PROJECT: **GEOTECHNICAL INVESTIGATION FOR WASTE TRANSFER STATION**

PREPARED FOR: **PHEASANT RUMP NAKOTA NATION**

PINTER & ASSOCIATES LTD

PINTER & ASSOCIATES LTD

06 August 2021 File: 2782

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Pheasant Rump Nakota Nation
P.O. Box 238
Kisbey, SK
S0C 1L0

Dear Chief and Council:

Subject: Geotechnical Investigation for Waste Transfer Station at Pheasant Rump Nakota Nation

Attached is a copy of our Geotechnical Investigation report including foundation design recommendations for the proposed new Waste Transfer Station (WTS) at Pheasant Rump Nakota Nation, near Kisbey, SK.

If you have any questions or concerns regarding our findings, please do not hesitate to contact the undersigned at: (306)-244-1710.

Yours Sincerely,
PINTER & Associates Ltd.

Rémi Valois, P.Eng.
Project Manager

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GEOTECHNICAL INVESTIGATION

FOR PRNN WASTE TRANSFER STATION

Prepared For:
Pheasant Rump Nakota Nation

Prepared By:
PINTER & ASSOCIATES LTD.

08 August 2021
File: 2782

Distribution:

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1.0 INTRODUCTION

Pheasant Rump Nakota Nation (PRNN, the Client) retained PINTER & Associates Ltd. (PINTER) to complete a geotechnical investigation at the location of a proposed new Waste Transfer Station to be located approximately 2 km north of the band office on grid road 605. The building is to be located at the coordinates 49.667302°N, 102.682698°W (the Site). The location of the Site is presented in Figure 1, Appendix A.

The goal of the investigation is to provide foundation design recommendations for the proposed structure(s). To achieve this goal, it is necessary to understand the surface topography and local soil and groundwater conditions.

Two boreholes were advanced to collect information about deep ground conditions beneath the approximate footprint of the proposed building and other structures within the transfer station. Borehole locations are presented in Figure 2, Appendix A.

Appendix B presents a Glossary of Terms and Abbreviations to aid in the reading of this report.

1.1. SCOPE OF WORK

The scope of work, as outlined in the PINTER proposal dated 27 Aug 2019, includes the following:

Field Work

PINTER will provide equipment, materials, and labor to carry out the following tasks:

- advance two (2) boreholes to a maximum depth of 12 m below ground surface (bgs), for logging of soil conditions and collection of samples;
- perform Standard Penetration Tests (SPTs) every 3.0 m for determination of various geotechnical soil properties;
- collect grab soil samples every 0.75 m, and at changes in geology, for potential laboratory analysis;
- visually log all soils encountered using field visual and textural methods;
- assess strength of cohesive soils (if present) using a pocket penetrometer, according to industry standards;

- groundwater conditions will be observed during drilling and measured immediately prior to backfilling the holes.

Laboratory Analysis

Laboratory analysis will be carried out on selected soil samples collected from the drilling program and will be analyzed as follows:

- Moisture content on all samples;
- up to a maximum of two (2) grain size distribution curves;
- up to a maximum of three (3) Atterberg limits analyses;
- up to a maximum of one (1) water soluble-sulfate analysis; and,
- other laboratory testing if deemed necessary (at an extra cost, to be discussed with client before proceeding).

Report

We will provide a geotechnical report describing the results of the field and laboratory testing, together with comments related to geotechnical aspects of foundation design and construction. The report will include the following:

- a site plan, including borehole locations;
- site surface and subsurface descriptions, including detailed borehole logs;
- complete laboratory testing results, including our summary and interpretation;
- design parameters and recommendations for shallow foundations (if appropriate);
- design parameters and recommendations for deep foundations (if required);
- estimates of the expected total settlement for the chosen foundation type;
- other specific geotechnical considerations such as settlement, frost protection, swelling and shrinking properties of subsoil, etc., if appropriate.

2.0 METHODOLOGY

The geotechnical drilling investigation was carried out under the direction of PINTER personnel on 09 June 2021.

2.1. SITE SPECIFIC HEALTH AND SAFETY

2.1.1. Tailgate Meeting

A Site-Specific Health and Safety assessment was carried out prior to activities on site. This Health and Safety assessment identified any on-site hazards along with any requirements in terms of project health and safety. In order to ensure that all personnel on site remained safe, the programs discussed were enforced and followed.

2.1.2. Utility Locates

Saskatchewan 1st Call was contacted to request a standard underground utility locate in the work area. The site was searched for all utilities including SaskTel, SaskPower, SaskEnergy, and Cresent Point Energy. The locations of the boreholes were selected to maintain a safe distance from underground utilities, while staying within the proposed work area.

2.2. BOREHOLE ADVANCEMENT

Two (2) borehole locations were selected as shown in Figure 2, Appendix A (BH21-1 and BH21-2). Both boreholes were in the approximate vicinity of the footprint of the proposed building. Visual logging, physical sampling, and field testing of soil strength were carried out at each borehole location. Borehole logs are presented in Appendix C.

Mobile Augers and Research Ltd. (Mobile) provided the necessary personnel, equipment and materials required to advance the geotechnical boreholes to the predetermined depths. BH21-1 and BH21-2 were both completed using solid-stem auger drilling.

BH21-1 was advanced to a depth of 12.0 m below ground surface (bgs), and BH21-2 was advanced to a depth of 9.0 m bgs. Standard Penetration Tests (SPTs) were carried out at 3.0 m intervals.

Undisturbed Shelby tube soil samples were not collected due to the non-cohesive nature of the soils on site. Grab soil samples were taken every 0.75 m, and at changes in stratigraphy, and SPT samples were obtained at regular intervals in laboratory grade polyethylene soil bags.

Borehole locations were recorded using GPS survey equipment accurate to approximately ± .04 m at the time of recording.

2.3. FIELD AND LABORATORY TESTS

2.3.1. Field Tests

Field testing of soil samples consisted of Standard Penetration Tests (SPTs). The results of the SPTs are recorded in the borehole logs in Appendix C.

Standard Penetration Test (SPT)

The Standard Penetration Test (SPT) is carried out by driving a sampler into the soil with a known mass falling from a known height. A variety of geotechnical parameters can be correlated to the SPT-N value, which is the number of blows required to drive the sampler 300 mm into the ground, following an initial penetration of 150 mm. SPT tests are terminated prematurely if at least 150 mm of penetration is not achieved after 50 consecutive blows.

2.3.2. Laboratory Tests

Water content analyses were performed on all samples submitted for laboratory testing. Two (2) grain size distributions, and one (1) water-soluble sulfate analysis were performed on selected samples. All the laboratory results are included on the borehole logs in Appendix C. Complete copies of the laboratory analysis reports are also provided in Appendix D.

Water Content

Water content analysis is carried out by comparing the mass of a sample before and after it is dried in an oven. Water content analyses were performed at all depths within the retrieved soil samples and are used to confirm the water content and physical state of soils.

Grain Size Analysis

Grain size analysis was carried out on soil samples retrieved from select depths within the boreholes. Determination of the distribution of coarse-grained particles (sands and gravels) is performed by separating the soil grain-size fractions by dry mechanical sieving through a series of sieves with progressively smaller openings. Distribution of fine-grained particles (clays and silts) is determined by a pipette method which takes advantage of the predictable relationship between particle size and the settling velocity in a fluid. The results of both methods are combined to determine the relative amounts of gravels, sands, silts, and clays in the soil, and to confirm soil classification.

Water-Soluble Sulfate

Sulfate in soil has a deleterious effect on concrete. The water-soluble sulfate analysis measures the amount of water-soluble sulfate in soil and is used to determine what grade, if any, of sulfate resistant cement should be used for concrete in direct contact with the soil.

ALS Canada Limited of Saskatoon, SK provided all laboratory analyses for the soil at this site.

2.4. GROUNDWATER

Seepage and sloughing soils were not encountered during drilling at this site. Upon completion of drilling, both holes remained open and dry.

3.0 RESULTS

3.1. SITE SETTING

The Site is located on the mid to bottom slope of a hill, approximately 2 km north of the Pheasant Rump Band office, off Grid Road 605. The Site is surrounded by grassland/pastureland on all sides. The atmospheric temperature at the time of the investigation was approximately 25°C, with clear skies and little wind.

Selected Site photographs are presented in Appendix E**.**

3.2. REGIONAL GEOLOGY

Soils at the Site consist of glacial lacustrine deposits of silty sand. Surficial soils up to approximately 20 m bgs are likely part of the Saskatoon Group. Underlying this is up to approximately 30 m bgs are soils of the Sutherland Group and/or Ravenscrag Formation. Beneath that lie approximately 25 m of soils from the Eastend and Frenchman Formations. Finally, the Pierre Shale is encountered at a depth of approximately 45 to 75 m bgs.

3.3. STRATIGRAPHY

The soils at this site consisted of a 0.10 m layer of organic topsoil at surface. Fine-grained silty sand continued to the end of drilling in both test holes to depths of at least 12.0 m bgs.

3.4. FIELD RESULTS

3.4.1. Standard Penetration Tests (SPT)

The standard penetration test (SPT) is an in-situ dynamic penetration test designed to provide the penetration resistance (N-value) along the depth at a given site. SPT results are presented in the borehole logs provided in Appendix C. SPT-N values ranged from 11 to 35.

3.4.2. Groundwater

Groundwater was not encountered during drilling at this site.

3.5. LABORATORY RESULTS

Table 2 summarizes the grain-size laboratory results. Grain size distributions on the samples tested resulted in the samples being classified a fine-grained silty sand (SM) according to the Unified Soil Classification System (USCS). These results indicate that the soils will likely not experience significant shrinking and swelling with changes in water content, but they are likely susceptible to frost heaving.

Table 1: Grain Size Distribution Results

Sample ID	Water Content (%)	USCS Particle Sizes			USCS Classification
		Fines (%)	Sand (%)	Gravel (%)	
21-1	6.07	23.4	76.6	<1.0	SM
21-2	2.27	6.1	93.9	<1.0	SP

USCS: Unified Soil Classification System

SM: Silty Sand

SP: Poorly-Graded Sand

A single sample (21-1@5.25m) was submitted for analysis of water-soluble sulfate. The results were below the detection limit of 0.050% by mass, indicating very little to no sulfate in the soil.

4.0 SUITABLE FOUNDATION TYPES AND PARAMETERS

The Canadian Foundation Engineering Manual (CFEM) recommends that the limit states design methodology be used for design of structural foundations. The limit states design methodology uses factored parameters to determine allowable design loads and resistances. The recommended geotechnical resistance factor (Φ) for deep foundations designed using semi-empirical analysis based on laboratory and in situ test data is 0.4 for bearing resistance, and 0.3 for uplift resistance.

This report presents the allowable geotechnical design parameters after these factors have been applied. Bearing capacity values recommended in this section are for typical foundation systems at the specified depths, which may change according to design specific purposes. They have been estimated based on the field and lab testing results, as well as conservative estimates of soil properties for a silty sand to sandy silt soil. Actual bearing capacities will vary slightly based on the geometries and depths of the designed foundations.

4.1. DEEP FOUNDATIONS

Deep foundations are the recommended foundation type for this location and structure. This is due to the high silt content in the native soils. Silty soils do not generally provide a great bearing capacity for shallow foundations and are highly susceptible to frost heave. Helical piles are the recommended foundation systems for the local conditions. Cast-in-place concrete piles may also be feasible.

4.1.1. Pile Bearing Capacity – Screw Piles

The total capacity of a helical pile is evaluated as the sum of the capacities of each individual helical plate. For a single helical plate at 10 m bgs, the factored geotechnical bearing resistance is 1,500 kPa. Skin friction along the shaft of screw piles is not generally taken into account unless the shaft diameter is greater than 100 mm.

4.1.2. Load Capacity in Relationship to Installation Torque – Screw Piles

A screw pile's ultimate load capacity may be estimated by monitoring the torque required to install the pile. Recording of installation torque should always be done

when installing screw piles as a quality control step to ensure that piles have reached their expected capacity. The required torque to ensure the expected capacity has been reached is dependent on soil conditions, and screw pile design including plate and shaft diameter. Once a screw pile design has been selected, PINTER should be contacted to review the design and specify a required torque during construction.

4.1.3. Pile End Bearing Capacity Recommendations – Cast-in-Place

The sand and silt at the Site have the potential to develop considerable capacity in both end-bearing and skin-friction. It is recommended that piles be installed to a depth of at least 10 m bgs, with the base set in dense sand. The factored geotechnical end-bearing resistance at this depth is 1600 kPa.

Table 2: Maximum Allowable Shaft Resistance for Cast-In-Place Concrete Pile Design

Depth Range (m bgs)	Vertical Downward Shaft Resistance (kPa)	Vertical Uplift Shaft Resistance (kPa)
0 - 2	0	0
2 - 4	9	7
4 - 6	20	15
6 - 8	30	23
8 - 10	40	30

4.1.4. General Pile Recommendations

The following minimum recommendations are presented for pile design and construction:

1. Centre-to-centre spacing of the piles must be a minimum of 3.0 pile diameters (3.0 helical plate diameters, in the case of screw piles).
2. If centre-to-centre spacing of less than 6.0 pile diameters is used, pile group effects will alter the overall bearing capacity of the individual piles. PINTER should be contacted in this case to review final foundation design.

4.2. SETTLEMENT

There are three components that contribute to the total settlement of a single pile: elastic deformation of the pile, settlement due to the shaft load, and settlement due to the toe

load. Taking all of these into account, the total predicted settlement for a pile at 10 m depth is 25 mm, assuming an applied load of 650 kN on the pile.

4.3. GENERAL SHALLOW FOUNDATION RECOMMENDATIONS

i. Materials directly beneath the shallow foundation footings should be excavated and replaced with a free draining granular material to a thickness of at least 1 m. The free draining material should be compacted to a minimum 100% of standard proctor density at optimum moisture content (SPDD).

ii. Provide 100 mm minimum diameter continuous weeping tile encased in a non-woven geotextile installed around the perimeter of the foundation base. A minimum of 300 mm free draining aggregate cover should be provided above the weeping tile.

   a. Free draining granular material should be placed a minimum of 1.5 m above the weeping tile aggregate, or half way up the foundation wall, whichever is greater. The granular material should be free draining. Allowance should be made for settlement of the fill.

   b. Free draining granular shall contain less than 5% material finer than 0.075 mm.

iii. Where deleterious materials such as soft/wet soils, organics, frozen material, rocks, etc. are encountered, these materials should be removed and replaced with gravel fill compacted to a minimum 100% SPDD, or lean concrete with a compressive strength of at least 2 MPa.

iv. Excessive wetting, drying, or freezing of exposed soils at the footing elevation during construction should be avoided. If exposed soils do become excessively wetted, dried, or frozen, they should be removed and replaced with compacted granular fill, or lean concrete.

v. Provide a polyethylene vapor barrier between the granular base and the reinforced concrete floor slab.

vi. Shallow foundations slabs should be reinforced to minimize effects of seasonal movements, and non-uniform bearing surfaces.

vii. Isolate the slab from grade beams, walls, columns by means of separation joints.

viii. Exterior below grade insulation should be installed to prevent freezing of the soil beneath the building footprint. A minimum temperature level should also be maintained within the proposed structures during the winter months.

ix. Backfilling against foundations should not be attempted until the concrete has cured enough to provide sufficient strength to resist the loads caused by lateral earth pressure and compaction.

x. No organic, frozen, or other deleterious materials should be used in the backfill. Any soil clumps should be broken up.

xi. Backfill around foundations should be placed in 150 mm lifts and compacted to at least 100% SPDD

xii. Positive drainage should be provided with a slope of at least 1% to shed water away from structures and prevent pooling against foundations.

4.4. SPECIFIC SHALLOW FOUNDATION RECOMMENDATIONS

Due to the generally poor quality of the native soils and their susceptibility to frost heave, shallow foundations are not recommended for this location.

4.5. FROST HEAVE

Frost heave can occur when the pore water within soil freezes and expands. Even when there is little water within the soil, a combination of capillary action and thermal gradients can draw water up from below to create solid ice lenses. Silty soils are the most susceptible to this kind of frost heave action, so the soils at this Site may be at risk. Frost heave can be avoided if the soils beneath the foundation can be prevented from freezing. This can be done by providing exterior below grade insulation and maintaining a minimum temperature level within the proposed structure during the winter months. Maintaining positive drainage away from the foundation will also serve to reduce potential frost heave by limiting the available water.

5.0 SITE PREPARATION

5.1. GRADING AND DRAINAGE

Proper grading and positive drainage are paramount for a long-term performance of the structural design. Maintaining a positive grade draining away from the structure and avoiding standing water after development is critical. A minimum slope of 0.5% away from the structure is recommended. Better performance is generally achieved with minimum slopes of at least 1% away from structures as some post-construction settlement is likely to occur.

5.2. FILL SELECTION AND PLACEMENT

The silty material at the site is likely susceptible to frost heave. For this reason, a well-draining granular material should be used below the structure's foundation. The thickness of the granular material will vary depending upon the weight and load distribution of the structure resting on the soil. Shallow foundations will require more granular material than deep foundations. A minimum granular support of between 0.3 and 0.5 m thick, placed at a Standard Proctor Density of 100% is recommended.

6.0 FOUNDATION CONCRETE RECOMMENDATIONS

PINTER has provided general concrete design recommendations below. Specific concrete foundation design recommendations should be made by a qualified structural engineer as it is outside the geotechnical engineering scope of work.

1. All concrete and concrete materials should be supplied, tested, and installed according to CSA 23.1.

2. The base below the concrete must be free from deleterious material including cuttings from excavations, organics, frozen material, and rocks.

3. Concrete slabs should be underlain by free draining material. The top layer of material between the base of the concrete and the granular material should consist of a 50 mm uniform sand layer to allow for even load distribution of the structure.

4. Based on the results of the water-soluble sulfate analysis, it is not essential that sulfate resistant cement be used at this location. However, PINTER recommends the use of sulfate resistant cement with all concrete in contact with soil as a precautionary measure.

5. Concrete slabs should be designed with 2 mats of rebar, the bottom mat for compression from loadings and the top mat from tension due to potential frost action.

7.0 CONSTRUCTION AND INSPECTION

The design recommendations within this report are based on the assumption that an appropriate level of inspection will be provided during construction and that qualified and experienced contractors will carry out construction.

PINTER should be retained for design review and engaged for inspection (and materials testing as required) during foundation installation.

A appropriate level of inspection is full time inspection. This is to confirm that site conditions encountered are consistent with subsurface interpretations, the assumptions used to develop design recommendations, and the findings of this investigation. This will help to assure that cost effective solutions are developed for any construction problems that may arise.

PINTER requests the opportunity to review drawings and specifications related to any foundations, earthworks or other designs based on the recommendations provided in this report.

8.0 LIMITATIONS

This report has been prepared for the exclusive use of *Pheasant Rump Nakota First Nation.* Any use of this report by a third party, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. PINTER & Associates Ltd. 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 findings and recommendations provided in this report were prepared in accordance with generally accepted professional engineering principles and practices. No other warranty, express or implied is made.

The results, findings and recommendations of this report are based on the results of field observations and laboratory analysis. Interpolation of soil and groundwater conditions has been made between borehole locations. Actual conditions may vary between boreholes or at depths not attained from those interpreted by PINTER. If conditions are encountered that differ from those detailed by the boreholes drilled onsite and described in this report, or if the assumptions stated in this report are not in keeping with the design, PINTER should be notified to review and adjust the recommendations, if necessary.

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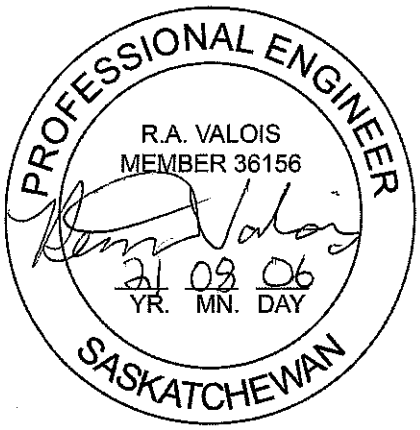
Where construction is undertaken based upon the recommendations of this report, PINTER should be notified and provided the opportunity to review designs or onsite inspection. Where PINTER is not afforded the opportunity for revision and/or inspection, PINTER makes no warranty regarding the interpretation of this report and the recommendations contained herein.

PINTER & Associates Ltd.



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Geotechnical Engineer

Association of Professional Engineers & Geoscientists of Saskatchewan

CERTIFICATE OF AUTHORIZATION
PINTER & Associates Ltd.

Number C1232

Permission to Consult held by:

Discipline	Sk. Reg. No.	Signature
Municipal	6565	
Environmental	6565	
Geotechnical	6565	

Date: 06 August 2021

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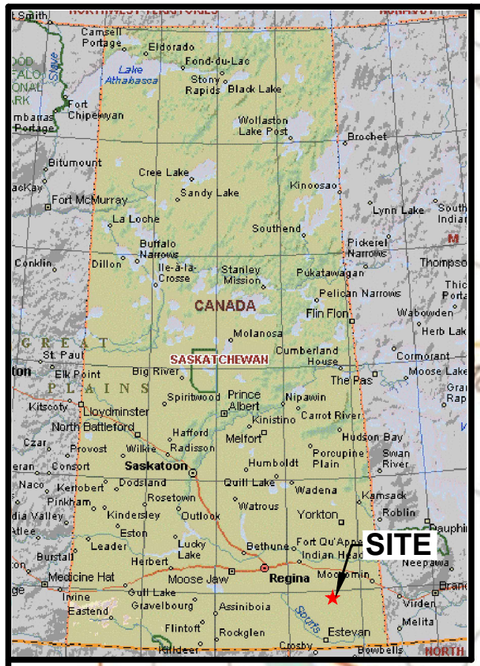
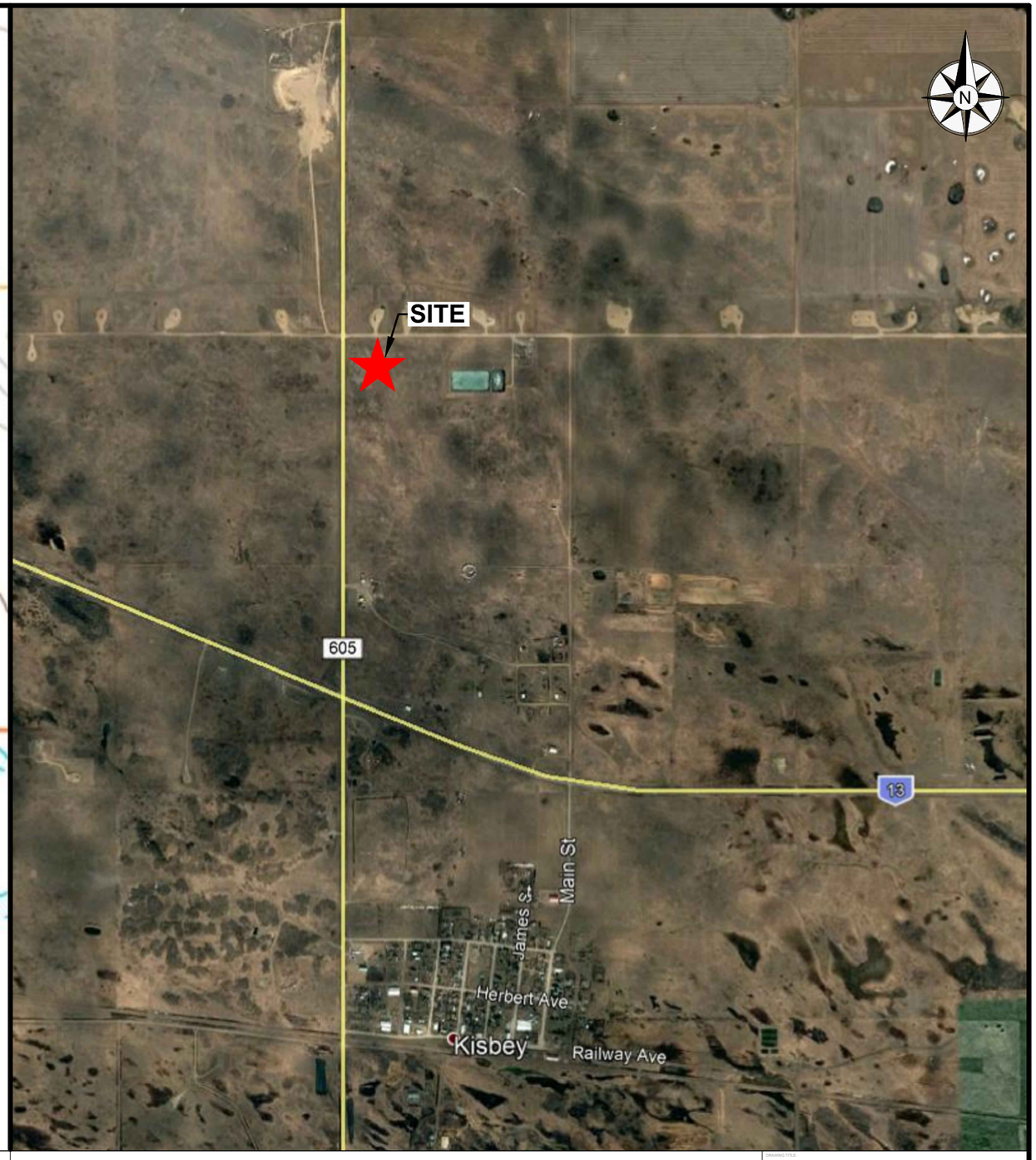
Appendix A – Site Layout





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NOTES:

1. IMAGE SOURCE FROM GOOGLE EARTH 2021 IMAGE DATED 2015 (ACCESSED JUNE 2021).
2. MAP FROM NATURAL RESOURCES CANADA GEOGRATIS.
3. THIS DRAWING IS PREPARED FOR ILLUSTRATIVE PURPOSES ONLY.

LEGEND

SITE- APPROXIMATE LOCATION ★

NOT TO SCALE

0 500 1000
METRES

SCALE: 1: 18,000

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FIGURE 1
SITE LOCATION

24 JUNE 2021

2782 - GEOTECHNICAL INVESTIGATION
PHEASANT RUMP NAKOTA NATION, SK.

DRAWN BY: NA

CHECKED BY: RV

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NOTES:

1. IMAGE SOURCE FROM GOOGLE EARTH 2021
   IMAGE DATED 2019 (ACCESSED JUNE 2021).
2. THIS DRAWING IS PREPARED FOR ILLUSTRATIVE PURPOSES ONLY.
3. THIS IS NOT A LEGAL SURVEY.

LEGEND

EXISTING FENCE - APPROXIMATE LOCATION —X—X—

BOREHOLE - APPROXIMATE LOCATION

0 25 50
METRES

SCALE: 1:1000

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DRAWING TITLE
FIGURE 2
BOREHOLE LOCATION

DATE
24 JUNE 2021

PROJECT
2782 - GEOTECHNICAL INVESTIGATION
PHEASANT RUMP NAKOTA NATION, SK.

DRAWN
DRAWN BY: NA

REVIEWED
CHECKED BY: RV

Appendix B – Glossary

GLOSSARY OF TERMS AND ABBREVIATIONS

Atterberg Limits	Values of water content which define when a soil acts non-plastically, plastically, and like a liquid
Borehole	A vertical hole drilled into the ground for the purposes of soil investigation and sample collection
Bearing Capacity/ Resistance	The stress that can be supported by a foundation due to transfer of load between the foundation and the soil beneath it
Bulk Density	The density of a soil sample retaining its natural, field water content
CFEM	Canadian Foundation Engineering Manual
Clay	Soil particles with minimum diameter ≤ 0.002 mm
the Client	Pheasant Rump Nakota Nation
cm	Centimetres, unit of length (1 cm = 0.01 m)
Cohesive Soils	Soils which possess a component of shear strength independent of interparticle friction (silts and clays)
Dry Density	The density of a soil sample with the water removed
Effective Friction Angle, ϕ'	A shear strength parameter of soil as defined by the Mohr-Coulomb failure criterion
Fines	The fraction of both clay and silt sized particles in the soil.
Geotechnical Resistance Factor, Φ	A factor by which ultimate geotechnical design parameters should be multiplied in order to determine allowable design parameters
Grain Size Distribution	The distribution of soil particle sizes within a soil sample
Gravel	Soil particles with minimum diameter ≤ 75 mm and > 4.75 mm
kg	kilograms, unit of mass (1 kg = 2.20462 lb)
kPa	kilopascals, unit of pressure/stress (1 kPa = 20.9 lb/ft^2)
m	metres, unit of length (1 m = 3.3 feet)

m bgs	metres below ground surface
mm	millimetres , unit of length (1 mm = 0.001 m
Moisture Content	The ratio of water to soil particles, by weight, in a soil sample
Non-cohesive soils	Soils which derive their shear strength entirely from interparticle friction (sands and gravels)
Oxidized	The soil has previously been exposed to air
Particle Size Analysis	See “Grain Size Analysis”
PINTER	PINTER & Associates Ltd.
Plasticity	The extent to which a soil behaves plastically
Plasticity Index	The range of water contents at which a soil behaves plastically
Pocket Penetrometer	Instrument used to estimate undrained shear strength of cohesive soils in the field
Sand	Soil particles with minimum diameter ≤ 4.75 mm and > 0.075 mm
Shelby Tube	A 76 mm outer diameter, 762 mm long, thin-walled tube with a cutting edge for collecting undisturbed soil samples.
Silt	Soil particles with minimum diameter ≤ 0.002 mm and > 0.075 mm
the Site	49.660520°N, 102.682562°W
SPT	Standard Penetration Test - a field test used to estimate certain soil strength properties by recording the number of blows needed to advance a standard sampler 300 mm into the soil using a standard hammer
SPT-N value	The number of blows required to advance the SPT sampler 300 mm into the soil
Unconfined Compressive Strength	The applied axial stress at which a cohesive soil sample fails in shear, under undrained conditions, with no confining pressure applied
Undisturbed sample	A sample collected in such a way so as to retain its natural, in situ properties as much as possible, most commonly via a Shelby tube

Undrained	The soil is loaded at a rate which does not allow internal pore water pressures to dissipate
Undrained Shear Strength, s_u	The magnitude of shear stress that a soil can sustain, under undrained conditions, before failing
Unoxidized	The soil has not previously been exposed to air
Vertical Effective Stress, σ'_v	The stress state in the vertical direction of a soil at a specific depth
Water Content	See "Moisture Content"
Well Graded	A soil with a diverse range of particle sizes

Appendix C – Borehole Logs

PINTER & ASSOCIATES LTD

LOG OF BORING
TH21-1

2782 PRNN Transfer Station
Pheasant Rump Nakota Nation
Geotechnical Investigation

Drilling Method	: Solid Stem	Surface Conditions	: Topsoil
Date Finished	: 09 June 2021	Wat. Elev. Recorded	: N/A
Time Started	: 11:30	Time Ended	: 12:40
Logged By	: RV	Latitude:	: 49.667668
Checked By	: RV	Longitude	: -102.682270

Sample Legend
- Shelby Tube
- Grab Sample
- Grab Sample Submitted

Atterbergs and Moisture (%) 0 5 10 15 20 25 30 35 40
Pocket Pen. (kg/cm^2) 0 .5 1 1.5 2 2.5 3 3.5 4 4.5
SPT-N 0 10 20 30 40 50 60

SIEVE ANALYSIS
% Fines
% Sands
% Gravels
20 40 60 80

Borehole Name: TH21-1

DEPTH (m)	DESCRIPTION
0	TOPSOIL
	Sand (fine-grained), silty, brown damp, compact
5	@ 5.0m - increased moisture
10	@ 10.5m - dense
12	EOH @ 12.0 m Hole remained open and dry after drilling

Bentonite
Cuttings

PINTER & ASSOCIATES LTD

LOG OF BORING
TH21-2

2782 PRNN Transfer Station
Pheasant Rump Nakota Nation
Geotechnical Investigation

Drilling Method	: Solid Stem	Surface Conditions	: Topsoil
Date Finished	: 09 June 2021	Wat. Elev. Recorded	: N/A
Time Started	: 13:10	Time Ended	: 14:30
Logged By	: RV	Latitude:	: 49.667385
Checked By	: RV	Longitude	: -102.681374

Sample Legend
- Shelby Tube
- Grab Sample
- Grab Sample Submitted

Atterbergs and Moisture (%) 0 5 10 15 20 25 30 35 40
Pocket Pen. (kg/cm^2) 0 .5 1 1.5 2 2.5 3 3.5 4 4.5
SPT-N 0 10 20 30 40 50 60

SIEVE ANALYSIS
% Fines
% Sands
% Gravels
20 40 60 80

Borehole Name: TH21-1

DEPTH (m)	DESCRIPTION
0	TOPSOIL
	Sand (fine-grained), silty, brown damp, compact
2	@ 2.2 - 2.5m Clay Seam low plastic, damp, firm, brown
3	@ 3.75m - damp to moist
5	@5.0m - decreased silt content
9	EOH @ 9.0 m Hole remained open and dry after drilling
10	

Bentonite
Cuttings

Appendix D – Lab Reports

PINTER & Associates Ltd.
ATTN: Remi Valois
710A 48 Street East
Saskatoon SK S7K 5B4

Date Received: 10-JUN-21
Report Date: 24-JUN-21 16:41 (MT)
Version: FINAL

Client Phone: 306-244-1710

Certificate of Analysis

Lab Work Order #: L2599810

Project P.O. #: NOT SUBMITTED
Job Reference: 2782-1
C of C Numbers:
Legal Site Desc:

Kimberley Head, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	MU	Qualifier*	D.L.	Units	Bias	Extracted	Analyzed	Batch
L2599810-1 TH21-1 @ 0.75M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	8.82	+/-1.3		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-2 TH21-1 @ 1.5M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	5.24	+/-0.89		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-3 TH21-1 @ 2.25M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	6.24	+/-1.0		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-4 TH21-1 @ 3.0M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	5.65	+/-0.93		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-5 TH21-1 @ 3.75M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	6.34	+/-1.0		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-6 TH21-1 @ 4.5M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	5.03	+/-0.86		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-7 TH21-1 @ 5.25M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
% Moisture									
% Moisture									
% Moisture	8.24	+/-0.50		0.25	%	0		18-JUN-21	R5493058
Miscellaneous Parameters									
Total Sulphate Ion Content	<0.050	-		0.050	%	-	24-JUN-21	24-JUN-21	R5498076
L2599810-8 TH21-1 @ 6.0M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	7.30	+/-1.1		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-9 TH21-1 @ 6.75M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	5.17	+/-0.88		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-10 TH21-1 @ 7.5M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	MU	Qualifier*	D.L.	Units	Bias	Extracted	Analyzed	Batch
L2599810-10 TH21-1 @ 7.5M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	6.48	+/-1.0		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-11 TH21-1 @ 8.25M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	6.07	+/-0.98		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
Particle Size - Pipette & Sieve Method									
% Gravel (>2mm)	<1.0	-		1.0	%	-	11-JUN-21	14-JUN-21	R5490296
% Coarse Sand (2.0mm - 0.2mm)	22.9	-		1.0	%	-	11-JUN-21	14-JUN-21	R5490296
% Fine Sand (0.2mm - 0.063mm)	53.7	-		1.0	%	-	11-JUN-21	14-JUN-21	R5490296
% Silt (0.063mm - 4um)	18.6	-		1.0	%	-	11-JUN-21	14-JUN-21	R5490296
% Clay (<4um)	4.8	-		1.0	%	-	11-JUN-21	14-JUN-21	R5490296
Texture	Loamy sand	-				-	11-JUN-21	14-JUN-21	R5490296
L2599810-12 TH21-1 @ 9.0M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	5.81	+/-0.95		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-13 TH21-1 @ 9.75M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	3.55	+/-0.70		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-14 TH21-1 @ 10.5M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	2.38	+/-0.57		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-15 TH21-1 @ 11.25M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	3.16	+/-0.65		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-16 TH21-1 @ 12.0M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	3.16	+/-0.65		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-17 TH21-2 @ 0.75M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	2.52	+/-0.58		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-18 TH21-2 @ 1.5M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	MU	Qualifier*	D.L.	Units	Bias	Extracted	Analyzed	Batch
L2599810-18 TH21-2 @ 1.5M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
% Moisture	2.14	+/-0.54		0.10	%	0	17-JUN-21	17-JUN-21	R5492681
L2599810-19 TH21-2 @ 2.25M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	17.5	+/-2.3		0.10	%	0	16-JUN-21	16-JUN-21	R5491817
L2599810-20 TH21-2 @ 3.0M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	10.1	+/-1.4		0.10	%	0	16-JUN-21	16-JUN-21	R5491817
L2599810-21 TH21-2 @ 3.75M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	3.35	+/-0.67		0.10	%	0	16-JUN-21	16-JUN-21	R5491817
L2599810-22 TH21-2 @ 4.5M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	2.28	+/-0.56		0.10	%	0	16-JUN-21	16-JUN-21	R5491817
L2599810-23 TH21-2 @ 5.25M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	2.27	+/-0.55		0.10	%	0	16-JUN-21	16-JUN-21	R5491817
Particle Size - Pipette & Sieve Method									
% Gravel (>2mm)	<1.0	-		1.0	%	-	11-JUN-21	14-JUN-21	R5490296
% Coarse Sand (2.0mm - 0.2mm)	66.3	-		1.0	%	-	11-JUN-21	14-JUN-21	R5490296
% Fine Sand (0.2mm - 0.063mm)	27.6	-		1.0	%	-	11-JUN-21	14-JUN-21	R5490296
% Silt (0.063mm - 4um)	4.5	-		1.0	%	-	11-JUN-21	14-JUN-21	R5490296
% Clay (<4um)	1.6	-		1.0	%	-	11-JUN-21	14-JUN-21	R5490296
Texture	Sand	-				-	11-JUN-21	14-JUN-21	R5490296
L2599810-24 TH21-2 @ 6.0M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	2.78	+/-0.61		0.10	%	0	16-JUN-21	16-JUN-21	R5491817
L2599810-25 TH21-2 @ 6.75M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	3.20	+/-0.66		0.10	%	0	16-JUN-21	16-JUN-21	R5491817
L2599810-26 TH21-2 @ 7.5M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	2.33	+/-0.56		0.10	%	0	16-JUN-21	16-JUN-21	R5491817

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	MU	Qualifier*	D.L.	Units	Bias	Extracted	Analyzed	Batch
L2599810-27 TH21-2 @ 8.25M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	3.68	+/-0.71		0.10	%	0	16-JUN-21	16-JUN-21	R5491817
L2599810-28 TH21-2 @ 9.0M									
Sampled By: REMI VALOIS on 10-JUN-21 @ 12:00									
Matrix: SOIL									
Miscellaneous Parameters									
% Moisture	2.63	+/-0.59		0.10	%	0	16-JUN-21	16-JUN-21	R5491817

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Preparation Method Reference	Method Reference**
MOIST-SK	Soil	Moisture Content		CCME PHC in Soil - Tier 1 (mod)

The weighed portion of soil is placed in a 105°C oven overnight. The dried soil is allowed to cooled to room temperature, weighed and the % moisture is calculated.

PREP-MOISTURE-ED	Soil	% Moisture		CCME PHC in Soil - Tier 1 (mod)

The weighed portion of soil is placed in a 105°C oven to dry to a constant weight; the drying time will vary based on the moisture content of the soil. The dried soil weight is then used to calculate % moisture.

PSA-1-SIEVE-SK	Soil	Particle Size - Pipette & Sieve Method		SSIR-51 METHOD 3.2.1

Particle size distribution is determined by a combination of techniques. Dry sieving is performed for coarse particles, wet sieving for sand particles and the pipette sedimentation method for clay particles.

SO4-T-CSA-A23-ED	Soil	Total Sulphate Ion Content		CSA INTERNATIONAL A23.2-3B

Total sulphate content is determined by mixing soil with water then hydrochloric acid, and digesting just below boiling point, for 15 minutes. Analysis by ion chromatography follows.
NOTE: the CSA-A23 method states that for a total sulphate ion content greater than 0.2%, soluble sulphate ion content shall be determined on the basis of a water extraction. This water extraction requires the total sulphate ion content result to calculate the correct ratio for the water extraction.

** The indicated Method Reference is the closest nationally or internationally recognized reference for the applicable ALS test method. ALS methods may incorporate modifications from the specified reference to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surr - Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.
MU: Measurement Uncertainty. The reported uncertainty is an expanded uncertainty calculated using a coverage factor of 2 which gives a level of confidence of approximately 95%.
Bias: The reported method bias is the average long term deviation from the target value for a long term reference or control sample, measured in percent. Zero values indicate no detectable method bias.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2599810 Report Date: 24-JUN-21

Client: PINTER & Associates Ltd.
710A 48 Street East
Saskatoon SK S7K 5B4
Contact: Remi Valois

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOIST-SK	**Soil**							
Batch R5491817								
WG3555100-1 DUP		**L2599810-22**						
% Moisture		2.28	2.63		%	14	20	16-JUN-21
WG3555100-3 LCS								
% Moisture			100.4		%		90-110	16-JUN-21
WG3555100-2 MB								
% Moisture			<0.10		%		0.1	16-JUN-21
Batch R5492681								
WG3555090-1 DUP		**L2599810-5**						
% Moisture		6.34	6.05		%	4.6	20	17-JUN-21
WG3555090-3 LCS								
% Moisture			100.6		%		90-110	17-JUN-21
WG3555090-2 MB								
% Moisture			<0.10		%		0.1	17-JUN-21
PREP-MOISTURE-ED	**Soil**							
Batch R5493058								
WG3557492-3 DUP		**L2602125-3**						
% Moisture		13.6	13.7		%	1.0	20	18-JUN-21
WG3557492-2 LCS								
% Moisture			99.7		%		90-110	18-JUN-21
WG3557492-1 MB								
% Moisture			<0.25		%		0.25	18-JUN-21
PSA-1-SIEVE-SK	**Soil**							
Batch R5490296								
WG3553055-1 DUP		**L2599810-23**						
% Gravel (>2mm)		<1.0	<1.0	RPD-NA	%	N/A	25	14-JUN-21
% Coarse Sand (2.0mm - 0.2mm)		66.3	65.6	J	%	0.7	5	14-JUN-21
% Fine Sand (0.2mm - 0.063mm)		27.6	27.8	J	%	0.2	5	14-JUN-21
% Silt (0.063mm - 4um)		4.5	5.0	J	%	0.5	5	14-JUN-21
% Clay (<4um)		1.6	1.7	J	%	0.1	5	14-JUN-21
WG3553055-2 IRM		**2020-PSA_SOIL**						
% Coarse Sand (2.0mm - 0.2mm)			21.3		%		16.5-26.5	14-JUN-21
% Fine Sand (0.2mm - 0.063mm)			23.2		%		18.4-28.4	14-JUN-21
% Silt (0.063mm - 4um)			32.2		%		28.6-38.6	14-JUN-21
% Clay (<4um)			23.3		%		16.5-26.5	14-JUN-21
SO4-T-CSA-A23-ED	**Soil**							

Quality Control Report

Client: PINTER & Associates Ltd.
710A 48 Street East
Saskatoon SK S7K 5B4
Contact: Remi Valois

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-T-CSA-A23-ED	**Soil**							
Batch R5498076								
WG3562471-3 CRM		**ED-634A_CEMENT**						
Total Sulphate Ion Content			95.0		%		80-120	24-JUN-21
WG3562471-4 DUP		**L2599334-1**						
Total Sulphate Ion Content		<0.050	<0.050	RPD-NA	%	N/A	30	24-JUN-21
WG3562471-2 LCS								
Total Sulphate Ion Content			101.1		%		70-130	24-JUN-21
WG3562471-1 MB								
Total Sulphate Ion Content			<0.050		%		0.05	24-JUN-21

Quality Control Report

Workorder: L2599810 Report Date: 24-JUN-21

Client: PINTER & Associates Ltd.
710A 48 Street East
Saskatoon SK S7K 5B4
Contact: Remi Valois

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

L2599810-COFC

C #

Page 1 of

Report To				Report Format / Distribution				Service Requested (Rush for routine analysis subject to availabilit
Company:	PINTER & Associates Ltd.			☑ Standard	☐ Other			◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Rémi Valois			☑ PDF	☑ Excel	☑ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	710A 48th Street East			Email 1:	remi.valois@pinter.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm T/
	Saskatoon, SK S7K 5B4			Email 2:				○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	306.914.1413	Fax:	306.933.4986	Email 3:				
Invoice To	Same as Report ?	☑ Yes	☐ No	Client / Project Information				Analysis Request
Hardcopy of Invoice with Report?		☐ Yes	☑ No	Job #:	2782-1			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	SAME			PO / AFE:				
Contact:				LSD:				
Address:								
Phone:		Fax:		Quote #:	Q83632			
Lab Work Order # (lab use only)				ALS Contact:	Brian Morgan	Sampler:	Rémi Valois	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Sieve	Moisture Content										Number of Containers
	Moisture Content on ALL SAMPLES	10-Jun-21		Soil		X										1
	TH21-1 @ 8.25 m	10-Jun-21		Soil	X	X										1
	TH21-2 @ 5.25 m	10-Jun-21		Soil	X	X										

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature: °C	Verified by:	Date: 10-6	Time: 12	Observations: Yes / No ? If Yes add SIF

17.9°C

Appendix E – Site Photos

Photograph #1: Northeast view from site location

Photograph #2: East view from site location

Photograph #3: Site view facing Southwest

Photograph #4: Site view facing south