BURNS MAENDEL
CONSULTING ENGINEERS LTD.

1331 Princess Ave.
Brandon, MB R7A 0R4
Tel: 204.728.7364
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December 19, 2014

Director, Environmental Approvals Branch
Manitoba Conservation and Water Stewardship
Suite 160, 123 Main Street
Winnipeg, MB R3C 1A5

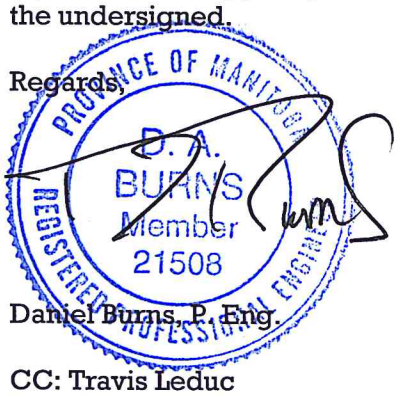
Reference: Environment Act Proposal
Sedimentation Pond
Neepawa, MB

Dear Director,

Burns Maendel Consulting Engineers Ltd. is pleased to submit an Environment Act Proposal for the proposed Sedimentation Pond in the Town of Neepawa on behalf of Rocky Mountain Equipment. The sedimentation pond will be sized to treat wastewater from the dealership wash bay.

All of the information relating to the Environment Act Proposal has been compiled in the attached document. Four (4) hard copies of our proposal have been included, as well as one (1) electronic copy. If you have any questions or comments, please don't hesitate to contact the undersigned.

Regards,



Daniel Burns, P. Eng.

CC: Travis Leduc

/enclosed

Director, Environmental Approvals Branch
Manitoba Conservation and Water Stewardship
Suite 160, 123 Main Street
Winnipeg, MB R3C 1A5

Environment Act Proposal
Sedimentation Pond
Neepawa, MB

Submitted by:

Burns Maendel Consulting Engineers Ltd.
1331 Princess Ave.
Brandon, MB R7A 0R4
Tel: 204.728.7364
Fax: 204.728.4418

On behalf of:

Travis Leduc
Rocky Mountain Equipment
3939 1st. Ave. S
Lethbridge, AB T1J 4P8
403-327-3154
403-327-9021

December 19, 2014

Executive Summary

Rocky Mountain Equipment (RME) is a consolidator of agriculture and construction dealerships throughout Manitoba, Saskatchewan and Alberta. They are comprised of 38 dealerships specializing mainly in the Case IH, Case Construction and New Holland brands. RME is in the process of constructing a new equipment dealership in Neepawa, MB at SE¼ 34-14-15 WPM along PTH 16.

The site is not serviceable from Town of Neepawa infrastructure, and RME is therefore planning to build an onsite treatment system. The initial plans were to construct a large on-site disposal field in accordance with the On-Site Wastewater Management Systems Regulation 83/2003. The field would have handled both domestic sewage as well as wastewater from the proposed washbay. Upon further consideration, BMCE had concerns with the field during winter months and is now proposing a lagoon for the washbay wastewater only; a field will still be utilized for the sewage. This EAP has been written to address environmental impacts attributable to the lagoon.

The lagoon will be a single-cell, synthetic geomembrane-lined structure sized to store wastewater over a 210-day period, for a total volume of 545 m^3. There will be 0.6 m freeboard, 1.6 m storage space, and 0.15 m deadspace. These depths are different from typical domestic wastewater lagoons, because the primary purpose of the lagoon is storage and sedimentation as opposed to microbial and nutrient decomposition. The lagoon will be complete with a gas venting and dewatering system.

The proposed discharge location is a local drain immediately east of the lagoon. The drain empties into the Whitemud River approximately 700 m downstream. No significant adverse impact on human health or the environment is anticipated to result from the proposed construction and operation of the lagoon, as will be elaborated on within the Environment Act Proposal.

Once approval for the lagoon has been received from Manitoba Conservation, construction is planned to begin in March 2015.

Standard Limitations

This report was prepared by Burns Maendel Consulting Engineers Ltd. (BMCE) for the account of Rocky Mountain Equipment (the Client). The disclosure of any information contained in this report is the sole responsibility of the Client. The material in this report reflects BMCE's best judgment in light of the information available to it at the time of preparation. Should this report be used by a third party, any reliance or decisions made based on this report are the responsibility of such third party. BMCE accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report. BMCE makes no representation concerning the legal significance of the findings or the information contained within this report.

Table of Contents

List of Appendices

1. Introduction and Background

Rocky Mountain Equipment (RME) is a consolidator of agriculture and construction dealerships, comprised of 38 dealerships across Manitoba, Saskatchewan and Alberta. RME specializes mainly in the Case IH, Case Construction and New Holland brands. RME is in the process of constructing a new equipment dealership in Neepawa, MB at the SE corner of 34-14-15 WPM along PTH 16. The dealership would be 2,550 m^2 and the corresponding developed site would be 5.14 acres. The developed surface would consist of a gravel pad and a large equipment display area in front.

RME is too far removed from the Town of Neepawa to tie into the existing wastewater system, and therefore they plan to construct an on-site wastewater treatment system. They have retained Burns Maendel Consulting Engineers Ltd. (BMCE) to design the system and handle the corresponding required approvals. There are two types of wastewater being produced at the site; there is the sewage produced by the employees, and the wastewater produced by the washbay. The initial solution evaluated was to construct a large on-site disposal field in accordance with the On-Site Wastewater Management Systems Regulation 83/2003. The field would have handled both domestic sewage as well as wastewater from the proposed washbay. After reviewing the design BMCE had concerns with the field during winter months and is now proposing a lagoon for the washbay wastewater only; a field will still be utilized for the sewage. We understand from conversations with Manitoba Conversation that a lagoon will require an Environment Act Proposal to address any potential environmental impacts.

Wastewater will be collected at the new dealership building. The wastewater will be pumped to the wastewater lagoon via buried 2-inch HDPE pipe. The pipe outlet will be located at the top of the berm to avoid potential freezing problems.

The lagoon itself will be designed to hold the wastewater produced over a 210-day period. The design loading is 4-hour-per-day continuous production at 15.1 L/min. The lagoon will be HDPE-lined complete with a dewatering and degassing system.

2. Description of Proposed Development

2.1. Certificate of Title

Refer to Appendix A. The legal landowner is Rocky Mountain Dealership Inc.

2.2. Legal Land Description, Map of Proposed Development

The legal land description where the sedimentation pond is situated is SE¼ 34-14-15 WPM. For a drawing of the proposed development refer to the drawing package in Appendix F.

2.3. Water Source

Water for the dealership will be drawn from an existing 300 mm watermain on the north side of the site. Water will be produced at the Town of Neepawa water treatment plant.

2.4. Sealed Engineering Drawings

Refer to Appendix F.

2.5. Sizing Parameters and Calculations

2.5.1. Summary Table

Parameter	Result
Detention Time (days)	210
Use Per Day (hours) (estimated by Client)	4
Weekly Usage (days per week)	5
Hydraulic Loading Rate (L/min) (Easy-kleen EZN3004E-1)	15.1
Total Storage Volume (m^3)	**543.6**
Active Storage Depth (m)	1.60
Freeboard (m)	0.6
Dead Space (m)	0.15
Total Depth (m)	2.35
Cell Interior Side Slope	3:1
Outer Dimensions - L x W x H (m)	30.0 x 30.0 x 2.35
Floor Dimensions - L x W (m)	15.9 x 15.9

2.5.2. Hydraulic Loading

The washbay is assumed to be used 4 hours per day, 5 days per week. This is a conservative estimate based in part upon the usage at other RME dealerships.

The rate of water use was estimated at 15.1 liters per minute. This is the rate specified for the model Easy-kleen EZN3004E-1. Based upon the rate of **15.1 liters per minute over a 4-hour period**, the hydraulic loading is estimated at **3,624 Lpd**.

The detention time was set at **210 days**. 227-230 days are commonly used detention times for lagoons, based on the operational requirement that the wastewater effluent be discharged between June 15 and November 1. However, the wastewater source could potentially be contaminated with hydrocarbons, glycol and cleaning solvents and not the microbial contamination and other nutrients normally associated with domestic wastewater lagoons. As a side note, we

advise that the wastewater will pass through an oil and grease interceptor before being discharged to the lagoon, so we anticipate contamination would be minimal. Therefore, we have sized the lagoon for a discharge cycle from October 1 to April 30. As the discharge is not expected to be contaminated with organic waste and nutrients we do not anticipate the release to have an effect on fish spawning.

Therefore, the required **Total Storage Volume** based upon the hydraulic loading parameters listed above is;

210 days x 3.624 m^3/d x (5 d / 7 d) = **543.6 m^3**

2.5.3. Organic Loading

Commonly in wastewater lagoon design across Manitoba, the design organic loading rate per person is set at 0.077 kg BOD/person/day, and the maximum organic loading is set at 56 kg BOD / (ha*d). However, due to the wastewater being produced at the washbays organic loading is not a factor important to this lagoon design. The main purpose of this lagoon is for storage and sedimentation.

2.5.4. Lagoon Design

Based upon the hydraulic loading requirements, the lagoon active storage capacity will be equal to 543.6 m^3.

As the lagoon is primarily for storage and sedimentation, the available storage will be 1.6 m.

Although a freeboard space of 1.0 m is used for wastewater lagoon design in Manitoba, a freeboard space of 0.6 m was used instead given the low concentrations of pollutants expected and corresponding low risk to the environment. This freeboard is the minimum specified in the '10 State Standards – Recommended Standards for Wastewater Facilities' document.

The area below the outlet pipe invert is considered dead storage, and is not part of the design storage volume or freeboard. The dead storage height is 0.15 m, as per common design practice.

The interior side slope is 3:1 while the exterior is 4:1.

For all other lagoon design details, refer to the drawings in Appendix F.

2.6. Synthetic Geomembrane Liner Details

A synthetic geomembrane liner will be used as the surrounding soil is sandy with a high groundwater table. A gas ventilation system and dewatering system

will be used to prevent gas build-up underneath the synthetic liner while simultaneously draining water. For drawing details, refer to Appendix F.

2.7. Discharge Route

There is a natural drain directly east of the lagoon which is proposed to be the discharge location. This drain converges with one other nearby drain and then discharges into the Whitemud River approximately 700 m downstream.

Figure 1: Discharge Route

The drain is expected to dilute and further polish the wastewater, and plant-life should aid by further filtering and absorbing contaminants.

The Office of Drinking Water was contacted to determine whether there were any public water users downstream. The Office of Drinking Water confirmed that there were no public users until Bloomfield Colony located near Westbourne; at this distance there would be no appreciable impact on drinking water quality. For correspondence between the Office of Drinking Water and BMCE, refer to Appendix C.

2.8. Facility Operation

Wastewater effluent will be pumped to the lagoon, where the wastewater will be stored until it is released in the spring and fall.

The discharge operation is summarized in the following steps:

a) A water sample from the lagoon will be obtained, using sample bottles supplied from an accredited laboratory. Water sampling and submission

procedures will be performed in accordance with Manitoba Conservation and laboratory guidelines.

b) If the water samples meet Manitoba Conservation requirements water from the cell can be discharged. Water will only be discharged between April 30 and October 1. If the samples do not meet Manitoba Conservation requirements, testing will be repeated until the samples have passed the testing criteria. Additional time will allow more time for natural processes such as settling to have an effect on the wastewater effluent quality.

2.9. Seasonal Maintenance

Regular observation of the lagoon will be undertaken by RME staff to ensure that there are no malfunctions or degradation. The following tasks will be performed to ensure that the integrity of the lagoon is maintained and that it functions properly;

- The lagoon will be inspected for signs of wildlife. Any wildlife burrowing into the berm or otherwise causing damage will be relocated.
- Valves and drainage areas will be checked and cleared of obstructions on a regular basis.
- Snow will be cleared on the lagoon access so that the lagoon may be accessed at any time.

3. Description of Pre-Development Environment

3.1. Land Use

The current land use is pastureland. Zoning is currently designated as Commercial Highway.

3.2. Topography

The location of the lagoon will be at an elevated position on RME property, next to a drainage ditch. This will help mitigate problems caused by the high groundwater table by ensuring that water is drained away from the lagoon. This will also allow for gravity discharge as opposed to pumping.

3.3. Soil Conditions

Based upon the geotechnical investigation, soil conditions commonly consist of a thin layer of topsoil, followed by sand ranging from 5.6 to 6.2 m. Below the sand there is a clayey silt; depths of clayey silt ranged from 14.6 m depth to depths explored. Sand till and a deep sand stratum was encountered in one of the testholes. For detailed information on soil types and layers, refer to the geotechnical report in Appendix E.

3.4. Groundwater

Geotechnical drilling indicated a groundwater table between 1.5 m and 2.0 m at the location of drilling, near the current location of the building. The elevation at the lagoon is approximately the same, although it varies throughout the lagoon footprint. For more detailed information, refer to the geotechnical report in Appendix E.

3.5. Protected or Endangered Species

The Manitoba Conservation Data Centre was contacted to ensure that there were no protected or endangered species observed in the vicinity of the proposed construction site. Manitoba Conservation confirmed that no occurrences of rare or endangered species have been noted in the project area. We have enclosed their response in Appendix B.

3.6. Socioeconomic Environment

The socioeconomic environment is not a large factor in this development, as the land is currently undeveloped, and is 2 km east of Neepawa. Neighboring properties include the HyLife livestock facility approximately 700 m from the lagoon, a single residence approximately 300 m from the lagoon, and a diner approximately 200 m to the south-east. Developed land increases to the east closer to Neepawa. We do not anticipate that the sedimentation pond would affect these properties in any way, as the sedimentation pond is not expected to produce noxious odors and will not be visually obstructive.

4. Description of Environmental and Human Health Effects of the Proposed Development

4.1. Impact on Biophysical Environment

4.1.1. Construction

Actual construction of the facility will involve land clearing, excavation, and construction of the lagoon itself. As the existing land use is currently pastureland with minimal tree and bush cover, the impact on the natural terrestrial environment is expected to be minimal. Furthermore, as per correspondence with Manitoba Conservation referenced in the previous section, there are no protected or endangered species within the construction area. Also, pipe will be trenched in between the lagoon and new building.

4.1.2. Operation

Once the lagoon is constructed, no impact is expected on local groundwater. Simply put, a properly designed and functioning lagoon will not allow wastewater to be leaked into the surrounding environment except during wastewater discharge, which only occurs once wastewater has been treated to acceptable levels. There are several domestic water wells within the SE ¼ 34-14-15 quarter section, but as the effluent will be tested prior to discharge we do not anticipate the lagoon operation to affect the water quality.

4.2. Type, Quantity and Concentration of Pollutants

4.2.1. General

Treated effluent, tested according to the *Manitoba Water Quality Standards, Objectives, and Guidelines*, and will be discharged into a local drain shown in Appendix D and *Figure 1*. Effluent will be discharged between October 1 and April 30, as per Section 2.5.2.

Odor is not expected to be a factor, as the lagoon is to be used primarily as a sedimentation pond.

4.2.2. Nutrients

Nutrients typically of concern for lagoons testing include phosphorus, nitrogen, total coliforms / fecal coliforms, 5-day biochemical oxygen demand, and total suspended sediment. It is our opinion these parameters will not need to be tested for, as the wastewater source is a washbay and will not be contaminated with organic waste.

4.2.3. Contaminants

Potential contaminants that may enter the sedimentation pond include hydrocarbons, glycol (antifreeze), and cleaning solvents. We stress that washbay wastewater enters an oil and grease interceptor before being discharged to the lagoon, so we do not anticipate that tests will show excessive contamination. Prior to discharge the effluent will be tested for VOCs and glycols by an accredited laboratory licensed to practice in the Province of Manitoba, and results will be evaluated according to the standards set out in the *Manitoba Water Quality Standards, Objectives and Guidelines* document. In the event that any of the tests fail, water will be re-tested according to the procedure set out in Section 2.8 Facility Operation.

4.3. Fish Habitat

The Department of Fisheries and Oceans has made available on their website maps detailing fish habitat across Manitoba. The maps are part of a report

published by D.W. Milani titled, "Fish community and fish habitat inventory of streams and constructed drains throughout agricultural areas of Manitoba (2002 - 2006)". We have included a map showing the RME lagoon discharge location in Appendix D. As the map demonstrates, the discharge location is Habitat E location for 700 m downstream. Habitat E indicates that the habitat is unsuitable for fish, as water does not flow continuously throughout the year. At 700 m, the drain converges with the Whitemud River. The Whitemud River is habitat for indicator fish, although we note that with the 700 m distance there is time for the natural polishing processes of the drain to further cleanse the already treated lagoon effluent. Furthermore, the wastewater being treated in the lagoon would not have the level of contamination normally expected in a domestic wastewater treatment lagoon. The flow rate is further slowed by plant-life which improves sedimentation processes and allows for increased absorption into the stream bed and native plant-life. Overall, the discharge route makes use of the natural cleansing processes of the drain to fully treat the effluent prior to fish being impacted.

4.4. Socio-Economic, Climate Change Implications

The Town of Neepawa wastewater treatment system is too distant from the RME dealership for it to be feasible to tie into. Given RME's value to the community as a source of jobs and as a local dealership this lagoon is an important project from a socio-economic perspective, as it will benefit RME by providing adequate wastewater treatment capacity.

As this is a small lagoon taking advantage of natural treatment processes, no significant climate change impacts are expected.

4.5. Potential Impact on Human Health and Safety

The site location is within established pastureland, two kilometers from the Town of Neepawa. Given the isolation of the site, it should not be considered an attractive nuisance. A fence will also be built around the lagoon for further protection and discouragement.

The effluent discharge route was examined to determine if there were any downstream users within sufficient range to be affected. As per correspondence with the Office of Drinking Water referenced in Appendix C, there are no public downstream users until Bloomfield Colony located near Westbourne, far too distant to be at risk. Therefore, no impact on human health and safety is expected.

5. Mitigation Measures and Residual Environmental Effects

5.1. Protection

The practices to be used during construction are common to projects of a similar nature. As this facility will be built on previously used pastureland and will have a relatively small footprint, we anticipate that our proposed design will not adversely affect the environment. A geomembrane-lined lagoon will provide environmentally sound storage and treatment of wastewater.

A dewatering and gas-venting system will be used in this design. This will ensure that if there are any holes in the synthetic liner there will be a safeguard against large gas pockets lifting the liner above the water surface. The gas venting and liner system will be installed to run along the floor of the lagoon and directly through the berm. The dewatering lines will daylight into the existing drain to the east of the sedimentation pond.

5.2. Monitoring

On-going monitoring of the lagoon will be performed to ensure the proper functioning of the lagoon. Regular inspection will ensure that there is no damage to the lagoon from erosion, failures or other causes. The general condition of the lagoon will be observed on an ongoing basis during all seasons.

Appendix A – Certificate of Title

DATE: 2014/12/15
TIME: 11:56

MANITOBA

STATUS OF TITLE

TITLE NO: 2733185/5

PAGE: 1

STATUS OF TITLE.....	**ACCEPTED**	**PRODUCED FOR..**	COUNTER
ORIGINATING OFFICE...	NEEPAWA	**ADDRESS.....**	
REGISTERING OFFICE...	NEEPAWA		
REGISTRATION DATE....	2014/07/24		
COMPLETION DATE.....	2014/07/25		
		CLIENT FILE...	NA
		PRODUCED BY...	E.POOLE

LEGAL DESCRIPTION:

ROCKY MOUNTAIN DEALERSHIPS INC.

IS REGISTERED OWNER SUBJECT TO SUCH ENTRIES RECORDED HEREON IN THE FOLLOWING DESCRIBED LAND:

LOT 1 PLAN 55943 NLTO
IN SE 1/4 34-14-15 WPM

ACTIVE TITLE CHARGE(S):

85-3166/5 ACCEPTED CAVEAT **REG'D:** 1985/05/27
FROM/BY: MANITOBA TELEPHONE SYSTEM
TO:
CONSIDERATION: **NOTES:** AFF: PART

86-1189/5 ACCEPTED CAVEAT **REG'D:** 1986/03/21
FROM/BY: THE TOWN OF NEEPAWA
TO:
CONSIDERATION: **NOTES:**

87-1024/5 ACCEPTED CAVEAT **REG'D:** 1987/03/25
FROM/BY: MANITOBA HYDRO-ELECTRIC BOARD
TO:
CONSIDERATION: **NOTES:** AFF: PART

88-4821/5 ACCEPTED CAVEAT **REG'D:** 1988/11/08
FROM/BY: THE TOWN OF NEEPAWA
TO:
CONSIDERATION: **NOTES:**

1106034/5 ACCEPTED EASEMENT **REG'D:** 2014/03/28
FROM/BY: TOWN OF NEEPAWA
TO: MTS INC.
CONSIDERATION: **NOTES:** AFF: ELY 12 M. PERP

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA STORAGE SYSTEM ON 2014/12/15 OF TITLE NUMBER 2733185/5

********** STATUS OF TITLE 2733185/5 CONTINUED ON NEXT PAGE **********

MANITOBA

STATUS OF TITLE

STATUS OF TITLE.....	**ACCEPTED**	**PRODUCED FOR..**	COUNTER
ORIGINATING OFFICE...	NEEPAWA	**ADDRESS.....**	
REGISTERING OFFICE...	NEEPAWA		
REGISTRATION DATE....	2014/07/24		
COMPLETION DATE.....	2014/07/25		
		CLIENT FILE...	NA
		PRODUCED BY...	E.POOLE

ADDRESS(ES) FOR SERVICE:

EFFECT	NAME AND ADDRESS	POSTAL CODE
ACTIVE	ROCKY MOUNTAIN DEALERSHIPS INC #301, 3345 8TH STREET S.E. CALGARY AB	T2G 3A4

ORIGINATING INSTRUMENT(S):

REGISTRATION NUMBER	TYPE	REG. DATE	CONSIDERATION	SWORN VALUE
1108309/5	T	2014/07/24	$75,000.00	$75,000.00

PRESENTED BY: THOMPSON DORFMAN SWEATMAN
FROM: TOWN OF NEEPAWA
TO: ROCKY MOUNTAIN DEALERSHIPS INC.

FROM TITLE NUMBER(S):

2725324/5 ALL

LAND INDEX:

LOT	BLOCK	SURVEY PLAN
1		55943

NOTE: SE 34-14-15W

ACCEPTED THIS 24TH DAY OF JULY, 2014
BY F.GREENGRASS FOR THE DISTRICT REGISTRAR OF
THE LAND TITLES DISTRICT OF NEEPAWA.

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA STORAGE SYSTEM ON 2014/12/15 OF TITLE NUMBER 2733185/5.

********** END OF STATUS OF TITLE 2733185/5 **********

Appendix B – Manitoba Conservation Data Centre Correspondence

Jeff Amundson

From: Friesen, Chris (CWS) [Chris.Friesen@gov.mb.ca]
Sent: Friday, December 12, 2014 12:15 PM
To: Jeff Amundson
Subject: RE: Rocky Mountain Equipment - Sedimentation Pond

Jeff
No, it would be the same.
Thanks for checking.

Chris Friesen
Biodiversity Information Manager
Manitoba Conservation Data Centre
204-945-7747
chris.friesen@gov.mb.ca
http://www.gov.mb.ca/conservation/cdc/

-----Original Message-----
From: Jeff Amundson [mailto:j.amundson@bmce.ca]
Sent: December-12-14 9:41 AM
To: Friesen, Chris (CWS)
Subject: RE: Rocky Mountain Equipment - Sedimentation Pond

Good Afternoon Chris,

I realized that I had put the SW corner rather than the SE corner in my information request. Would that affect the results of your search?

Regards,

Jeff Amundson, E-I-T
Junior Engineer

1331 Princess Avenue
Brandon, MB R7A 0R4
Tel: 204.728.7364
Fax: 204.728.4418
j.amundson@bmce.ca

-----Original Message-----
From: Friesen, Chris (CWS) [mailto:Chris.Friesen@gov.mb.ca]
Sent: Wednesday, December 10, 2014 3:53 PM
To: Jeff Amundson
Subject: Rocky Mountain Equipment - Sedimentation Pond

Jeff

Thank you for your information request. I completed a search of the Manitoba Conservation Data Centre's rare species database and found no occurrences at this time for your area of interest.

The information provided in this letter is based on existing data known to the Manitoba Conservation Data Centre at the time of the request. These data are dependent on the research and observations of CDC staff and others who have shared their data, and reflect our current state of knowledge. An absence of data in any particular geographic area does not necessarily mean that species or ecological communities of concern are not present; in many areas, comprehensive surveys have never been completed. Therefore, this information should be regarded neither as a final statement on the occurrence of any species of concern, nor as a substitute for on-site surveys for species as part of environmental assessments.

Because the Manitoba CDC's Biotics database is continually updated and because information requests are evaluated by type of action, any given response is only appropriate for its respective request. Please contact the Manitoba CDC for an update on this natural heritage information if more than six months pass before it is utilized.

Third party requests for products wholly or partially derived from Biotics must be approved by the Manitoba CDC before information is released. Once approved, the primary user will identify the Manitoba CDC as data contributors on any map or publication using Biotics data, as follows as: Data developed by the Manitoba Conservation Data Centre; Wildlife Branch, Manitoba Conservation and Water Stewardship.

This letter is for information purposes only - it does not constitute consent or approval of the proposed project or activity, nor does it negate the need for any permits or approvals required by the Province of Manitoba.

We would be interested in receiving a copy of the results of any field surveys that you may undertake, to update our database with the most current knowledge of the area.

If you have any questions or require further information please contact me directly at (204) 945-7747.

Chris Friesen
Biodiversity Information Manager
Manitoba Conservation Data Centre
204-945-7747
chris.friesen@gov.mb.ca
http://www.gov.mb.ca/conservation/cdc/

-----Original Message-----
From:
Sent: November-27-14 11:00 AM
To: Friesen, Chris (CWS)
Subject: WWW Form Submission

Below is the result of your feedback form. It was submitted by WWW Information Request () on Thursday, November 27, 2014 at 11:00:05

DocumentID: Manitoba_Conservation

Project Title: Rocky Mountain Equipment - Sedimentation Pond

Date Needed: 2014/12/11

Name: Jeff Amundson

Company/Organization: Burns Maendel Consulting Engineers Ltd.

Address: 1331 Princess Ave

City: Brandon

Province/State: MB

Phone: 204-728-7364

Fax: 204-728-4418

Email: j.amundson@bmce.ca

Project Description: We are looking to design a sedimentation pond on behalf of Rocky Mountain Equipment. The information will be included in an EAP to indicate impact on the local environment.

Information Requested: We would like to be aware of any protected or endangered species in the listed quarter section.

Format Requested: PDF format would be preferred; if PDF format is not available, Microsoft Word would be the next best option.

Location: The site is approximately 2 km east of Neepawa. The legal description of the site is SW 34-14-15 WPM.

action: Submit

Appendix C – Office of Drinking Water Correspondence

Jeff Amundson

From: Robertson, Glen (CWS) [Glen.Robertson@gov.mb.ca]
Sent: Friday, December 12, 2014 10:46 AM
To: Jeff Amundson
Cc: Cronk, John (CWS); Balcaen, Marc (CWS); Gerardy, Christine (CWS)
Subject: RE: Rocky Mountain Equipment - Sedimentation Pond

Hello Jeff. I have discussed this with some of my co-workers and the only public or semi-public water system that we know of that uses the Whitemud River as its source water is Bloomfield Colony which we consider a public water system. Bloomfield Colony is located near Westbourne.

Glen Robertson
Senior Drinking Water Officer
Manitoba Conservation and Water Stewardship
1129 Queens Avenue
Brandon MB R7A 1L9
phone: (204)726-6563
fax: (204)726-6567

www.manitoba.ca/drinkingwater

From: Jeff Amundson [mailto:j.amundson@bmce.ca]
Sent: December-12-14 9:38 AM
To: Robertson, Glen (CWS)
Subject: RE: Rocky Mountain Equipment - Sedimentation Pond

My apologies Glen, you're right. Looks like I mistyped the quarter section. The correct quarter section is SE 34-14-15 WPM.

Regards,

Jeff Amundson, E-I-T
Junior Engineer

BURNS MAENDEL
CONSULTING ENGINEERS LTD.

1331 Princess Avenue
Brandon, MB R7A 0R4
Tel: 204.728.7364
Fax: 204.728.4418
j.amundson@bmce.ca

From: Robertson, Glen (CWS) [mailto:Glen.Robertson@gov.mb.ca]
Sent: Friday, December 12, 2014 9:26 AM

To: Jeff Amundson
Subject: RE: Rocky Mountain Equipment - Sedimentation Pond

Hello Jeff. I'm looking at this right now. Can you confirm the section-township-range you have provided? The location you have provided is north of Kelwood which is not near the Whitemud River, as far as I can tell.

Thanks.

Glen

From: Jeff Amundson [mailto:j.amundson@bmce.ca]
Sent: December-01-14 10:57 AM
To: Robertson, Glen (CWS)
Subject: Rocky Mountain Equipment - Sedimentation Pond

Hello Glen,

We are currently working on an EAP for a wastewater sedimentation pond on behalf of Rocky Mountain Equipment, located at SW 34-19-15 WPM. The effluent discharge location would be a local drain, which would eventually join the Whitemud River. We are looking to identify any downstream users. Would you be able to provide us with this information? If not, do you know who we would be able to contact?

I have attached a map of the proposed discharge route.

If you have any questions or need anything clarified, please let me know.

Regards,

Jeff Amundson, E-I-T
Junior Engineer

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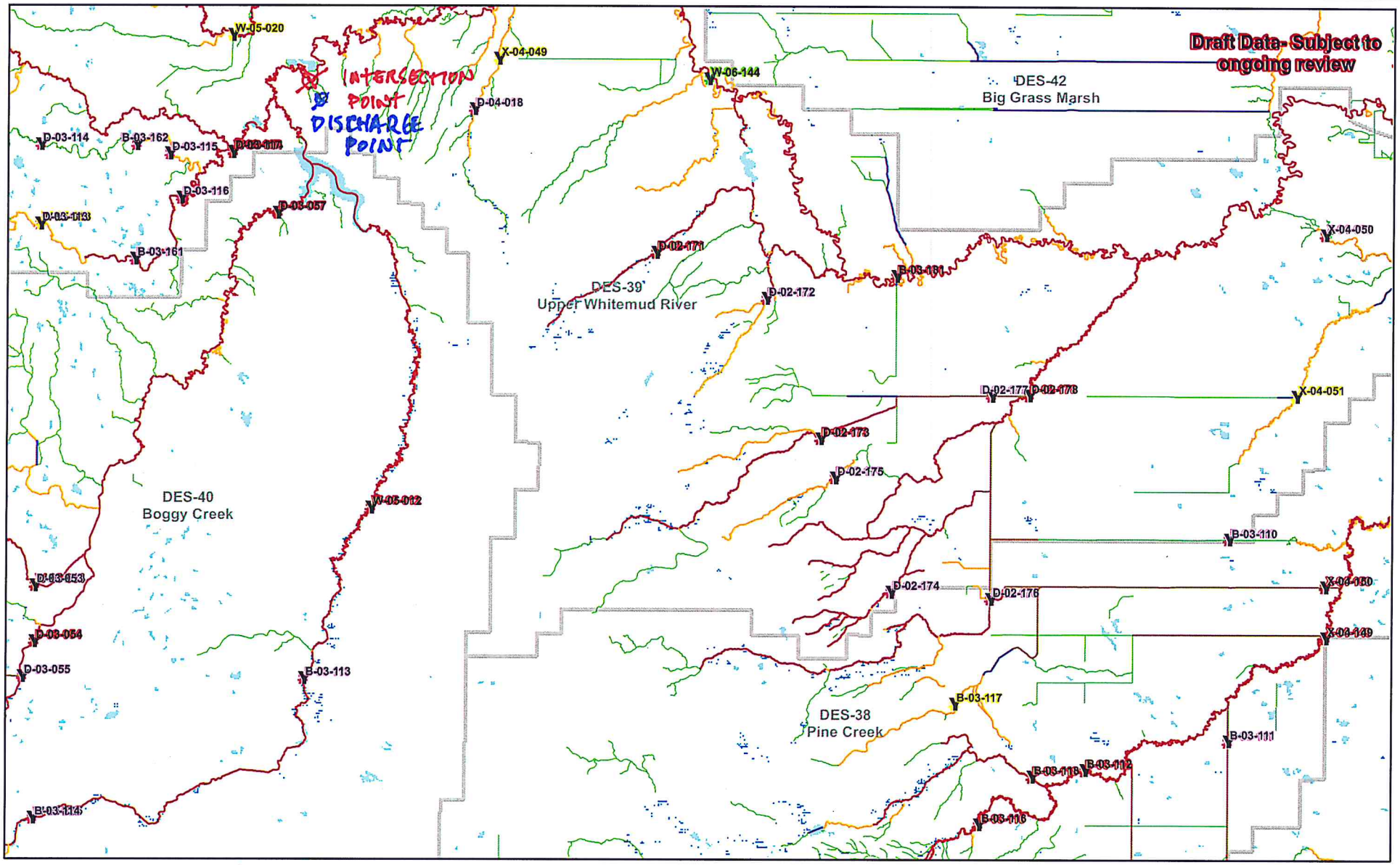
Appendix D – Fish Habitat Map



062J05	062J06	062J07
062J04	062J03	062J02
062G13	062G14	062G15

Habitat Classification

A
B
C
D
E

Fishing Results

Indicator Species
Non-Indicator Species
No Catch
No Fishing Effort

Appendix 9

Sampling sites, fish captures and habitat classification of streams and constructed drains throughout agricultural areas of Manitoba (2002 – 2006)

062J03

Produced April 2012

Appendix E – Geotechnical Report

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199 Henlow Bay
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THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

GEOTECHNICAL INVESTIGATION AND ENGINEERING REPORT FOR ROCKY MOUNTAIN EQUIPMENT NEEPAWA, MANITOBA

Prepared for
NODACO BUILDING SOLUTIONS INC.
P.O. BOX 137
NOTRE DAMES DE LOURDES, MANITOBA
R0G 1M0

Prepared by
STANTEC CONSULTING LTD.
199 HENLOW BAY
WINNIPEG, MANITOBA
R3Y 1G4

December 2, 2013

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

TABLE OF CONTENTS

List of Tables

List of Appendices

1.0 SUMMARY

The National Testing Laboratories Limited was retained to undertake a geotechnical investigation to evaluate the soil conditions and provide foundation recommendations for the proposed Rocky Mountain Equipment building in Neepawa, Manitoba. Three testholes were drilled on the project site on November 14, 2013. The typical soil stratigraphy on the project site, as interpreted from the testhole logs, consists of a shallow stratum of sand overlying clayey silt, silt till and a deep stratum of sand. Based on the soil and groundwater conditions encountered at the testhole locations, the proposed building may be supported on shallow footings, driven timber piles, or precast concrete piles.

2.0 TERMS OF REFERENCE

The scope of work for this project was outlined in our proposal dated October 16, 2013. Mike Berard of NODACO Building Solutions Inc. provided authorization to proceed with the geotechnical investigation on October 22, 2013.

3.0 PROJECT SITE AND PROPOSED CONSTRUCTION

The proposed Rocky Mountain Equipment building will be located at the northwest corner of the intersection of Highway 16 and Neepawa Road, approximately 2 km east of the town of Neepawa, Manitoba. At the time of the field investigation, the project site was undeveloped and sand was exposed at the ground surface within the building footprint. It was reported that 200 to 300 mm of topsoil had been stripped from the building footprint prior to the field investigation. Photographs taken at the time of the field drilling program are provided in Appendix A.

It is our understanding the building will be a steel framed structure with a soil supported floor slab. Approximately two thirds of the floor area will consist of a shop area, and the remaining third of the floor area will consist of a storage room, mechanical room and offices.

4.0 GEOTECHNICAL INVESTIGATION

4.1 TESTHOLE DRILLING AND SOIL SAMPLING

The subsurface drilling and sampling program was conducted on November 14, 2013. Drilling services were provided by Kletke Enviro Drilling Ltd. under the supervision of our geotechnical field personnel. Three testholes were drilled to depths ranging from 15.2 to 18.3 m using a drill rig equipped with 125 mm solid stem augers. The testhole locations are shown on the Testhole Location Plan provided in Appendix B.

Representative soil samples were obtained directly from the augers at depth intervals ranging from 0.3 to 0.8 m. The soil samples were visually classified in the field and returned to our soils laboratory for additional examination and testing. Upon completion of drilling, the testholes were examined for evidence of sloughing and groundwater seepage. The testholes were backfilled with the auger cuttings upon completion of the field drilling program. Excess soil cuttings were left on the project site adjacent to the testhole locations.

At the time of the field drilling program, pit-run material was being stockpiled on the project site. It was reported that the fill material was placed without compaction to a depth of 200 to 300 mm within the building footprint after the field drilling program was completed.

4.2 LABORATORY TESTING

Soil samples recovered from the testholes were tested for water content (ASTM D2216) and shear strength, and the test results are shown on the testhole logs provided in Appendix C. Selected soil samples were tested for particle size (ASTM D422) and the test results are summarized in the following table.

Table 1 - Particle Size Test Data

Testhole no.	Sample Depth (m)	Soil Type	Gravel (%) 75 to 4.75 mm	Sand (%) <4.75 to 0.075 mm	Silt (%) <0.075 to 0.005 mm	Clay (%) <0.005 mm
TH2	1.5	sand	0	56.8	33.5	9.7
TH2	9.1	clayey silt	2.6	11.0	53.0	33.4

The laboratory test reports are provided in Appendix D.

5.0 SUBSURFACE CONDITIONS

5.1 SOIL PROFILE

The typical soil stratigraphy on the project site, as interpreted from the testhole logs, consists of a shallow stratum of sand overlying clayey silt, silt till and a deep stratum of sand. A description of the soil types encountered in the testholes is provided below.

Shallow Sand Stratum

Sand was encountered at the surface of the testholes and extended to depths ranging from 5.6 to 6.2 m. The sand was brown to grey in color, compact, moist, fine-grained and silty with trace amounts of clay. Water contents of the sand ranged from 6% to 31%.

Clayey Silt

Clayey silt was encountered below the shallow sand stratum in the testholes. The clayey silt extended to the depths explored in Testholes TH1 and TH3, and to a depth of 14.6 m in Testhole TH2. The clayey silt was grey in color, soft to firm, moist, and of medium to high plasticity. The clayey silt contained varying amounts of sand and fine gravel. Water contents of the clayey silt ranged from 23% to 39%.

Silt Till

Silt till was encountered below the clayey silt in Testhole TH2 and extended to a depth of 16.8 m. The silt till was tan in color, compact, moist, and contained trace sand and trace gravel. Water contents of the silt till ranged from 22% to 26%.

Deep Sand Stratum

Sand was encountered below the silt till in Testhole TH2 and extended to the depth explored in the testhole. The sand was grey in color, compact, moist and fine-grained. The water content of the sand was 37%.

5.2 GROUNDWATER AND SLOUGHING CONDITIONS

Varying groundwater seepage and soil sloughing conditions were observed during and upon completion of drilling. A summary of our observations during the field drilling program is provided in the following table.

Table 2 - Groundwater and Sloughing Conditions in Testholes

Testhole no.	Groundwater Seepage	Depth of Groundwater Seepage	Depth of Soil Sloughing
TH1	Moderate	3.0 m	1.8 m
TH2	Heavy	1.5 m	2.3 m
TH3	Moderate	3.0 m	1.8 m

Although the depth to the groundwater table could not be confirmed due to excessive soil sloughing in the testholes, the depth to groundwater seepage and water contents of the sand would indicate the groundwater table is at a depth between 1.5 m and 2.0 m.

It should be noted that only short-term seepage and sloughing conditions were observed in the testholes. Groundwater levels will normally fluctuate during the year and will be dependent on precipitation, surface drainage, and regional groundwater regimes.

6.0 GEOTECHNICAL CONSIDERATIONS

Based on our current understanding of the project and the results of our geotechnical investigation, the primary geotechnical concerns at the project site are the high groundwater table and the potential problems with excavation and foundation construction for shallow footings as well as inadequate compaction of the pit run materials placed within the building footprint. These issues will be discussed in the following sections.

7.0 DESIGN RECOMMENDATIONS AND COMMENTS

7.1 FOUNDATIONS

Based on the soil and groundwater conditions encountered at the testhole locations, the proposed building may be supported on shallow footings, timber piles or precast concrete piles. It is generally not recommended that more than one foundation type be used to support a given structure, unless the differing foundation types are used to support structurally independent components of the structure. Cast-in-place concrete friction piles are not recommended due to the problems anticipated during installation due to groundwater seepage and sloughing. End-bearing piles are not recommended for the proposed building as no suitable end-bearing stratum was encountered within the depth of the testholes.

In accordance with the 2010 National Building Code of Canada (NBCC), the use of Limit States Design (LSD) is required for the design of buildings and their structural components including foundations. The limit states of LSD design are classified into two groups; the Ultimate Limit States (ULS) and the Serviceability Limit States (SLS).
The Ultimate Limit States case is primarily concerned with collapse mechanisms for the structure and hence, safety. For foundation design, ultimate limit states consist of:

- Exceeding the load-carrying capacity of the foundation
- Sliding
- Uplift
- Large deformation of foundation, leading to an ultimate limit state being induced in the superstructure or building
- Overturning, and

- Loss of overall stability

The factored resistance at the ULS is the ultimate geotechnical resistance multiplied by the appropriate resistance factor.

The Serviceability Limit State (SLS) case considers mechanisms that restrict or constrain the intended use or occupancy of the structure. They are typically associated with movements that interrupt or hinder the purpose of the structure. For foundation design, serviceability limit states can be categorized as:

- Excessive movements, and
- Unacceptable vibrations

The SLS case is addressed by determining the maximum available resistance to keep the foundation under service loads within tolerable limits as provided by the structural engineer. Unfactored permanent and transitory loads are used for calculating total deformation in non-cohesive soils. Unfactored permanent loads and appropriate portions of transitory loads are used for the initial and time-dependent final deformations of cohesive soils. Therefore, the foundation loads and serviceability tolerances have to be known to properly determine the SLS resistance values. In cases where tolerable movements are not provided by the structural engineer, the tolerable limit of total settlement for foundations subject to compression is assumed to be 25 mm.

7.1.1 SHALLOW FOOTINGS

Based on the soil and groundwater conditions encountered at the testhole locations, shallow footings may be used to support the building. To reduce the risk of encountering the groundwater table during excavation for the footings, it is recommended the footings be constructed at a depth of approximately 1.5 m. Footings bearing on compact sand at a depth of approximately 1.5 m may be designed based upon the parameters provided in the following table.

Table 3 - Limit States Design Parameters for Footings

Factored Bearing Resistance (ULS)	Serviceability Limit Pressure (SLS)
200 kPa	130 kPa

It should be noted that groundwater table at the time of the site investigation was estimated to be between a depth of 1.5 m and 2.0 m. The depth to the groundwater table will vary over time. A high groundwater table will increase the costs for excavation and foundation construction. It is strongly recommended that testpits be excavated to confirm the depth to the groundwater table prior to foundation construction.

The compact sand encountered near the bearing surface elevation is highly susceptible to disturbance during construction of the footings. To prevent disturbance to the footing bearing surface, the final 150 mm of the footing excavations should be excavated with a flat bucket. Construction traffic on the footing bearing surface should not be permitted. All disturbed materials should be removed from the footing bearing surface. The footing bearing surface should be inspected by qualified geotechnical personnel prior to concrete placement. Concrete should be poured as soon as the footing bearing surface has been inspected and approved.

It should be noted that the sand is a highly frost-susceptible soil and freezing of the soil will lead to frost heave. For winter construction, all footing bearing surfaces and the newly poured concrete footings

should be protected from freezing. For long-term protection from frost-related movements, the perimeter of the building must be insulated to prevent frost penetration beneath the footings.

7.1.2 TIMBER PILES

A foundation system suitable to support the proposed building is a system of driven timber piles. Timber piles should have a minimum 200 mm (8 inch) tip and 305 mm (12 inch) butt. These units, when driven to a depth of 13.5 m with a hammer capable of delivering a minimum rated energy of 40 KJ per blow, may be designed based on the factored shaft friction resistance values shown in the following table.

Table 4 - ULS Design Shaft Resistance for Timber Piles

Depth Range below Grade	Factored Shaft Resistance
0 m to 1.5 m	0 kPa
1.5 m to 6.0 m	increases linearly from 6 kPa at 1.5 m to 14 kPa at 6.0 m
6.0 m to 13.5 m	increases linearly from 7 kPa at 6.0 m to 14 kPa at 13.5 m

The contribution from end bearing should be ignored in pile capacity calculations. For friction piles, less than 15 mm of settlement is required to mobilize skin friction and consequently, the SLS case does not govern pile design. Although higher pile capacities will be achieved for pile lengths greater than 13.5 m, it is not anticipated that timber pile lengths greater than 13.5 m will be available. Our office should be contacted if pile lengths greater than 13.5 m are being considered for the proposed structure. The structural engineer must check the properties of the timber pile and confirm that the foundation loads do not exceed the structural capacity of the pile.

Due to the potential for soil drying and shrinkage near the ground surface, the frictional support should be excluded in the calculation of the pile capacity as follows:

- For piles inside heated buildings (not perimeter piles), the depth to ignore for frictional support should be the upper 1.5 m below the adjacent ground surface
- For perimeter piles, the depth to ignore for frictional support should be the upper 2.5 m below the adjacent ground surface

There is a risk that timber piles will refuse within the compact sand. Precautions must be taken to prevent damage to the piles if they cannot be driven to their design depth. Our office should be contacted if piles refuse at a shallow depth to confirm the required capacities have been achieved.

Pile spacing should not be less than 3 pile diameters, measured center to center. Pile heave for piles within 5 pile diameters should be monitored and redriving done where pile heave occurs. Timber piles are subject to decay above the zone of saturation and must therefore be treated with a wood preservative. Pre-boring to a depth of approximately 1.5 m should be considered for all driven piles to enhance pile alignment. The prebored hole diameter should be slightly larger than the nominal pile diameter. All piles should be driven continuously to their required depth once driving is initiated. If pile groups are required, we should be contacted to review the requirement for a group reduction factor.

To ensure that the piles achieve their design capacities, full time inspection by qualified geotechnical personnel is recommended during pile installation.

7.1.3 PRECAST CONCRETE PILES

A foundation system suitable to support the proposed structure is a system of driven precast concrete friction piles. These units, when driven to a depth of 18 m with a hammer capable of delivering a minimum rated energy of 40 KJ per blow, may be designed based on the factored shaft friction resistance values shown in the following table.

Table 5 - ULS Design Shaft Resistance for Precast Concrete Piles

Depth Range below Grade	Factored Shaft Resistance
0 m to 1.5 m	0 kPa
1.5 m to 6.0 m	increases linearly from 6 kPa at 1.5 m to14 kPa at 6.0 m
6.0 m to 18.0 m	increases linearly from 7 kPa at 6.0 m to 19 kPa at 18.0 m

The contribution from end bearing should be ignored in pile capacity calculations. For friction piles, less than 15 mm of settlement is required to mobilize skin friction and consequently, the SLS case does not govern pile design. Although higher pile capacities will be achieved for pile lengths greater than 18 m, soil conditions below a depth of 18 m were evaluated during our site investigation. Our office should be contacted if pile lengths greater than 18 m are being considered for the proposed structure.

Due to the potential for soil drying and shrinkage near the ground surface, the frictional support should be excluded in the calculation of the pile capacity as follows:

- For piles inside heated buildings (not perimeter piles), the depth to ignore for frictional support should be the upper 1.5 m below the adjacent ground surface
- For perimeter piles, the depth to ignore for frictional support should be the upper 2.5 m below the adjacent ground surface

There is a risk that precast concrete piles will refuse at a shallow depth within the compact sand. Our office should be contacted if piles refuse at a shallow depth to confirm the required capacities have been achieved.

Pile spacing should not be less than 3 pile diameters, measured center to center. Pile heave for piles within 5 pile diameters should be monitored and redriving done where pile heave occurs. Pre-boring to a depth of approximately 1.5 m should be considered for all driven piles to enhance pile alignment. The prebored hole diameter should be slightly larger than the nominal pile diameter. All piles should be driven continuously to their required depth once driving is initiated. If pile groups are required, we should be contacted to review the requirement for a group reduction factor.

To ensure that the piles achieve their design capacities, full time inspection by qualified geotechnical personnel is recommended during pile installation.

7.2 FLOOR SLAB

Pit-run material was being stockpiled on the project site at the time of the field drilling program. It was reported that the fill material was placed without compaction to a depth of 200 to 300 mm within the building footprint after the field drilling program was completed. It should be noted that no evaluation of the fill material was undertaken as part of our geotechnical investigation. It is recommended that samples of the fill material be submitted to our laboratory for evaluation of the suitability of the fill material.

Proper compaction of the fill material will be required prior to construction of the floor slab. During compaction of the fill material, care must be taken to avoid disturbing the underlying sand. Following compaction, the surface of the fill material should be proof rolled to identify areas of low strength and unsuitable soils. In areas where unsuitable soils are identified, these soils should be removed and replaced with granular sub-base material. Inspection of the subgrade for the floor slab by qualified geotechnical personnel is recommended during subgrade preparation. It is critical that there be no frost present during compaction or proof rolling of the fill material.

The minimum requirement for fill material beneath a soil-supported floor slab is 150 mm of granular base course. The granular base course should be compacted to at least 100% of maximum dry (Standard Proctor) density. Additional materials required to meet the design elevation should consist of granular sub-base material. The granular base and sub-base materials should comply with the requirements for Manitoba Infrastructure and Transportation Class A and Class C Base Course respectively. Sieve analysis and compaction testing of the base course and sub-base materials should be conducted to ensure that the materials and compaction comply with the design specifications.

Potential settlement of a soil-supported floor slab is anticipated to be less than 25 mm, provided the subgrade and base preparation recommendations provided above are followed. To prevent frost-related movements in the floor slab, the subgrade must not be allowed to freeze during construction and there should be no frost present in the subgrade soils prior to concrete placement for the floor slab.

8.0 FOUNDATION CONCRETE

Based on our experience, type GU cement is considered acceptable for concrete in contact with the sand at a shallow depth. Due to the potential for sulphate attack within the clayey silt layer, precast concrete piles should be manufactured with Type HS cement.

9.0 DESIGN REVIEW, CONSTRUCTION MONITORING & TESTING SERVICES

We should be retained to review the foundation plans and specifications for conformance with the intent of our recommendations. During construction, we recommend that a representative from our firm be involved with the following tasks:

- Inspection of foundation installation
- Inspection of subgrade conditions for floor slab
- Field density tests
- Concrete testing

The purpose of the foundation and subgrade inspection services would be to provide us the opportunity to observe the soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described

herein. The purpose of the concrete and field density testing would be to ensure the materials and construction comply with the specification requirements.

10.0 CLOSURE

Professional judgments and recommendations are presented in this report. They are based on an evaluation of the technical information gathered during our site investigation. We do not guarantee the performance of the project in any respect other than that our engineering work and judgment rendered meet the standards and care of our profession. The testholes may not represent potentially unfavourable subsurface conditions between testholes. If during construction soil conditions are encountered that vary from those discussed in this report, we should be notified immediately in order that we may evaluate the impact, if any, on our recommendations. The recommendations presented in this report are applicable only to this specific site. These data should not be used for other purposes.

We appreciate the opportunity to assist you in this project. Please call me if you have any questions regarding this report.

Prepared by

Aron Piamsalee, B.Sc., EIT
Project Manager, Geotechnical Engineering

Reviewed by

Don Flatt, M. Eng., P.Eng.
Senior Geotechnical Engineer

APEGM
Certificate of Authorization
Stantec Consulting Ltd.
No. 1301

PROVINCE OF MANITOBA
D.G.
FLATT
Member
5062
REGISTERED PROFESSIONAL ENGINEER

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

APPENDIX A

SITE PHOTOGRAPHS

Photo 1 - General view of the project site, with stockpiled pitrun granular fill material

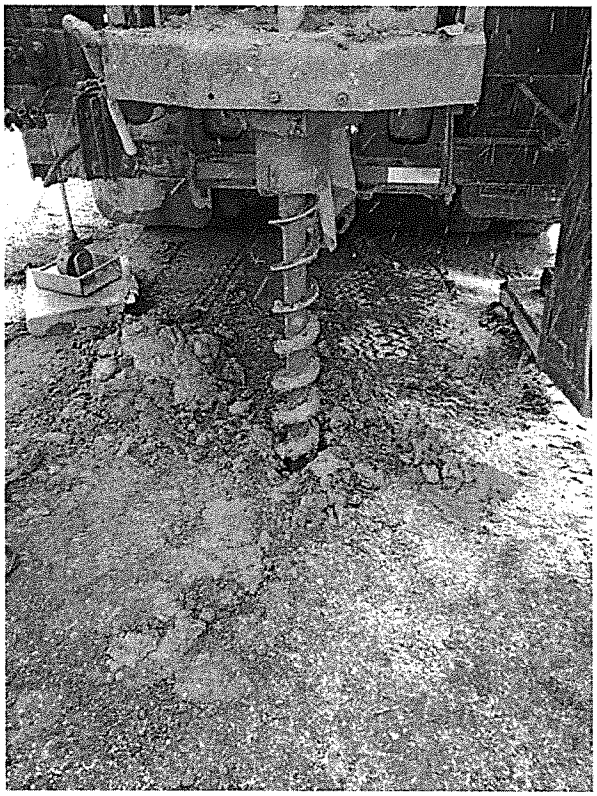

Photo 2 - Drilling Testhole TH2 on the project site

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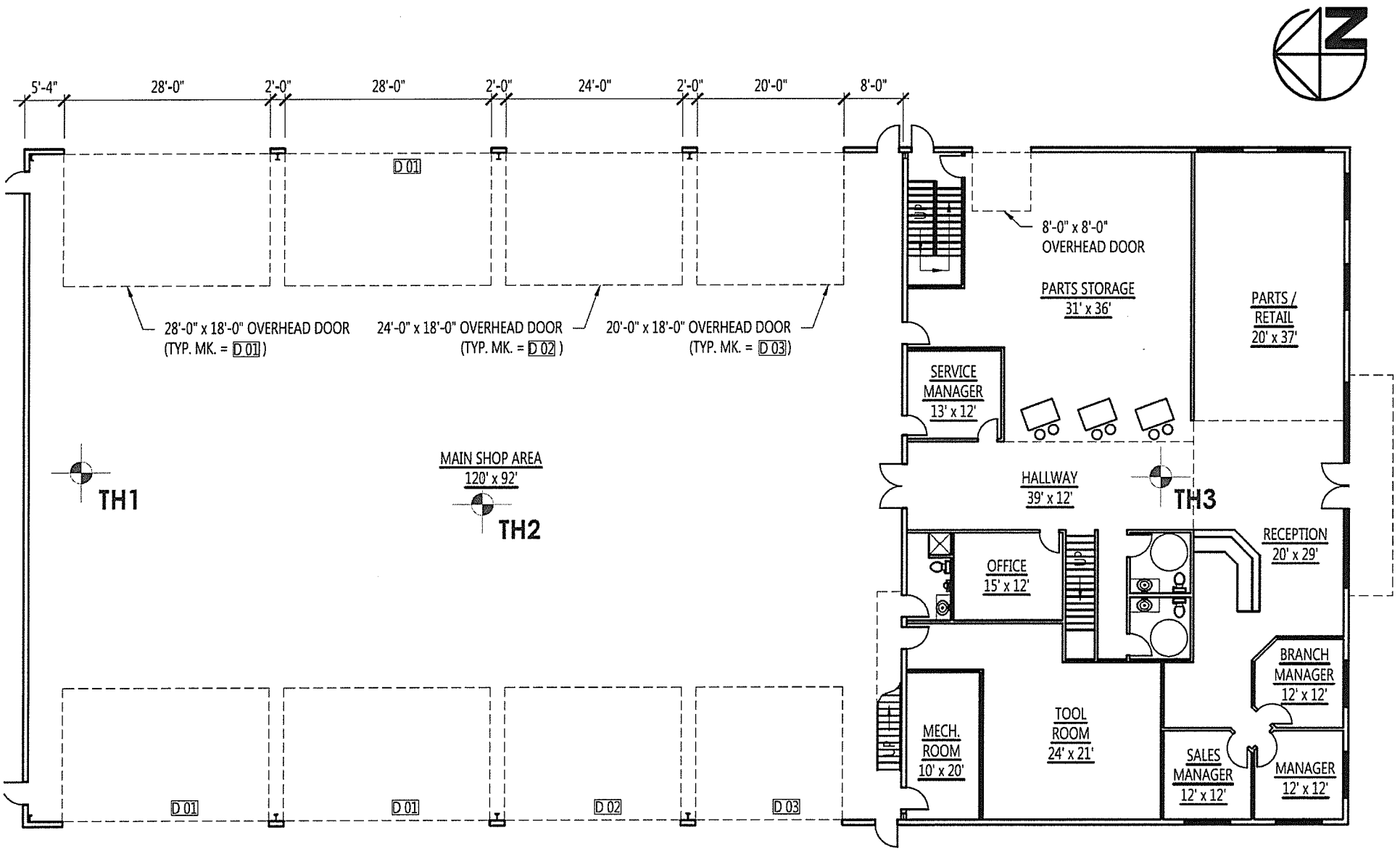
APPENDIX B

TESTHOLE LOCATION PLAN



Stantec	Project No. NBS-1301	Drawn by: NB	Figure: 1
	Date: Nov 26, 2013	Reviewed by: AP	Scale: NTS

Testhole Location Plan
Rocky Mountain Equipment
Neepawa, Manitoba

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APPENDIX C

TESTHOLE LOGS

TESTHOLE TH1

Stantec

Project Name: Rocky Mountain Equipment
Project Location: Neepawa, Manitoba
Client: Nodaco Building Solutions Inc.
Drilling Contractor: Kletke Enviro Drilling Ltd.
Drilling Method: 125 mm Solid Stem Auger
UTM Coordinates: 14U 469092.0 m E, 5564057.0 m N

Date Drilled: November 14, 2013
Depth of Testhole: 15.2 m
Logged by: Nestor Abarca
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	▲ Cu Torvane (kPa) 20 40 60 80	● Water Content (%) 25 50 75 100
1		**Sand** - brown, compact, moist, fine-grained - silty - trace clay - grey below 3.4 m	BS		10
			BS		6
			BS		20
2			BS		27
3			BS		25
			BS		28
4			BS		29
5			BS		27
6		**Clayey Silt** - grey, firm, moist, medium plasticity - trace sand	BS	▲	30
7					
8			BS	▲	32
9			BS	▲	30
10					
11			BS	▲	27
12			BS		38
13					
14			BS	▲	23
15			BS	▲	35
16		• Moderate groundwater seepage was observed at a depth of 3.0 m. • Soil sloughing was observed at a depth of 1.8 m. • Testhole terminated at a depth of 15.3 m.			
17					

TESTHOLE TH2

Stantec

Project Name: Rocky Mountain Equipment
Project Location: Neepawa, Manitoba
Client: Nodaco Building Solutions Inc.
Drilling Contractor: Kletke Enviro Drilling Ltd.
Drilling Method: 125 mm Solid Stem Auger
UTM Coordinates: 14U 469093.0 m E, 5564033.0 m N

Date Drilled: November 14, 2013
Depth of Testhole: 18.3 m
Logged by: Nestor Abarca
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	▲ Cu Torvane (kPa)	● Water Content (%)
1		**Sand** - brown, compact, moist, fine-grained - silty - trace clay - grey below 3.4 m	BS						9
			BS						12
			BS						20
2			BS	0.0	56.8	33.5	9.7		27
3			BS						25
4			BS						26
5			BS						31
6			BS						30
7		**Clayey Silt** - grey, firm, moist, medium plasticity - some sand - trace fine gravel - trace coarse gravel below 8.2 m	BS					▲	31
8			BS					▲	34
9			BS	2.6	11.0	53.0	33.4	▲	26
10			BS					▲	27
11			BS					▲	29
12			BS					▲	28
13			BS						22
14			BS						26
15		**Silt Till** - tan, compact, moist - trace medium to coarse sand - trace fine to coarse gravel	BS						37
16									
17		**Sand** - grey, compact, moist, fine-grained							
18									
19		• Heavy groundwater seepage was observed at a depth of 1.5 m. • Soil sloughing was observed at a depth of 2.3 m. • Testhole terminated at a depth of 18.3 m.							
20									

TESTHOLE TH3

Stantec

Project Name: Rocky Mountain Equipment
Project Location: Neepawa, Manitoba
Client: Nodaco Building Solutions Inc.
Drilling Contractor: Kletke Enviro Drilling Ltd.
Drilling Method: 125 mm Solid Stem Auger
UTM Coordinates: 14U 469092.0 m E, 5564002.0 m N

Date Drilled: November 14, 2013
Depth of Testhole: 15.2 m
Logged by: Nestor Abarca
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	▲ Cu Torvane (kPa) 20 40 60 80	● Water Content (%) 25 50 75 100
0		**Sand** - brown, compact, moist, fine-grained - silty - trace clay - grey below 3.8 m	BS		10
1			BS		6
			BS		8
2			BS		26
3			BS		25
			BS		27
4			BS		29
5			BS		25
6		**Clayey Silt** - grey, soft, moist, medium plasticity - some sand - firm below 6.7 m - soft below 10.4 m - firm below 13.4 m	BS	▲	29
7					
8			BS	▲	28
9			BS	▲	30
10					
11			BS	▲	30
12			BS		34
13					
14			BS	▲	25
15			BS	▲	39
16		• Moderate groundwater seepage was observed at a depth of 3.0 m. • Soil sloughing was observed at a depth of 1.8 m. • Testhole terminated at a depth of 15.3 m.			
17					

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APPENDIX D

LABORATORY TEST REPORTS

Stantec

PARTICLE SIZE ANALYSIS
ASTM D422

Nodaco Building Solutions Inc.
P.O. Box 137
Notre Dame des Lourdes, MB
R0G 1M0

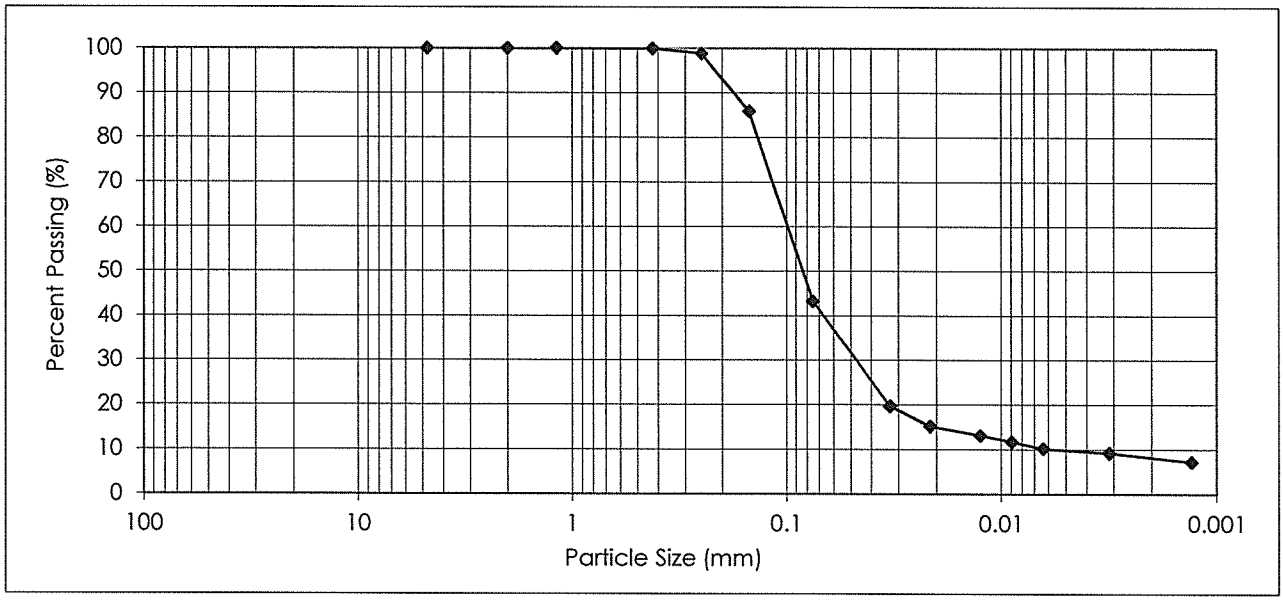
PROJECT: Rocky Mountain Equipment

Attention: Mike Berard

PROJECT NO.: NBS-1301

SAMPLED BY: Nestor Abarca
SAMPLE ID: TH2 at 1.5 m

DATE RECEIVED: November 15, 2013
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	100.0

PARTICLE SIZE	PERCENT PASSING
1.18 mm	100.0
0.425 mm	100.0
0.250 mm	98.8
0.150 mm	85.9
0.075 mm	43.2
0.005 mm	9.7
0.002 mm	7.9
0.001 mm	NT*

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.0	56.8	33.5	9.7	NT*

NT* Sample not tested for colloids

November 22, 2013

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

Stantec

PARTICLE SIZE ANALYSIS
ASTM D422

Nodaco Building Solutions Inc.
P.O. Box 137
Notre Dame des Lourdes, MB
R0G 1M0

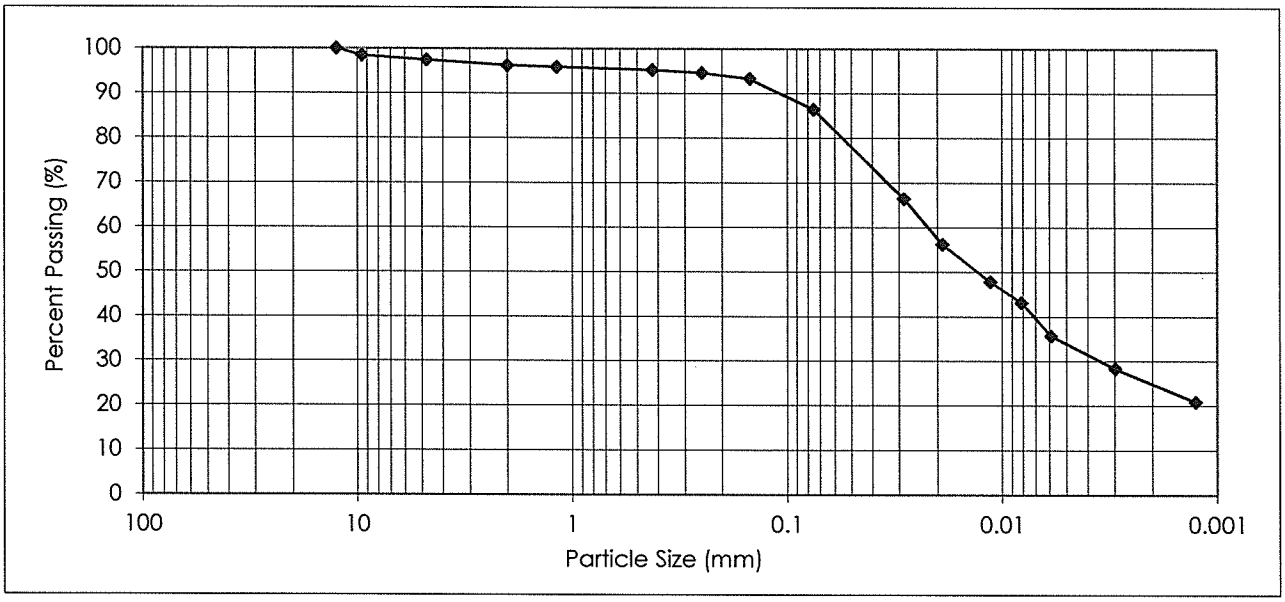
PROJECT: Rocky Mountain Equipment

Attention: Mike Berard

PROJECT NO.: NBS-1301

SAMPLED BY: Nestor Abarca
SAMPLE ID: TH2 at 9.1 m

DATE RECEIVED: November 15, 2013
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	98.4
4.75 mm	97.4
2.00 mm	96.2

PARTICLE SIZE	PERCENT PASSING
1.18 mm	95.9
0.425 mm	95.3
0.250 mm	94.6
0.150 mm	93.3
0.075 mm	86.4
0.005 mm	33.4
0.002 mm	24.1
0.001 mm	NT*

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
2.6	1.2	0.9	8.9	53.0	33.4	NT*

NT* Sample not tested for colloids

November 22, 2013

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

Appendix F – Drawing Package