Clifton Associates

20 April 2018

Attention: Wendy Holtzman
Company:
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Geotechnical Commentary **File R6043**
Outdoor IARD Structure
Project #1005719
Regina, SK

This letter provides additional geotechnical commentary regarding the preparation of the foundation site for the new fabric building for the outdoor IARD training facility.

The finished surface for the proposed building will consist of 100 mm of compacted Type 33 crushed base course and 150 mm of well graded pit run gravel. The Type 33 crushed base course material will be placed after the structure has been erected. The pit run gravel will provide a working surface during erection and will be relevelled and recompacted after the structure has been erected. The finished elevation of the floor is 574.26 m. The elevation of the top of the clay subgrade and top of the pit run gravel working surface will be 574.01 m and 574.16 m, respectively.

The finished floor for the structure will be level so that there is little opportunity to promote drainage from the subgrade surface. The pit run gravel working surface is meant to provide a relatively clean temporary work area but will require regular and timely maintenance as it is disturbed by equipment. Additional material may be utilized as required to repair any ruts or failures.

The concrete foundation blocks will be supported on 300 mm of compacted, well graded pit run gravel. The granular material will be 1,350 mm wide so that it will extend 300 mm on the inside and outside of the 750 mm wide concrete blocks.

A perimeter subdrainage system will be installed inside of the foundation blocks and will be placed about 300 mm from the foundation blocks. The subdrainage system will consist of 100 mm diameter perforated high density polyethylene pipe with a geotextile fabric wrap. The invert of the pipe will be 300 mm below the bottom of the foundation blocks. The subdrainage pipe will be enclosed in 200 mm of clean, minus 9 mm drainage rock.

Site work will consist of the following:

- Removal of all trees, bushes, and stumps as indicated on the site plan prepared by AECOM dated March 2018.
- Stripping and stockpiling or removal of all organic topsoil from the site.
- Grading the site and placing select granular to the design elevation.
- Compacting the upper 150 mm of the in-situ subgrade soil to the specified density and at the specified water content.
- Compacting fill material in lifts not exceeding 150 mm in thickness to the specified density and at the specified water content.
- Grading the perimeter of the pad at a 5% slope away from the proposed building extending 5,000 mm from the perimeter of the proposed concrete block foundation.
- Providing drainage to the drainage swale located on the south side of the site.

Specifications for Type 33 crushed base course and well graded pit run gravel are shown on the attachment to this letter. Common fill material will be in situ high plasticity clay.

The following recommendations are provided for compaction.

- The excavated subgrade should be uniformly compacted to 95% of its maximum dry density determined in accordance with ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort [12,400 ft lbf/ft^3 (600 kN m/m^3)]. The water content of the subgrade should be close to optimum to optimum +2%. Clay should be compacted using a padfoot or sheepsfoot compactor.
- Clay fill material that will be under the floor area or the perimeter foundation should be compacted to a minimum 98% of maximum dry density determined in accordance with the standard Proctor test in lifts no thicker than 150 mm in compacted thickness. The water content of the subgrade should be close to optimum to optimum +2%. Clay should be compacted using a padfoot or sheepsfoot compactor.
- Fill under landscaped areas should be compacted to a minimum 95% of maximum dry density determined in accordance with the standard Proctor test.
- Backfill of trenches in areas that are under the building footprint should be compacted to a minimum 98% of maximum dry density determined in accordance with the standard Proctor test.
- Base course or granular material that will be on top of the building pad should be compacted to a minimum 98% of maximum dry density determined in accordance with the standard Proctor test. Water may be added as an aid to compaction, keeping in mind that the amount of compaction effort required should be minimized if the water content is close to optimum. The material should be compacted using a smooth drum vibratory compactor.
- Granular material that will be supporting the foundation blocks should be compacted to a minimum 98% of maximum dry density determined in accordance with the standard Proctor test. Water may be added as an aid to compaction, keeping in mind that the amount of compaction effort required should be minimized if the water content is close to optimum. The material should be compacted in lifts with a thickness no greater than 150 mm using a smooth drum vibratory compactor.

We trust that the information provided in this letter is adequate for your current needs. Should you have any questions, please contact us.

Yours truly

Clifton Associates Ltd.

Richard T. Yoshida PEng
Senior Geotechnical Engineer

Association of Professional
Engineers and Geoscientists of Saskatchewan
Certificate of Authorization No. C0238

Attachments: Appendix A - Standard Specifications for Granular Materials

Appendix A
Recommended Specifications for Granular Materials

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Recommended Specifications for Granular Materials

1. Granular materials shall be composed of fragments of durable rock free from undesirable quantities of soft or flaky particles, topsoil, organic matter, clay or silt lumps, lumps of frozen granular soil, ice, snow or construction rubble.

2. The Pit Run Fill shall have a plasticity index less than 10 percent. The Crushed Base Course shall have a plasticity index less than 6 percent.

3. For Pit Run Sand, $\frac{D_{60}}{D_{10}} > 6$, and $1 < \frac{(D_{30})^2}{D_{10} \times D_{60}} < 3$. For Pit Run Gravel, $\frac{D_{60}}{D_{10}} > 4$, and $1 < \frac{(D_{30})^2}{D_{10} \times D_{60}} < 3$.

4. Granular materials shall be excavated, loaded, hauled, placed and levelled in such a manner to prevent contamination with undesirable materials described in Point 1 above and to prevent excessive segregation of coarse and fine particles.

5. Granular material shall conform to the following gradation specifications:

Percent by Weight Passing U.S. Standard Sieve Series							
Sieve	Pit Run Gravel Fill	Pit Run Sand Fill	Crushed Base Course				
			32	33	34	35	36
50.0 mm	100						
25.0 mm	85 – 100		100				
18.0 mm	80 – 100		87 – 100	100	100	100	100
12.5 mm	70 – 100	100	79 – 93	81 – 100	91 - 100	81 - 100	91 – 100
5.0 mm	50 – 85	75 – 100	47 – 77	50 – 80	70 - 85	50 - 85	70 – 85
2.0 mm	35 – 75	50 – 90	29 – 56	32 – 52	45 - 65	32 - 65	45 – 70
900 µm	25 – 50	30 – 75	18 – 39	20 – 35	28 - 43	20 - 43	28 – 51
400 µm	15-35	15 – 50	13 – 26	15 – 25	20 - 30	15 - 30	20 – 35
160 µm	8 – 22	5 – 30	7 – 16	8 – 15	11 - 18	8 - 18	11 – 21
71 µm	0 - 13	0 – 15	6 - 11	7 – 10	8 - 12	7 - 12	8 – 13