MUNICIPAL PLANNING COMMISSION AGENDA
SUMMER VILLAGE OF NORGLENWOLD
SUMMER VILLAGES ADMINISTRATION OFFICE
JULY 9, 2021 @ 9:00 A.M.

A. CALL TO ORDER

B. ADOPTION OF AGENDA

C. DEVELOPMENT ITEMS

1. 205 Grand Avenue

D. ADJOURNMENT

Summer Village of Norglenwold – Municipal Planning Commission

July 9, 2021

Agenda Item

205 Grand Avenue (Lot 13, Block 2, Plan 2203KS)

Development Permit Application

Background:

The registered homeowner submitted an application for escarpment work, boathouse repairs and tree removal to take place at 205 Grand Avenue (Lot 13, Block 2, Plan 2203KS) in the Summer Village of Norglenwold. This property is in the R-S District (Shoreline Residential).

The proposed work on the escarpment is to remove the vegetation and reduce the slope of the bank, reshaping it and replanting vegetation with a meandering path to the shore as well as constructing a new set of stairs to provide access to the boathouse. Essentially everything will be removed from the escarpment area that is currently there, including the boathouse. The boathouse is proposed to be retuned and repaired once the bank work is completed. The foundation of the boathouse is damaged and rotten so in order to do the repairs the roof and walls are to be removed. A new foundation will would extend 3ft. to the back with an integrated retaining wall to prevent further erosion to the bank.

The proposed tree removal is to be completed during the time of work on the escarpment for the development of the future dwelling. The trees proposed to be removed will be replaced during dwelling completion.

Discussion:

This application is before MPC for the following reasons:

- Mechanized Excavation, Stripping and Grading is listed as a discretionary use; therefore, the decision must come from the Municipal Planning Commission.
- Land located below the top of bank/top of escarpment should be in a natural state, a variance is required.

Recommendation:

In regards to the boathouse and based on the Based on the Municipal Government Act section 643 (1), “a non-conforming building may continue to be used but the building may not be enlarged, added to, rebuilt or structurally altered to except: to make it a conforming building, and for routine maintenance of the building; if the development authority considers it necessary. If a non-conforming building is damaged or destroyed to the extent of more than 75% of the value of the building above its foundation, the

building may not be repaired or rebuilt except in accordance with the land use bylaw. The boathouse is considered to be a non-conforming building meaning it was lawfully constructed or lawfully under construction at the date a land use bylaw affecting the building or the land on which the building is situated becomes effective. In our current Land Use Bylaw, an accessory building on a parcel abutting Sylvan Lake shall be situated so that it is not closer to the front parcel boundary and the top of any escarpment area or high-water mark than the front wall of the main building or 15m whichever is least.

The Municipal Development Plan 6.3.6. states Norglenwold shall not allow development adjacent to or near the shores of the Lake,
including reserves, and other open spaces, unless the proponent can demonstrate to the satisfaction of the Summer Village the development will not:
(a) reduce lake water quality;
(b) degrade fish or wildlife habitat;
(c) adversely impact the area's visual or natural quality through inappropriate or excessive removal of vegetation, and
(d) lead to soil erosion or instability or damage to the bank or shore.

It is recognized that remedial actions to banks may be necessary from time to time, the village strongly desired that the banks and shoreline remain as natural as possible to retain the natural ecosystems. It does not state in the geotechnical report that there are signs of erosion and that the work is necessary.

After reviewing all relevant planning and other statutory documents, it is the recommendation of administration to deny the application. The boat house repairs are significant and in administration's opinion are not considered to be routine maintenance of the building and the bank work does not appear to be necessary.

Conditions:

If approved, Administration would recommend the following conditions:

- Completions Deposit of $4,000.00
- At minimum, the same number of trees removed from the escarpment to be replaced.
- Minimum 1m no mow zone required adjacent to lake, including native grassy areas.
- Areas around meandering path to contain native plantings and to be left natural.
- Provincial approval is required for any work on the shoreline.
- Development to be followed according to the recommendations in the geotechnical report.
- The boathouse will remain a non-conforming building and can't be enlarged in the future.

Authorities:

The MPC may:

- Grant a variance to reduce the requirements of any use of the LUB and that use will be deemed to comply with LUB.
- Approve application even though the proposed development does not comply or is a non-conforming building if:
    - It would not unduly interfere with the amenities of the neighborhood, or
    - Materially interfere with or affect the use, enjoyment, or value of neighboring parcels of land, And
    - It conforms with the use prescribed for that land or building in the bylaw.

- Consider a Variance only where warranted by the merits or the proposed development and in response to irregular lot lines, parcel shapes or site characteristics which create difficulties in siting structures within the required setback or in meeting the usual bylaw requirements, except there shall be no variance for Parcel Coverage or Building Height.

For a discretionary use in any district:

- The Municipal Planning Commission may approve an application for a Development Permit:
    - With or without conditions;
    - Based on the merits of the proposed development, including it's relationship to any approved statutory plan, non-statutory plan, or approved policy, affecting the site;
    - Where the proposed development conforms in every respect to this Land Use Bylaw; or
- May refuse an application for a development permit based on the merits of the proposed development, even though it meets the requirements of the Land Use Bylaw; or
- Subject to provisions of section 2.4 (2), the Municipal Planning Commission shall refuse an application for a development permit if the proposed development does not conform in every respect to the Land Use Bylaw.

As per the MGA, a non-conforming building:

- means a building: (i) that is lawfully constructed or lawfully under construction at the date a land use bylaw affecting the building or the land on which the building is situated becomes effective, and (ii) that on the date the land use bylaw becomes effective does not, or when constructed will not, comply with the land use bylaw.
- May continue to be used but the building may not be enlarged, added to, rebuilt or structurally altered except: to make it a conforming building; for routine maintenance of the building; if the development authority considers it necessary;

or in accordance with a land use bylaw that provides minor variance powers to the development authority for the purposes of this section.

- Is damaged or destroyed to the extent of more than 75% of the value of the building above its foundation, the building may not be repaired or rebuilt except in accordance with the land use bylaw.

Decision:

In order to retain transparency of the Commission, Administration recommends one of the following:

1. Approve the application with or without conditions *(Section 642 of the MGA),* or
2. Deny the application stating reasons why *(Section 642(4) of the MGA).*

205 Grand Avenue : Lot 13, Block 2, Plan 2203KS

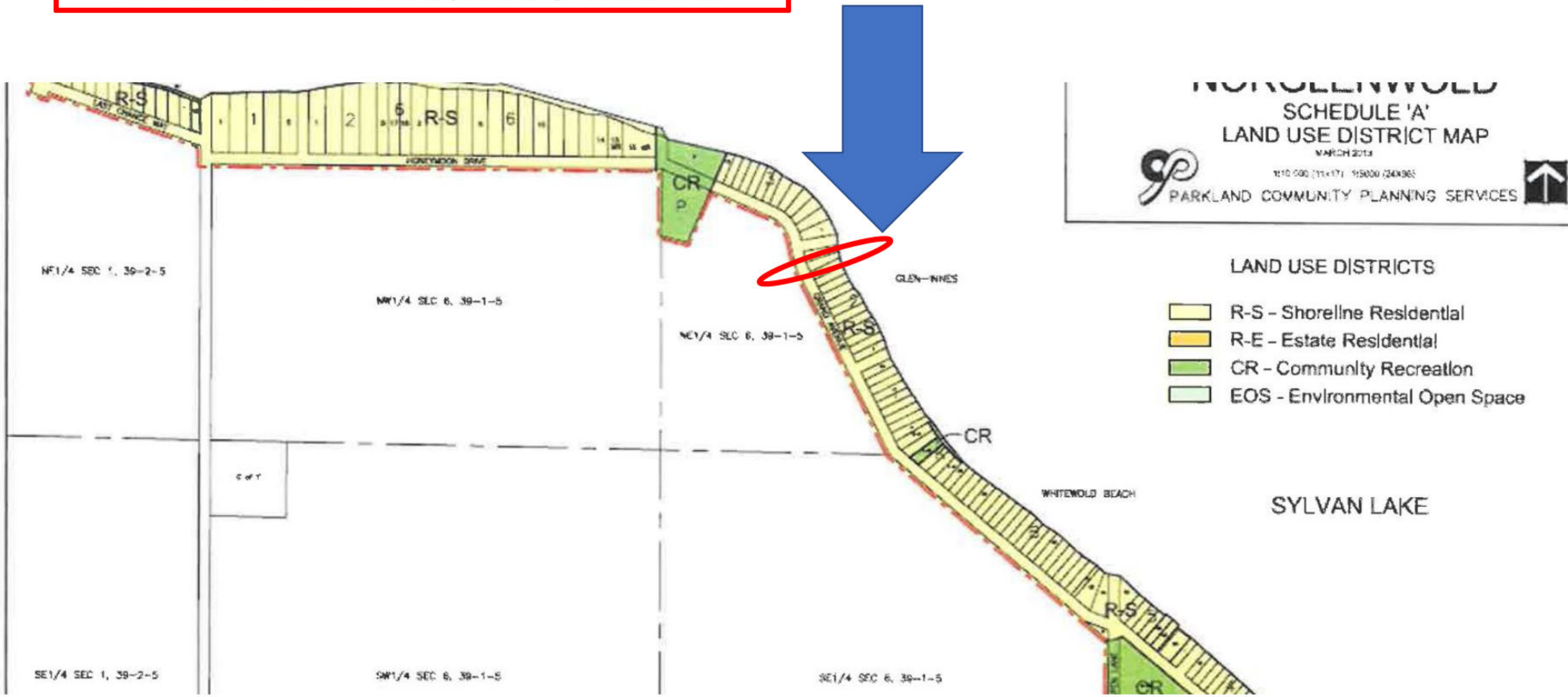
Proposals for :

Bank Revitalization

Boat House Repair

Tree Removal

205 Grand Avenue : Lot 13, Block 2, Plan 2203KS



View from the road to the lake

View from the bank back to the road

Development permit application:

1. Bank revitalization
2. Boathouse repairs
3. Tree Removal

PARKLAND NURSERY
& Landscape Services Ltd.
Box 25004 Deer Park P.O., Red Deer, Alberta T4R 2M2
Phone: 403-340-8755 • **Fax:** 403-340-8759 • **Website:** www.pnls.ca • **Email:** admin@pnls.ca
Your Green Connection

April 22, 202

Kara Kashuba
Junior Development Officer
Sylvan Summer Villages

Dear Ms. Kashuba,

Parkland Nursery and Landscape Services Ltd. has been approached to help revitalise the bank at Mr. Radford's property in the Summer Village of Norglenwold, on Sylvan Lake. The goal of the revitalization on his property is to create a safe embankment that provides his family access to the lake. We have reviewed parts of the "Caring for Shoreline Properties" to help us design an embankment that meets your standards while increasing the safety and accessibility of the current bank. In addition to our explanation for our plan, we have attached a concept sketch of our intentions.

As most of the large vegetation on Mr. Radford's embankment are dead or past their prime, such as the large popular trees that are comprised of large amounts of deadwood, we propose clearing the dead or dying vegetation and replanting native species such as Saskatoon bushes to help stabilize the slope from erosion.

Once we remove the dead or soon-to-be hazardous vegetation, we would remove the limited remaining vegetation as we propose reshaping the bank to reduce the slope, work which is supported on page 24 of "Caring for Shoreline Properties". The current slope now is steeper than the 3:1 and does not match the slopes of adjacent properties. We propose reshaping the bank and as previously mentioned, replant parts of the revised slope with native species for further erosion protection. With the reshaping, we plan to install a meandering path from the top of the embankment to the shore as the primary access to the lake which is supported by page 20 of the "Caring for Shoreline Properties".

As the boat house has been grandfathered in, we propose to make amendments around the boat house to improve both access and safety. We propose building a new set of stairs 3 feet from the boat house to provide access to the structure. The retaining wall behind the existing boathouse has disintegrated, therefore we propose installing a new retaining wall 3 feet from the boat house once we reshape the embankment.

For the shoreline, we have planned to use Gabions to help stabilize the shoreline which are recommended by Alberta Environmental Protection (Caring for Shoreline Properties, page 25).

If you have any questions regarding our proposal or our concept, please do not hesitate to contact me.

Thank you for your time and your consideration,

Breanna Beck B.Sc, B.Ed,
Project Manager
403.588.1010
lands@pnls.ca

FILE REFERENCE _____

To: _____

From: _____

Date: April 22/2021

Subject: Radford - Sylvan Lake

PARKLAND NURSERY
& Landscape Services Ltd.
Box 25004 Deer Park P.O.
Red Deer, Alberta CANADA T4R 2M2
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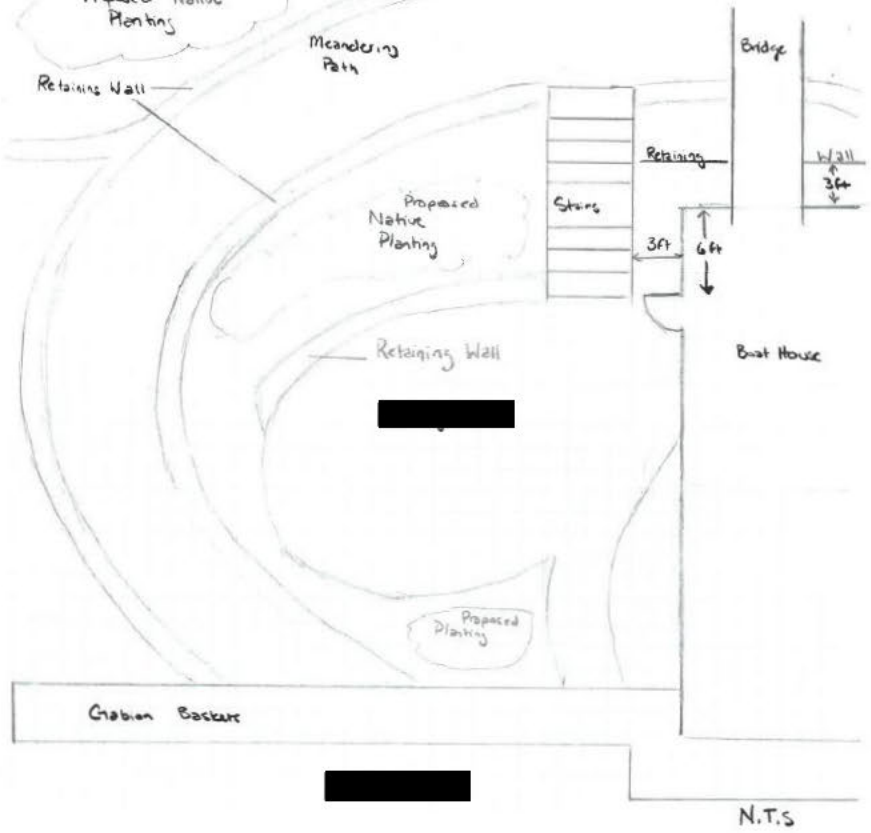
N.T.S



Existing Stairs

The poplar trees circled in red above are both past their best before date as they have a substantial amount of deadwood.

The birch circled in red above is dead as it had a metal wire wrapped around its trunk which girdled it (see picture below).

The majority of vegetation growing to the left of the staircase are growing through fencing. It is only a matter of time before these trees and shrubs die as a result of girdling from the fence (see close up pictures below).

Boathouse Repair Concept

Proposed Repairs to the Boathouse:

Scope of the work:

We would like to make an application to disassemble the boathouse until the repairs and upgrades to the bank are completed and then the boathouse would be returned and repaired.

The foundation of the boathouse is damaged and the main beams appear to be rotten. The center beam is broken off. In order to carry out the repair of the foundation we intend to remove the roof (which needs resheeting) and take the walls down.

We will place a new foundation structure which would extend 3 feet in front so there is room to stand when opening the door but will not extend passed the property line.

The foundation structure would also extend 3 feet to the back with an integrated retaining wall to prevent further erosion of the bank.

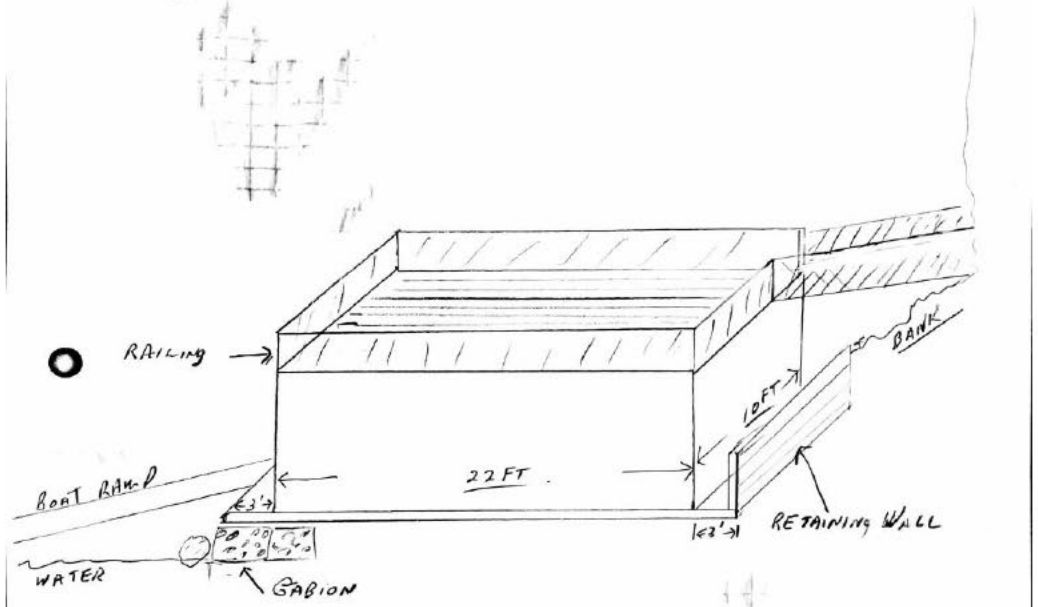
Recap:

1. Take down the boathouse and move it to the yard above the bank.
2. Complete shoreline repair as per permit.
3. Return the boathouse when shoreline repairs are complete.

Boathouse concept

[redacted]

BOAT HOUSE



The first 5 boards of the floor are damaged, but the walls and the roof (in the next picture) are good. Only the roof sheeting needs replacement.


The Roof
Structure

This is the foundation structure of the boathouse. The center beam is broken off and appears to be rotten. Great home for the porcupine.

Behind the boathouse there was never a proper retaining wall. This is now a danger for my grandkids with a 10inch space that is over 3 feet deep and caving in.

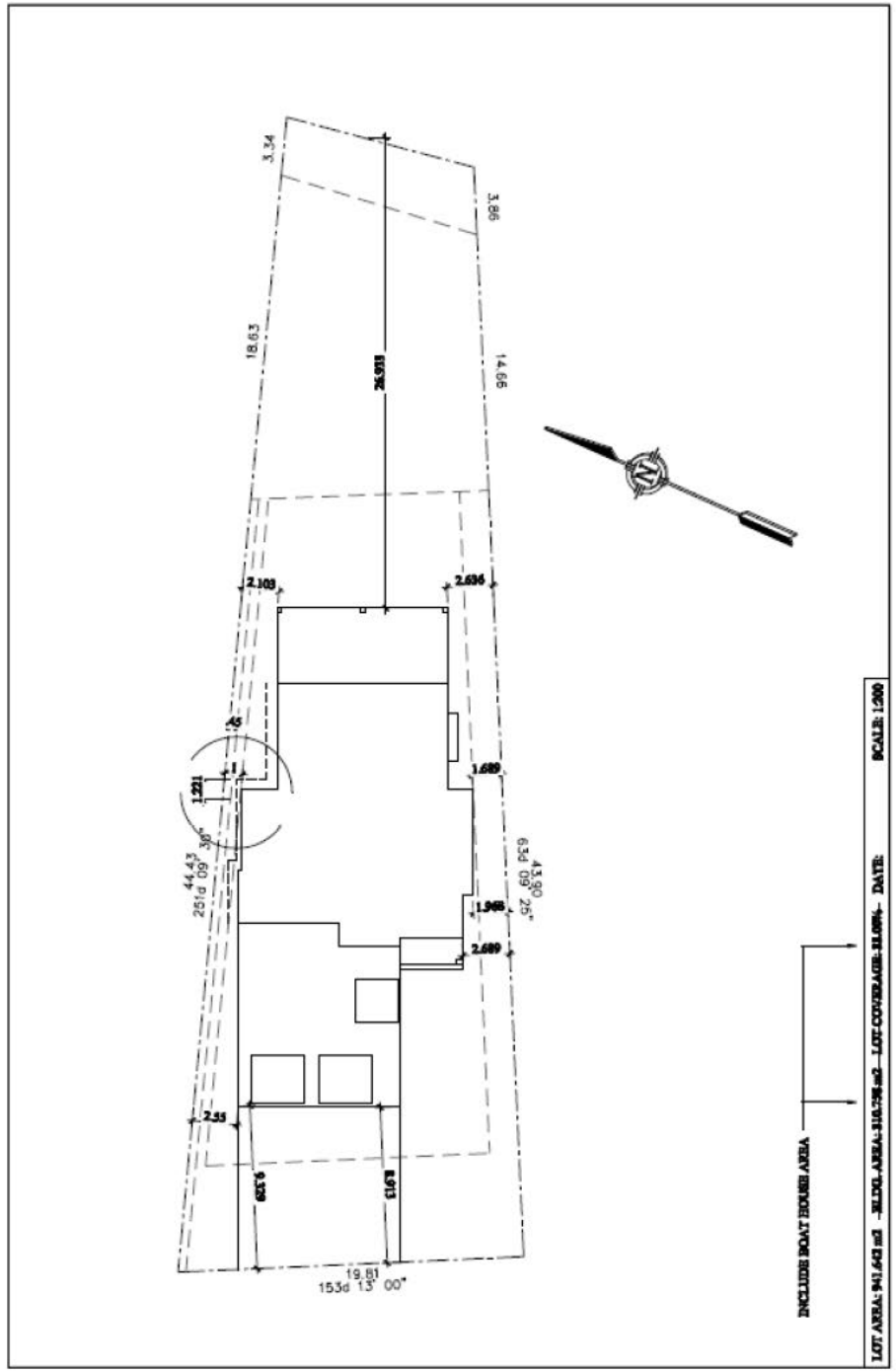
The top of the boathouse was once used for a patio. I plan to add a railing and safe walkway to utilize this and create less impact on the slope area.

The lot to the north has been cleared and sloped at about a 4-1 slope.

This is the lot to the south side and it is tiered with retaining walls and about a 4-to-1 slope.

Tree Removal

Future-planned development



While all the equipment is on-site for the bank revitalization, we would like to clear the trees for the development of the house and landscaping.

A full landscaping plan and tree replacement will be submitted with the house development permit application

North Lot Line –

[redacted]

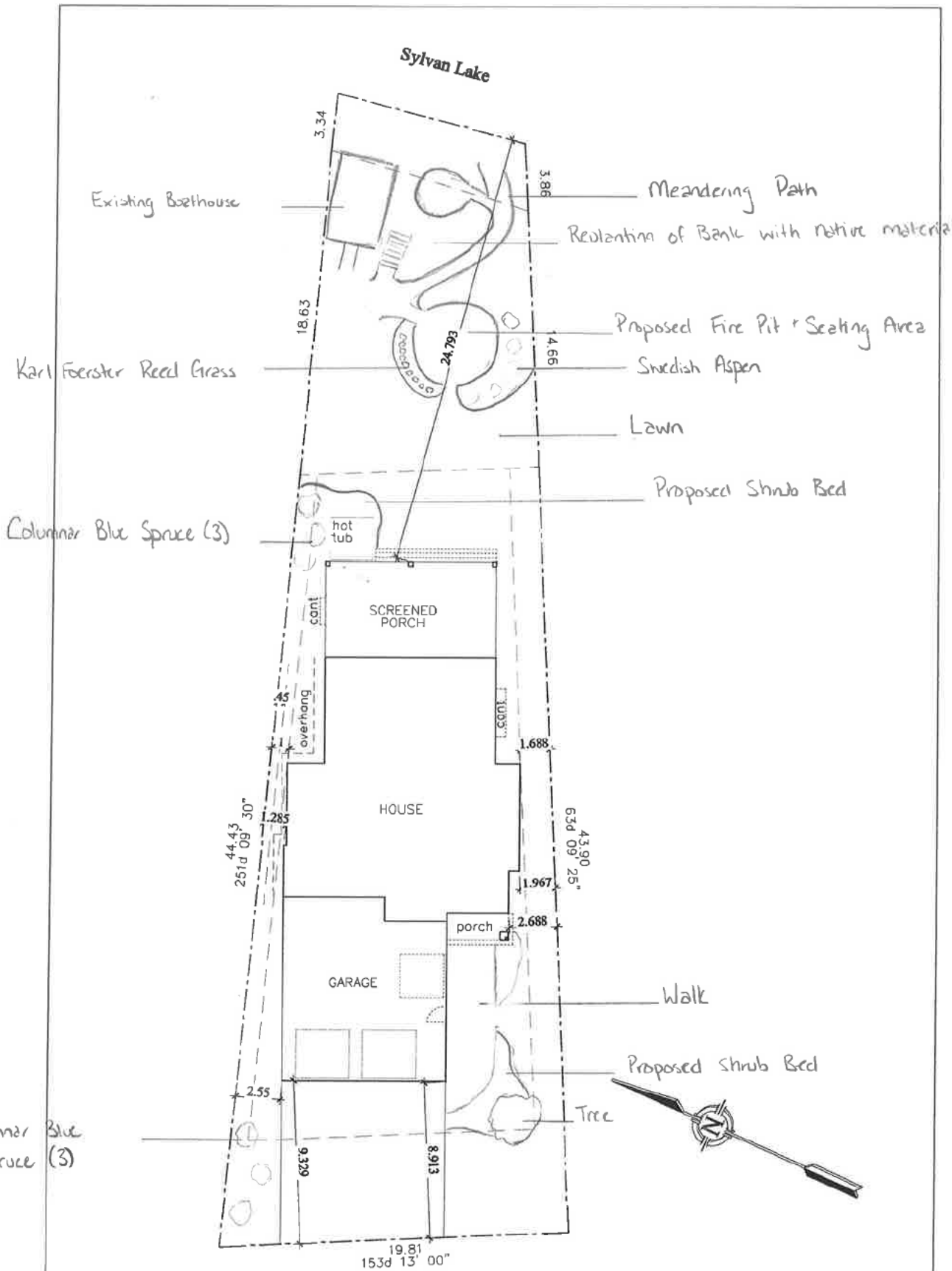
is passed then

due date

South Lot Line:

- Trees encroach on building envelope
- Trees passed their due date
- Concern that weakened root system and enhanced exposure to wind may pose danger of damage to neighbor's residence

Proposed Landscaping



Radford Residence	205 Grand Ave, Norglenwold, AB	Lot 13 Block 02 Pl# 2206 KS		
LOT AREA: 981.190 m2	BLDG. AREA: 322.246 m2	LOT COVERAGE: 32.84%	DATE: June 8, 2021	SCALE: 1:200

Geotechnical, Environmental and Materials Engineering

Red Deer · Sherwood Park · Grande Prairie · Calgary · Fort McMurray
Peace River · Medicine Hat · Lethbridge · Fort St. John · Estevan · Regina

GEOTECHNICAL SLOPE ASSESSMENT

205 GRAND AVENUE
SUMMER VILLAGE OF NORGLENWOLD, ALBERTA

PREPARED FOR

[redacted]
RED DEER, ALBERTA

PREPARED BY

PARKLAND GEOTECHNICAL CONSULTING LTD.
RED DEER, ALBERTA

ParklandGEO

PROJECT NO. RD7303-07
JUNE 8, 2021

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TABLES

APPENDICES

1.0 INTRODUCTION

[redacted] was proposing to construct a residential home and reconfigure the lake slope at the rear of 205 Grand Avenue in the Summer Village of Norglenwold, Alberta. Parkland Geotechnical Consulting Ltd. (ParklandGEO) was requested to perform a slope stability assessment of the site to provide related recommendations for development of the property. This report provides a review of the slope stability with regards to the proposed residential development.

1.1 SCOPE OF WORK

The scope of work was outlined in ParklandGEO's proposal dated May 7, 2021 (PRO9029rev1). Authorization to proceed with this investigation was given verbally by Mr. Reg Radford. This report summarizes results of the field and laboratory testing programs and presents geotechnical recommendations for the site.

The slope assessment in this report is intended to provide the Owner and municipal authorities with a reasonable expectation with respect to slope stability and potential for slope movement; and to communicate the technical risks so that informed development decisions can be made relating to the slope.

1.2 EXISITNG GEOTECHNICAL INFORMATION

ParklandGEO is not aware of and was not provided any previous geotechnical investigations for this property.

2.0 BACKGROUND

2.1 SITE DESCRIPTION

The property is located at 205 Grand Avenue in the Summer Village of Norglenwold, Alberta as shown on the Key Plan, Figure 1. The legal property description is Lot 13, Block 2, Plan 2203KS. The site was bordered by Grand Avenue to the west, developed residential lots to the north and south, and Sylvan Lake to the West. The greater area around the site is a mix of residential along the lake and agriculture in areas away from the lake.

The lot was previously partially developed with the majority of the trees cleared from the uplands area of the a lot, a small access down the lakeside slope, and a small shed on the lower slope face near the lake. It appears that a house or permanent structure had not previously been constructed in the uplands area at the site.

The lot can be divided into two distinct areas: the upland area; and the lake slope. The upland area extends from Grand Avenue about 50 m east to the crest of the slope. Upland area dips down about 3 m to the east at a grade of about 20H:1V over the length of the lot with a surface elevation of about 943.6 m at Grand Avenue and 940.6 m at the lake slope crest. The uplands

area had a maintained grass surface with thickets of mature trees on the north and south edges of the west half of the property.

The lake slope is about 4 m high with an elevation of about 940.6 m at the crest and 936.6 m at the toe near the lake. The grade of the slope ranged from about 1.4 to 5H:1V with a typical grade of 2.5H:1V. The slope face was vegetated with mature birch trees, bushes, and native prairie grasses. The south side of the slope had a small stairway built onto the slope face. A small shed was also located on the lower slope face, about 0.5 m above the toe. The slope had been previously cut to create a relatively flat platform for the shed. Photographs of the site are shown on Figure 4.

2.2 PROJECT DESCRIPTION

The proposed development is expected to include a newly constructed residential house with a basement. The exact location of the house is not known, however is expected to be located in the uplands area at least 10 m from the crest of the slope. The development may also include changes to the lake slope to allow for updates to the shed structure at the base of the slope. The regraded slope would remove material from the crest and slope face resulting in a more stable. The proposed reconfigured slope grade will be no steeper than 4H:1V, similar to the grade of the lot directly north of the site. This will result in the crest of the slope extending about 10 m west of the current location and the removal of material from the crest.

Summer Village of Norglenwold Land Use Bylaw No. 208/13 Section 2.3.2 requires a geotechnical engineering study for development near slopes exceeding a grade of ten percent. The purpose of the investigation was to identify a suitable development area with regards to slope stability and provide recommendations for development.

3.0 FIELD AND LABORATORY PROGRAM

On May 24, 2021, a site inspection was completed and two boreholes were drilled at the property. Borehole locations are shown on the Site and Aerial Plans, Figures 2 and 3. The following sampling and testing procedures were followed during the field program:

1. Prior to mobilizing the drilling rig, the ParklandGEO completed an Alberta One Call to verify the drill site was clear of underground utilities.

2. The drill rig was owned and operated by Finco Environmental Drilling Ltd. of Red Deer County, Alberta. Drilling operations were monitored by members of ParklandGEO's geotechnical staff. The soil encountered was visually examined during drilling and logged according to the Modified Unified Soil Classification System.

3. Soil samples were collected from auger cuttings at 1.0 m intervals in order to determine the soil/moisture profile. Soil samples were also obtained from auger grab and Standard Penetrations Tests (SPTs) at selected depth intervals.

4. At the completion of drilling, 25 mm hand-slotted PVC standpipes were installed in Boreholes 1 and backfilled with auger cuttings and a bentonite cap. The remaining borehole was backfilled with auger cuttings only. Excess auger cuttings were piled at the borehole locations. Groundwater measurements were recorded on June 7, 2021.

5. All soil samples were returned to ParklandGEO's Red Deer's laboratories for possible further testing. The results of all laboratory testing are shown on the borehole logs and individual test results presented in Appendix A. The laboratory program consisted of moisture contents and water soluble sulphates.

6. A topographic survey of the slope face conducted by Base Surveys Inc.. The borehole locations were surveyed by ParklandGEO using a Trimble GPS receiver and a pole mounted Trimble antenna. The estimated post data correction vertical accuracy of this equipment is ±20 cm. ASCM 991474 was picked up was surveyed as a fixed reference point (elevation 996.745 m) and confirmed the expected accuracy of the equipment. UTM coordinates and geodetic elevations are provided in the boreholes logs in Appendix A.

4.0 SUBSURFACE CONDITIONS

The soil profile encountered at this site was in descending order: topsoil; clay; clay till; residual clay bedrock and weathered bedrock. This profile is considered to be typical in the Summer Village of Norglenwold. The detailed soil conditions encountered at the borehole location are described on the borehole logs. The soil test results and definitions of the terminology and symbols used on the borehole logs are provided on the explanation sheets. The following is a brief description of the soil types encountered.

4.1 TOPSOIL

A 250 to 350 mm layer of topsoil was encountered at the borehole locations. The topsoil encountered was black and moderately organic. Local topsoil is considered to be weak and highly compressible when subjected to loads. The thickness of topsoil may vary between borehole locations.

4.2 CLAY

A 350 mm layer of clay was encountered below the topsoil in Borehole 2. The clay contained some silt and little sand. The layer was considered to be medium plastic, firm and moist.

4.3 CLAY TILL

Clay till was encountered below the topsoil and clay in both boreholes and it extended to depths ranging from 1.7 to 1.9 m below grade (elev. 940.7 to 939.1). The clay till was a mixture of clay, silt and sand with inclusions of coal and occasional rust stains. The clay till was brown considered to be low to medium plastic. SPT 'N' values ranged from 20 to 31 blows indicated that clay till layer very stiff to hard consistency The moisture content of the deposit ranged from 16 to 19 percent. Based on local experience, the estimated Optimum Moisture Content (OMC) of silt is about 16 percent.

4.4 RESIDUAL BEDROCK

Highly weathered bedrock was encountered below the clay till in both boreholes. The residual bedrock extended beyond the depth drilled in Borehole 2 and to 3.9 m below grade in Borehole 1. Both residual clay shale and fine sandstone materials were encountered. The moisture content ranged from 16 to 25 percent. Standard Penetration test (SPT) N in the residual weathered bedrock ranged from 24 to 33 blows indicating a very stiff to hard consistency.

4.5 WEATHERED BEDROCK

Weathered siltstone bedrock was encountered below clay till and residual bedrock in Boreholes 1 about 3.9 m below grade (elev. 938.6 m). Auger refusal was encountered within 2 m of the surface of the weathered bedrock. The typical local formation consists of inter-bedded silt-stone and clay shale with occasional layers of sandstone. The upper zone of the local formation is usually considered to be weak, weathered rock with a very stiff to very hard consistency. The moisture content ranged from 12 to 16 percent. The local bedrock is prone to weathering, quickly breaking down into constituent materials (ie. silt, clay, or sand). The competency of bedrock generally increases with depth.

4.6 WATER SOLUBLE SULPHATES

One soil samples was taken for water soluble sulphate concentration tests. The concentrations of sulphates are expressed as a percent of the dry mass of soil. The concentration of water soluble sulphates at 1.5 m below grade in Borehole 2 was 0.08, which indicates a "negligible potential for sulphate attach on buried concrete in direct contact with soil".

5.0 GROUNDWATER CONDITIONS

Groundwater seepage was not observed during drilling of the boreholes. The groundwater level in Borehole 1 was measured 4.14 m below grade (elev. 936.6 m) on June 7, 2021. The groundwater surface is expected to tie into the lake elevation near the toe of the slope.

The observed groundwater measurements are considered to be near the seasonal average. Groundwater elevations are expected to fluctuate on a seasonal basis and will be highest after periods of heavy or prolonged precipitation and snow-melt. Groundwater seepage is expected for relatively shallow excavations at this site. The volumes of groundwater encountered will be dependent on seasonal conditions and the permeability of the soils within the profile.

Localized areas may experience temporarily perched conditions in the sandy soils layer above the bedrock. Perched water conditions will dissipate over time as the groundwater infiltrates down through the low permeable subgrade soils.

6.0 ASSESSMENT OF SLOPE STABILITY

6.1 METHODOLOGY

Slope stability is described in terms of a factor of safety (FS) against slope failure which is the ratio of total forces resisting failure divided by the sum of forces promoting failure. In general a FS of less than 1.0 indicates that failure is expected and a FS of more than 1.0 indicates that the slope is stable. A steepened slope will slump back over time to establish a stable profile for the existing soil and groundwater conditions. Given the possibility of soil variation, groundwater fluctuation, erosion, delayed strength loss, and other factors, slopes with a FS ranging between 1.0 and 1.3 are considered to be marginally stable and a "long term" stable slope is considered to have a FS greater than 1.3. For permanent structure development at the crest of a slope, a setback corresponding to a factor of safety of 1.5 is considered an industry standard.

Stability analysis was carried out using the Morgenstern-Price method and *Slope/W* software. A series of slope models were prepared to represent various failure cases slopes. Model sensitivity was evaluated by varying slope geometry, soil strength parameters and groundwater conditions.

6.2 LONG-TERM VERSUS SHORT-TERM

Slope stability is dependent on a number of factors such as: slope geometry; groundwater and soil moisture conditions; and soil characteristics including soil strength. It is not uncommon to find slopes with very steep inclinations or even near vertical faces for relatively weak clay soils. This is an example of short-term stability based on short term soil strength of the clay. Soil strength is a function of:

- The friction angle of the soil, which can be visualized looking at the natural angle formed on the outside of a sand or gravel stockpile;
- The cohesion of the soil, which is the combination of physical and chemical bonds between the soil particles, some of which can break down due to conditions like wetting; and,
- Outside physical forces, such as suction of water from the slope subgrade via plant roots which adds strength to the soil similar to cohesion.

The short-term stability of a slope is based on all of the potential strength factors available under current conditions. Under ideal conditions steep clay slopes are possible, but if conditions change like: removal of vegetation; wetting the slope face; or raising of the groundwater table, overly steep slopes will begin failing as the short term strength disappears. With proper management to avoid destabilizing factors, this short-term soil strength can be preserved and steepened slopes can be maintained for extended periods, but not indefinitely. The risk of depending on short term conditions for assessing slope developments is rarely acceptable.

6.3 SLOPE MODELS

6.3.1 Slope Profile

The slope profiles for the site were based on survey data collected by Base Surveys Inc. and as shown on the Contour Plan, Figure 2. A representative profile was taken through the slope on the south side of the lot. Briefly, the side slopes range from about 1.4 to 2.1H:1V, with slope height of about 4 m. The proposed slope reconfiguration was modelled by holding the toe of the slope at the lake and reducing the slope grade to 4H:1V.

6.3.2 Subsurface Conditions

The following effective strength parameters were used in the analysis and derived based on modelling the historical slope movement of the upper slope and previous experience.

TABLE 1
SUMMARY OF SOIL PARAMETERS

Soil	Elevation (m)	Unit Weight γ (kN/m^3)	Cohesion c' (kPa)	Friction Angle Φ' (degrees)
Till	Surface – 939	19	0 – 1	27 – 29
Residual Bedrock	939 – 937	20	1 – 5	22 - 25
Weathered Bedrock	< 937	21	5 – 15	22 – 25

Groundwater conditions used in the analysis were assumed to be around 4 m below grade in the upland area and drop to meet the lake elevation near the slope location.

6.4 RESULTS OF STABILITY ANALYSIS

Stability analysis was carried out using the *SLOPE/W 2019* computer program to evaluate the factor of safety for the representative slope models. The results of the slope analysis are summarized in the below table.

TABLE 2
MODEL RESULTS FOR EXISTING CONDITIONS

Stability Run	Case	Factor of Safety	Figure
Slope Global	Current Slope	1.1	---
Upper Slope	Current Slope	1.1	B1
Setback 4 m from Crest	Current Slope	1.3	---
Setback 7.5 m from Crest	Current Slope	1.5	---
House Setback 8.5 m from Crest	Current Slope	1.5	---
Slope Global	4H:1V Reconfiguration	1.9	---

Upper Slope	4H:1V Reconfiguration	> 2.0	---
House Setback 2.5 m from new Crest	4H:1V Reconfiguration	1.5	B2

Representative slope profiles for the analysis are shown in Appendix B. It should be noted that a series of stability runs have be undertaken for both localized failures and global stability and the example runs provided in Appendix B are just samples of typical analysis results for various cases and conditions.

6.5 ASSESSMENT

The findings of the slope stability analysis for the slope model and the proposed soil parameters listed in Table 2 were in general agreement with observed slope experience. The long term assessment at this site is that the potential for a major slope movement impacting the proposed development is low under normal conditions with a reasonable expectation of seasonal variation. The proposed re-grading of the slope and development of a house site near new crest of the slope appears to have negligible impact on the slope, given proper setback. This is not surprising, as the re-grading measured would act to improve overall stability.

The existing slope face is considered to be marginally stable, with the potential minor movement if vegetation is removed from the slope face or in isolated overstepped areas near the existing shed. The proposed reconfiguration of the slope to a 4H:1V grade will improve the overall stability of the slope by off-loading some of the driving force from the slope.

The FS against a small shallow "slump-type" failure on the existing slope face may fall close to 1.0 if the slope face at the site was subject to grading causing excessive steepening, or if areas of the slope face were to become saturated. However, it would take unusually wet conditions to cause shallow slumping of the slope face. Saturation of the surficial soils, leading to the regressive slumping of the slope face is considered to be the most likely mode of slope failure at this site. If a large movement were to occur, the failure in the subgrade would be expected to be slow moving and would provide some warning in the form of cracks on the slope face prior to failure

7.0 DISCUSSION AND RECOMMENDATIONS

7.1 GEOTECHNICAL EVALUATION

The site soil conditions are considered typical for the Summer Village of Norglenwold and are suitable for the construction of the proposed residence. The foundations loads for the proposed residence are assumed to be light to moderate. The site soil conditions are considered suitable for conventional strip and spread footings bearing on the native till. The proposal to reconfigure the site slope will increase the global stability.

Based on the stability analysis, the critical failure plane at the rear wall of the proposed house footprint is considered to be stable with a FS of over 1.5 based on a design setback of 8.5 m from the crest for the existing slope configuration. The setback can be reduced to 2.5 m from the new crest if the slope is reconfigured to be no steeper than 4H:1V. The construction of the proposed residence is not expected to have a significant impact on the stability of the slope. The overall assessment of the slope issues at this site is that slope stability will not be a significant obstacle to residential development provided reasonable design, construction and long-term slope maintenance practices are followed.

The existing slope face is considered to be marginally stable in its current configuration. Changes to the slope face, such as toe erosion from wave action or loss of vegetation would reduce the stability of the slope face and may result in localized slumping and failures. Without vegetation, erosional forces such as wind and rain may cause spalling slumping on the slope face over time. With the designed house setback from the crest, this slumping is not expected to impact the proposed house. This spalling slumping could undermine the existing lake access stairs and shed area. There are three options to increase the stability of the slope face.

1. Flattening and removing the over steepened area of the slope face. Based on experience with the local soils, proposed reconfiguration to 4H:1V is considered to be suitable.

2. The slope face could be stabilized by installing a retaining wall system. The retaining wall system would need to be designed by a qualified engineer.

It should be understood the stairs and the shed are not considered to be permanent occupied structures, so the other option to slope rehabilitation would be to leave the features remaining after site development in an "as is" condition and maintain or repair them as required. Landscaping or retaining walls may be required to minimize impacts on neighboring properties if the crest area is lowered. Un-retained grade changes between adjacent lots should be no steeper than 3H:1V to ensure long term stability.

If the shed on the lower slope is moved to support a vertical cut of the slope face, there is potential for differential lateral earth pressures on the building due to the sloping grade and unburied east wall. The shed could be redesigned with a concrete wall designed to resist lateral earth pressures or the shed walls can be protected from these pressures by providing retaining walls to create a "pocket" around the shed.

There is potential for the shed to intercept groundwater seepage from the upslope area. This does not appear to have been a major issue with the current shed, but the old timbers were not fully sealed and groundwater would have some outlet towards the lake. It will be prudent to build some features into the design to allow any groundwater seepage from the upslope subgrade to have a pathway towards the natural drainage into the lake. This can be provided by selection of suitable foundation and backfill materials.

7.2 STABILITY OF DEVELOPMENT AREA

The overall assessment of the slope issues at this site are that slope stability will not be a significant obstacle to residential development provided reasonable design and construction practices are followed. Residential development should be setback at least 8.5 m from the existing crest location. If the slope if reconfigured to 4H:1V or flatter, the setback can be reduced to 2.5 m from the new crest location.

The most likely failures to occur at this site are shallow surficial failures during periods of soil saturation. However, the established vegetation at the site will help to prevent these failures from occurring. The surficial soil will also susceptible to erosion due to surface water run-off. This will be most likely to occur in areas that are cleared as part of the site development. It is critical to ensure that new vegetation is established following any re-grading of the lot. If even minor erosion is identified following construction, erosion protection measures should be implemented.

Septic tank or underground water storage should be setback a minimum of 10 m from the crest of the slope to limit the risk of saturation of the slope face. This will require careful planning of the layout of the site to ensure all minimum setback distances are adhered to for the septic tank, water well, and buildings.

7.3 SITE PREPARATION

It is anticipated that stripping and minor grading will be required as part of the residential development. It is anticipated that the maximum grade changes will be less than 1.0 m.

7.3.1 Stripping

In general, all surficial topsoil, organics, non-engineered fill or unsuitable soils should be stripped in the building and pavement areas. Trees and bushes should only be removed from areas required for development. Based on site observations the surficial topsoil ranges up to 350 mm thick. Some areas of the site may require more stripping or undercutting to remove any remaining topsoil, root systems, or foundation debris or pavement debris. Organic materials

should not be mixed with mineral soils. The excavated organics and unsuitable materials may be stockpiled at least 5 m from the crest of the slope for future landscaping use.

7.3.2 Subgrade Preparation

The exposed subgrade should be scarified to a depth of 150 mm and recompacted uniformly to a minimum of 98 percent of SPMDD. Site preparation measures should be monitored by qualified and experienced geotechnical personnel to identify potential soft areas or unsuitable material.

Site preparation should be carried out under dry weather conditions to minimize the risk of disturbance and softening. If adverse weather or groundwater conditions are observed, these recommendations should be reviewed in order to avoid subgrade failure. Uniformity of compaction is of most importance to minimize potential for differential settlement under new loads. Over compaction and wetting should be avoided. Site preparation measures should be monitored by qualified and experienced geotechnical personnel to identify potential soft areas. Soft areas should be sub-cut and replaced with a suitable fill material to a depth sufficient to support construction traffic. Methods to avoid subgrade failure of soft subgrades may include: limiting construction traffic, modification of site preparation procedures (scarification, recompaction, etc.) and sub-cut and replacement with a suitable engineered fill material.

7.3.3 Excavations and Backfill

Temporary excavations will be required for foundations and underground utility installations. All excavation work must comply with the requirements of the Alberta Occupational Health and Safety Act (OHS Act, 2018), OHS Regulation (2018) and OHS Code (2019). The OHS Code contains the technical requirements that support the Act and Regulation. Excavation side slopes are not expected to be able to stand near vertical for extended periods of time. Short term excavations side slopes should be cut back to 1H:1V from up to 1.5 m above the toe in the native cohesive soils. For excavations into the groundwater table or during wet conditions, flatter side-slopes may be required.

If space does not permit the slopes to be cut back, some form of temporary shoring must be installed to protect workers in the trench. All temporary surcharge loads should be kept back from the excavated faces a distance of at least one-half the depth of the excavation. All vehicles delivering materials to the site should be kept back from excavated faces at least 1.0 m or one times the excavation depth, whichever is greater. Fill materials used to bring the site to grade after excavation may consist of low to medium plastic imported clay, sand fill, or an approved granular fill.

Compliance with compaction recommendations around buildings is especially important, because poorly compacted backfill adjacent to foundation walls or grade beams will settle and may lead to ponding of surface water.

7.3.4 Fill/ Backfill and Compaction

Fill required to bring the site up to grade should be low to medium plastic inorganic clay or well graded select sand or gravel. The native sand is considered suitable as fill material; however it will require moisture conditioning in order to achieve proper compaction. The native sand will likely require an addition of moisture in order for proper compaction. The following table provides minimum compaction level and target moisture contents for any engineered fill at the site.

TABLE 3
RECOMMENDED COMPACTION LEVELS AND MOISTURE CONTENTS

Fill Location	Recommended Minimum Compaction Level	Moisture Content
Building Areas		
New fill greater than 0.6m thickness (including trenches)	100% SPMDD	±2% OMC
New fill less than 0.6m thickness (including trenches)	98% SPMDD	±2% OMC
Under structural slabs	95% SPMDD	±3% OMC
Other Development Areas		
Exterior building area outside of road structures	95% SPMDD	±3% OMC

The lift thicknesses should be governed by the ability of the selected compaction equipment to uniformly achieve the recommended density. However, it is generally recommended to use lifts with a maximum compacted thickness of 200 mm for granular fill and 150 mm for clay fill. Uniformity is of most importance. Granular fill is best compacted with large smooth drum vibratory rollers while clay fill is best compacted with vibratory "padfoot" or "sheepsfoot" rollers. Over compaction and excessive use of vibration to achieve density should be avoided to minimize risk of failing the subgrade. In areas which require higher compaction, it is recommended that granular fill be placed at moisture contents 0 to 2 percent below the OMC and that clay fill be placed at moisture contents about 0 to 2 percent above the OMC. This will help reduce compactive effort and potential risk of subgrade disturbance needed to achieve maximum density.

Fill placement and compaction during the winter months is challenging due to the difficulty in moisture conditioning the fill soils and obtaining high compaction levels. Materials and methodology should be reviewed prior to construction if cold weather compaction of clay fills is proposed. High compaction levels can only be achieved using fill soils that are unfrozen provided the compaction area is heated and hoarded to prevent freezing during placement and compaction.

7.3.5 Site Drainage

Surface water should be drained away from the site as quickly as possible, both during and after construction. Site drainage should be directed away from the foundation walls. It is recommended to provide a 5 percent back slope from buildings for a distance of at least 3 m with a 2 percent slope beyond that. Roof and other drains should discharge well clear of buildings and be designed to discharge at several different locations. Discharging all roof runoff at the same location has the potential to cause development of erosion channels that can ultimately impact slope stability.

Compliance with the recommendation for compaction of fill in exterior areas is important because poorly compacted backfill adjacent to foundation structures will settle, which may lead to ponding of surface water against foundation walls or grade beams. The slope of exterior backfill should be checked periodically to verify water is shed away from buildings. If the backfill settles causing water to pond against foundation walls, the surface should be re-graded. Water should not be allowed to pond adjacent to the building or pavement areas.

7.4 FOOTINGS

Standard house basement foundations using strip and spread footings will generally be acceptable at this site. Footings based on undisturbed native sand may be designed based on a maximum allowable bearing pressure of 120 kPa for strip footings and 140 kPa for pad footing placed on undisturbed inorganic soil free from loosened material. The design and construction of residential foundations should conform to the Alberta Building Code. In general, excavations should be protected against surface water runoff and ingress of groundwater; footing bases should not be allowed to dry out excessively during construction; and the bearing soil should be protected against freezing during and after construction.

Additional design and construction recommendations for footings include:

1. Footings should bear on native sand or approved engineered fill free from loosened material. Excavation of the footing trenches should be undertaken in a manner to minimize disturbance to the bearing surface. The use of backhoe or grade-all equipment is strongly recommended over loader or dozer equipment.

2. For protection against frost action, exterior footings in continuously heated structures should be provided with a minimum depth of ground cover of 1.5 m. If any proposed building/structures will be left unheated over the winter they will require at least 2.5 m of ground cover. Artificial insulation may be used to prevent frost penetration where adequate depths of ground cover cannot be economically provided. Insulation should be placed exterior to the footing wall.

3. Footings and foundation walls should be reinforced to span localized soft spots.

4. The footing trenches should be protected against surface water run-off and seepage water through the use of conventional sumps and ditches, if required.

5. Footing bases should not be allowed to dry out excessively during construction.

6. Foundation soils must not be allowed to freeze at any time prior to, during, or after construction.

7. Preparation of the bearing surfaces should be monitored by a qualified geotechnical engineer prior to placement of footings to verify that design criteria are met.

7.5 GRADE SUPPORTED FLOOR SLABS

Floor slabs should rest on at least 150 mm of well graded, free draining, granular base. Suitable materials would include coarse sand or crushed gravel with less than 10 percent passing the 0.080 mm sieve. The drainage layer below the slab should be compacted uniformly to at least 95 percent of SPMDD.

Small vertical subgrade movements may be experienced; therefore provisions should be made for movements between partitions and adjoining columns or load bearing walls. In addition, where partitions are placed under structural members a space should be left at the top of the partition to allow vertical movement (at least 25 mm). Columns in basements which support floor joists should be adjustable. Water lines should be installed carefully to minimize the potential for breakage and leaks below slabs.

7.6 BACKFILL FOR HOUSE STRUCTURES

Backfill soils are capable of exerting significant horizontal pressures onto a basement wall. It is recommended the backfilling be delayed until the concrete has gained enough strength to support the horizontal loads. The top and bottom of the wall should be braced prior to backfilling. Therefore, it is recommended to place the basement floor slab and floor joists prior to backfilling around walls. Backfill should be brought up evenly around the building perimeter to minimize differential horizontal pressures on the basement walls.

Rather than heavily compacting the backfill around the basements, it is recommended to nominally compact the backfill (90 - 95 percent of SPMDD) recognizing that settlement of the backfill will occur, particularly after the first freeze/thaw and moisture infiltration cycle. Backfill around basement walls should be sloped to shed water away from the structure with a recommended slope of at least 5 percent over a distance of 3 metres. The slope of the backfill should be checked periodically to maintain the slope of the ground surface away from the wall. If possible, the upper 500 mm of backfill should be low to medium plastic clay, to reduce potential surface water infiltration against the foundation walls. Roof leaders from houses and garages may be discharged onto the ground surface well clear of the foundation walls to help reduce wet weather infiltration of water around the foundation.

7.7 BASEMENT AND SUBDRAINAGE SYSTEM

A permanent subdrainage system (weeping tile drain) is not specifically required to control groundwater at this site. However, weeping tile is an inexpensive way to ensure water is unable to pond against foundation walls during heavy rainfall events, spring melt or unforeseen circumstances.

The weeping tile should consist of a minimum 100 mm diameter perforated rigid pipe surrounded by a filter of free draining gravel and enveloped in filter fabric. It is noted that corrugated HDPE is prone to sagging because it is flexible; to plugging because the corrugations of the pipe promotes deposition of the soil; and also to crushing where backfill thickness exceed 1.2 m. PVC pipe (with two 45-degree fittings at building corners) is more easily flushed, snaked, and unplugged; and is also the less prone to breakage.

Weeping drain should be surrounded with granular material to prevent the fine grained native soil from being washed into the drain. The granular filter may consist of free draining crushed rock or washed rock placed around the perforated drain pipe and wrapped with a coarse concrete sand or suitable geotextile. The weeping tile should be directed to a sump for collection and discharge. The discharge should be taken outside well away from the basement and well away from the slope face. Gravity discharge can be considered at this site as the surrounding topography allows. Sump discharge point should be protected from erosion with suitable landscaping features or splash-pad. Infiltration flows into the weeping tile drains from the sand subgrade is expected to be infrequent and minimal. The largest flows will occur during periods of heavy precipitation and snow melt.

7.8 FOUNDATION CONCRETE

Water soluble sulphate concentration results indicate a negligible potential for sulphate attack of subsurface concrete. As per CSA A23.1-14, General Use (GU) hydraulic cement is recommended with a minimum 28 day compressive strength of 28 MPa with a water cement ratio of 0.5. All concrete exposed to a freezing environment either during or after construction should be air entrained. Calcium chloride or any admixture formulation containing chloride should not be used in the subsurface concrete. Calcium salts used as accelerating admixture should be avoided, since they may increase the severity of sulphate attack.

7.9 RETAINING WALL DESIGN RECOMMENDATIONS

For any new retaining walls, the foundations should be designed for an ultimate bearing capacity of 300 kPa for ULS design. The "factored" ULS resistance may be calculated by multiplying the ultimate bearing capacity by a geotechnical resistance factor of 0.5, in accordance with the building code requirements. For SLS design an allowable bearing resistance of 120 kPa may be used.

Earth pressures behind the wing-walls will produce a horizontal sliding force and an overturning moment. It is expected that long term permanent lateral earth pressure cases may be

encountered on this project. Three long term earth pressure cases may be considered for earth retaining structures on this project.

1. Active Case. Active earth pressures (K_A) should be used behind retaining walls which are unrestrained at the top and flexible walls which are allowed to move away from the restrained soil mass (i.e. shoring).

2. "At Rest" Case. "At rest" pressures (K_O) should be used behind fixed walls or shoring walls with bracing struts installed at the top the shoring walls. "At rest" earth pressures will be larger than active earth pressures, but shoring walls will be more stable.

3. Passive Case. Passive earth pressures (K_P) act on the front of shoring walls on the portion installed below the final excavation grade and on the rear of shoring wall acting as backstops for jacking (i.e. against the base of the wall). Horizontal stresses on the wall push against the soil creating a much larger resisting force than is produced by the active or at rest conditions. It is recommended to ignore passive pressure from soil which slopes down away from the wall.

Lateral earth pressures may be computed using the following equation:

$$P = K\,Q + K\,\gamma\,H$$

where: P = lateral earth pressure at depth H below ground level (kPa)
Q = any surcharge loading at the ground surface (kPa)
K = coefficient of lateral earth pressure
γ = total unit weight of backfill compacted to 95 % SPMDD (kN/m^3)
H = depth below ground level

TABLE 4
LATERAL EARTH PRESSURE PARAMETERS

Type of Backfill	Total Unit Weight (kN/m^3)	Coefficient of Lateral Earth Pressure			
		β*= 0°		β*= 15°	
		K_A	K_P	K_A	K_P
Clay fill	18.0	0.44	2.28	0.53	1.87
Gravel Fill	21.0	0.27	3.69	0.31	3.25
Native Till	19.0	0.38	2.66	0.44	2.25

* β is the slope angle of any soil material behind the wall measured from the horizontal

1. This relationship makes no allowance for hydrostatic pressure to build up on the wall, as it is expected that the retaining system will be protected by a sub-drainage system.

2. The earth pressure relationship given above assumes nominal compaction of the backfill to a maximum of 95 percent SPMDD. Only light, hand operated equipment should be used within 1.5 m of walls, and walls should be braced prior to backfilling. The use of

heavy compaction effort adjacent to walls will induce significant stresses on the upper portion of the walls requiring additional structural reinforcement. If heavy equipment is proposed, the earth pressure relationship should be reviewed.

3. The preceding relationship makes no allowance for additional horizontal forces due to frost to build up behind the shoring walls on the assumption that frost protection will be installed, if required. If no frost protection is provided the lateral earth pressures pushing on the wall should be increased by a factor of 2 for the depth of frost.

7.10 SLOPE DEVELOPMENT RECOMMENDATIONS

The slope face around the development area will be subject to periodic wetting from precipitation and potential surface erosion from run off. It is important that the proposed site development does not initiate any detrimental changes to the subsurface conditions and slope geometry. In order to minimize the potential for destabilization that could lead to localized failures, the crest areas and the slope faces should be kept well vegetated. Permanent removal of the existing vegetation from the crest area and the slope face is not recommended and growth of new vegetation on the slope and crest area should be encouraged. Vegetation should only be removed from areas that are required for development. Ongoing monitoring of the surficial conditions of the slope should be carried out. Erosion control measures should be implemented in any areas where erosion is identified.

The following general recommendations are intended as a guide to minimize the impact of the proposed development on the stability of the slope.

1. Site grading carried out should be designed to drain surface water due to rainfall and snowmelt away from the slope, promoting infiltration rather than surficial run off. Where surface run-off toward the slope is required it should be designed as sheet flow, rather than directed to a discharge point such as a swale.

2. All discharge from roof leaders and possible weeping tile systems should be directed away from the top-of-bank. Drainage from roof leaders and/or weeping tile sump discharges should not be allowed to flow uncontrolled over the crest or be allowed to pond on the ground surface near the crest of the slope, causing increased water infiltration into the slope.

3. It is suggested that exposed soils around site should be vegetated soon after site grading and construction is complete. It is suggested that any new vegetation for this site be selected from native species with deep root systems that can grow with a minimum of watering. Leaving graded areas of the site unvegetated for extended periods of time will cause increased infiltration into the slope, resulting in the saturation of the upper soils of the slope.

4. Septic fields and water storage/septic tanks (i.e. cisterns) should not be located at the crest of the slope. If required, water storage/septic tanks should be located at least 10 m from the crest of the slope.

5. Swimming pools and underground sprinkler systems should be avoided at the site due to the possibility of long term undetected leakage which could reduce stability of the slope.

6. Building contractors often make the mistake of pushing excavation soil out onto the slope face in an attempt to establish larger level yard area; often placing the material over existing vegetation and topsoil. This usually results in over loading and steepening of the original slope, resulting in very unstable conditions. Under no circumstances should soil or construction debris be placed on the slope face or at the crest of the slope.

The general recommendations in this section are considered to be "common sense" actions to undertake or avoid in order to minimize potential disturbance to the slope. It is considered prudent to follow these recommendations to maintain a low risk to the property (and thereby to the house). It should be noted, that the possibility that future property owners may undertake activities which are detrimental to the stability of the slope is assumed when assessing the factor of safety of the slope. These general recommendations and guidelines may be subject to site specific modifications based on the review of a qualified geotechnical engineer.

8.0 CLOSURE

This report is based on information at two boreholes location, site reconnaissance and site survey. If different subsoil and groundwater conditions than those described above are encountered, this office must be notified and recommendations submitted herein will be reviewed and revised as required. This report has been prepared for the exclusive use of **Reg Radford**, and their approved agents for the specified application to the residential development within 205 Grand Avenue, Summer Village of Norglenwold, Alberta. It is understood that this report will be submitted to the county as part of a development permit application package. This report has been prepared in accordance with generally accepted soil and geotechnical engineering practices. No other warranty, expressed or implied, is made. The limitations of this report are specified in the General Terms and Conditions section and should be considered part of this report.

We trust this meets with your present needs. If you have any questions or comments regarding this information, please do not hesitate to contact this office.

Respectfully submitted,
PARKLAND GEOTECHNICAL CONSULTING LTD.

PROFESSIONAL ENGINEER ALBERTA
BRYDEN LUTZ
ID 126288
08 June 2021

Bryden Lutz, P.Eng.
Geotechnical Engineer

APEGA Permit to Practice No. P – 7312

8 June 2021

Michael Staple, P.Eng.
Responsible Member

Reviewed by: Christopher Pratt, P.Eng.
Geotechnical Engineer

FIGURES

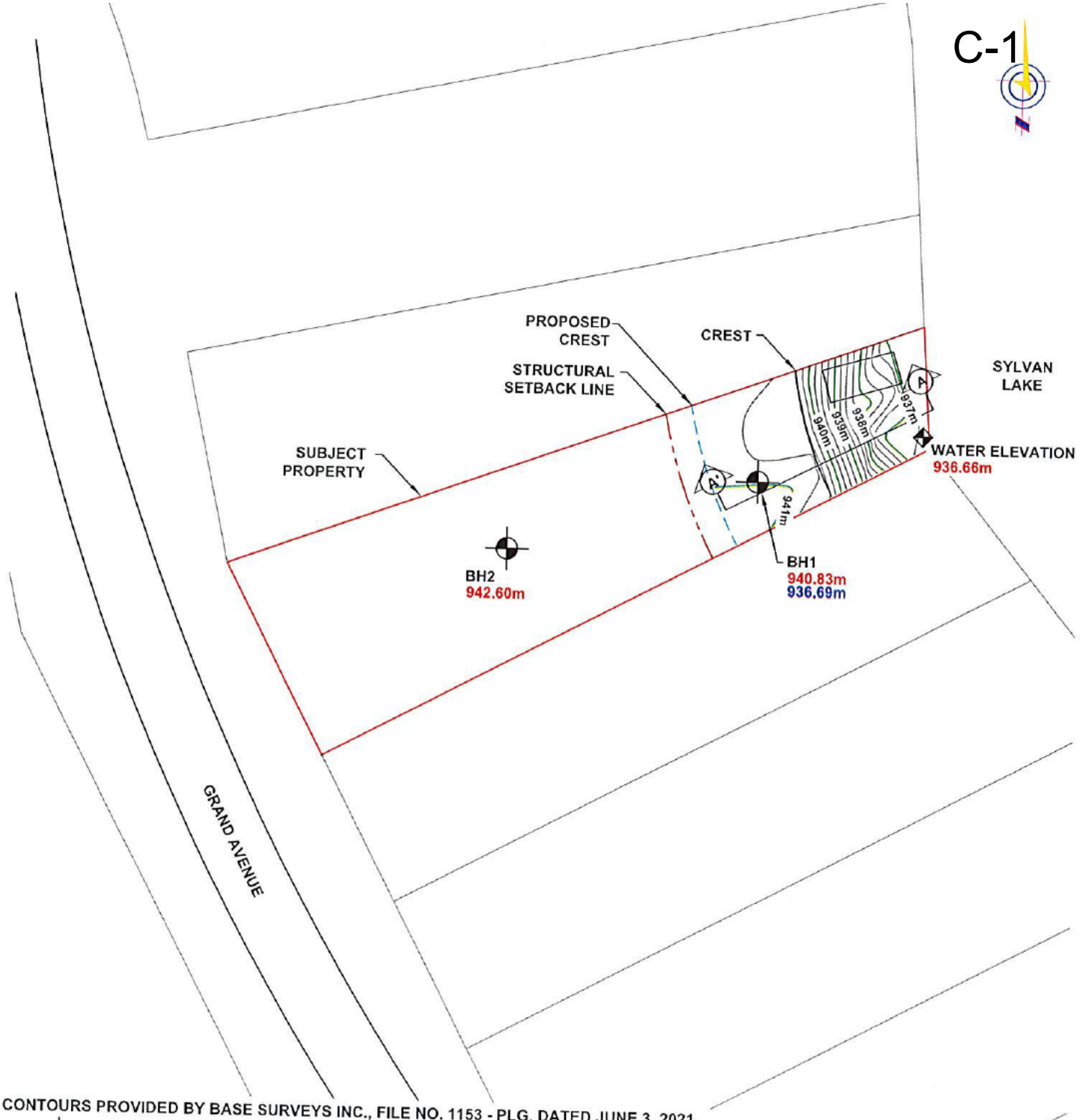
Parkland GEO

CLIENT: [redacted]

KEY PLAN

PROPOSED RESIDENCE SLOPE ASSESSMENT
205 GRAND AVENUE, NORGLENWOLD, ALBERTA

DRAWN:	CHK'D.:	REV #:	DATE:
NC	BL	0	JUNE 2021
SCALE:	JOB NO.		DRAWING NO.
NTS	RD7303-07		FIGURE 1



CONTOURS PROVIDED BY BASE SURVEYS INC., FILE NO. 1153 - PLG, DATED JUNE 3, 2021.

ALL BOREHOLE LOCATIONS ARE APPROXIMATE.

REFERENCE POINT

940.83m SURFACE ELEVATION

936.69m GROUNDWATER ELEVATION (JUNE 7, 2021)

SCALE (metres)

-10 -5 0 5 10 20

Parkland GEO

CLIENT: [redacted]

SITE PLAN

PROPOSED RESIDENCE SLOPE ASSESSMENT
205 GRAND AVENUE, NORGLENWOLD, ALBERTA

DRAWN:	CHK'D.:	REV #:	DATE:
NC	BL	0	JUNE 2021
SCALE:	JOB NO.		DRAWING NO.
1:500	RD7303-07		FIGURE 2

NOTE: AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH, DATED AUGUST 22, 2015.

ALL BOREHOLE LOCATIONS ARE APPROXIMATE.

SCALE (metres)

-10 -5 0 5 10 20

Parkland GEO

CLIENT: [redacted]

AERIAL PLAN

PROPOSED RESIDENCE SLOPE ASSESSMENT
205 GRAND AVENUE, NORGLENWOLD, ALBERTA

DRAWN:	CHK'D.:	REV #:	DATE:
NC	BL	0	JUNE 2021

SCALE:	JOB NO.	DRAWING NO.
1:500	RD7303-07	FIGURE 3

PHOTOGRAPH 1: SHOWS BH1 AND SUBJECT PROPERTY, FACING EAST

PHOTOGRAPH 2: SHOWS SUBJECT PROPERTY, TAKEN FROM GRAND AVENUE, FACING EAST

PHOTOGRAPH 3: SHOWS BOATHOUSE SHED AT TOE OF SLOPE, FACING WEST

PHOTOGRAPH 4: SHOWS TOE OF SLOPE, STAIRWAY AND NEIGHBOUR PROPERTY TO THE SOUTH, FACING WEST

Parkland GEO	CLIENT: [redacted]	**SITE PHOTOGRAPHS** PROPOSED RESIDENCE SLOPE ASSESSMENT 205 GRAND AVENUE, NORGLENWOLD, ALBERTA

DRAWN:	CHK'D.:	REV #:	DATE:
NC	BL	0	JUNE 2021
SCALE:	JOB NO.		DRAWING NO.
NTS	RD7303-07		FIGURE 4

APPENDIX A

Borehole Logs (2)
Explanation of Terms and Symbols
Soil Test Results

Parkland GEO

CLIENT: [redacted]
SITE: 205 Grand Avenue - Norglenwold
NOTES:

BOREHOLE NO.: 01
C-1
PROJECT NO.: RD7303-07
BH LOCATION: Lake Crest

SUBSURFACE PROFILE

Depth (m)	Description	Symbol	Moisture (Wp |-----X-----| Wl) 25 50 75	Type	Sample No	SPT (N)	Comments	Well Completion Details	Elevation (m)
0	GROUND SURFACE								940.80
	Topsoil Black, organic, moist.								940.45
	Till Clay, some sand, little sand, trace gravel, very stiff, low to medium plastic, brown, occasional coal and rust, damp.		16						
1									
					1D1	31			939.10
	Clay (Residual Bedrock) Some sand, medium plastic, very stiff, brown, damp.		16						
2				G	1G1				
			25						
3					1D2	33			937.60
	Weakly Cemented Sand Some silt, fine grained, dense, damp to dry.								
	Weathered Bedrock Siltstone, some silt, hard, brown, dry.		12						936.90
4									
			21						
5	- Grey, very hard at 5.5 m.								
			16						
6					1D3	-	- 25 blows for 50 mm		934.70
	Auger refusal at 6.1 m. Dry upon completion. 25 mm PVC standpipe installed. Backfilled with auger cuttings and bentonite cap. Water at 4.14 m on June 7, 2021.								
7									

Well Completion Details: 25MM PVC PIPE; BACKFILLED WITH AUGER CUTTINGS; SLOTTED PVC PIPE

LOGGED BY: BL
CONTRACTOR: Finco Enviromental Drilling Ltd.
RIG/METHOD: Track Rig/ 150 mm Solid Stem
DATE: May 24, 2021
CALIBRATION:

GROUND ELEVATION: 940.8 m
NORTHING: 5801627.7 m
EASTING: 695616.5 m

PAGE 1 of 1

Parkland GEO

CLIENT: [redacted]
SITE: 205 Grand Avenue - Norglenwold
NOTES:

BOREHOLE NO.: 02 C-1
PROJECT NO.: RD7303-07
BH LOCATION: House Location

SUBSURFACE PROFILE

Depth (m)	Description	Symbol	Moisture (Wp |-----X-----| Wl) 25 50 75	Type	Sample No	SPT (N)	Comments	Well Completion Details	Elevation (m)
0	GROUND SURFACE								942.60
	Topsoil Black, organic, moist.								942.35
	Clay Some silt, little sand, medium plastic, firm, brown, moist.								942.00
1	**Till** Clay, some sand, little sand, trace gravel, very stiff, low to medium plastic, brown, occasional coal and rust, damp.		19						
					2D1	20	SO4 = 0.08%		
2	**Clay (Residual Bedrock)** Some silt, some sand, medium plastic, very stiff, brown, dry to damp.		19						940.70
3			16		2D2	24			
4			23						
	Auger refusal at 4.5 m. Dry upon completion. Backfilled with auger cuttings.								938.10
5									
6									
7									

LOGGED BY: BL
CONTRACTOR: Finco Enviromental Drilling Ltd.
RIG/METHOD: Track Rig/ 150 mm Solid Stem
DATE: May 24, 2021
CALIBRATION:

GROUND ELEVATION: 942.6 m
NORTHING: 5801621.1 m
EASTING: 695593.3 m

PAGE 1 of 1

EXPLANATION OF TERMS AND SYMBOLS

The terms and symbols used on the borehole logs to summarize the results of the field investigation and subsequent laboratory testing are described on the following pages.

The borehole logs are a graphical representation summarizing the soil profile as determined during site specific field investigation. The materials, boundaries, and conditions have been established only at the borehole location at the time of drilling. The soil conditions shown on the borehole logs are not necessarily representative of the subsurface conditions elsewhere across the site. The transitions in soil profile can have gradual rather than distinct boundaries.

1. **PRINCIPAL SOIL TYPE** – The major soil type by weight of material or by behaviour.

Material	Grain Size
Boulders	Larger than 300 mm
Cobbles	75 mm to 300 mm
Coarse Gravel	19 mm to 75 mm
Fine Gravel	5 mm to 19 mm
Coarse Sand	2 mm to 5 mm
Medium Sand	0.425 mm to 2 mm
Fine Sand	0.075 mm to 0.425 mm
Silt	0.020 to 0.075 mm
Clay	Smaller than 0.020 mm

2. **DESCRIPTION OF MINOR SOIL TYPE** – Minor soil types are identified by weight of minor component.

Descriptor	Percent
and	35 to 50
some	20 to 35
little	10 to 20
trace	1 to 10

3. **CONSISTENCY OF FINE GRAINED SOILS** – The following terms are used relative to undrained shear strength and Standard Penetration Test (SPT), N value, for blows per 300 mm penetration (ASTM D1586).

Description	Undrained Shear Strength, C_u (kPa)	SPT N Value
Very Soft	Less than 12	Less than 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 150	15 to 30
Hard	Over 150	Over 30

4. **RELATIVE DENSITY OF COARSE GRAINED SOIL** – The following terms are used relative to Standard Penetration Test (SPT), N value, for blows per 300 mm penetration (ASTM D1586).

Description	SPT N Value
Very Loose	Less than 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	Over 50

5. **TYPICAL SEDIMENTARY BEDROCK TYPES AND CLASSIFICATION** – The following terms are based on visual inspection and field/laboratory identification tests.

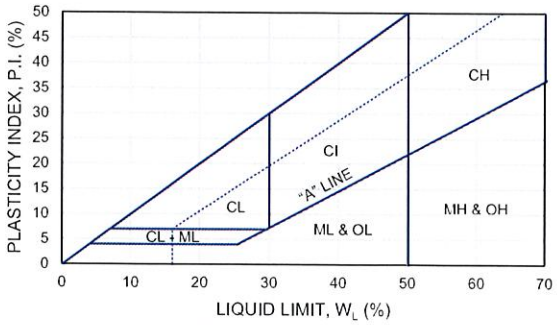
Characteristic	Sandstone	Mudrocks			
		Siltstone	Mudstone	Clayshale	Claystone
Composition	>50% Sand $CaCO_3$ or silica binder. Use weak acid to test for $CaCO_3$.	>50% Silt	33% to 66% Silt & 33% to 66% Clay	>50% Clay & <33% Silt	
Bedding	Banding possible Non- Fissile Wackes – dirty sandstone matrix (>15% clay)	Non-Fissile & Non-laminated	Non-Fissile & Non-laminated	Fissile	Non-Fissile

Definitions

Fissile	Breaks apart on bedding planes, not fractures.
Shale	Only used to describe a fissile clay mudrock.
Slate	Hard mudstone exposed to high pressure and temperature.
Limestone	Sedimentary rock (i.e. particles) formed from calcium carbonate minerals from skeletal fragments of marine organisms such as coral. Particles generally too small to see with eye.

MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS

MAJOR DIVISION			GROUP SYMBOL	GRAPH SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA	
COARSE GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN NO. 200 SIEVE)	GRAVELS MORE THAN HALF COARSE GRAINS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	GW		WELL GRADED GRAVELS, GRAVEL-SAND MIXTURE, LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} \geq 4$ AND $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3	
			GP		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS	
		DIRTY GRAVELS (WITH SOME FINES)	GM		SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW "A" LINE OR P.I. LESS THAN 4
			GC		CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES		ATTERBERG LIMITS ABOVE "A" LINE AND P.I. GREATER THAN 7
	SANDS MORE THAN HALF FINE GRAINS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	SW		WELL GRADED SANDS, GRAVELLY SANDS WITH LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} \geq 6$ AND $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3	
			SP		POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS	
		DIRTY SANDS (WITH SOME FINES)	SM		SILTY SANDS, SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW "A" LINE OR P.I. LESS THAN 4
			SC		CLAYEY SANDS, SAND-CLAY MIXTURES		ATTERBERG LIMITS ABOVE "A" LINE AND P.I. GREATER THAN 7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT PASSES NO. 200 SIEVE)	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	$W_L < 50\%$	ML		INORGANIC SILTS & VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW)	
		$W_L > 50\%$	MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS		
	CLAYS ABOVE "A" LINE NEGLIGIBLE ORGANIC CONTENT	$W_L < 30\%$	CL		INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY SOILS		
		$30\% < W_L < 50\%$	CI		INORGANIC CLAYS OF MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS		
		$W_L > 50\%$	CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
	ORGANIC SILTS & CLAYS BELOW "A" LINE	$W_L < 50\%$	OL		ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW AND MEDIUM PLASTICITY		
		$W_L > 50\%$	OH		ORGANIC CLAYS OF HIGH PLASTICITY, ORGANIC SILTS		
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOR OR ODOR, AND OFTEN FIBROUS TEXTURE	



NOTES ON SOIL CLASSIFICATION AND DESCRIPTION:

1. Soil are classified and described according to their engineering properties and behaviour.
2. Boundary classification for soil with characteristics of two groups are given combined group symbols (e.g. GW-GC is a well graded gravel sand mixture with clay binder between 5 and 12%).
3. Soil classification is in accordance with the Unified Soil Classification System (ASTM D2487) with the exception that an inorganic clay of medium plasticity (CI) is recognized.
4. The use of modifying adjectives may be employed to define the estimated percentage range of minor components.

Parkland GEO

WATER-SOLUBLE SULPHATE IN SOIL

PROJECT: 205 Grand Avenue, Norglenwold

PROJECT#: RD7303-07

CLIENT: [redacted]

SAMPLE DATE: June 2, 2021

TEST DATE: June 7, 2021

Sample #:	2D1	Sample #:	
Borehole:	2	Borehole:	
Depth:	1.5m	Depth:	
Result:	0.080%	Result:	
Sample #:		Sample #:	
Borehole:		Borehole:	
Depth:		Depth:	
Result:		Result:	
Sample #:		Sample #:	
Borehole:		Borehole:	
Depth:		Depth:	
Result:		Result:	
Sample #:		Sample #:	
Borehole:		Borehole:	
Depth:		Depth:	
Result:		Result:	
Sample #:		Sample #:	
Borehole:		Borehole:	
Depth:		Depth:	
Result:		Result:	
Sample #:		Sample #:	
Borehole:		Borehole:	
Depth:		Depth:	
Result:		Result:	

Comments: Range of 0.08 to 0.08 percent. Sulphate Exposure Classification Negligible

REQUIREMENTS FOR CONCRETE SUBJECTED TO SULPHATE ATTACK (CAN/CSA-A23.1-14)

EXPOSURE CLASSIFICATION	DEGREE OF EXPOSURE	WATER-SOLUBLE SULFATE (SO_4) IN SOIL SAMPLE, %	SULFATE (SO_4) IN GROUNDWATER SAMPLES, mg/L	MINIMUM SPECIFIED 56-DAY COMPRESSIVE STRENGTH, MPa	MAXIMUM WATER-CEMENTING MATERIAL RATIO	PORTLAND CEMENT TO BE USED
S-1	Very Severe	over 2.0	over 10,000	35	0.40	HS
S-2	Severe	0.20 to 2.0	1,500 to 10,000	32	0.45	HS
S-3	Moderate	0.1 to 0.2	150 to 1,500	30	0.50	MS or HS

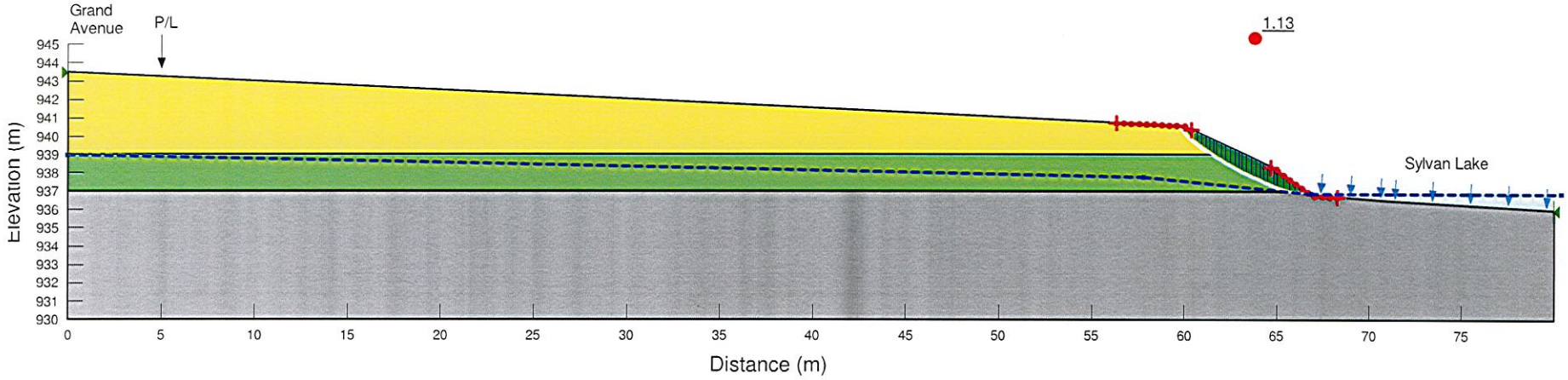
TECH: AB

CHECKED: BL

APPENDIX B

Slope Stability Models (B1 to B2)

Color	Name	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Piezomet Line
	Residual Bedrock	20	2	22	1
	Till	19	0	27	1
	Weathered Bedrock	21	10	25	1



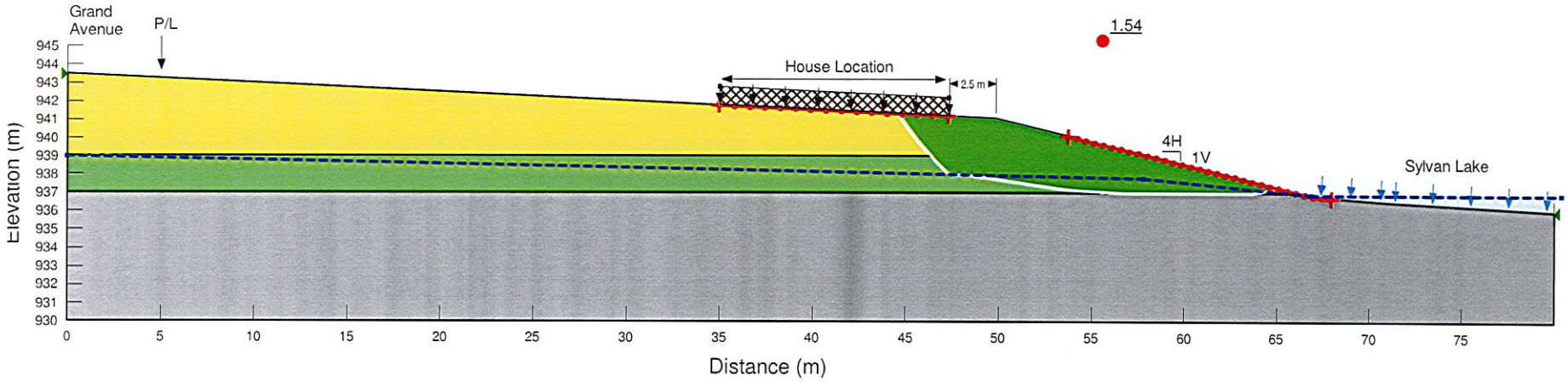
ParklandGEO

Global Stability - Existing Slope

DATE: 06/08/2021

JOB NO.: RD7303-07 205 Grand Ave | B1

Color	Name	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Piezomet Line
	Residual Bedrock	20	2	22	1
	Till	19	0	27	1
	Weathered Bedrock	21	10	25	1



ParklandGEO	House Setback - Proposed Cut Slope	
	DATE: 06/08/2021	
JOB NO.: RD7303-07 205 Grand Ave		B2

LIMITATIONS

General Terms and Conditions

The use of this attached report is subject to the following general terms and conditions.

1. STANDARD OF CARE - In the performance of professional services, ParklandGEO used the degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same or similar localities. No other warranty expressed or implied is made in any manner.

2. INTERPRETATION OF THE REPORT - The CLIENT recognizes that subsurface conditions will vary from those encountered at the location where borings, surveys, or explorations are made and that the data, interpretations and recommendation of ParklandGEO are based solely on the information available to him. Classification and identification of soils, rocks, geological units, contaminated materials and contaminant quantities will be based on commonly accepted practices in geotechnical or environmental consulting practice in this area. ParklandGEO will not be responsible for the interpretation by others of the information developed.

3. SITE INFORMATION - The CLIENT has agreed to provide all information with respect to the past, present and proposed conditions and use of the Site, whether specifically requested or not. The CLIENT acknowledged that in order for ParklandGEO to properly advise and assist the CLIENT, ParklandGEO has relied on full disclosure by the CLIENT of all matters pertinent to the Site investigation.

4. COMPLETE REPORT - The Report is of a summary nature and is not intended to stand alone without reference to the instructions given to ParklandGEO by the CLIENT, communications between ParklandGEO and the CLIENT, and to any other reports, writings or documents prepared by ParklandGEO for the CLIENT relative to the specific Site, all of which constitute the Report. The word "Report" shall refer to any and all of the documents referred to herein. In order to properly understand the suggestions, recommendations and opinions expressed by ParklandGEO, reference must be made to the whole of the Report. ParklandGEO cannot be responsible for use of any part or portions of the report without reference to the whole report. The CLIENT has agreed that "This report has been prepared for the exclusive use of the named CLIENT. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. ParklandGEO accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report."

   The CLIENT has agreed that in the event that any such report is released to a third party, the above disclaimer shall not be obliterated or altered in any manner. The CLIENT further agrees that all such reports shall be used solely for the purposes of the CLIENT and shall not be released or used by others without the prior written permission of ParklandGEO.

5. LIMITATIONS ON SCOPE OF INVESTIGATION AND WARRANTY DISCLAIMER
   There is no warranty, expressed or implied, by ParklandGEO that:
   a) the investigation uncovered all potential geo-hazards, contaminants or environmental liabilities on the Site; or
   b) the Site is entirely free of all geo-hazards or contaminants as a result of any investigation or cleanup work undertaken on the Site, since it is not possible, even with exhaustive sampling, testing and analysis, to document all potential geo-hazards or contaminants on the Site.

   The CLIENT acknowledged that:
   a) the investigation findings are based solely on the information generated as a result of the specific scope of the investigation authorized by the CLIENT;
   b) unless specifically stated in the agreed Scope of Work, the investigation will not, nor is it intended to assess or detect potential contaminants or environmental liabilities on the Site;
   c) any assessment regarding geological conditions on the Site is based on the interpretation of conditions determined at specific sampling locations and depths and that conditions may vary between sampling locations, hence there can be no assurance that undetected geological conditions, including soils or groundwater are not located on the Site;
   d) any assessment is also dependent on and limited by the accuracy of the analytical data generated by the sample analyses;
   e) any assessment is also limited by the scientific possibility of determining the presence of unsuitable geological conditions for which scientific analyses have been conducted; and
   f) the laboratory testing program and analytical parameters selected are limited to those outlined in the CLIENT's authorized scope of investigation; and
   g) there are risks associated with the discovery of hazardous materials in and upon the lands and premises which may inadvertently discovered as part of the investigation. The CLIENT acknowledges that it may have a responsibility in law to inform the owner of any affected property of the existence or suspected existence of hazardous materials and in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed. The CLIENT further acknowledges that any such discovery may result in the fair market value of the lands and premises and of any other lands and premises adjacent thereto to be adversely affected in a material respect.

6. COST ESTIMATES - Estimates of remediation or construction costs can only be based on the specific information generated and the technical limitations of the investigation authorized by the CLIENT. Accordingly, estimated costs for construction or remediation are based on the known site conditions, which can vary as new information is discovered during construction. As some construction activities are an iterative exercise, ParklandGEO shall therefore not be liable for the accuracy of any estimates of remediation or construction costs provided.

7. LIMITATION OF LIABILITY - The CLIENT has agreed that to the fullest extent permitted by the law ParklandGEO's total liability to CLIENT for any and all injuries, claims, losses, expenses or damages whatsoever arising out of or in anyway relating to the Project is contractually limited, as outlined in ParklandGEO's standard Consulting Services Agreement. Further, the CLIENT has agreed that to the fullest extent permitted by law ParklandGEO is not liable to the CLIENT for any special, indirect or consequential damages whatsoever, regardless of cause.

8. INDEMNIFICATION - To the fullest extent permitted by law, the CLIENT has agreed to defend, indemnify and hold ParklandGEO, its directors, officers, employees, agents and subcontractors, harmless from and against any and all claims, defence costs, including legal fees on a full indemnity basis, damages, and other liabilities arising out of or in any way related to ParklandGEO's work, reports or recommendations.

MAY 18 2021

MAY 18 2021

MAY 18 2021

MAY 18 2021

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MAY 18 2021

Development Officer Kasuba and Norglenwold MPC:

Please find below our adjustments or comments to Development Officer Kashuba comments in an email dated June 8, 2021:

- Looking at the plan for the escarpment area and along with our statutory documents generally we wouldn't want to see both a meandering path and stairs. The idea of having a meandering path is to keep the area as natural as possible with a natural like meandering path, the additional stairs wouldn't be seen as necessary when there is both.
  The stairwell will be for access to the boat house and a safe access with a handrail for elderly users. The meandering path follows the recommendation of the geo-tech report that we keep the slope at 1:4 while maintaining bank stabilization vegetation. As there isn't a clear and safe access point to the lake from the top of the escarpment at this time, we designed a meandering path down as the primary access to the lake. The stairs that are already there would be refurbished and provide access to the boat house and for the physically compromised users to the water

- The seating area in the escarpment would not be considered a natural area, the escarpment is to remain natural as much as possible. I am thinking that area would be maintained?
  If you consider the proposed very small size of the seating area which is already there; it gives a small flat safe access point for all users (children, adults and seniors) to access the gabions and then the water w/o compromising the natural area.. As the family has young grandchildren, the sitting area is also designed to be an area for adults to sit and supervise the children when they are in the lake. As you can see, the proposed fireplace area is at the top of the bank and therefore the seating area at the water is primarily for safety and parental supervision.
- I see there is sand in the plans, we like to see at least a 1m no mow zone adjacent to the lake as man-made beaches/sand can easily erode.
  This will now be a natural area, no sand. The area surrounding the seating area as well as the embankment will be planted with native plant material once the embankment is reshaped. The native plantings will help stabilize the bank and prevent erosion. Remember this area is behind the gabions, which are 1 metre high and 1 meter wide.

- It is clear that the intent is to fully remove this boathouse and put it back, I would not call this repairs. I understand that you want to do work to the bank and want to keep the boathouse but I would not classify it as routine maintenance which is something that could be allowed depending on the type of maintenance and how much. If a non-conforming building (boathouse) is damaged or destroyed to the extent of more than 75% of the value of the building above its foundation, the building may not be repaired or rebuilt except in accordance with the land use bylaw, again, these repairs would be considered very significant especially since the boathouse would have to be removed. As boathouses aren't allowed to be newly constructed generally if it has to be completely removed, we wouldn't recommend for MPC to approve it to go back.

Removing the walls

For the tree removal plan part of things, my understanding is that you will be applying for a dwelling as well. I also understand it would make sense to have those trees removed at the same time while other work is getting done and don't have the re-planting plans yet but I do think the Municipal Planning Commission would want to see some sort of re-planting plan, if you are able to provide something showing even where you plan to have the house and where you plan to replace trees/shrubs for the new building plans that will come in. Just so they have an idea and understand your intent to replace them.

- The attached plot plan is the first draft which shows proposed landscaping with the minimum trees and shrub beds. It is our desire to keep as much of the natural trees we can and not remove but sometimes once you get into a deeper inspection, age, disease and individual tree damages can change these plans.
- As I have explained on our site visit , since this is a very narrow lot, we only have one opportunity to get the repairs done right and to last for a very long time. The trees are past their prime and many are damaged, and a big infestation of Caragana has over run the bank area. The large trees are also dangerous to our neighbors on both sides.
- Further the bank has collapsed behind the boathouse and creates a very dangerous place for children with a slot about 10 inches wide and 3 to 4 feet deep. The front of the boathouse has been undermined by the waves and needs to be shored up with Gabions to stop the erosion of dirt and wood into the lake. If you look at the pictures included you will also see that it would be difficult to properly grade and reinforce the bank with the boathouse in place. I can and will do it that way if you insist as we are committed to making this a safe place to the betterment of the lake and this community. For that reason, I have requested to lift the major parts, walls , floor of the boathouse to the upper bank and then repair and replace it once the bank work is completed. There is less than 20 % damage to the boathouse and your guidelines state 75% damaged above the foundation so it is well within your guidelines.

After reviewing this application as it stands, it does not appear that the bank revitalization (escarpment work) and boat house repairs are necessary and needed. (Maybe the geotechnical report will tell me otherwise) My comments above don't mean that the application has to change, this is just my opinion based on what is in our statutory documents and if you choose to keep what you have applied for to MPC that is fine, it is my position to review the documents and give a recommendation to MPC based on what was submitted and what is stated in our documents.

We feel that we have stated supporting evidence as well have adjusted some areas to accommodate a reasonable, safe and accessible approval for this development.

Respectfully submitted,

[redacted]