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CONSULTING ENGINEERS
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June 4, 2024 Reference No. 2006-S167

Balbir Babra & Harvinder Babra
45 Timberlane Drive
Brampton, Ontario
L6Y 4B3

Attention: Mr. Balbir Babra

Re: A Letter of Opinion
Proposed Residential Development
44-45 Longview Place
City of Mississauga

Dear Sir,

In accordance with the written authorization of Mr. Harminder Singh dated December 14, 2023, Soil Engineers Ltd. (SEL) has reviewed the engineering drawing packages for the proposed development and herein provide our opinion and recommendations. The following documents are drawings are reviewed:

- Geotechnical Investigation Report (Reference No. 2006-S167) prepared by SEL dated August 2020.
- Site Grading and Servicing Plan (Project No. 219-M117 – Dwg Nos. C101 and 102), prepared by Skira & Associates Ltd., dated November 23, 2023.
- Armourstone Retaining Wall Design Report (Reference No. 2006-S167) prepared by SEL dated April 30, 2024

SUBSURFACE FINDINGS

Based on the geotechnical report, a total of 6 boreholes to a depth of 6.2 m were completed on July 8 and 13, 2020. The logs of the boreholes along with the Borehole Location Plan are attached with this letter.

Based on the borehole findings, the site is underlain by a generally very stiff silty clay till, overlying a shale bedrock at a depth of 2.9 m. The surficial native soil, extended to an approximate depth of 0.7 m below the prevailing ground surface, is generally weathered.

No groundwater was encountered, and all boreholes remained dry on completion of field work.

DISCUSSION AND RECOMMENDATIONS

It is understood that the proposed project consists of the construction of 3 residential houses, each with a basement. The basement finished floor elevation of the 3 houses is at El. 196.75 m. Furthermore, a retaining wall is proposed at the terminus of a common access laneway, in front of the proposed Building 2, having an approximate length of 25 m and a maximum height of 1.8 m.

An underground storm sewer will be running beneath the private laneway, connecting to an existing storm manhole (STM MH 12). The proposed inverts ranged from El. 195.55 m to 195.16 m. Sanitary connections, having a gradient of 1%, are also provided for each house, having inverts of 196.38 m to 196.05 m. These connections will be connected to the existing sewer line at various location on the existing road.

Based on the engineering drawings and the subsurface condition, SEL herein provides our opinion on the design and construction of the proposed residential development.

- It is understood that the site will need to be raised by additional earth fill in majority of the area. This earth fill must be constructed in an engineered manner in order to support the proposed buildings and the construction of the underground services and pavement. The requirement for the construction of the engineered fill is provided in the original geotechnical report.

- Based on the proposed site grading, the foundation of the proposed buildings will be found onto the native subgrade, and in places onto the engineered fill, which is suitable to support the construction of spread and strip footings. The recommended soil bearing pressures of 150 kPa (SLS) and 250 kPa (ULS) can be used for the design of the footings. Where footings are constructed adjacent to each other or stepped footings are considered, the footings must be constructed at a gradient 10H:7V or flatter, and the deeper footings must be constructed before the shallower footings. Other recommendations for foundation design and construction provided in the geotechnical report should also be followed.

- Based on the Plan and Profile drawings of the individual roadways, majority of the underground services will be constructed within the glacial till. In some locations, the inverts will lie within the engineered fill. A Class 'B' bedding, consisting of 20-mm Crusher-Run Limestone (CRL) or equivalent, is recommended to be used as bedding material.

- Excavation should be carried out in accordance with O. Reg.213/91. Based on the subsurface findings, extensive dewatering is not anticipated within the anticipated depth of excavation. Any water seepage from the excavation can be removed by conventional pumping from sumps.

- Other recommendations stated in the geotechnical investigation report and retaining wall design letter remain applicable.

We trust this letter is explicit and meets your present needs. Should any queries arise, please feel free to contact our office.

Yours very truly,
SOIL ENGINEERS LTD.

Poh Fung Kwok, M.Sc.

Kin Fung Li, P.Eng.
PK/KL

Encls.

LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

SAMPLE TYPES

AS Auger sample
CS Chunk sample
DO Drive open (split spoon)
DS Denison type sample
FS Foil sample
RC Rock core (with size and percentage recovery)
ST Slotted tube
TO Thin-walled, open
TP Thin-walled, piston
WS Wash sample

PENETRATION RESISTANCE

Standard Penetration Resistance or 'N' Value:

The number of blows of a 63.5 kg hammer falling from a height of 76 cm required to advance a 51 mm outer diameter drive open sampler 30 cm into undisturbed soil, after an initial penetration of 15 cm.

Plotted as '○'

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows per each 30 cm of penetration of a 51 mm diameter, 90° point cone driven by a 63.5 kg hammer falling from a height of 76 cm.

Plotted as '—●—'

WH Sampler advanced by static weight
PH Sampler advanced by hydraulic pressure
PM Sampler advanced by manual pressure
NP No penetration

SOIL DESCRIPTION

Cohesionless Soils:

'N' (blows/30 cm)	Relative Density
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
>50	very dense

Cohesive Soils:

Undrained Shear Strength (kPa)	'N' (blows/30 cm)	Consistency
<12	<2	very soft
12 to <25	2 to <4	soft
25 to <50	4 to <8	firm
50 to <100	8 to <15	stiff
100 to 200	15 to 30	very stiff
>200	>30	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding
△ Laboratory vane test

METRIC CONVERSION FACTORS

1 ft = 0.3048 m
1 inch = 25.4 mm
1 lb = 0.454 kg
1 ksf = 47.88 kPa

JOB NO.: 2006-S167

LOG OF BOREHOLE NO.: 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 44-45 Longview Place
City of Mississauga

DRILLING DATE: July 8, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
197.6	Ground Surface							
0.0	**13 cm TOPSOIL**	1	DO	11	0		13	Dry on completion
	Brown, stiff to very stiff weathered	2	DO	26	1		11	
	SILTY CLAY TILL occ. wet sand and silt seams and layers cobbles and boulders	3	DO	20	2		13	
		4	DO	27			12	
194.7								
2.9	Reddish-brown	5	DO	77/23	3		9	
	SHALE BEDROCK (WEATHERED)	6	DO	50/5	4		8	
					5			
191.3		7	DO	50/5	6		6	Cave-In @ El.192.1 m on completion
6.3	**END OF BOREHOLE**				7			
					8			
					9			
					10			

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JOB NO.: 2006-S167

LOG OF BOREHOLE NO.: 2

FIGURE NO.: 2

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 44-45 Longview Place
City of Mississauga

DRILLING DATE: July 8, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
197.5	Ground Surface							
0.0	**18 cm TOPSOIL**	1	DO	9	0		16	Dry on completion
	Brown, stiff to very stiff weathered	2	DO	16	1		17	
	SILTY CLAY TILL	3	DO	28	2		13	
	occ. wet sand and silt seams and layers cobbles and boulders	4	DO	23			12	
194.6								
2.9	Reddish-brown	5	DO	78/20	3		8	
	SHALE BEDROCK (WEATHERED)	6	DO	50/5	4		9	
191.2		7	DO	50/5	5			
6.3	**END OF BOREHOLE**				6		6	
					7			
					8			
					9			
					10			

Cave-in @ El.191.7 m on completion

Soil Engineers Ltd.

JOB NO.: 2006-S167

LOG OF BOREHOLE NO.: 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 44-45 Longview Place
City of Mississauga

DRILLING DATE: July 13, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
197.6	Ground Surface							
0.0	**13 cm TOPSOIL**	1	DO	9	0		24	Dry on completion
	Brown, stiff to very stiff weathered							
		2	DO	12	1		27	
	SILTY CLAY TILL							
	occ. wet sand and silt seams and layers cobbles and boulders	3	DO	27	2		13	
		4	DO	26			14	
194.7								
2.9	Reddish-brown	5	DO	50/8	3		10	
	SHALE BEDROCK (WEATHERED)	6	DO	50/8	4		7	
191.3		7	DO	50/8	5			
6.3	**END OF BOREHOLE**				6		6	
					7			
					8			
					9			
					10			

Soil Engineers Ltd.

JOB NO.: 2006-S167

LOG OF BOREHOLE NO.: 4

FIGURE NO.: 4

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 44-45 Longview Place
City of Mississauga

DRILLING DATE: July 8, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
197.4	Ground Surface							
0.0	**18 cm TOPSOIL**	1	DO	9	0		12	Dry on completion
	Brown, stiff to very stiff weathered	2	DO	32	1		11	
	SILTY CLAY TILL occ. wet sand and silt seams and layers cobbles and boulders	3	DO	25	2		13	
		4	DO	31			12	
194.5								
2.9	Reddish-brown	5	DO	50/5	3		10	
	SHALE BEDROCK (WEATHERED)	6	DO	50/8	4		6	
191.1		7	DO	50/8	5			
6.3	**END OF BOREHOLE**				6		6	
					7			
					8			
					9			
					10			

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JOB NO.: 2006-S167

LOG OF BOREHOLE NO.: 5

FIGURE NO.: 5

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 44-45 Longview Place
City of Mississauga

DRILLING DATE: July 13, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
197.2	Pavement Surface							
0.0	**8 cm TOPSOIL**	1	DO	12	0		12	Dry on completion
	Brown, stiff to very stiff							
	weathered	2	DO	19	1		12	
	SILTY CLAY TILL							
	occ. wet sand and silt seams and layers cobbles and boulders	3	DO	26	2		13	
		4	DO	23			13	
194.3								
2.9	Reddish-brown	5	DO	50/8	3		10	
	SHALE BEDROCK				4			
	(WEATHERED)	6	DO	50/5	5		8	
190.9		7	DO	50/5	6		22	
6.3	**END OF BOREHOLE**				7			
					8			
					9			
					10			

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JOB NO.: 2006-S167

LOG OF BOREHOLE NO.: 6

FIGURE NO.: 6

PROJECT DESCRIPTION: Proposed Residential Development

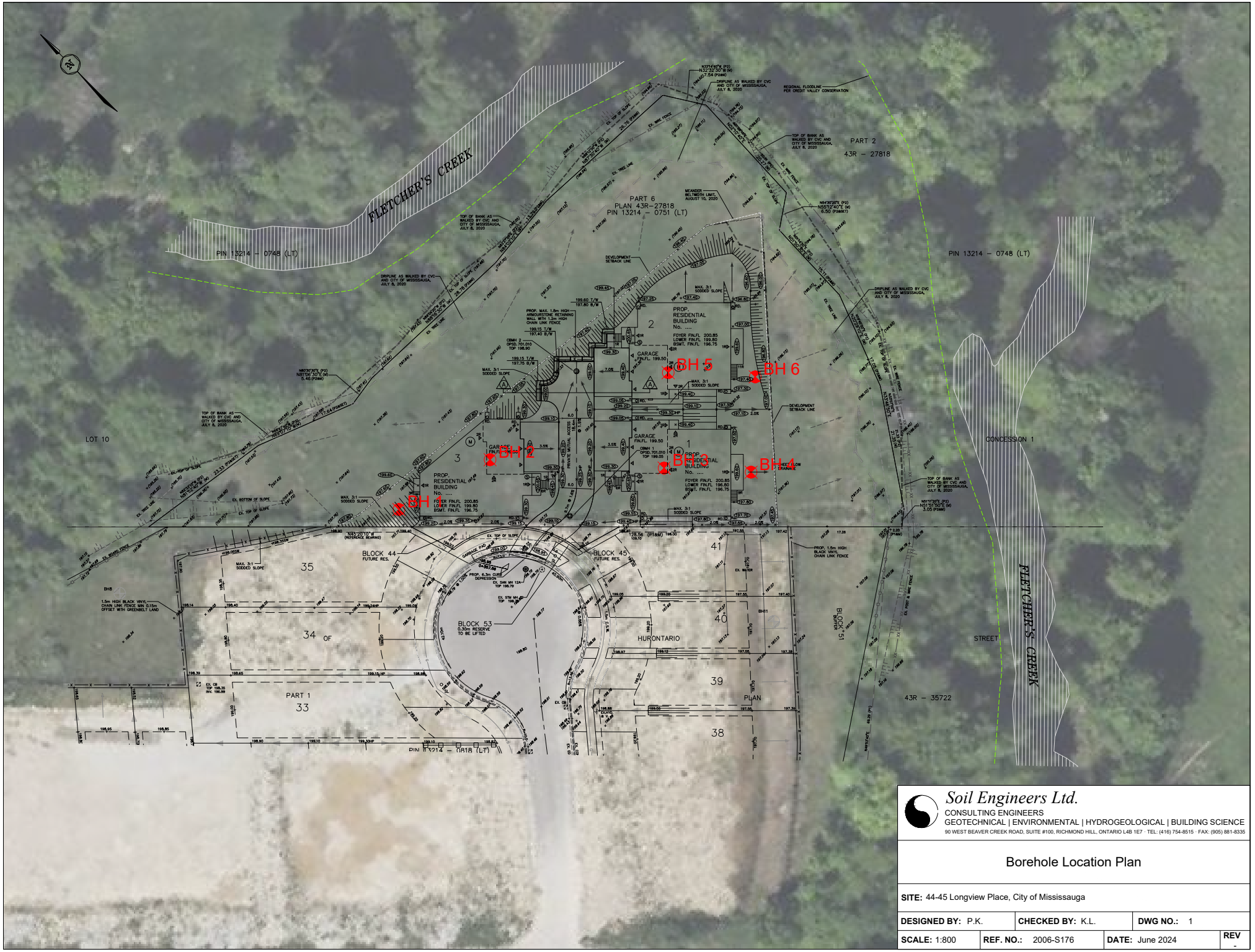
METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 44-45 Longview Place
City of Mississauga

DRILLING DATE: July 8, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
196.8	Ground Surface							
0.0	**18 cm TOPSOIL**	1	DO	11	0		10	Dry on completion
	Brown, stiff to very stiff weathered	2	DO	20	1		12	
	SILTY CLAY TILL occ. wet sand and silt seams and layers cobbles and boulders	3	DO	25	2		11	
		4	DO	29	2		12	
193.9								
2.9	Reddish-brown	5	DO	50/13	3		8	
	SHALE BEDROCK (WEATHERED)	6	DO	50/8	4		7	
190.5		7	DO	50/5	6		6	
6.3	**END OF BOREHOLE**				10			

Soil Engineers Ltd.



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Borehole Location Plan

SITE: 44-45 Longview Place, City of Mississauga			
DESIGNED BY: P.K.	**CHECKED BY:** K.L.	**DWG NO.:** 1	
SCALE: 1:800	**REF. NO.:** 2006-S176	**DATE:** June 2024	**REV** -