

May 13, 2024

File: 64153.80

Novatech
240 Michael Cowpland Drive, Suite 200
Ottawa, Ontario
K2M 1P6

Attention: Alex McAuley, P.Eng.

**Re: Grading Plan Review
West Capital Airpark – Phase 1B-2 Residential Development
Diamondview Road at March Road
Ottawa, Ontario**

INTRODUCTION

As requested, this letter provides a grading plan review for Phase 1B-2 of the West Capital Airpark residential development located southeast of the intersection of Diamondview Road and March Road in Ottawa, Ontario.

BACKGROUND

Paterson Group carried out the geotechnical investigation for Phase 1B-2 of the West Capital Airpark residential development. The results of that investigation are provided in the following reports:

- Report to West Capital Developments, titled “Geotechnical Investigation, Carp Airport Servicing and Residential Development – Phase 1, Carp Road, (Carp) Ottawa”, dated July 22, 2013, (Project No. PG2450-2).
- Report to West Capital Developments, titled “Geotechnical Investigation, Carp Airport Servicing and Residential Development – Phase 1, Carp Road, (Carp) Ottawa, Ontario”, dated January 16, 2023, (Project No. PG2450-2), Revision 1.

Recently, we were asked to provide lot specific information regarding certain geotechnical aspects of the development. The requested information is provided in Attachment A. The grading plans for Phase 1B-2 of West Capital Airpark were prepared by Novatech and provided in the following drawings:

- Drawing No. 102085-GR13, titled “GRADING PLAN - PHASE 1B-2” (Project No. 102085) Revision Number 6 (dated April 24, 2024);

- Drawing No. 102085-GR14, titled “GRADING PLAN - PHASE 1B-2” (Project No. 102085) Revision Number 7 (dated April 24, 2024); and,
- Drawing No. 102085-GR15, titled “GRADING PLAN - BLOCK 184” (Project No. 102085) Revision Number 5 (dated February 20, 2024).

DISCUSSION

As indicated above, the requested, lot specific information for Phase 1B-2 of this development is provided in the Attachments. The following sections provide additional comments based on the Paterson’s geotechnical investigation.

Grade Raise Restrictions

Based on the results of the Paterson’s geotechnical investigation, permissible limits for the grade raise restrictions ranges from 1.2 to 1.5 metres. Based on the review of the proposed grading plan, majority of the lots are in the range of the permissible limits except Lots 1, 3, 4, 14, 15, 16, 17, 52, 54, 55, 56, 57, 58, and 62.

Consideration can be given to the use of expanded polystyrene (EPS) blocks for the above-mentioned lots. As a preliminary assessment, the EPS should extend at least 2.4 metres beyond the entire perimeter of the foundations and within the garages and porches, where necessary, with a thickness equal to, or greater, than the grade raise exceedance.

Allowable Bearing Pressure

Based on the subsurface conditions encountered at the site, the proposed houses may be founded on conventional spread footings, with pad footings up to 3 metres wide and strip footings up to 2 metres wide, bearing on or within the native over burden soils, provided that the topsoil and any fill materials, if encountered, are removed from the proposed building areas.

The following bearing resistance at serviceability and ultimate limit state (SLS and ULS, respectively) may be used to size the spread footing foundations:

Table 1 – Allowable Bearing Pressures for Foundations

Subgrade Material	Bearing Resistance Values at SLS (kilopascals)	Bearing Resistance Values at ULS (kilopascals)
Stiff to very stiff silty clay	125	200
Compact silty sand/clayey silt	100	150
Firm silty clay	75	120
Loose sandy silt/silty sand	60	100

The post construction total and differential settlement of footings should be less than 25 and 20 millimetres, respectively, provided that the subgrade at or below the founding level is not disturbed during construction (i.e., all loose or disturbed soil is removed from the bearing surfaces).

Frost Protection

All exterior footings should be provided with at least 1.5 metres of earth cover for frost protection purposes. Isolated footings located outside of the building footprint or footings located within unheated areas should be provided with at least 2.1 metres of frost cover. If the required depth of earth cover for foundations is not practicable, a combination of earth cover and extruded polystyrene insulation could be considered.

Based on the review of the Grading Plan, the earth cover above the underside of footings at the front of the houses at Lots 5, 6 and 7 are less than 2.1 metres, which is less than the recommended value. At these locations, the footings site should be provided with a minimum 2.1 metres of earth cover for frost protection purposes, or the frost protection could be provided by means of a combination of earth cover and extruded polystyrene insulation.

In preparation for the insulation, a levelling mat consisting of 25 millimetres of concrete/mortar sand, or 50 millimetres of lean concrete should be placed on the approved bearing surface. Care must be taken to ensure that the insulation is not damaged during construction. Joints should be carefully lap jointed and glued where and if possible. Footings may then be constructed on the surface of the insulation. The type of insulation should be selected such that the bearing pressure on the insulation placed under the footings does not exceed about 35 percent of the insulation’s quoted compressive strength. This is due to the time dependant creep characteristics of this material. For example, the allowable bearing pressures for several grades of insulation are:

Table 2 – Summary of Insulation Bearing Resistance

Insulation Type	SLS Resistance (kilopascals)
Dow SM	75
DOW Highload 40	95
DOW Highload 60	145
DOW Highload 100	240

The allowable bearing resistance at SLS will be dependant on the type of insulation chosen and the presence of compacted engineered fill above the insulation. For footings supported on insulation, the lower SLS bearing resistance provided in Table 1 and 2 above will govern.

The insulation should extend out from the foundations horizontally a distance equal to 2.1 metres less the amount of earth cover.

However, it is noted that lot specific grading plans will be developed by the individual house builders. The lot specific plans should demonstrate sufficient earth cover or the use of insulation to provide the necessary frost protection.

Seismic Design

Based on the results of the investigation, it is considered that Site Class D would be applicable to the design of structures on this site. The soils underlying the proposed wet well are not susceptible to liquefaction.

CLOSURE

We trust this letter provides the necessary information for your purposes. Do not hesitate to contact the undersigned should you require additional information.



Pawandeep Singh, M.Eng.
Geotechnical Scientist

PS/WAM



Alex Meacoe, P.Eng.
Senior Geotechnical Engineer



Enclosures

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ATTACHMENTS

Soil Review Chart
West Capital Airpark – Phase 1B-2

Assessment Area	Lot/Block	Original Ground Surface (metres)				Proposed Ground Surface (metres)		Proposed USF Grade (metres)	Grade Raise or Cut over Original Ground Surface (metres)				Grade Raise Limit (metres)	Grade Raise Within Permissible?				Estimated Bearing Pressure at SLS (kilopascals)	Earth Cover over Footings (metres)		Frost Protection Required	Min. LWF Thickness (metres)		Site Class for Seismic Site Response	Lot-Specific Notes
		Front Left	Front Right	Rear Left	Rear Right	Front	Rear		Front Left	Front Right	Rear Left	Rear Right		Front Left	Front Right	Rear Left	Rear Right		Front	Rear		Front	Rear		
	55	115.50	115.75	115.25	115.25	116.90	116.30	114.66	1.40	1.15	1.05	1.05	1.2	No	Yes	Yes	Yes	75	2.24	1.64	No	0.20		E	
	56	115.75	115.50	115.25	115.25	116.90	116.30	114.66	1.15	1.40	1.05	1.05	1.2	Yes	No	Yes	Yes	75	2.24	1.64	No	0.20		E	
	57	115.50	115.50	115.25	115.25	116.85	116.25	114.61	1.35	1.35	1.00	1.00	1.2	No	No	Yes	Yes	75	2.24	1.64	No	0.15		E	
	58	115.50	115.50	115.25	115.00	116.75	116.15	114.51	1.25	1.25	0.90	1.15	1.2	No	No	Yes	Yes	75	2.24	1.64	No	0.05		E	
	59	115.50	115.50	115.00	115.00	116.60	116.20	114.36	1.10	1.10	1.20	1.20	1.5	Yes	Yes	Yes	Yes	75	2.24	1.84	No			E	
	60	115.50	115.25	115.00	115.00	116.55	116.15	114.31	1.05	1.30	1.15	1.15	1.5	Yes	Yes	Yes	Yes	75	2.24	1.84	No			E	
	61	115.25	115.00	115.00	114.75	116.40	116.20	114.16	1.15	1.40	1.20	1.45	1.5	Yes	Yes	Yes	Yes	75	2.24	2.04	No			E	
	62	115.00	115.00	115.25	115.60	116.55	116.75	114.31	1.55	1.55	1.50	1.15	1.5	No	No	Yes	Yes	75	2.24	2.44	No	0.05		E	
	63	115.25	115.25	115.60	115.79	116.55	116.75	114.31	1.30	1.30	0.96	0.96	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	64	115.25	115.50	115.79	115.83	116.55	116.75	114.31	1.30	1.05	0.92	0.92	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	65	115.50	115.75	115.83	115.92	116.60	116.80	114.36	1.10	0.85	0.88	0.88	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	66	115.75	115.75	115.92	115.97	116.75	116.95	114.51	1.00	1.00	0.98	0.98	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	67	115.75	115.75	115.97	116.00	116.85	117.05	114.61	1.10	1.10	1.05	1.05	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	68	115.75	115.75	116.00	116.02	116.90	117.10	114.66	1.15	1.15	1.08	1.08	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	69	115.75	115.75	116.02	116.08	117.00	117.20	114.76	1.25	1.25	1.12	1.12	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	70	115.75	115.75	116.08	116.13	117.00	117.20	114.76	1.25	1.25	1.07	1.07	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	71	115.75	115.75	116.13	116.12	117.00	117.20	114.76	1.25	1.25	1.08	1.08	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	72	115.75	115.75	116.12	116.12	117.00	117.20	114.76	1.25	1.25	1.08	1.08	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	73	115.75	116.00	116.12	116.24	117.05	117.25	114.81	1.30	1.05	1.01	1.01	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	74	116.00	116.00	116.24	116.31	117.20	117.40	114.96	1.20	1.20	1.09	1.09	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	75	116.00	116.00	116.31	116.36	117.30	117.50	115.06	1.30	1.30	1.14	1.14	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	76	116.00	116.00	116.36	116.38	117.40	117.60	115.16	1.40	1.40	1.22	1.22	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	77	116.00	116.25	116.38	116.46	117.40	117.60	115.16	1.40	1.15	1.14	1.14	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	BLK 78 (A-E)	116.25	116.50	116.50	116.50	117.50	117.75	115.31	1.25	1.00	1.25	1.25	1.5	Yes	Yes	Yes	Yes	75	2.19	2.44	No			E	
	BLK 78 (F-J)	116.50	116.50	116.50	116.50	117.70	117.70	115.46	1.20	1.20	1.20	1.20	1.5	Yes	Yes	Yes	Yes	75	2.24	2.24	No			E	
	BLK 79 (A-E)	116.50	116.50	116.50	116.75	117.70	117.90	115.46	1.20	1.20	0.87	0.87	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	BLK 79 (F-J)	116.75	117.00	117.00	117.00	117.80	118.00	115.56	1.30	0.80	0.73	0.73	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	BLK 79 (K-O)	117.00	117.25	117.00	117.25	117.95	118.15	115.71	0.95	0.95	0.69	0.69	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	
	BLK 79 (P-T)	117.25	117.50	117.50	117.50	118.20	118.40	115.96	1.20	1.20	0.90	0.90	1.5	Yes	Yes	Yes	Yes	75	2.24	2.44	No			E	