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March 18, 2021
Project No. 1265

Attn: Mr. Ken Venner
Partner, Municipal Planning Strategic Lead

**Re: Preliminary Geotechnical Review
Residential Subdivision
SE 21-24-03-W5M, Rocky View County, Alberta**

1. Introduction

A 40 acre residential subdivision has been proposed in the southeast quarter section of 21-24-03-W5M, in Rocky View County, Alberta. The subdivision will consist of sixteen lots, a residential street, and a cul-de-sac. Lone Pine Geotechnical Ltd. was requested to perform a preliminary geotechnical review for the subdivision.

The purpose of the review is to provide a preliminary assessment of the soil and groundwater conditions at the site prior to a detailed geotechnical investigation being performed. The scope of work for the review was outlined in our proposal dated March 11, 2021 (Proposal No. 1437-21). Authorization to proceed was given by Ms. Laura Chapman acting on behalf of Mr. Allan Markin on March 12, 2021.

2. Methodology

The initial task was as review of published information pertaining to this area of Rocky View County, including surficial geology maps, geological papers, historical aerial photographs, and historical water well records. Aerial photographs taken in the years 2011, 2016, and 2020 were reviewed.

Six soil samples collected during a recent investigation performed by GRIT Ltd. for the subdivision were taken to our soils laboratory and visually classified. The moisture and plasticity of three of the six samples were tested.



3. Soil and Groundwater Conditions

The site is situated in the upland area north of the Elbow River Valley west of Calgary. Based on a review of published information and the writers experience, this area of Rocky View County consists of extensive lacustrine deposits, underlain by glacial deposits of the Spy Hill Formation, underlain by sedimentary bedrock of the Paskapoo Formation. The depth of the bedrock is expected to be about 10 to 20 m at the site.

The lacustrine deposits in the area predominately consist of silty clays, which are generally medium to high plastic, firm to stiff, and moist to wet. Isolated areas with soft and saturated clays are also present. The groundwater in the area is known to be relatively shallow. Groundwater depths of less than 2 m below surface are not uncommon.

The six soil samples visually classified as part of the review were all silty clay, which is consistent with the expected soils in the area. The results of the moisture and plasticity tests are summarized in the following table.

Table 1 – Soils Laboratory Testing

Sample	Depth (m)	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)	Plasticity Index (%)
MW21-1	3.5	30.0	22.2	39.2	17.0
MW21-2	4.0	28.8	20.2	35.0	14.8
MW21-3	4.0	29.8	20.5	35.3	14.8

All three samples were medium plastic and wet, which is consistent with the typical properties of the silty clays in the area.

There is a potential for high plastic clays at the site, so additional sampling and plasticity testing will be performed as part of the geotechnical investigation which will be performed at the site. Furthermore, the groundwater at the site is expected to be shallow, so standpipe piezometers will be installed, and groundwater measurements will be taken over a six-month monitoring period. The geotechnical investigation will be performed in accordance with the requirements in Rocky View County's "2013 County Servicing Standards" document.

4. Preliminary Assessment

The soil and groundwater conditions at the site are expected to be suitable for the proposed residential subdivision as evidenced by similar subdivisions in the surrounding area. However, there is a potential for high plastic clays, soft clays, and shallow groundwater at the site. A detailed geotechnical investigation will be performed to help identify these potential issues.

Certain precautions may need to be taken during housing construction to mitigate these issues. For example, house basements in areas with very shallow groundwater can be raised in order to minimize the risk of continuous pumping from sumps connected to weeping tile drains. High plastic clays have a tendency to shrink and swell with changes in moisture which can damage basement foundations. High plastic clays, soft clays, and otherwise problematic soils are identified through geotechnical investigations and soil bearing inspections during housing construction.

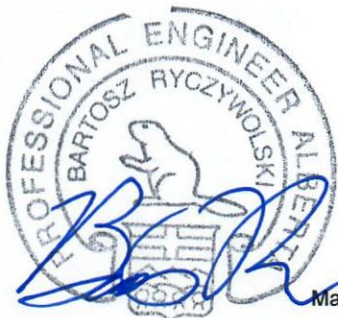
The soils at the site are expected to provide an acceptable level of subgrade support for the proposed residential street and cul-de-sac. Silty clay subgrades will generally be stable if they are not excessively saturated or disturbed during construction. A California Bearing Ratio (CBR) test will be performed as part of the geotechnical investigation to better quantify the expected level of subgrade support from the soils at the site.

5. Closure

This letter has been prepared for the exclusive use of B&A Planning Group and Mr. Allan Markin for the proposed residential subdivision within SE 21-24-03-W5M, in Rocky View County, Alberta. It may not be used by any third party without the express written consent of Lone Pine Geotechnical Ltd.

This letter is based on a review of published information, the visual classification of six soil samples, and laboratory tests on three soil samples. The preliminary assessment provided above will be verified through a detailed geotechnical investigation of the site. If you have any questions or comments, please contact the undersigned.

Respectfully Submitted,
Lone Pine Geotechnical Ltd.
APEGA Permit to Practice P13802


March 18, 2021

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