided herein are site specific and should not be used on other sites without consulting Paterson Group for the sufficiency of the provided recommendations.

All rigid insulation should consist of either Dow Chemical High-Load 40 (HI-40), Styro Rail SR.P400, or equivalent approved by Paterson. The placement of all insulation within the service trenches must be reviewed and approved by Paterson personnel at the time of construction. Reference should be made to Figure 2 – Typical Frost Insulation Detail, attached to this memorandum.

In addition, it should be noted that based on the invert elevation of the proposed culvert at the southwest side of the subject site and the proposed ground surface at this location, insufficient soil cover (less than 2.1 m) is provided for the culvert structure. Therefore, a minimum 75 mm thick layer of HI-40 rigid insulation or an approved equivalent should be placed directly above the native subgrade prior to the placement of the concrete culvert structure. The rigid insulation should extend a minimum of 600 mm horizontally beyond the edge of the culvert on all sides. The insulation should be placed flat and level over the subgrade with no gaps between sheets. The insulation placement should be reviewed in the field by Paterson at the time of placement.

Further, it is understood based on the available drawings for the subject development that there is a dry pond proposed to be located on the east side of the subject site. Paterson should complete a review of the finalized plans for the dry pond from a geotechnical perspective when available.

We trust that the current submission meets your immediate requirements.

Best Regards,

Paterson Group Inc.

Nicole R. L. Patey, P.Eng.

Scott S. Dennis, P.Eng.

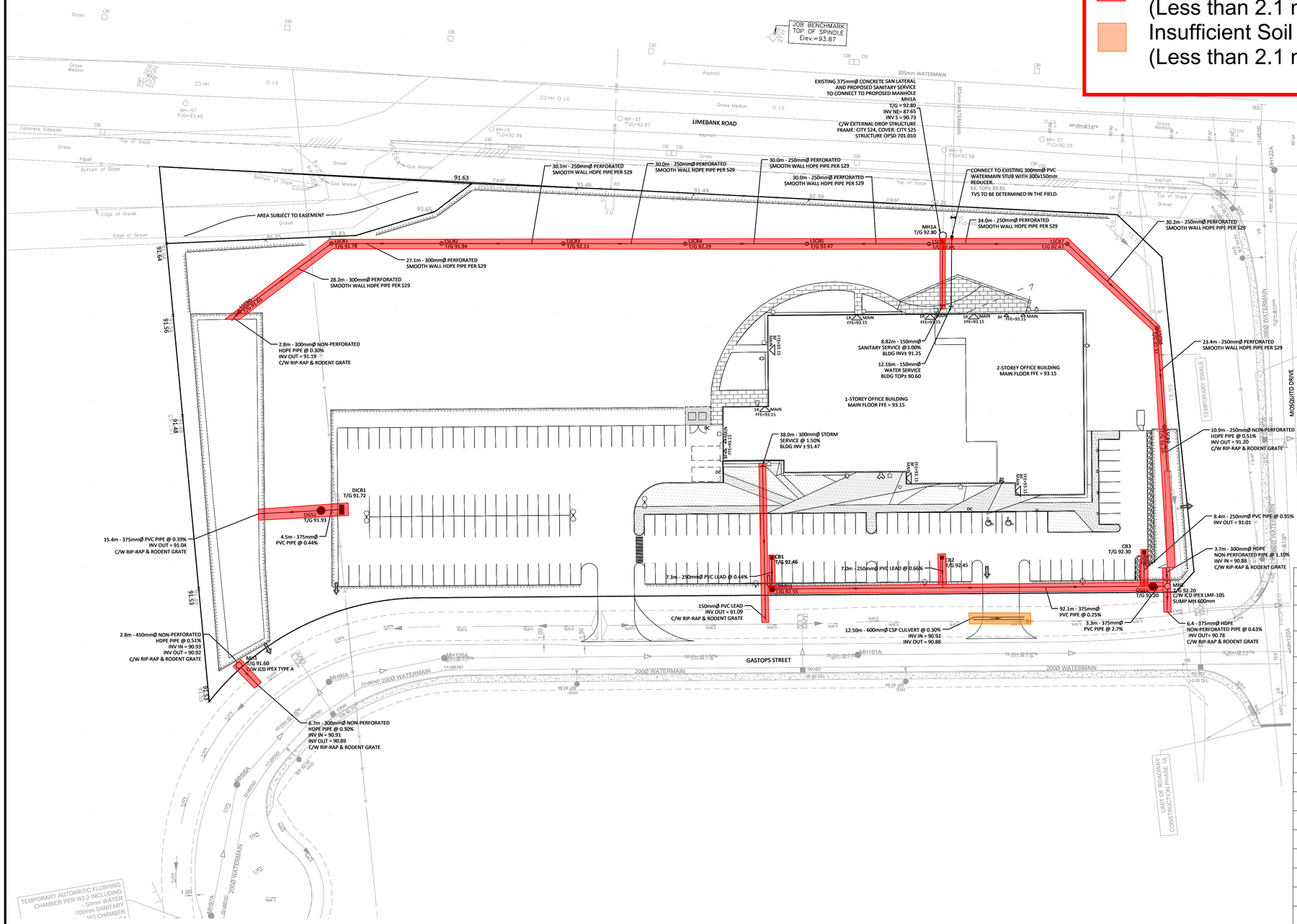
Attachments:

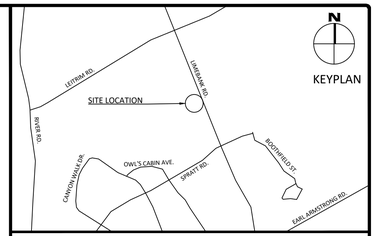
- Figure 1 – Markup Site Servicing Plan for the Location of Pipes and Culverts Where Insulation Will Be Required.
- Figure 2 – Typical Frost Insulation Detail for Servicing Pipes.

Figure 1 – Markup Site Servicing Plan for the Location of Pipes and Culverts Where Insulation Will Be Required.

LEGEND:

- Insufficient Soil Cover for Pipes (Less than 2.1 m)
- Insufficient Soil Cover for Culverts (Less than 2.1 m)





LEGEND

LEGAL BOUNDARY	
EXISTING FENCE	
EXISTING STORM STRUCTURE	○
EXISTING CATCHBASIN	□
EXISTING SANITARY STRUCTURE	●
EXISTING FIRE HYDRANT	
EXISTING VALVE & VALVE BOX	
EXISTING HYDRO POLE	○ H.P.
EXISTING HYDRO	H
EXISTING UTILITIES	HSCS HSCS
EXISTING ELEVATION	×99.00
PROPOSED STORM MANHOLE	○
PROPOSED STORM CATCHBASIN MH	◎
PROPOSED SANITARY STRUCTURE	●
PROPOSED WATER VALVE/HYDRANT	
PROPOSED FINISHED GROUND ELEVATION	×99.00
PROPOSED TOP OF CURB ELEVATION	×99.00TC
PROPOSED TOP OF WALL ELEVATION	×99.00TW
PROPOSED BOTTOM OF WALL ELEVATION	×99.00BW
PROPOSED DITCH ELEVATION	×99.00(D)
PROPOSED SWALE ELEVATION	×99.00(S)
PROPOSED SLOPE	1.0%
PROPOSED TERRACING (3:1 MAX)	
PROPOSED BARRIER CURB	
PROPOSED RETAINING WALL	
PROPOSED DRAINAGE SWALE	
PROPOSED CONCRETE SIDEWALK	
ENTRY/EXIT LOCATION, ELEVATION & LEVEL BF = BARRIER FREE 1R = ONE RISER, OH = OVERHEAD DOOR	BF,1R, OH MAIN,L1 FFE=74.40

No.	Revisions	Date
01	ISSUED FOR SUBMISSION	02.10.2025

Check and verify all dimensions before proceeding with the work

Do not scale drawings

SCALE 1 : 500

0 10 20 30 40 50 Metres

egis

Stamp: LICENSED PROFESSIONAL ENGINEER 24792 A.J. GOSLING 100226726 PROVINCE OF ONTARIO

Client:

CSV ARCHITECTS
190 O'CONNOR ST, SUITE 100
OTTAWA, ON

Project:

GASTOPS LTD. HEADQUARTERS
RIVERSIDE SOUTH BUSINESS PARK,
OTTAWA, ON

Drawing Title:

SITE SERVICING PLAN

Scale: 1:500	Project Number: CO-24-2748
Drawn By: RP	
Checked By: AG	Drawing Number: C102
Designed By: RP	

D07-00-000

#18662

STM STRUCTURE TABLE

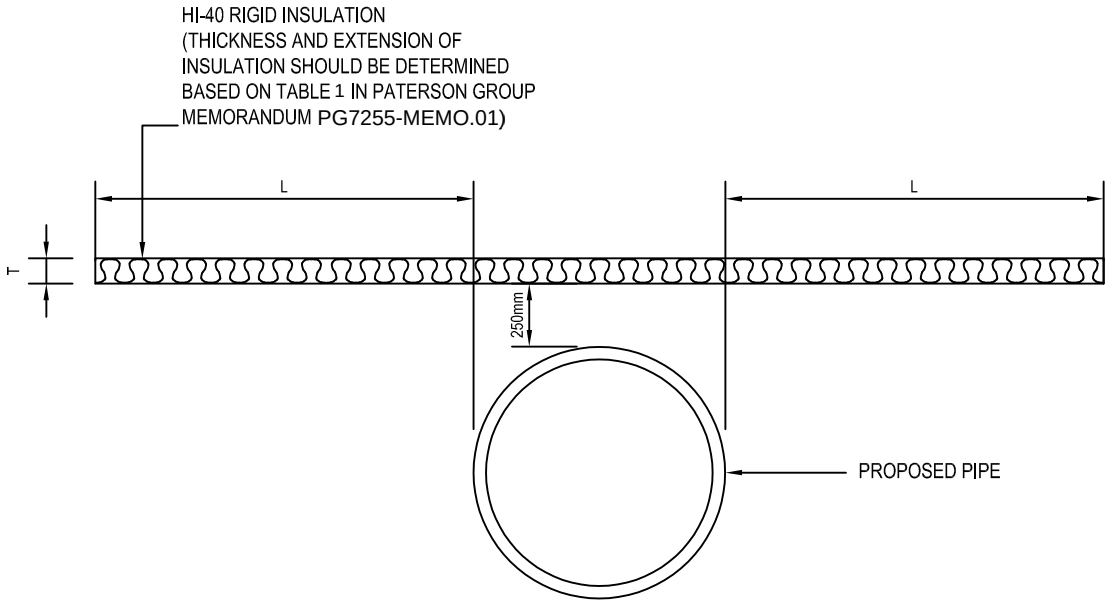
NAME	RIM ELEV.	INVERT IN	INVERT OUT	DESCRIPTION
CB1	92.46		SW91.215	STR.: OPSD 705.010 FRAME: CITY S19 COVER: CITY S19
CB2	92.45		SW92.200	STR.: OPSD 705.010 FRAME: CITY S19 COVER: CITY S19
CB3	92.30		SW91.010	STR.: OPSD 705.010 FRAME: CITY S19 COVER: CITY S19
CBMH1	92.55	NE91.170	SE91.140	COVER: CITY S24 FRAME: CITY S25 STR. OPSD 701.010
DICB1	91.72		NW90.720	STR.: OPSD 705.020 FRAME: CITY S19 COVER: CITY S19
LSCB0	91.61	SE91.200	W91.195	PER CITY STANDARD S30
LSCB1	91.78	SE91.290	NW91.286	PER CITY STANDARD S30
LSCB2	91.94	SE91.370	NW91.368	PER CITY STANDARD S30
LSCB3	92.11	SE91.461	NW91.460	PER CITY STANDARD S30
LSCB4	92.29	SE91.552	NW91.550	PER CITY STANDARD S30
LSCB5	92.47	SE91.640	NW91.640	PER CITY STANDARD S30
LSCB6	92.65		SE91.730 NW91.730	PER CITY STANDARD S30
LSCB7	92.47	NW91.550	S91.520	PER CITY STANDARD S30
LSCB8	92.32	N91.340	SW91.335	PER CITY STANDARD S30
LSCB9	92.20	NE91.260	SW91.255	PER CITY STANDARD S30
MH1	91.60	NE90.921	S90.914	COVER: CITY S24 FRAME: CITY S25 STR. OPSD 701.010
MH2	92.20	NW90.900 NE90.850	SW90.820	COVER: CITY S24 FRAME: CITY S25 STR. OPSD 701.010
OGS1	92.20	NW90.913	SE91.000	DOWNSTREAM DEFENDER BY HYDRO INTERNATIONAL OR APPROVED EQUIVALENT
OGS2	91.93	SE90.700	NW91.100	DOWNSTREAM DEFENDER BY HYDRO INTERNATIONAL OR APPROVED EQUIVALENT

WATER COVER TABLE

LOCATION	STATION	FINISHED GRADE	TOP OF PIPE	COVER
CONNECTION & REDUCER	0+000.00	92.31	89.850	2.46
BUILDING	0+012.16	93.00	90.600	2.40

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

FILENAME: U:\Ottawa\01 Project - Proposal\02024 Jobs\CCO\CO-24-2748 CSV_Gastops Ltd. World HQ_Riverside South Business Park\12 - Drawings\CO-24-2748 - Design.dwg
LAST SAVED: Monday, February 10, 2025 LAST SAVED BY: r.pickard
LAST PLOTTED: Monday, February 10, 2025 PLOTTED BY:



PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

Typical Frost Insulation Detail for Servicing Pipes

Scale: N.T.S	Date: 04/2025
Drawn by: YZ	Report No.: PG7255-MEMO.01
Checked by: NP	Drawing No.: Figure 2
Approved by: DG	Revision No.:

8-1/2x11