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October 19, 2016 Ref.: 3316410-000-RPT

Ms. Tracy Braun, Director
Manitoba Sustainable Development
Environmental Approvals
Suite 160, 123 Main Street
Winnipeg MB R3C 1A5

Dear Ms. Braun:

Re: Environment Act Proposal - Bird River Bible Camp Wastewater Management System Design and Construction

MMM Group Limited (MMM), a WSP Global Company has been retained by Southland Church to submit an Environment Act Proposal for a wastewater management system upgrade for the Bird River Bible Camp (Camp) located at NE01-17-13EPM.

Southland Church is planning to upgrade the current wastewater management system at the Camp, from an existing ejector system to a septic field system, in order to meet future wastewater disposal needs at the Camp of up to 15,000 litres per day. Southland Church received an "approval for assumption of responsibility for decommissioning an out of service sewage ejector system" for the Camp from Manitoba Conservation on December 14, 2015.

It is our understanding that wastewater management systems over 10,000 litres per day are categorized as a Class 2 Development under the *Environment Act*. The objective of this Environment Act Proposal is to provide documentation in support of attainment of an Environment Act Licence for this Project.

For your consideration, please find enclosed an electronic (USB drive) copy and four printed copies of the Environmental Act Proposal, the application form and application fee for $7,500.00 made out to the Minister of Finance. If you have any questions or concerns about this submission, please contact the undersigned at 204-272-2020.

Yours truly,

MMM Group Limited

Darren Keam, M.Sc., P.Ag.
Senior Project Manager, Environmental Management

DK/tc

MMM Group Limited

ENVIRONMENT ACT PROPOSAL

BIRD RIVER BIBLE CAMP

WASTEWATER MANAGEMENT SYSTEM DESIGN AND CONSTRUCTION

Prepared for:
Manitoba Sustainable Development, Environmental Approvals Branch

Submitted by:

WSP | MMM GROUP

October 19, 2016 | 3316410-000-RPT

ENVIRONMENT ACT PROPOSAL
BIRD RIVER BIBLE CAMP
WASTEWATER MANAGEMENT SYSTEM DESIGN AND CONSTRUCTION

3316410-000-RPT

Prepared for:

Manitoba Sustainable Development, Environmental Approvals Branch

On Behalf Of:

Southland Church

Prepared by:

MMM Group Limited

October 2016

Prepared by:

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Dated: October 19, 2016

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Darren Keam, M.Sc., P.Ag.
Project Manager
Dated: October 19, 2016

Danette Sahulka, M.Sc., P.Ag.
Senior Ecologist
Dated: October 19, 2016

Environment Act Proposal Form

Manitoba
Sustainable Development

Name of the development:
Bird River Bible Camp Wastewater System Design and Constuction

Type of development per Classes of Development Regulation (Manitoba Regulation 164/88):
On-site wastewater management system - Class 2

Legal name of the applicant:
Southland Church Inc.

Mailing address of the applicant: 190 PTH 52 W

Contact Person: Ryan Warkentin, Associate Pastor

City: Steinbach | Province: MB | Postal Code: R5G 1M2

Phone Number: 204-326-9020 | Fax: | email: ryanw@mysouthland
RYANW@MYSOUTHLAND.COM

Location of the development: RM of Alexander

Contact Person: Ryan Warkentin, Associate Pastor

Street Address: 95437 Provincial Road 315

Legal Description: NE01-17-13EPM

City/Town: Steinbach | Province: MB | Postal Code: R5G 1M2

Phone Number: 204-326-9020 | Fax: | email: ryanw@mysouthland
RYANW@MYSOUTHLAND.COM

Name of proponent contact person for purposes of the environmental assessment:
Darren Keam

Phone: 204-943-3178
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Mailing address: 111-93 Lombard Ave. Winnipeg, MB R3B 3B1

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Date: OCT 5/2016.

Signature of proponent, or corporate principal of corporate proponent:

Printed name: RYAN WARKENTIN

EXECUTIVE SUMMARY

Introduction

The Southland Church of Steinbach, Manitoba, currently operates the Bird River Bible Camp (Camp) located along the Bird River in Manitoba, as a seasonal summer camp for youth and young adults. The Camp is located approximately 145 km northeast of the City of Winnipeg, in the Rural Municipality (RM) of Alexander, at NE01-17-13EPM. Access to the Camp is via Hugh Road, which connects to Provincial Road 315. Southland Church is planning to upgrade the current wastewater management system at the Camp from an existing ejector system to a septic field system (Project), in order to meet future wastewater disposal needs as the Camp continues to expand its number of summer campers and to meet requirements under the *Manitoba Environment Act, On-site Wastewater Management Systems Regulation* (E125 – MR 83/2003). The Project will take place on the Camp land owned by the proponent.

Objective

The purpose of this Environment Act Proposal report is to provide information in support of obtaining an Environment Act Licence for a wastewater management system upgrade at the Camp (Class 2 Development).

Summary

The proposed new on-site wastewater management system for the Camp incorporates a kitchen grease trap, settling solids tanks, and an aboveground, pressurized sand treatment mound design, that will accommodate an increase in camper and staff accommodations up to 230 persons daily with the design flow rate of 15,000 L/day. The design took into account site topography, slope aspect, infiltration aspects, as well as applicable restrictions described in Schedule A, of the *On-site Wastewater Management Systems Regulation 83/2003* under *The Environment Act*.

Components of the Project involved: the completion of a geotechnical assessment for the proposed study area; development of specification drawings for the proposed wastewater management system; a public engagement program designed to provide information to, and address stakeholder and public concerns regarding the Project; and, review of biophysical and socioeconomic components for the Local and Project Study Areas in order to identify potential negative impacts from the Project during the environmental and socioeconomic review for the proposed Project, potential impacts to heritage resources and to the eastern whip-poor-will, a species of conservation concern were identified. Subsequently, a Heritage Resource Impact Assessment (HRIA) was completed for the Project Study Area. No heritage resources were

recovered during the HRIA. Findings of the HRIA report are pending approval from the Manitoba Historic Resources Branch. A copy of any additional communication/requests from the Historic Resources Branch will be forwarded on to Manitoba Sustainable Development Environmental Approvals Branch upon receipt by the proponent. In addition, a targeted field survey for the eastern whip-poor-will was completed with the result that a mating pair of whip-poor-wills was observed within 50 m of the proposed Project site. Appropriate mitigation measures have been incorporated into this Project as outlined below, in order to minimize impact to this bird species.

Mitigation measures incorporated into the Project to minimize negative environmental impacts include: should previously undocumented archaeological resources be discovered, alteration of the site must cease immediately and a permit-holding archaeological consultant should carry out fieldwork in compliance with Part II, Section 12 & 14 of the *Heritage Resources Act*; vegetation clearing will be conducted outside of the breeding bird window (April 15 to August 31) and outside of the activity restriction guidelines for the eastern whip-poor-will (May 15 until July 16); siting the septic field 50 m back from the Bird River and maintaining the surrounding forest as a catchment zone for any potential surface runoff from the field; and, installing three groundwater monitoring wells around the septic field in order to monitor shallow groundwater flow and quality around the septic field.

Based on the review of existing biophysical and human environmental components, assessment of anticipated effects and application of identified mitigation measures within the Project Study Area, the proposed Project is not anticipated to result in any significant adverse environmental or socioeconomic effects.

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LIST OF ACRONYMS AND ABBREVIATIONS

BRCOA	Bird River Cottage Owners Association
°C	degrees Celsius
Camp	Bird River Bible Camp
CLI	Canada Land Inventory
COSEWIC	The Committee on the Status of Endangered Wildlife in Canada
CSA	Canadian Standards Association
EAB	Environmental Approvals Branch
EAL	Environment Act License
EAP	Environment Act Proposal
ESEA	Endangered Species and Ecosystems Act (Manitoba)
GHG	Greenhouse Gas(es)
HCB	Heritage Conservation Branch
HRIA	Heritage Resource Impact Assessment
km	kilometre(s)
KPa	Kilo Pascal
L	litre(s)
L/day	litres per day
L/s	litres per second
lbs	pounds
LSA	Local Study Area
m	metre(s)
m^2	square metre(s)
masl	metres above sea level
mbg	metres below grade
mg/L	milligrams per litre
mm	millimetre(s)
MMM	MMM Group Limited (consultant assigned to the project)
MB CDC	Manitoba Conservation Data Centre
MSD	Manitoba Sustainable Development (formerly Manitoba Conservation and Water Stewardship [MCWS])
PDI	Plumbing and Drainage Institute
PEP	Public Engagement Plan
PSA	Project Study Area
psi	pounds per square inch
ppm	parts per million
R.M.	Rural Municipality
SARA	*Species at Risk Act*
USpgm	U.S. gallons per minute

1.0 INTRODUCTION

The Southland Church of Steinbach, Manitoba currently operates the Bird River Bible Camp (Camp) located along the Bird River in Manitoba as a seasonal summer camp for youth and young adults. Southland Church is planning to upgrade the current wastewater management system at the Camp from an existing ejector system to a septic field system, in order to meet future wastewater disposal needs as the Camp continues to expand its number of summer campers (Project). This Environment Act Proposal (EAP) describes the details of the proposed wastewater management system upgrade. Based on discussions with the Manitoba Sustainable Development (MSD, formerly Conservation and Water Stewardship), Environmental Approvals Branch (EAB), wastewater management systems over 10,000 litres per day (L/day) are categorized as a Class 2 Development as described under the *Environment Act – Classes of Development Regulation*.

1.1 Background

The Camp was established in 1952 and encompasses approximately 65 hectares (160 acres) of land along the Bird River. The Southland Church operates the Camp over an 8-week summer season through July and August. The Camp currently houses approximately 1,000 guests and staff (approximately 150 people per week – 100 campers and 50 staff) over the summer season and would like to increase usage to 1,500 guests and staff (approximately 230 individuals on-site per week) over the summer season. The Camp was previously owned by the Baptist General Conference of Canada and managed under the Bird River Camping Association (Property Titles are included in Appendix D). The property has now transferred ownership to Southland Church Inc., as of June 1, 2016. As required by the *Manitoba Environment Act, On-site Wastewater Management System Regulation*, Clause 14.2, the transfer of land on which a sewage ejector system is located requires the ejector to be decommissioned and a new wastewater management system to be put in place. As such, the Camp's current wastewater system is outdated and no longer meets the Province's environmental standards. Southland Church received an "approval for assumption of responsibility for decommissioning an out of service sewage ejector system" for the Camp from Manitoba Conservation on December 14, 2015 (a copy of this document is provided in Appendix D).

A feasibility study was conducted in 2015, to evaluate a suitable wastewater management system for the Camp to allow for the future expansion and retirement of the current ejector system (refer to Section 3.0 of this report).

1.2 Objective

The purpose of this EAP is to provide information in support of obtaining an Environment Act Licence (EAL) for a wastewater management system upgrade at the Camp (Class 2 Development). The EAP report provides:

- An overview of the Project.
- A detailed description of the proposed on-site wastewater management system.
- A summary of the public engagement activity completed for the Project.
- A summary of the existing biophysical and socioeconomic environments within the Project Study Area.
- A summary of potential environmental effects of the Project and mitigation measures to be employed to minimize these effects during the course of the Project development.

1.3 Proponent

The proponent of the Project is the Southland Church of Steinbach, Manitoba.

1.4 Project Location

The Camp is located approximately 145 km northeast of the City of Winnipeg, in the Rural Municipality (RM) of Alexander, at NE01-17-13EPM with municipal address 95437 Provincial Road 315, Alexander, Manitoba (refer to **Figure 1**, **Appendix A**). The Project will take place on the Camp land owned by the proponent (refer to **Figure 2**, **Appendix A**). Access to the Camp is via Hugh Road, which connects to Provincial Road 315.

2.0 DESCRIPTION OF REGULATORY REQUIREMENTS

Water and wastewater disposal in Manitoba are governed by both the *Environment Act* and the *Public Health Act*. Under these Acts there are a number of regulations that are applicable to the Project including:

- *On-site Wastewater Management System Regulation, 83/2003*
- *Water and Wastewater Facility Operators Regulation, 77/2003*
- *Water Works, Sewage and Sewage Disposal Regulation, 38/2007*

2.1 On-site Wastewater Management System Regulation, 83/2003

The objective of the *On-site Wastewater Management System Regulation* is the protection of water quality throughout Manitoba. This regulation applies to combined sewage or greywater flow of less than 10,000 L/day and to private, generally residential systems. The *On-site*

Wastewater Management System Regulation also outlines the prohibitions on new, expanded or modified sewage ejector systems and the phasing out of existing sewage ejector systems when there is a transfer of land or subdivision on which the sewage ejector system is located. For wastewater management systems greater than 10,000 L/day these systems are then administered by the *Water Works, Sewage and Sewage Disposal Regulation* of the *Public Health Act*.

2.2 Water Works, Sewage and Sewage Disposal Regulation, 38/2007

MSD, EAB approval is required for the development of new wastewater collection systems or alteration of existing wastewater collection systems pursuant to Sections 6 to 7 of the *Water Works, Sewerage and Sewage Disposal Regulation*, and its Amendment under the *Public Health Act*. Section 6 requires that the proponent shall submit to the Minster of Environment required documents (e.g., plans, specifications and reports) for approval. Section 7 of the regulation states that: "no proponent shall construct, alter or operate a wastewater treatment system without first obtaining approval from the Minister". Approval by the Minister of Environment is provided by an EAL pursuant to the *Environment Act* and the *Classes of Development Regulation*.

2.3 Water and Wastewater Facility Operators Regulation, 77/2003

The *Water and Wastewater Facility Operators Regulation* addresses the classification of water and wastewater facilities and certification of operators in Manitoba. Wastewater facilities that are licenced (>10,000 L/day) by the MSD EAB require a certified operator to manage the system as defined by this regulation.

3.0 FEASIBILITY ASSESSMENT FOR WASTEWATER DISPOSAL SYSTEM OPTIONS

In order to aid the Southland Church in the selection of a new preferred wastewater disposal system option, a feasibility assessment was undertaken in 2015 that included:

1. Modelling the current wastewater production for the Camp and future needs;
2. Reviewing the requirements of the Provincial Acts and Regulations pertaining to wastewater disposal outlined in Section 2.0 in regards to the Project; and
3. Assessing three viable disposal system options in terms of ability to handle more than 10,000 L of peak water use per day, capital costs for each option, long-term maintenance requirements and life expectancy of each system.

3.1 CURRENT WATER USE

Southland Church provided a summary of current water use fixtures for the Camp; this information is summarized in **Table 1**.

Table 1. Current Water Use Fixtures for the Camp

Fixture Type	Water Use Rate	Anticipated Water Use Duration	Number of Fixture Type at Camp
Toilets	6 L/flush	1 flush	27
Urinal	6 L/flush	1 flush	5
Lavatory Faucet	7.3 L/min.	30 seconds	32
Shower	7.3 L/min.	5 minutes	26
Kitchen Sink	14 L/min.	-	14
Dish Washer	11.3 L/rack	1 cycle	1
Cloth Washer	122.7 L/wash	1 cycle	5
Laundry Sink	13.6 L/min.	-	2

Table 2 provided by Southland Church, is the estimated day use occupancy for the Camp for a typical day when fully active, this occupancy use table would apply to approximately 40 days of the 74 days the Camp is open. The Camp houses youth campers only Monday to Friday. The balance of days (34 of the 74 days), the occupancy is reduced to approximately 10 to 12 adults that ready and maintain the Camp for the weekday campers. The occupancy use table is based on best estimates from the Camp's experience.

Table 2. Occupancy Table

Hours of the Typical Day	Adult Employee	Child Camper
1	0	0
2	0	0
3	0	0
4	40	0
5	80	0
6	80	20
7	80	100
8	80	100
9	80	100
10	80	100
11	80	100
12	80	100
13	80	100
14	80	100
15	80	100
16	80	100
17	80	100
18	80	100
19	80	100
20	80	100
21	80	100
22	40	0
23	0	0
24	0	0

During the summer of 2015, the Camp tracked both the in-flow water use and the discharge wastewater volume to the ejector system. The average water use was approximately 10,646 L/day and the average wastewater produced was 7,554 L/day. Peak water use on an individual day was recorded as 21,846 L on August 18, 2015, and in general, peak discharge rates were reported to be greater than 10,000 L/day on more than one occasion within a week throughout the summer.

Table 3. In-flow and Pump Discharge Volumes

Dates		In-flow Meter Readings (L)	Pump Discharge (L)	# of People	Avg L/Person
July 8-9	Maximum	15898.722	19286.67		
	Minimum	0.00	7883.39		
	Weekly Average	**7949.36**	**3941.695**	**155**	**51**
July 13-17	Maximum	12253.37	10705.12		
	Minimum	7567.03	7156.14		
	Weekly Average	**10643.06**	**8721.182**	**162**	**66**
July 20-23	Maximum	12647.05	11170.56		
	Minimum	2755.78	3898.06		
	Weekly Average	**8683.73**	**8276.105**	**153**	**57**
July 26-31	Maximum	10595.36	12159.62		
	Minimum	5151.94	5207.11		
	Weekly Average	**10092.66**	**8017.204**	**155**	**65**
August 4-7	Maximum	16856.43	11286.92		
	Minimum	7124.14	4392.59		
	Weekly Average	**10222.50**	**7621.58**	**155**	**66**
August 9-14	Maximum	14490.55	9308.80		
	Minimum	4455.43	4567.13		
	Weekly Average	**13240.61**	**6969.964**	**162**	**82**
August 16-21	Maximum	21845.60	10036.05		
	Minimum	6658.54	959.97		
	Weekly Average	**12102.71**	**5905.27**	**167**	**72**
August 23-28	Maximum	17791.43	19868.47		
	Minimum	9842.07	8697.91		
	Weekly Average	**12515.32**	**13160.316**	**164**	**76**
August 30-September 4*	Maximum	14782.03	8581.55		
	Minimum	4008.75	2007.21		
	Weekly Average	**10362.94**	**5370.014**	**56**	**186**

Notes:

All meter readings taken between 6-8am except July 20 (18:30) and July 26 (14:00)

29.09 = litres/minute discharge flow

Inflow summer average L/day = 10646

Discharge average L/day = 7554

*End-of season Camp clean-up activities

3.2 WASTEWATER MODEL ANALYSIS

A wastewater model was produced to evaluate the daily water consumption of current and future occupancies during peak summer months at the Camp. The results were used to establish the foundation for the evaluation of a suitable wastewater management system, to meet future demands for wastewater production of over 10,000 L/day.

The following scenarios were evaluated for total wastewater production:

- Scenario A: Water use with current use population and current water use features.
- Scenario B: Water use with current use population and new efficient water-use features.
- Scenario C: Water use with future population (50% increase) and new efficient water-use features.

The scenarios were modeled using industry accepted standards for usage patterns. Water consumption rates for current equipment were based on information provided by the Southland Church. Water consumption rates for new efficient water use features were based on typical new equipment specifications. All modeling assumptions are summarized in **Table 4** below.

Table 4. Water Model Assumptions

Fixture Type	Current Flow Rate	Efficient Flow Rate	Duration	Uses / Day	Users (Current)	Users (50% incr.)
Toilet (Female)	6 L/flush	4.8 L/flush	1 flush	5	90	135
Toilet (Male)	6 L/flush	4.8 L/flush	1 flush	2	90	135
Urinal (Male)	6 L/flush	0.5 L/flush	1 flush	3	90	135
Lavatory Faucet	7.3 L/min	1.9 L/flush	15 seconds	5	180	270
Shower	7.3 L/min	5.7 L/flush	5 minutes	1	180	270
Kitchen Sink*	14 L/min	5.7 L/flush	15 seconds	0.1	80	120
Dish Washers	11.3 L/cycle	5 L/cycle	1 cycle	120	1	1.5
Clothes Washers	122.7 L/cycle	60 L/cycle	1 cycle	5	1	1.5

*It is assumed that only 10% of adult employees will use kitchen sinks and that kitchen sinks will not be used by youth campers.

Using the stated model assumptions, the results show the peak daily wastewater for the current population and fixtures (Scenario A) to exceed the 10,000 L/day peak threshold. If new efficient water-use features were to be installed for the current population (Scenario B), the model shows daily wastewater to fall below the threshold. However, once the population grows by 50%

(Scenario C), the model again shows daily wastewater to rise above the threshold, even with new water-use features installed. A summary of the water model results is summarized in **Table 5** below.

Table 5. Water Model Results

Scenario	A	B	C
Peak Daily Wastewater	13,760 L/day	8,571 L/day	12,856 L/day

3.3 EVALUATION OF WASTEWATER USE SYSTEM

The evaluation of an applicable on-site wastewater management system was completed to provide an evaluation of potential suitable systems that will meet the water use scenarios and regulatory framework requirements. Based on the three scenarios of the water use model (A = 13,760 L/day; B = 8, 571 L/day and C = 12, 856 L/day) three options for wastewater management were developed (refer to Table 6): 1) a holding tank; 2) a subsurface disposal system (septic field); and, 3) a small wastewater treatment plant or lagoon.

Table 6. Proposed Wastewater Management Options

Proposed Wastewater Management System	Option 1: Holding Tank	Option 2: Subsurface Sewage Disposal Systems (Field)	Option 3: Small Wastewater Treatment Plant/Lagoon
Applicable Scenario (A, B, C)	A, B and C	A, B and C	A, B and C
Site Suitability	Intrusive Investigation required.	Intrusive Investigation required.	Intrusive Investigation required.
Limitations	Requires weekly pump-out and transport to a neighbouring wastewater treatment facility. Agreement to be in place with local treatment facility and demonstrated capacity. A certified Wastewater Operator required for Scenario A and C.	Limited ability to expand future occupancy and must implement water efficiency fixtures.	Significant Capital Investment for limited days of use. Annual start-up and shut-down costs. A certified Wastewater Operator required for Scenario A and C.
Advantages	Meets regulatory requirements. Limited mechanical constraints. Allows for expansion.	Meets regulatory requirements. Basic, limited mechanical constraints. Self-contained. Only pumping and transporting solids once per season.	Meets regulatory requirements. Limits environmental exposure. Self-contained.

Proposed Wastewater Management System	Option 1: Holding Tank	Option 2: Subsurface Sewage Disposal Systems (Field)	Option 3: Small Wastewater Treatment Plant/Lagoon
Capital and Operating Costs	Tank Certified Wastewater Operator (Scenario A and C). Transport of total volume to wastewater treatment facility and disposal fees.	Tank and Field Certified Wastewater Operator (Scenario A and C). Transport of solids to wastewater treatment facility and disposal fees.	Treatment System Contractor Certified Wastewater Operator Maintenance
Associated Costs	Scenario A and C require an EAL and therefore consultancy fees, administration fees are required.	Engineering Scenario A and C require an EAL and therefore consultancy fees, administration fees are required. Contractor	Engineering Requires an EAL and therefore consultancy fees, administration fees are required.
Discussion	Option 1 has the lowest capital cost but maintains a lifetime of transport and disposal costs that are subject to third party decisions.	Option 2 has a greater capital investment and associated costs than Option 1 however, the long term operating and maintenance costs are manageable.	Option 3 requires the greatest capital investment and associated costs to service the potential future occupancy growth, however with the seasonal utilization of the Camp and system this option is cost prohibitive.

After review of the wastewater disposal options, Southland Church elected to install a septic field system at the Camp to meet future needs based on capital cost, annual maintenance requirements, environmental sustainability and life expectancy of the septic field system.

4.0 DESCRIPTION OF PROPOSED PROJECT

4.1 Overview of Proposed Project

The Camp administration is projecting growth at the Camp, and has requested that the new wastewater management system be designed for a daily capacity of 15,000 L. While the Camp is anticipating increasing the number of campers and staff to 230 individuals (35% increase), the proposed design allows for a growth of nearly 40% at the Camp, thus permitting adaptability within the system.

The system will include a series of solids settling tanks buried in a tank nest, and a septic field consisting of six independent treatment “zones”, which are elevated mounds constructed of

sand and gravel. The design took into account daily effluent peak flow, site topography, slope aspect, infiltration aspects, as well as applicable restrictions described in Schedule A, of the *On-site Wastewater Management Systems Regulation 83/2003* under *The Environment Act* including required setback distances as outlined in **Table 7**.

Table 7. Required Setback Distances for Septic Tanks and Field Design

Feature	Minimum Setback Distance Required under Schedule A		Discussion
	Septic Tanks	Septic Field	
Building	1 m (3.25 feet)	11 m (36 feet) (building with a basement)	The septic tanks nest and septic field will be located more than 20 and 100 m from the nearest occupied Camp building respectively.
Property boundary	3 m (10 feet)	8 m (26 feet)	The septic tanks nest and field will be located within Camp property boundaries (more than 200 m from adjoining properties).
Well	8 m (26 feet)	15 m (50 feet) (drilled and cases to a minimum of 6 m below ground)	The on-site groundwater well is located more than 30 m from the proposed septic tanks nest location and more than 75 m from the septic field. Monitoring wells will be installed 15 m away from the septic field.
Water course, excluding a ditch	15 m (50 feet)	30 m (100 feet)	The septic tanks nest and septic field are located more than 30 m from the Bird River.
Cut or embankment	8 m (26 feet)	15 m (50 feet)	During in-field establishment for the septic field, the 15 m setback will be applied to landscape features such as the strong slope descending to the Bird River.
Swimming pool	3 m (10 feet)	8 m (26 feet)	Not applicable to site
Cistern Water service pipes	3 m (10 feet) --	-- 8 m (26 feet)	Not applicable to site Septic field is located more than 8 m from water service lines.

4.2 Topographical Data Review and Geotechnical Assessment

In order to determine the optimal location for the on-site wastewater management system, a review of topographical and slope information provided by Manitoba Hydro was completed for the general area of the Camp. Based on this information, a preliminary location for the septic field was selected based on a maximum potential setback distance from the Bird River of 50 m, setback from drop-offs (cuts) and levelness of the ground surface. A geotechnical evaluation was completed in November 2015, for the proposed septic field location; however geotechnical test-pits could not be accomplished due to mature tree cover in most of the proposed septic field area. **Figure 3**, **Appendix A** provides an overview of the topography for the Camp. Select photographs of the geotechnical survey are provided in **Appendix C**.

4.3 Soil Characteristics

On April 29, 2016, two soil test holes were drilled at representative locations within the proposed septic field area and soil samples were taken at depths of approximately 0.3 and 1.2 m below grade (mbg), in order to characterize the soil for final location siting for the septic field. Analysis for particle size distribution shows the soil to be silty clay to heavy clay below the forest soil matt. Clay content was found to range from a low of 45% to a high of 78% with two samples at 64% and 68%. The particle size distribution curves for the four samples are generally similar (refer to **Appendix D**). The test holes showed the soil to be dry to a depth of 1.2 mbg, indicating that the high water table is below that level. No rock, sand or coarse gravel deposits were encountered to the same depth. Photographs of the geotechnical survey are provided in **Appendix C**.

Based on these results, the soil at the Camp is suitable for the installation of a wastewater disposal field but is limited to an above-ground system as per requirements found in the *On-site Wastewater Management Systems Regulation 83/2003* and supplementary information provided by MSD. A pressurized sand filter system is one such above-ground system that is approved under *Regulation 83/2003*, and this type of system has been selected as the preferred system for this application.

4.4 Location of the Septic Field

The proposed system will include the development of a pressure sand treatment mound system in a wooded area located approximately 100 m east of the main Camp Lodge. The septic field will be located approximately 50 m from the Bird River shoreline. **Figure 4**, **Appendix A** provides the initial conceptual field layout for the selected septic field system. The surrounding area of the proposed disposal field is covered with mature trees (refer to **Section 7.0** for additional details on existing environment).

4.5 Design of Septic Field System

The solids settling tanks, septic field, and natural processes will work together to treat the wastewater. All components of the treatment system (kitchen grease trap, solids holding tanks, distribution line and valve chamber, and septic field) will be new on-site and the old on-site holding tanks will be decommissioned according to *On-site Wastewater Management Systems Regulation 83/2003, Schedule I (Decommissioning Out-of-Service Systems).* Refer to **Appendix B** for Drawings of the proposed septic field.

4.5.1 Grease Trap

Currently the Camp kitchen is not equipped with a grease trap. The proposed Project will include the installation of a passive grease trap for kitchen sinks and dishwashers where solid food waste, fats, oils and grease will be retained and not permitted to enter the on-site wastewater management system. The kitchen wastewater will be directed through the grease trap, upstream of the drain connection to the main building drain. The grease trap tank will act as a reservoir holding the wastewater and food solids, as the wastewater cools, fats, oils and grease will solidify and the food solids will settle out. The fats, oils and grease will float to the top of the trap and the wastewater will then be drawn out to the on-site solids settling tanks.

Specifications for the kitchen grease trap have not been determined as of yet, however the Camp is committed to ensuring the long-term operation of the on-site wastewater management system and the installation of a kitchen grease trap. A potential model for consideration is the Endura Model 3935A04, which has the capacity of 35 USgpm and 70 lbs. The foregoing rate of flow would be sufficient if the wash basins in the kitchen would have a combined working capacity of less than 35 US gallons and that, if drained simultaneously from a completely full condition would be expected to drain in not less than one minute. For the dishwasher, the required grease interceptor capacity is rated by the Plumbing and Drainage Institute (PDI). It is expected that a typical dishwasher for a facility like the Camp kitchen will have a required grease interceptor rated capacity of about 15 to 20 lbs, well below the rated capacity of the aforementioned recommended model. The CSA Standard for such a unit is CSA B 481. The above-listed model is fabricated of injection moulded, seamless and leak-proof copolymer thermoplastic for corrosion resistance and long life.

4.5.2 Settling Solids Holding Tanks

A settling solids holding tank nest will be located approximately 30 m south of the main Camp Lodge building (**Figure 4**, **Appendix A**) and will be utilized to settle out solid waste from liquid waste. The solids tanks will have a capacity for 140% of daily flow and a pump-out chamber with a minimum of 20% daily flow. As wastewater enters the holding tanks, a corresponding volume of liquid (no solids) will overflow into a final pump-out tank. When the volume of liquid builds to a predetermined volume, the liquid (effluent) will be pumped approximately 100 m east

to the above ground, pressurized sand treatment mound. Solids retained in the holding tanks will be pumped out and hauled off site to an appropriate waste disposal site by a certified contractor on an "as required" basis. Assuming that the choice of tanks will be precast concrete, the standard size that is anticipated is the 1,400 gallon model with a working capacity of 6,000 L per tank. Three such tanks in series plus a two-compartment final tank with a similar overall size, but customized to provide a settling compartment of about 3,000 L and a pump chamber of the same size, will provide the required pre-treatment before the effluent is pumped to the proposed sand treatment mound system.

The holding tanks are to be installed with a burial of at least 1.8 m. The three holding tanks shall be equipped with an access riser and secure covers for access to pump out the solids from time to time. The two-compartment final pump-out tank shall have an access riser of sufficient size to permit the installation and removal of the pump, controls, discharge piping, final filter and solids removal.

4.5.3 Effluent Discharge Pump

The effluent discharge pump is designed to match the characteristics of the pipeline, filter, indexing valve and distribution system of the on-site wastewater management system. On the basis of dividing the field into six zones, the pump is specified to be capable of pumping a minimum of 2.5 L/sec (40 USgpm) at a total dynamic head of 15 m (50 feet). The specifications of the pump shall be submitted by the supplier to the Camp for review prior to construction of the system.

The discharge pipe from the pump shall be directed through a pressure filter, such as Sim/Tech STF 100. Unless otherwise approved by the Camp as equivalent, the filter shall be 75 mm in diameter and 450 mm long. The screen shall be stainless steel with 1.6 mm diameter holes spaced to provide for a minimum 40% open area. The pressure filter shall be installed so that it is readily accessible for removal and cleaning (estimated to be required every six months to one year). The discharge from the pressure filter shall be connected to the proposed 50 mm forcemain which conveys the effluent to the indexing valve chamber adjacent to the disposal field.

It is recommended that the effluent pipe from the pump shall have a single, drilled hole, 4 mm in diameter, inside the control tank and above the high liquid level, to permit some back-drainage from the effluent forcemain following each pumping cycle. In particular, it would permit the portion of the forcemain that comes up into the disposal field valve chamber to drain back, thus reducing the chance of freezing in the winter. A 90º elbow fitting shall be inserted into the drilled hole and fitted with a tube which directs the flow downwards into the control tank liquid.

The forcemain from the pumpout chamber to the disposal field shall be a 50 mm diameter polyethylene pipe, CSA-Certified with a minimum pressure rating of 515 kPa (75 psi). The pipe

shall be installed and joined in accordance with the installation recommendations of the pipe manufacturer. Minimum bury shall be 1.8 m in depth.

4.5.4 Above Ground, Pressurized Treatment Mounds

The option of the above ground, pressurized sand treatment mound is permitted in the 2005 Director Variance for *Regulation 83/2003*. The above ground, pressurized sand treatment method is an effective and relatively robust system that offers a considerable margin of safety for long-term operation of the proposed on-site wastewater management field. The sand treatment mound is proposed to be installed in the location shown on the attached **Figure 4**, **Appendix A**. Sand treatment mounds in the Manitoba environment have been shown to provide secondary level treatment of wastewater within the sand filter and before the effluent comes in contact with and infiltrates the underlying native organic layer and mineral soil, thus aiding both the rate and extent of infiltration.

The *Regulation 83/2003* and the Director Variance do not specify full details for the design of sand treatment mounds. Both the Manitoba On-site Wastewater Management Systems Training Manual and the 2009 Alberta Private Sewage Systems Standard of Practice Handbook (which has been used successfully for on-site wastewater systems in Manitoba) have been referenced in completing the design of the proposed sand treatment mound system. **Drawing 1.0**, **Appendix B** outlines the plan view for pressure distribution zones 1 through 6, a section view, manifold and laterals layout and the valve chamber detail.

The sand treatment mound system will consist of an above ground bed of washed and graded (ASTM C-33) sand on which a total of six zones of graded rock and perforated pressure distribution pipe will be placed. Wastewater effluent from the primary settling tanks will be applied sequentially in these six zones for filtration in the sand and infiltration into the underlying soil. Details are shown on **Drawing 1.0**, **Appendix B**.

This on-site wastewater management system will allow for a 40% growth in Camp and the buffering capacity of the sand filter system offers about four weeks of holding capacity in the voids of the sand alone for easy accommodation of occasional days of extraordinary flows.

4.5.5 Base Area Preparation

The design base area of each of the six zones is 16 m wide by 28 m long, approximately 450 m^2 and will be installed contiguous to each other. Each individual zone will be configured to accommodate the landscape topography in the area where the field is to be located and does not need to be level between zones. The configuration of the six zones is shown in **Figure 4**, **Appendix A**.

The aforementioned soil analysis, when applied to the Soil Texture Classification Triangle in *Regulation 83/2003* and related supplementary information documents indicates that the permissible wastewater application rate is 8.31 L/day per square metre. The formula in Clause 2(6) of Schedule A of the Regulation calls for a safety factor of 2.0 in applying the application rate for an area field. Since the use of an aboveground, pressurized sand treatment filter provides for wastewater treatment that is essentially equal to that of other aerated methods of secondary treatment we have applied a 25% reduction in the application area when receiving wastewater effluent only from an aerobic treatment unit (Clause 2(7) of Schedule A).

$$Area\ of\ Field = \frac{(Daily\ Effluent\ Flow)x\ (Safety\ Factor)}{(Application\ Rate)}\ (1 - \frac{aerobic\ treatment\ coefficient}{100})$$

- Area of Field = total required disposal field surface area.
- Daily Effluent Flow = daily wastewater effluent flow to the field
- Safety Factor = factor of 2 for graded stone and pipe systems and 1.5 for chamber/aggregate free system.
- Application Rate = Applicable application rate for the proposed field (Schedule A, Table)
- Aerobic treatment coefficient = a reduction of up to 25% in a field's size when receiving wastewater effluent only from an aerobic treatment unit.

$$Area\ of\ Field = \frac{(15{,}000\ L/Day)x\ (2)}{\frac{8.31\frac{L}{Day}}{(square\ metre)}}\ (1 - \frac{25}{100})$$

Area of Field = 2,708 square metres

Therefore, the total area of field required is 3,610 square metres; with the aerobic treatment coefficient applied the required land area is 2,708 square metres and then divided amongst six zones is the individual zone area is approximately 450 square metres.

Prior to the installation of the sand filter, the footprint of the entire field will be cleared of trees and large branches, but retaining the forest floor material and small vegetation. In addition to the reworking of the surface from such clearing, the entire area shall be scarified so as to create a land surface that is amenable to the infiltration of the treated effluent from the sand filter. Following scarification, heavy equipment and vehicular travel on the prepared surface of the site is to be avoided without first placing a layer of sand or sandy loam on the site to prevent compaction of the native material and sealing of the infiltration surface.

4.5.6 Sand Mound Filter

The sand filter component of the treatment and disposal field shall be a layer of sand that meets the gradation standard of ASTM C-33. The Regulation documents indicate the minimum thickness of this layer is to be 300 mm, it is proposed to provide a layer of 400 mm to allow for

the uneven terrain of the site. The sand filter is a proven method of wastewater treatment. The USEPA On-site Wastewater Treatment Systems Manual (2002), reports that in tested field performance of these filters provide effluent quality of less than 5 mg/L (Table 4-16 in USEPA 2002), stating further that most of the biochemical treatment occurs within approximately the top 15 centimetres (cm) of the filter surface. The treatment process as described in Section 4.7.1 of the USEPA document states that, "Sand filters are essentially aerobic, fixed film bioreactors used to treat septic tank effluent. Other very important treatment mechanisms that occur in sand filters include physical processes such as straining and sedimentation, which remove suspended solids within the pores of the media and chemical adsorption of dissolved pollutants to media surfaces" (USEPA, 2002).

The *Regulation 83/2003* documents state that the top width of the filter is not to exceed 3 m (**Drawing 1.0**, **Appendix B**). The installation may therefore consist of a core sand filter in each zone of the field, oriented in the longitudinal (28 m) direction. The sand thickness is to be a minimum of 400 mm within the 3 m level width of the application area; the side slopes may be at the normal angle of repose for the material but are recommended to be not less than 2:1. As each of the filters is installed, it is recommended that the area in between each of the sand filters be filled with sandy loam (> 50% sand and < 20 % clay) to the same 400 mm thickness as the sand filter, though these areas are to be filled to match the natural slope of the land. Note that it is also permitted, at the owner's or installer's option, to fill these areas with the same grade of sand as that of the filters. The sand and sandy loam layer is to be installed to cover the entire footprint of the six treatment zones of the field. During the installation, it is important that heavy equipment movement on the bare, scarified ground surface be minimized to prevent compaction that would limit the eventual infiltration of effluent into the underlying soil.

4.5.7 Pressure Distribution System

In a designated alignment in the 28 m dimension of each zone, a 300 mm thick layer of 20-25 mm stone shall be installed, 3 m in width and about 25 m in length. This is the layer that is referred to as a Gravel Bed in **Drawing 1.0**, **Appendix B**. Embedded in this layer is a 38 mm Schedule 40 PVC header pipe at the inlet end with three 38 mm lateral pipes, 1 m apart and extending to the opposite end of the zone. The pipes shall be embedded so that they are covered with 50 mm of rock. The laterals shall each have a 90˚ long radius elbow and a vertical section protruding 300 mm above the finished surface at the far end with a secure end cap. The laterals shall be drilled with 4.8 mm holes on the underside, spaced at 1.2 m. An orifice shield shall be placed over each of the drilled holes. The entire rock layer shall be covered with geotextile fabric extending to a width of 1 m beyond each side of the rock layer. The configuration of the pressure distribution pipe system is shown in a cutaway section in **Drawing 1.0**, **Appendix B**, the layout within the respective zones is shown in the overall site plan, **Figure 4**, **Appendix A**.

4.5.8 Cover Material

The area of the pressure distribution in each of the zones shall be covered with a layer of sandy loam material with a minimum of 300 mm of cover over the centreline of the layer of graded stone. A crown with a slope of 2% to each side is recommended, to a minimum width of 3 m each way. The balance of the area of each zone is to be filled to a minimum thickness of 400 mm with clean local fill material. The entire area of the six zones of the field shall be covered with a minimum thickness of 75 mm of topsoil and seeded to native grass.

4.5.9 Alternating Valve and Distribution Headers

In order to provide for a modest pumping volume and to optimize the performance of the proposed pump, the effluent will be distributed into the field in six zones. In order to facilitate this distribution, a valve chamber will be located adjacent to the disposal field as shown in the Plan View of **Drawing 1.0**, **Appendix B**. The valve chamber will consist of a 1,200 mm diameter, precast well cribbing with a total height of 1,200 mm and lockable lid for controlled access. It will house an automatic indexing (alternating) valve, such as the K-Rain Hydrotek Series 6606 with a 6-zone cam (the 4000 series, all-plastic model is not considered to be sufficiently robust for Manitoba's temperature conditions and is not recommended), as well as a 4-zone Series 6402 with a 2-zone cam setting for two-zone application. The two indexing valves will be installed in parallel in the cribbing. A tee on the incoming pipe from the settling tanks will direct the flow to either of the indexing valves via 38 mm PVC pipes, fitted with gate or ball shutoff valves at each outlet from the tee. The 6606 indexing valve automatically alternates the outlet port between six effluent header pipes, one to each of the six zones of the sand filter and disposal field. The outlets to zones 1 and 2 shall be fitted with gate or ball valves. The 6402 indexing valve automatically alternates the outlet port between two effluent header pipes, which are to be valved and connected via tee to the pipes leading from valve 6606 to zones 1 and 2. This connection is to be made downstream of the shutoff valves on the headers coming from valve 6606.

The indexing valves shall be accessible for servicing, at least twice every year or as needed. It is to be noted that for the winter period, from the end of October to mid-May, the isolating valves shall be operated so as to engage the 6402 indexing valve serving zones 1 and 2 only and to isolate valve 6606. This is to minimize the risk of freezing in the zones that are active in the winter. For the summer period the 6606 indexing valve will be engaged to distribute to all 6 zones and valve 6402 will be isolated. Also, the valve chamber is to be insulated with 50 mm thickness of water resistant polystyrene insulation on the sides and top to minimize the risk of freezing of the valve and piping. The valve chamber shall also be backfilled with native soil to match the level of the top of the filter mounds at the upper end of the disposal field where it is located. The access lid of the valve chamber shall be flush with the top of the soil backfill.

The forcemain pipe from the Camp shall be extended to the valve chamber at a minimum burial of 1.8 m and inserted into the chamber and be connected to the valve inlets, using reducers and adapters as required. A series of 38 mm, Sch. 40 PVC header pipes shall connect each of the six outlets from the 6606 indexing valve to its respective sand filter zone as well as the two outlets from 6402 valve to the respective filter zones. Each of the header pipes shall be buried at a minimum of 1.2 m of depth within the treatment mound as shown in **Drawing 1.0**, **Appendix B**. Laterals will direct the effluent flow from each header pipe into each of three 38 mm laterals in each zone. All 90° bends shall be long radius elbows or successive 45° elbows.

4.5.10 Monitoring Tubes

Monitoring tubes shall be placed in the body of each of the sand filter units, located approximately at the downslope edge of the top of the filter and in the longitudinal centre of each zone as shown in **Drawing 1.0**, **Appendix B**. The tubes shall be 100 mm diameter perforated PVC pipe enclosed in a geotextile sleeve. The tubes shall be 1.5 m in length and project out of the top of the filter by about 300 mm. The tubes shall be fitted with a locked j-plug cap to permit observation of the water level in the sand mound zones.

4.6 Small Systems Water and Wastewater Facility Operator

As per the requirements of *the Water and Wastewater Facility Operators Regulation M.R. 77/2003* under *The Environment Act,* and to ensure safe operation and regular maintenance of the new septic system, Southland Church will retain the services of a certified Small Systems Water and Wastewater Facility Operator to operate the new wastewater treatment system.

4.7 Project Tasks and Schedule of Events

The pre-construction, construction and operation and maintenance (O&M) tasks and schedules associated with the Project are provided in **Table 8**.

Table 8. Project Tasks and Schedule

Task	Timeline
Pre-Construction	
Geotechnical assessment of proposed study area	November 2015
Draft septic field infrastructure layout and design	April – May 2016
Mapping and reporting on project constraints (e.g. setback distances - MB Hydro flood zone, nutrient management)	May and June, 2016
Environmental site survey with focus on species of conservation concern	June 14, 2016
Stakeholder Meeting	June 16, 2016
Public Open House	July 23, 2016
Finalize septic field infrastructure layout and design	August – September 2016
Complete EAP Report and submit to MSD EAB for license approval	October 2016
Granting of EAL[1]	August 2017[A]
Construction[2]	
Tree and vegetation clearing of septic field area	September 2017
Installation and testing of holding tanks, septic zones and pump system	September – October. 2017
Installation of groundwater monitoring wells	September – October. 2017
Post-construction	
Groundwater monitoring at site	Post-construction

Notes:

[1]Estimated

[2]Dependent on timing of EAL issuance

5.0 STAKEHOLDER AND PUBLIC ENGAGEMENT

5.1 Public Engagement Program

In order to inform stakeholders and the public of the proposed Project, a public engagement plan (PEP) was developed that included one Stakeholder Meeting and a Public Open House at the Camp. The PEP was designed to ensure that stakeholders and community members had an opportunity to meet with the proponent to share their interests and/or concerns, and ask questions relating to the Project.

A Stakeholder Meeting was held on June 16, 2016, at the Lac du Bonnet Public Library. The meeting provided an opportunity for targeted stakeholders to review the wastewater treatment option selected for the Camp and provide any feedback prior to the Public Open House. Targeted stakeholders included the RM of Alexander, the RM of Lac du Bonnet, Manitoba

Sustainable Development Eastern Region, Manitoba Hydro, and the Bird River Cottage Owners Association (BRCOA). Stakeholders were invited to the meeting through email two weeks prior to the event. Manitoba Hydro and the BRCOA were both unable to attend the stakeholder meeting. MMM offered to arrange an alternative time to meet with those stakeholders and MMM was subsequently able to meet with representatives from the BRCOA on August 4, 2016, at MMM's office and MMM/Southland Church was able to consult with Manitoba Hydro on the project via telephone discussion.

The Stakeholder Meeting included a presentation followed by time for discussion and questions. The presentation provided information on the project background, wastewater management options evaluation, septic field design including the conceptual field layout and pressurized treatment mound system, proposed location and existing environment, and construction considerations.

Stakeholders asked the following questions regarding the proposed on-site wastewater management treatment option:

- What is the camp's interest in offering programs beyond its current summer camp program?
- Will the new system allow the camp to accommodate more campers?
- Will all greywater be treated by this system?
- How will drainage from overland flooding and snowmelt be addressed? Are any techniques being implemented to divert water or provide extra water absorption?
- Will surface water monitoring be conducted?

In addition, stakeholders provided the following comments:

- The proposed above ground mound system is preferred over an in-ground treatment option.
- The pod (zone) systems can better adapt to the site and the camp's use.
- It looks like a good system, no issues with it.
- We have no particular concerns.

Community members and interested persons had an opportunity to learn about the Project at a Public Open House event hosted by the proponent at the Camp on July 23, 2016. To help advertise the Open House, a newspaper ad was placed in the public notice section of the July 7 Lac du Bonnet Clipper, invitations were posted at three prominent community facilities (Trappers Gas Station, Tall Timber Lodge, and Drifters), and leading up to the event an "A-Frame" sandwich board sign advertising the Open House was placed on Provincial Road 315 at the Camp's entrance. In addition, information on the event was posted on the proponent's and on the BRCOA websites and Camp staff went to neighbouring cottages to deliver invitations by hand. The event included presentation storyboards depicting the same information shared at

the Stakeholder Meeting. The proponent and members of the project team were on hand at the event to answer any questions and record comments. Select photographs of the Public Open House are provided in **Appendix C**.

Sixteen people signed in at the Open House, but it was observed that a number of attendees (approximately 10) did not sign-in.

Open House attendees asked the following questions at the event:

- With the new system, is the camp expanding their programming (i.e., drop-in events, weekends, shoulder seasons)?
- Is all wastewater entering the field?
- How does the proposed wastewater treatment system compare with Camp Cedarwood's new system?
- How will water quality be monitored?
- Who monitors the shallow groundwater wells? What happens if a sample comes back with poor results?
- How many times per year will water quality be monitored?
- Are there any chemicals used in the system?
- How is the camp affected by the development moratorium?

In addition, Open House attendees provided the following comments:

- Concerned that the system will allow the camp to increase the number of people on-site per day.
- Do not like how the camp has authority to increase the number of people.
- Would like to see frequent monitoring of groundwater wells and surface water monitoring as well.

A comment sheet was made available online as a means to collect any comments or concerns from Open House attendees, as well as from those who could not attend the event. Open House attendees were provided with a link to the comment sheet, and for those who were unable to attend the open house the link was posted on the proponent's website. A total of nine completed comment sheets were received.

Survey responses indicate a general approval for the proposed system. The greatest concern indicated is whether the wastewater treatment system will impact the water quality of the Bird River and for the most part respondents believe that the system poses no threat to the Bird River waterway. Rather, respondents view the new system as a significant improvement from the existing ejector treatment system.

Comments indicate that the location and environmental considerations are well thought-out and that exceeding the Provincial set-back distance requirement from the Bird River is a good idea. In addition, it is noted that the location seems to be appropriate and that the multiple treatment mounds should meet the needs of the Camp for a considerable period of time. Concerns raised include how the Bird River waterway is under strain due to current levels of development, and if the system is not properly drained in the fall piping could freeze, split, and leak effluent.

General responses from the comment sheets include:

- Good to see responsible waste management.
- A good choice to handle wastewater.
- Your plan to accommodate a greater capacity of wastewater than what is needed is a good idea, but it's important that this additional capacity is great enough to meet future demand.
- How deep is the natural groundwater in this area?
- Please make available the results of the groundwater monitoring wells.
- Please make the EAP available on your website.
- What are the plans for the 2017 camp season?

A copy of all engagement material (i.e., invitations, presentations, meeting notes, survey feedback) can be found in **Appendix E**.

5.2 Presentation at Bird River Cottage Owners Association Annual General Meeting

On September 4, 2016, the BRCOA held their annual general meeting. Four representatives from the Southland Church/Camp, including Mr. Ryan Warketin, Associate Pastor – Technology/Properties with the Church attended the meeting. Mr. Warketin was provided time on the meeting agenda to speak to the BROCA regarding the Camp's future plans including the wastewater proposal. Mr. Warketin spoke to the history of the Camp and the recent transfer of ownership to Southland Church as well as the desire by the Camp to improve on-site infrastructure by phasing out the current ejector system and installing an approved wastewater treatment system. Mr. Warketin highlighted the type of system that is being proposed as well as proposed mitigation measures to minimize and monitor environmental effects from the system including the proposed installation of monitoring wells. The few questions that were raised during the meeting pertained primarily to the mechanics of the system, which Mr. Warketin answered. Mr. Mac Kinghorn (Councillor from RM of Alexander) was present as well and spoke further on the system from his perspective. In his talk, he endorsed the project as an excellent approach to dealing with wastewater at the Camp. Overall the response to the project from meeting attendees was very positive and no concerns were raised during or after the meeting.

6.0 STUDY AREA

6.1 Local Study Area

In order to assess potential direct and indirect effects of the proposed Project on local biophysical components (wildlife, native vegetation, Bird River, fish and fish habitat, rare species, etc.) and socioeconomic components (public and stakeholder interests, land use, recreation and development within the localized area), a Local Study Area (LSA) for the Project was defined. The LSA for this EAP report is depicted in **Figure 2**, **Appendix A** and included the Camp boundaries (65 hectares).

6.2 Project Study Area

The Project Study Area (PSA) is defined as the spatial area that will be directly impacted and/or physically altered by Project construction, operation and maintenance activities. For the purpose of this EAP report, the PSA was defined as the spatial extent of the septic field area (Project footprint) (refer to **Figure 4**, **Appendix A**).

7.0 DESCRIPTION OF EXISTING BIOPHYSICAL ENVIRONMENT

The proposed development is located within the Wrong Lake Ecodistrict of the Lac Seul Ecoregion, which is covered by the broader Boreal Shield Ecozone.

7.1 Climate

The Wrong Lake Ecodistrict is located in a humid and cooler subdivision of the Mid-Boreal Ecoclimatic Region. The LSA is located in the southern part of the ecodistrict, which is considered to be a cooler portion of the subhumid Transitional Low Boreal. This region is characterized by short, warm summers and long, cold winters. The mean annual temperature is 0.5ºC with 168 days during the growing season and approximately 1,400 growing degree-days on average (Smith, Veldhuis, Mils, Eilers, Fraser & Lelyk, 1998).

The mean annual precipitation can range from 460 mm to 600 mm, but can vary greatly on a year-to-year basis, with the majority of precipitation occurring from spring through summer. Approximately one-fifth of the annual precipitation falls as snow. The Wrong Lake Ecodistrict has a cold to moderately cold, Cryoboreal soil climate with an average annual moisture deficit of 150 mm to 200 mm (Smith, et al. 1998).

7.2 Physiography and Drainage

The ecodistrict is situated in a transitional zone between the peat dominated lowland areas of the Berens River Ecodistrict and the bedrock dominated Nopiming Ecodistrict. The physiography varies from peat-covered depressions underlain by clayey glaciolacustrine sediments in level to gently sloping areas to gently to steeply sloping bedrock outcrops of Precambrian origin, overlain with clayey and silty glaciolactustrine sediments. Elevations in the region range from about 245 to 305 m above sea level (masl). Slope length range from approximately 50 m to more than 150 m, but in bedrock outcrop areas short, steep slopes are common (Smith, et al. 1998).

7.3 Surficial and Bedrock Geology

The bedrock geology of the LSA is within the Bird River greenstone belt which is composed of mafic to felsic Neoarchaen metavolcanic rock. The LSA is located near a transition zone with the Booster Lake Formation, a late sedimentary rock formation composed of Greywacke-siltstone and the Peterson Creek Formation, composed of dacite, rhyolite, felsic tuff and felsic volcanic fragmental rocks (Gilbert, 2008).

The surficial geology of the area is composed of offshore glaciolacustrine sediments of clay silt and minor sand. These deposits from the Quaternary period were deposited in suspension in offshore, deep-water of glacial Lake Agassiz. In areas where rock outcrops are common these sediments rarely completely fill the lows between outcrops, however depths may be between one and twenty meters thick (Matile and Keller, 2004).

7.4 Groundwater and Hydrological Description

Groundwater is anticipated to be present in areas of fractured bedrock and within small surficial sediment deposits. The depth to groundwater in areas of bedrock can vary considerably from less than 15 m to greater than 100 m (Rutulis, 1982). A review of the MSD GWDrill log searchable disk revealed two test wells within 0.5 km of the LSA. It is anticipated that most of the residents in the LSA obtain water for domestic use directly from the Bird River or from off-site potable water sources (e.g., self-serve water containers).

In 2014, the Camp commissioned the installation of an on-site groundwater well for domestic use purposes. The well was developed to approximately 122 m (400 feet) below ground surface into granite bedrock and is located to the east of the main Camp lodge (refer to **Figure 4**, **Appendix A**). A copy of the well driller's log is provided in **Appendix D**.

Table 9. Groundwater Use Well Records within the LSA

Legal Land Location	GWdrill Results (GWDrill, 2012)	Groundwater Use
NE 1-17-13 E1	2	Test well

7.5 Soils

Soils within the LSA consist of a mixture of forest soil types from the Gleysolic, Luvisolic and Brunisolic Soil Orders (**Figure 5**, **Appendix A**).

7.5.1 Dominant Soil Series

The areal extent of the dominate soil series within the LSA are provided in **Table 10**. Overall, nine soil series are present within the LSA. Further description of these soil series is presented in **Table 11**.

Table 10. Soil Series and Areal Extent within the LSA

Soil Series / Map Unit (percent area of polygon)	Aerial Extent (ha)
Acidic Bedrock	5.57
Acidic Bedrock (80%) – Rat Lake (20%)	5.77
Fyala	4.13
Fyala Peat	0.46
Lettonia	2.94
Lettonia (70%) – Mukatawa (30%)	4.60
Lettonia Clay	21.56
Middlebro	7.01
Mulkatawa (80%) – Fyala (20%)	5.62
Nora Lake	0.23

Table 11. Classification of Soils

Order	Great Group	Subgroup	Soil Series, Family Description
Gleysolic Poorly drained soils which may have an organic and/or an A horizon. The subsoils show gleying and are dull coloured, but may have brighter colored prominent mottles. Soils associated with wetness.[1]	**Humic Gleysol** - Contain at least 2% organic C and its rubbed colour varies from 3.5 or less.[1]	**Rego Humic Gleysol**	**Fyala (FYL):** Poorly drained, developed on weakly to moderately calcareous lacustrine clay deposits.[2]
			Fyala Peat (FYLP): Peaty phase; Poorly drained, developed on weakly to moderately calcareous lacustrine clay deposits.[2]
Luvisolic Develop in well to imperfectly drained sites and generally have light-coloured, eluvial horizons, illuvial B horizons where silicate clays are located.[1]	**Gray Luvisol** – Have eluvial and Bt horizons with mean annual soil temperature <8ºC. Parent materials are often calcareous but can be developed in acid materials.[1]	**Gleyed Dark Gray Luvisol**	**Middlebro (MDB):** Imperfectly drained, clay surface texture, developed on lacustrine clay over silt parent material.[3]
		Solonetzic Gray Luvisol	**Rat Lake (RTK):** Well drained, developed on lacustrine clay over bedrock.[3]
			Lettonia (LTI): Well drained soil developed on moderately to strongly calcareous lacustrine clay with undulating topography.[2]
			Lettonia Clay (LTI-c): Well drained soil developed on moderately to strongly calcareous lacustrine clay with undulating topography.[2]
		Gleyed Solonetzic Gray Luvisol	**Mukatawa (MUW):** Imperfectly drained soil developed on moderately to strongly calcareous lacustrine clay.[2]
Brunisolic Well to imperfectly drained soils that occur in a wide range of climatic and vegetative environments. They have a Bm horizon that is brownish-coloured found under forest and a Bm, Bfj, thin Bf or Btj horizon that is at least 5 cm thick.[1]	**Dystric Brunisol** – Acidic brunisols soils that lack a well-developed mineral-organic surface horizon.[1]	**Eluviated Dystric Brunisol**	**Nora Lake (NOL):** Well drained soil developed on morainal till over bedrock.[3]

[1]Agriculture Canada Expert Committee, 1987.

[2]Aglugub, C, 1999.

[3]Fraser et al., 1980.

7.5.2 Canada Land Inventory

The Water Protection Act (C.C.sMc W65, 2005) *Nutrient Management Regulation* (62/2008) outlines nutrient application restrictions based on Canada Land Inventory Soil Capability

Classification for agriculture ratings (Government of Manitoba, 2008). The Canada Land Inventory (CLI) is a dry-land agriculture capability inventory for rural Canada. The CLI limitations are based on climate, geology, soil chemical and physical characteristics (salinity and structure), droughtiness, inundation, erosion, stoniness and landscape topography of the soils.

The CLI groups mineral soils into seven classes with the same relative degree of limitation and then delineates subclasses within each class based on type of limitation (Fraser et al. 2001). Classes one to seven are based on increasing degree of limitation, the first three classes are capable of sustained cultivated crop production, class four is marginal for sustained arable cropping and class five is capable of pasture or hay, class six is capable of permanent pasture and class seven has no capability for arable crop or permanent pasture. There are 13 different subclasses or limitations. Soils series within the LSA range from Class 2 through to Class 7 with subclass designations of R, T, W, D and P. The soil series within the PSA are identified as being class and subclass 3D and 3W. The class descriptions are as follows (Agriculture and Agri-food Canada, 2013):

- Class 2 – Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices. Class 2 soils have a good water-holding capacity, the limitations are moderate and productivity is moderately high. Limitations may be one of the following; adverse regional climate, moderate effects of accumulative undesireable characteristics; moderate effects of erosion, poor soil structure or slow permeability, low fertility (correctable with fertilization), gentle to moderate slopes, occasional damagining overflow, and wetness (correctable with drainage).
- Class 3 - Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices. The limitations are more severe than for class 2 soils. They affect one or more of the following practices: timing and ease of tillage, planting and harvesting, choice of crops, and methods of conservation. Under good management they are fair to moderately high in productivity for a fair range of crops.
- Class 4 - Soils in this class have severe limitations that restrict the range of crops or require special conservation practices, or both. The limitations seriously affect one or more of the following practices: timing and ease of tillage, planting and harvesting, choice of crops, and methods of conservation. The soils are low to fair in productivity for a fair range of crops, but may have high productivity for a specially adapted crop.
- Class 5 - Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible. The limitations are so severe that soils are not capable of use for sustained production of annual field crops. The soils are capable of producing native or tame species of perennial forage plants, and may be improved by use of farm machinery. The

improvement practices may include clearing of bush, cultivation, seeding, fertilizing, or water control.

- Class 6 - Soils in this class are capable only of producing perennial forage crops, and improvement practices are not feasible. The soils provide some sustained grazing for farm animals, but the limitations are so severe that improvement by use of farm machinery is impractical terrain may be unsuitable for use of farm machinery, or the soils may not respond to improvement, or the grazing season may be very short.
- Class 7 - Soils in this class have no capability for arable culture or permanent pasture. This class also includes rockland, other non-soil areas, and bodies of water too small to show on the maps.

The subclass descriptions are as follows (Agriculture and Agri-food Canada, 2013):

- 'D' – Undesirable soils structure and/or low permeability – Undesirable soil structure and/or low permeability - this subclass indicates soils that are difficult to till or soils where water is absorbed very slowly or where the depth of rooting zone is restricted by conditions other than a high water table or consolidated bedrock.
- 'P' – Stoniness – These soils are sufficiently stoney to hinder tillage, planting and harvesting operations.
- 'R' – Consolidated bedrock – This subclass includes soils where the presence of bedrock near the surface restricts their agricultural use. Consolidated bedrock at depths greater than 3 feet from the surface is not considered as a limitation except on irrigated lands where a greater depth of soil is desirable.
- 'T' – Topography – This subclass is made up of soils where topography is a limitation. Both the percent of slope and the pattern or frequency of slopes in different directions affect the cost of farming and the uniformity of growth and maturity of crops, as well as the hazard of erosion.
- 'W' – Excess Water – this subclass includes soils where excess water other than brought about by inundation is a limitation to agricultural use. Excess water may result from inadequate soil drainage, a high water table, seepage or from runoff from surrounding areas.

7.5.3 Nutrient Management Zones

The Water Protection Act (C.C.sMc W65, 2005) *Nutrient Management Regulation* (NMR) (62/2008) outlines criteria for the application of nutrients (nitrogen and phosphorous) to agricultural land. The purpose of the NMR is to protect water quality by encouraging responsible nutrient planning. The objective to regulate the application of substances containing

nitrogen or phosphorous to land is a protective measure for sensitive water bodies and/or groundwater (Government of Manitoba, 2008).

Table 12 outlines the identified soil series, the associated CLI – soil capability for agriculture classes and subclasses, and the water quality management zone within the LSA and associated limitations for nutrient application. **Figure 6**, **Appendix A** outlines the CLI-Agricultural Capability within the LSA for each soil polygon.

Table12. Soil Series, CLI Rating and Water Quality Management Zone within LSA

Soils Series	CLI Rating Agricultural Capability Class and subclass	Water Quality Management Zone
Acidic Bedrock	7R	N4
Rat Lake	6RT	N4
Fyala	5W	N3
Fyala Peat	6W	N4
Lettonia	3D	N1
Lettonia-c	3D	N1
Lettonia-d	4TD	N2
Middlebro	3W	N1
Mukatawa	3DW	N1
Nora Lake	6RP	N4

Within the PSA the soil series consist of the Middlebro and Lettonia; a Class 3W and nutrient management zone of N1 and Class 3D and nutrient management zone of N1, respectively. Both soil series are suitable for an on-site wastewater management system.

7.6 Vegetation

The vegetation of the Wrong Lake Ecodistrict is patchy due to historic forest fires and diverse soil and topographic conditions. In well drained upland sites, jack pine (*Pinus banksiana*) and trembling aspen (*Populus tremuloides*) are common while in imperfectly drained areas, black spruce (*Picea mariana*) is dominant. Other tree species associated with the ecodistrict include white spruce (*Picea glauca*), balsam fir (*Abies balsamea*) and balsam poplar (*Populus balsamifera*). In mixed forest and deciduous dominant sites, the understory and ground cover can be diverse with multiple shrub and herbaceous species. In coniferous dominated sites, ground cover tends to be dominated by moss species (Smith et al., 1988).

A vegetation survey was conducted on June 14, 2016, by MMM biologists in order to better characterize the vegetation species present within the PSA. Six tree species were identified in the PSA, as well as unidentified willow species. Six shrub species were identified, as well as, 29 species of forbs, grasses and mosses. Three non-native species were also observed on-site. No rare plant species were observed during the vegetation survey.

A complete list of species and their Provincial conservation status rank can be found in **Table A**, in **Appendix F** and select photographs can be found in **Appendix C**.

7.7 Wildlife Species

The Lac Seul Ecoregion is host to several ungulate species including moose, woodland caribou and white-tailed deer, black bear and wolves, rodents including beaver, red squirrel and muskrat, as well as snowshoe hare, lynx, mink and fisher. Characteristic bird species include multiple waterfowl species, bald eagles, numerous species of raptors, spruce grouse, turkey vulture, herring gull and double crested cormorant (Smith et al., 1988).

During the vegetation survey conducted on June 14, 2016, incidental wildlife was recorded upon observation. Bird species included red-eyed vireo (*Vireo olivaceus*), American robin (*Turdus migratorius*), merlin (*Falco columbarius*) and ruffed grouse (*Bonasa umbellus*). Mammal species observed included white-tailed deer (*Odocoileus virginiana*) and red squirrel (*Tamiasciurus hudsonicus*). Herpetofauna species observed were snapping turtle (*Chelydra serptentina*), northern leopard frog (*Lithobates pipiens*), wood frog (*Lithobates sylvaticus*) and grey tree frog (*Hyla versicolor*).

A list of incidental wildlife species observed during the vegetation survey can be found in **Table B**, in **Appendix F**.

7.8 Aquatic Environment

7.8.1 Surface Water Bodies

The PSA is bound by the Bird River to the north. The Bird River is a tributary of the Winnipeg River system; its headwaters are located in Nopiming Provincial Park at Bird Lake before flowing eastward into Lac du Bonnet. The Bird River is considered a Class 2 waterbody (has slight limitations to the production of fish) for fish habitat classification and provides year round habitat to aquatic life as well as supporting a recreational angling fishery (pers. comm. Laureen Janusz, MSD).

The Bird River is a controlled water way in that its water level is monitored and controlled by Manitoba Hydro via the MacArthur hydroelectric generating station downstream on the Winnipeg River. It was estimated that during a flood flow the Bird River would be approximately 256 masl and remain close to the present shoreline (pers. comm. Brian Giesbrecht, Manitoba Hydro).

Due to the high level of cottage development along the Bird River, water quality issues particularly relating to phosphorus levels are of concern (pers. comm. Derek Kroeker, MSD).

7.8.2 Aquatic Life

A request was made to MSD for a database search of their Fisheries Inventory and Habitat Classification System (FIHCS) for fish species within the PSA. The FIHCS is not georeferenced and therefore their database listing for the Bird River includes all species reported to be found within the river system. The results received on March 31, 2016, indicated the following fish species occur within the Bird River: carmine shiner (*Notropis percobromus*), emerald shiner (*Notropis atherinoides*), fathead minnow (*Pimephales promelas*), northern pike (*Esox lucius*), sauger (*Sander canadensis*), silver redhorse (*Moxostoma anisurum*), smallmouth bass (*Micropterus dolomieu*), walleye (*Sander vitreus*), white sucker (*Catostomus commersoni*) and yellow perch (*Perca flavescens*).

7.9 Potential Species of Concern

A request was made to the Manitoba Conservation Data Center (CDC) on March 8, 2016, to perform a search of their databases for any species of conservation concern within the LSA. The response received on March 21, 2016, resulted in three species occurrences: eastern whip-poor-will (*Caprimulgus vociferous*), mink frog (*Lithobates septentrionalis*) and water star-grass (*Heteranthera dubia*). The request to MSD regarding their FIHCS database revealed the presence of carmine shiner (*Notropis percobromus*) occurring in the Bird River. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (2006) indicated the carmine

shiner was collected at the mouth of Peterson Creek on the Bird River, north, on the opposite shoreline from the Camp.

Conservation rankings from the COSEWIC, the federal *Species at Risk Act* (SARA), the *Manitoba Endangered Species and Ecosystem Act* (ESEA) and the MB CDC are provided in **Table 13**.

Table 13. Species of Conservation Concern

Species	Ranking			
	COSEWIC	SARA	MB ESEA	MB CDC
Eastern whip-poor-will	Threatened	Threatened	Threatened	S3B
Mink frog	-	-	-	S3
Water star-grass	-	-	-	S2S3
Carmine shiner	Threatened	Threatened	-	-

Note: "-" indicates no listing

7.9.1 Rare Species Profiles

Eastern Whip-poor-will

The eastern whip-poor-will is a medium sized, nocturnal bird with cryptic grey and brown coloured plumage. This camouflage is effective as eastern whip-poor-will's roost and nest on leaf litter on the ground. Preferred nesting sites are based on forest structure as opposed to species compositions. Semi-open forests, patchy forests with clearings or forests regenerating from a major disturbance are most likely to be utilized. Two eggs are laid on the forest floor and upon hatching; the male will care for the first nest while the female begins incubating a second. The eastern whip-poor-will is an insectivore and captures prey by sallying from perches. Its name comes from the birds call, which sounds like "whip-poor-will" (COSEWIC, 2009). It is listed in the CDC database as S3B, meaning that breeding occurrences for this species are uncommon in the province. Based on the habitat requirements of this species and antidotal evidence of this species being heard calling within the vicinity of the Camp, this species was determined to have the potential to occur within or adjacent to the PSA.

Mink Frog

The mink frog is a large, green and brown mottled frog that is found in a small area of southeastern Manitoba. Due to its small range in the province it is listed as S3 or uncommon. They are primarily aquatic species and do not travel far from permanent water bodies and are often associated with water lilies (lily pads). Male frogs begin calling in late June and into July, and eggs are laid in July. Mink frog larvae metamorphose the following summer and overwinter as larvae (Nature North, 2016). This species is not likely to occur within the PSA as the PSA is located within a forested, upland area, more than 50 m away from the Bird River.

Water Star-grass

Water star-grass is an aquatic plant that can be found in shallow waters of streams, river, lakes and ponds. Flowers are small, single on a stalk-like tube and protrude above the water. Flowering occurs between July and October in Minnesota (Chayka, 2016). In Manitoba it is considered S2S3, meaning there is some uncertainty about the exact species rarity, however it is considered rare throughout the province and vulnerable to extirpation and/or uncommon throughout the province. This species is not likely to occur within the PSA as the PSA is located within a forested, upland area, more than 50 m away from the Bird River.

Carmine Shiner

Carmine shiners are small, freshwater minnows known to inhabit clear to brown-coloured fast flowing creeks and small rivers in Manitoba. The reason for their threatened status is due to its limited distribution in Manitoba, sensitivity to water temperature and quality changes and it being the only population known in Canada. Carmine shiners are omnivorous and early summer spawners. Otherwise, little else is known about this species (COSEWIC, 2006). This species is not likely to occur within the PSA as the PSA is located within a forested, upland area, more than 50 m away from the Bird River.

7.9.2 Results of Targeted Rare Species Survey

In conjunction with the vegetation survey completed on June 14, 2016, a targeted auditory field survey was conducted for the eastern whip-poor-will following a protocol developed by MMM for a project completed for the Ontario Ministry of Natural Resources, Guelph District; the protocol is based on information from the following sources:

1. *Atlassing for Species at Risk in the Maritime Provinces 2nd Edition,* 2008, Maritimes Breeding Bird Atlas, pp.16-18.
2. "Where in the Square?" Whip-poor-will Pilot Project Participant's Guide. 2012. Bird Studies Canada, 12pp.

The targeted survey identified a pair of whip-poor-will through vocalizations heard within 50 m to the southwest of the PSA beyond a rock outcrop.

7.10 Parks and Protected Areas

The Camp itself is not located within a park or a protected area; however it is located approximately 7 km northeast of Poplar Bay Provincial Park, 10 km northwest of Whiteshell Provincial Park and approximately 10 km west of Nopiming Provincial Park.

8.0 DESCRIPTION OF EXISTING SOCIOECONOMIC ENVIRONMENT

8.1 Population

The Camp is located within the RM of Alexander. According to Statistics Canada, the RM had a population of 2,983 people in 2011. The median population age is approximately 54 and 87% of the population is 15 years of age or older. English is the primary language spoken with French and German being second and third, respectively (Statistics Canada, 2011). There are an estimated 227 seasonal residential dwellings located along the Bird River (Lombard North Group Ltd., 2007).

8.2 Existing Land and Resource Uses

Within the LSA, existing land use is primarily seasonal use, including the Camp and surrounding single family dwelling cottages. The area is used for recreational outdoor activities, including angling, canoeing and boating.

8.3 Heritage Resources

A request was made to the Government of Manitoba's Historic Resources Branch (HRB) on March 8, 2016, for information on potential heritage resources in the LSA. The response received on June 7, 2016, indicated that there was a high potential to impact significant heritage resources in the area. The HRB recommended that a heritage resource impact assessment (HRIA) be conducted for the LSA by a qualified archaeological consultant.

Subsequent to the HRB recommendation, a HRIA was completed within the PSA for the area that will be directly disturbed by the Project including the holding tank nest site, supply line and septic field area. The HRIA was conducted on July 18, 2016, by Lisa Hein, a Manitoba qualified archaeologist with WSP Canada under HRB Permit No. A35-16. Methodology of the assessment included a pedestrian assessment, shovel testing and hand auger testing in which

no archaeological materials or features were encountered. It was concluded that no further archaeological mitigation efforts were warranted and that the project archaeologist had no further concerns with the site. However, the HRIA report noted that should previously undocumented archaeological resources be discovered, alteration of the site must cease immediately and a permit-holding archaeological consultant should carry out fieldwork in compliance with Part II, Section 12 & 14 of the *Heritage Resources Act*.

At this time, final approval of the HRIA report by the HRB is pending.

8.3.1 First Nation Communities

There are no First Nation communities within the LSA. Fort Alexander First Nation is nearest to the Camp and is located approximately 50 km to the northwest on Lake Winnipeg at the mouth of the Winnipeg River.

9.0 DESCRIPTION OF ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES OF THE PROPOSED PROJECT

9.1 Potential Soil Impacts

During construction, potential soil impacts include compaction, rutting and the potential for release of hazardous materials (e.g., fuel, oil, lubricants, etc.) through malfunctions associated with the operation of construction equipment. Construction impacts are expected to be low and short-term in nature.

Mitigation of construction impacts to soil includes, following applicable Federal and Provincial regulations, guidelines and best management practices for handling and disposal of hazardous materials and construction waste materials. Compaction of the septic field area will be minimized by restricting heavy machinery access in this area.

Operation and management of the wastewater management system will include increased nitrogen and phosphorus addition to the septic field area. The system is designed to allow for increased capacity and filtering of wastewater entering the field and therefore impacts to the soil during operation are expected to be low. Re-vegetation of the septic field area with native grass species will also occur as soon after construction as possible (i.e., spring 2018) in order to minimize erosion at the site and allow for increased nutrient removal from the soil.

9.2 Potential Vegetation Impacts

Impacts to vegetation within the LSA are anticipated to be low and will be restricted to the PSA. Selective clearing of mature trees will be conducted wherever possible to maintain native vegetation cover. In addition, the septic field area will be re-seeded to a native grass mixture appropriate to the area and low native vegetation cover from the surrounding area will be allowed to re-establish on the septic field site.

During the initial septic field site revegetation, the area will be maintained to ensure no invasive and weed species will be permitted to establish.

9.3 Potential Wildlife Impacts

Potential impacts to wildlife include permanent habitat loss within the immediate vicinity of the PSA through the removal of some ground vegetation, understorey shrubs and mature trees. The impact to wildlife is considered to be low as the project incorporates a relatively small area and the timing for the clearing of vegetation will occur outside of the breeding bird window (April 15 – August 31).

9.3.1 Impacts to Eastern Whip-poor-will

The eastern whip-poor-will was identified to the southwest of the PSA during an auditory bird survey conducted on June 14, 2016. The MB CDC has published recommended development setback distances and development activity timings for bird species of conservation concern within the Province (MB CDC, 2014). The recommended restricted development activity period for nesting eastern whip-poor-will is from May 15 until July 16. Corresponding activity setback distances during this restriction period are based on disturbance categories. Due to the proposed activity to occur on-site, the disturbance category is classified as medium: “e.g., trucks>1 ton (gravel, oil, grain), regular/frequent/long-term small vehicle (<1 ton) or ATV use, pipeline construction (diameters <1 foot), operating compressor station or battery without flaring (MB CDC, 2014).” The setback distance therefore is recommended as 200 m from approximate nesting sites during the restricted activity period of May 15 to July 16. However, to meet regulatory requirements associated with the *Migratory Bird Convention Act*, clearing of vegetation will be completed outside of the breeding bird window for Manitoba (April 15 – August 31) which will meet the activity period recommendations for the eastern whip-poor-will.

9.4 Potential Groundwater, Surface Water and Fisheries Impacts

Potential impacts to groundwater, surface water and fisheries within the Bird River drainage system include nutrient loading from runoff and groundwater infiltration to the river from the wastewater management system. However, the impact to surface water and fish is considered to be low as the system is designed to accommodate the anticipated wastewater use by the

Camp. The septic field will be constructed over natural leaf litter and woody debris, which increases effluent retention time in the field while at the same time increasing treated water distribution into the soils thereby reducing the potential for runoff or groundwater contamination. In addition, the septic field will be setback a distance of 50 m from the Bird River and the mature forest surrounding the field will be maintained to provide a hydrologic barrier to effluent migration from the septic field.

9.5 Potential Heritage Resource Impacts

According to the Manitoba HRB, the PSA is located in an area with a high potential to impact significant heritage resources due to its location along the Bird River and in a flood plain. Although no heritage resource concerns were identified during the HRIA assessment completed for the PSA and intrusive development (trenching) will be minimal with the installation of the septic field, if heritage resources are discovered during tree removal, clearing and preparation of the site, work at the PSA will cease immediately and a permit-holding archaeological consultant will be retained to conduct an archeological investigation at the site, in compliance with Part II, Section 12 & 14 of the *Heritage Resources Act*.

A copy of any additional communication/requests from the HRB will be forwarded on to MSD EAB upon receipt by the proponent.

9.6 Greenhouse Gas Considerations

Greenhouse gas (GHG) emissions within the context of this wastewater system development include the emission of carbon dioxide. The activities related to GHG contributions will be limited to the equipment emissions that will be used to clear and construct the system on the PSA. The benefits of utilizing a septic field wastewater system is the reduction in frequency of tank pump outs by septic waste haulers using large tanker trucks to drive to and from the Camp thereby reducing GHG emissions from truck-traffic.

9.7 Socioeconomic Effects

The addition of the wastewater management system to the Camp will have a positive economic effect for the Southland Church by allowing more youth to attend camp and provide a larger number of jobs for camp counsellors. It also provides the Southland Church with the most economical way, with the least required maintenance, to manage solids and wastewater on-site. The use of a privately operated septic field also alleviates pressure on the local municipal wastewater lagoon.

9.8 Public Safety and Health Risks

9.8.1 Biological Pathogens and Odour Management

Biological pathogens, such as *E. coli* and fecal coliforms associated with the treatment of solid waste and wastewater may be considered to pose a public health and safety risk. However, these human health and safety risks will be managed through the solids materials and wastewater remaining on private land that has restricted public access. In addition, the wastewater is piped directly to the enclosed septic field, which will help to control odour and eliminate human exposure to pathogens. Further, by reducing the need for hiring waste haulers to once a year, the Camp is able to reduce odours and truck traffic that would occur with regularly scheduled wastewater and soilds material transfers to the local municipal lagoon for disposal.

10.0 FOLLOW-UP MONITORING AND REPORTING

10.1 Groundwater Monitoring

In order to evaluate the movement and quality of shallow groundwater within the PSA, three shallow groundwater monitoring wells will be installed during construction of the septic field; one monitoring well will be located upgradient of the field zones and two will be located downgradient of the field zones (refer to **Figure 4**, **Appendix A**). The groundwater monitoring wells will be installed approximately 15 m away from the toe of the field and to a depth of 6 m. Well installation will be completed by a qualified water well installer and monitored by a qualified professional.

Shallow groundwater quality will be monitored prior to the commissioning of the field to evaluate baseline data, once in the year of commissioning and then once annually for three years. Monitoring events will be completed during peak operation performance of the on-site wastewater management system (e.g. August 1 to Sept. 15).

In-field groundwater parameters would include; depth to groundwater and depth to bottom of well. Water quality parameters will also be recorded (pH, electrical conductivity, temperature and dissolved oxygen) using a multi-parameter probe; wells will then be purged. Monitoring wells will then be allowed to recharge in order to obtain fresh water samples for analysis, the rate of recharge will be monitored and the wells will be sampled when an adequate volume of groundwater accumulates within the wells.

Groundwater analytical parameters will include: Total-kjendahl nitrogen, nitrate/nitrite, ammonia, total phosphorus, chloride, electrical conductivity and chemical/biological oxygen demand. This

information will then be utilized to assess any potential concerns relating to potential impacts due to the on-site wastewater management system, if any.

11.0 SUMMARY

The proposed new on-site wastewater management system for the Bird River Bible Camp incorporates a kitchen grease trap, settling solids tanks buried in a tank nest, and an above ground, pressurized sand treatment mound design that will accommodate an increase in camper and staff accommodations up to 230 persons daily with the design flow rate of 15,000 L/day. The design took into account site topography, slope aspect, infiltration aspects, as well as applicable restrictions described in Schedule A, of the *On-site Wastewater Management Systems Regulation 83/2003* under *The Environment Act*.

Based on the review of existing biophysical and human environmental components, assessment of anticipated effects and application of identified mitigation measures within the Local and Project Study Areas, the proposed Project is not anticipated to result in any significant adverse environmental or socioeconomic effects.

12.0 CLOSURE

This report has been prepared for use by the Southland Church, in accordance with generally accepted environmental investigation practices by qualified professional and technical staff. The Standard Limitations pertaining to the use of this report are presented in **Appendix G**.

13.0 REFERENCES

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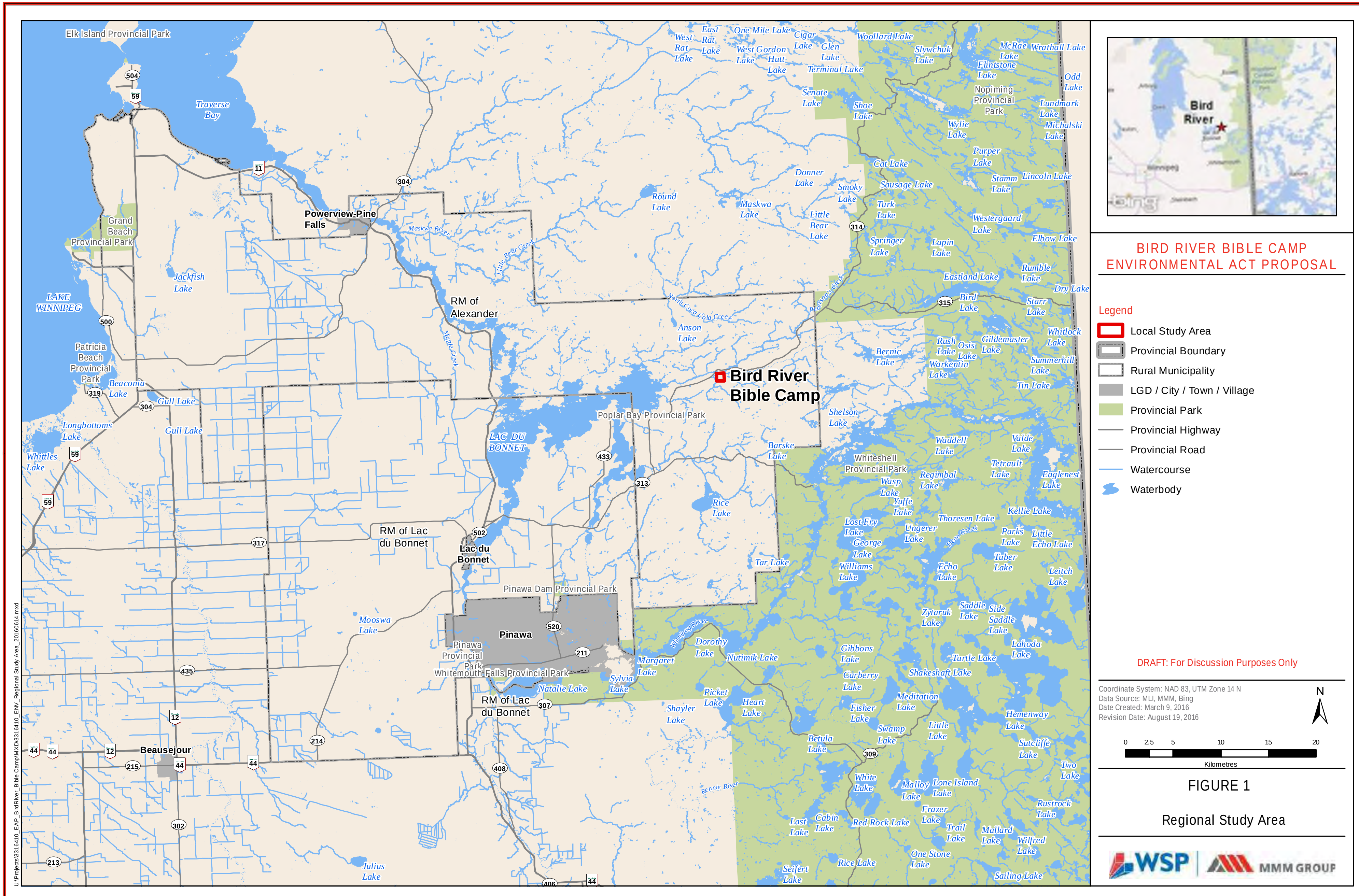
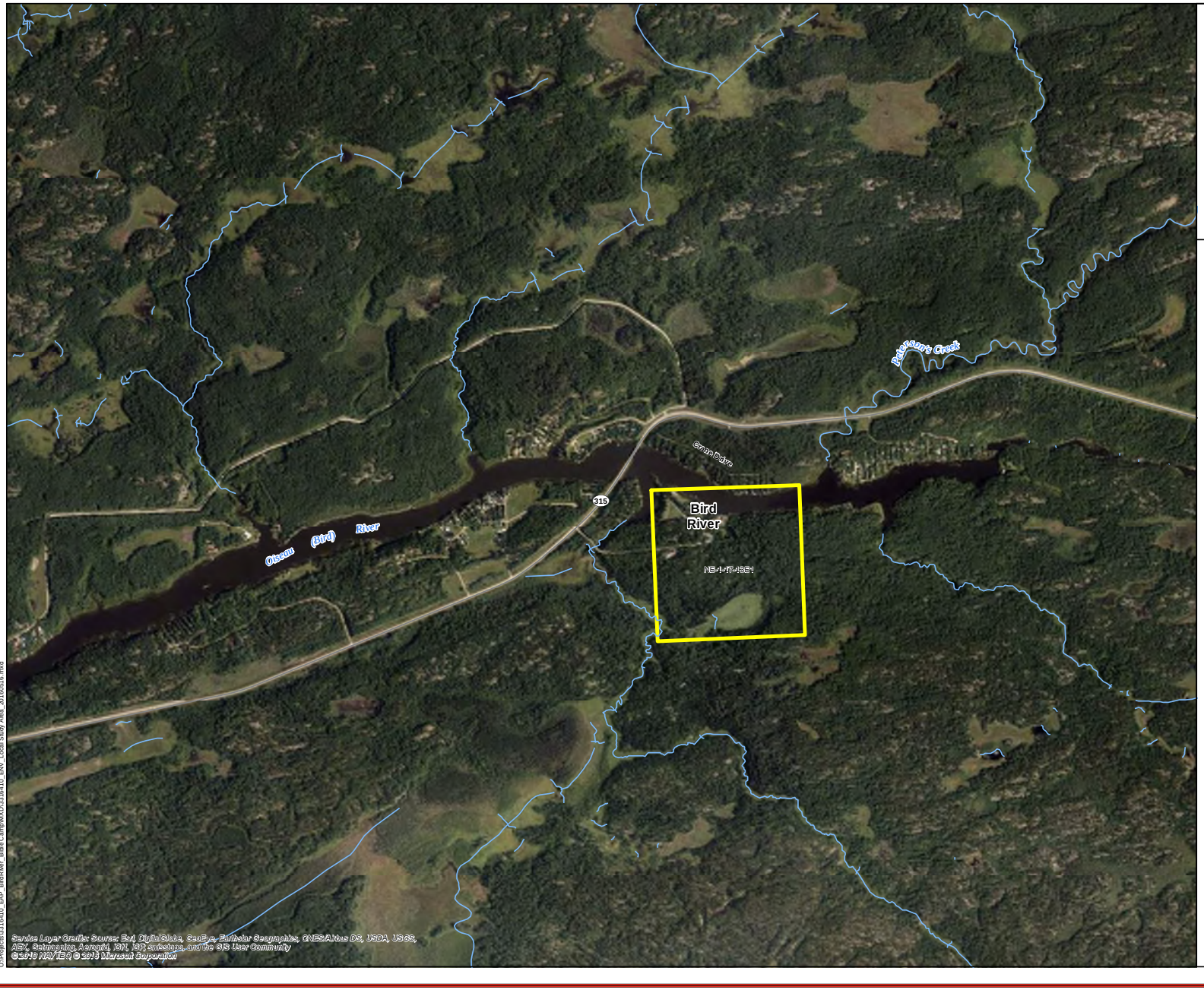
APPENDIX A

FIGURES - PROJECT LOCATION AND ECOLOGICAL ASSESSMENT


BIRD RIVER BIBLE CAMP
ENVIRONMENTAL ACT PROPOSAL
Legend
Local Study Area
Provincial Boundary
Rural Municipality
LGD / City / Town / Village
Provincial Park
Provincial Highway
Provincial Road
Watercourse
Waterbody
DRAFT: For Discussion Purposes Only
Coordinate System: NAD 83, UTM Zone 14 N
Data Source: MLI, MMM, Bing
Date Created: March 9, 2016
Revision Date: August 19, 2016
N
0 2.5 5 10 15 20
Kilometres
FIGURE 1
Regional Study Area
WSP
MMM GROUP
Bird River
Bird River Bible Camp
Elk Island Provincial Park
Traverse Bay
Powerview-Pine Falls
Grand Beach Provincial Park
LAKE WINNIPEG
Patricia Beach Provincial Park
RM of Alexander
Nopiming Provincial Park
Poplar Bay Provincial Park
LAC DU BONNET
Whiteshell Provincial Park
RM of Lac du Bonnet
Lac du Bonnet
Pinawa Dam Provincial Park
Pinawa
Pinawa Provincial Park
Whitemouth Falls Provincial Park
Beausejour
U:\Projects\3316410_EAP_BirdRiver_Bible Camp\MXD\3316410_ENV_Regional Study Area_20160614.mxd



BIRD RIVER BIBLE CAMP ENVIRONMENTAL ACT PROPOSAL

Legend

- Local Study Area
- Provincial Trunk Highway
- Provincial Road
- Watercourse

Coordinate System: NAD 83, UTM Zone 14 N
Data Source: MLI, MMM, Bing, NRCan
Date Created: March 10, 2015
Revision Date: August 19, 2016

N

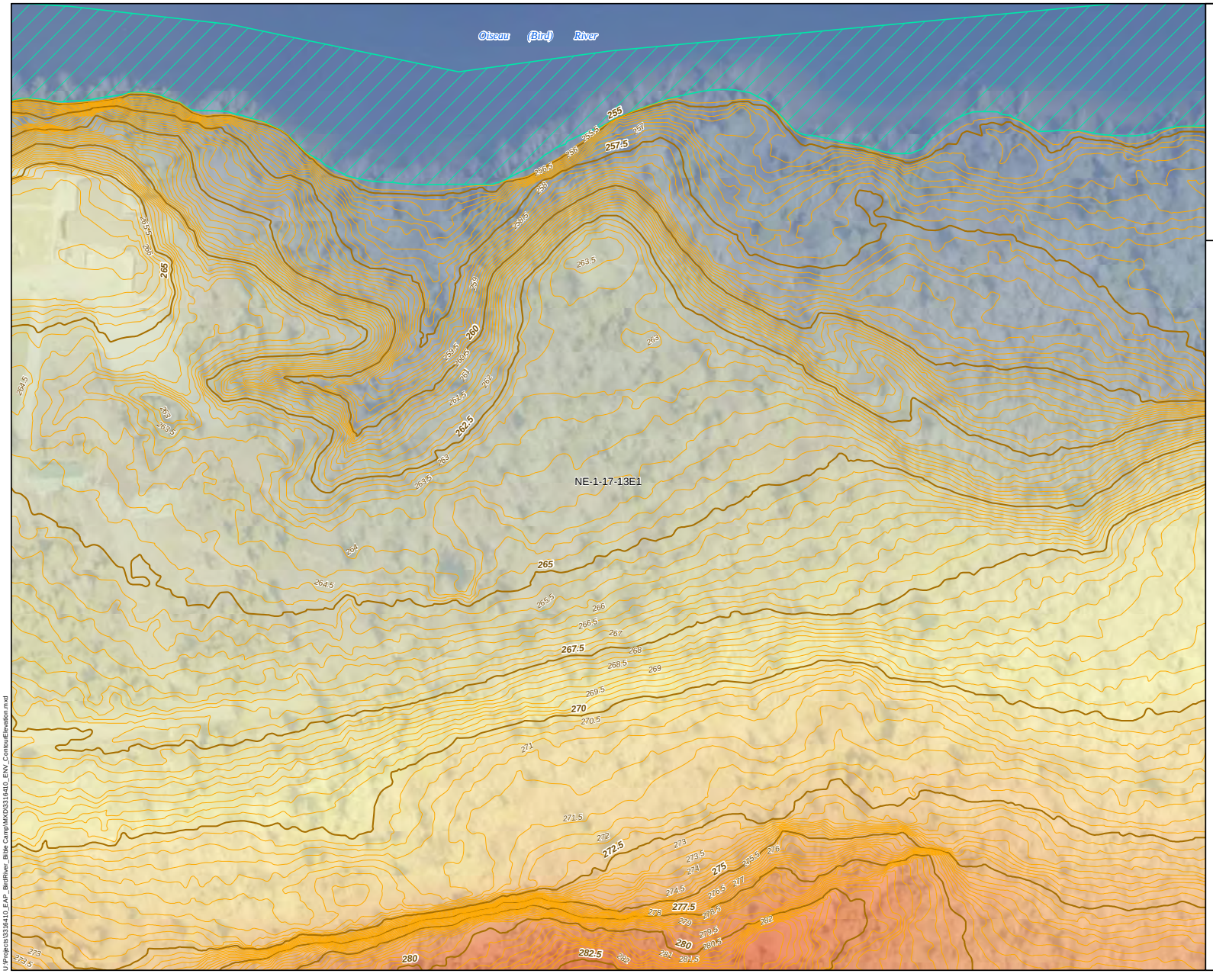
0 250 500 1000
Metres

FIGURE 2

Local Study Area

WSP | MMM GROUP

U:\Projects\3316410_EAP_BirdRiver_BibleCamp\MXD\3316410_ENV_Local Study Area_20160518.mxd



BIRD RIVER BIBLE CAMP ENVIRONMENTAL ACT PROPOSAL

Legend

- Major Contour
- Minor Contour
- Waters Edge

Elevation

High : 291.588

Low : 248.228

Coordinate System: NAD 83, UTM Zone 14 N
Data Source: MBHydro, MLI, MMM, Bing
Date Created: January 18, 2015
Revision Date: April 08, 2016

N

0 10 20 40
Metres

FIGURE 3

Contour and Elevation for Area of Concern

WSP | MMM GROUP

U:\Projects\3316410_EAP_BirdRiver_Bible Camp\MXD\3316410_ENV_ContourElevation.mxd

BIRD RIVER BIBLE CAMP ENVIRONMENTAL ACT PROPOSAL

Legend

- Valve Chamber
- Domestic Well
- Soil Sample Point
- Proposed Shallow Groundwater Monitoring Well
- Hydro Severance Line
- Effluent Discharge Pipeline
- Proposed Septic Field (Individual Pods: 16x28m)
- Project Study Area
- Proposed Septic Tank Nest
- Major Contour
- Minor Contour
- Waters Edge

Coordinate System: NAD 83, UTM Zone 14 N
Data Source: MBHydro, MLI, MMM, Bing
Date Created: January 18, 2015
Revision Date: September 27, 2016

N

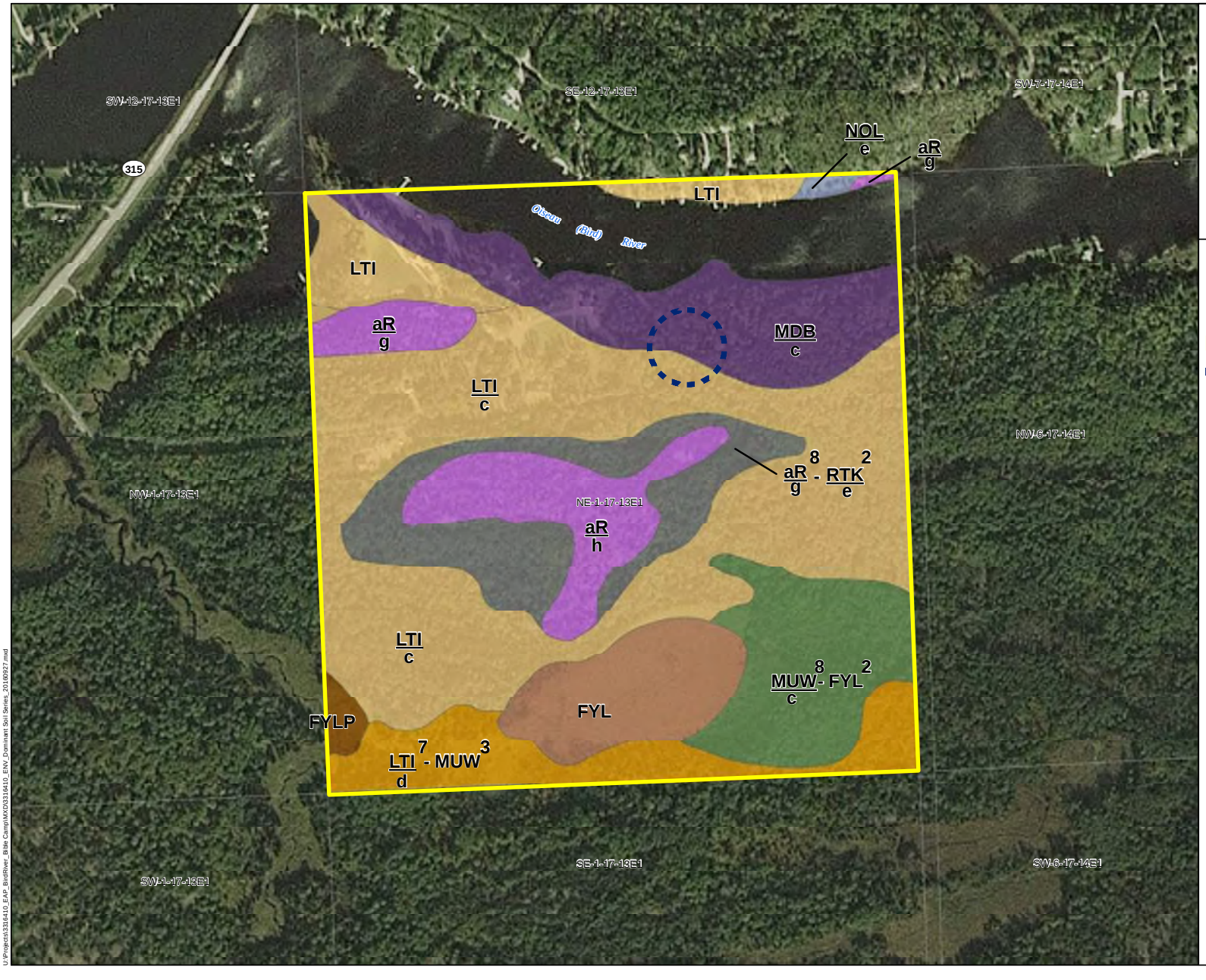
0 10 20 40
Metres

FIGURE 4

On-Site Wastewater Management System Conceptual Septic Field Layout

WSP | MMM GROUP

U:\Projects\3316410_EAP_BirdRiver_Bible Camp\MXD\3316410_ENV_ConceptualFieldLayout_16x28m_20160927.mxd



BIRD RIVER BIBLE CAMP ENVIRONMENTAL ACT PROPOSAL

Legend

- Local Study Area
- Project Study Area
- Quarter Section Grid

Dominant Soil Series

- Acidic Bedrock (aR)
- Acidic Bedrock-Rat Lake (aR-RTK)
- Fyala (FYL)
- Fyala-Peaty Phase (FYLP)
- Lettonia (LTI)
- Lettonia-Mukatawa (LTI-MUW)
- Middlebro (MDB)
- Mukatawa-Fyala (MUW-FYL)
- Nora Lake (NOL)

Coordinate System: NAD 83, UTM Zone 14 N
Data Source: MLI, MMM, NRCan, Bing
Date Created: January 18, 2015
Revision Date: September 27, 2016

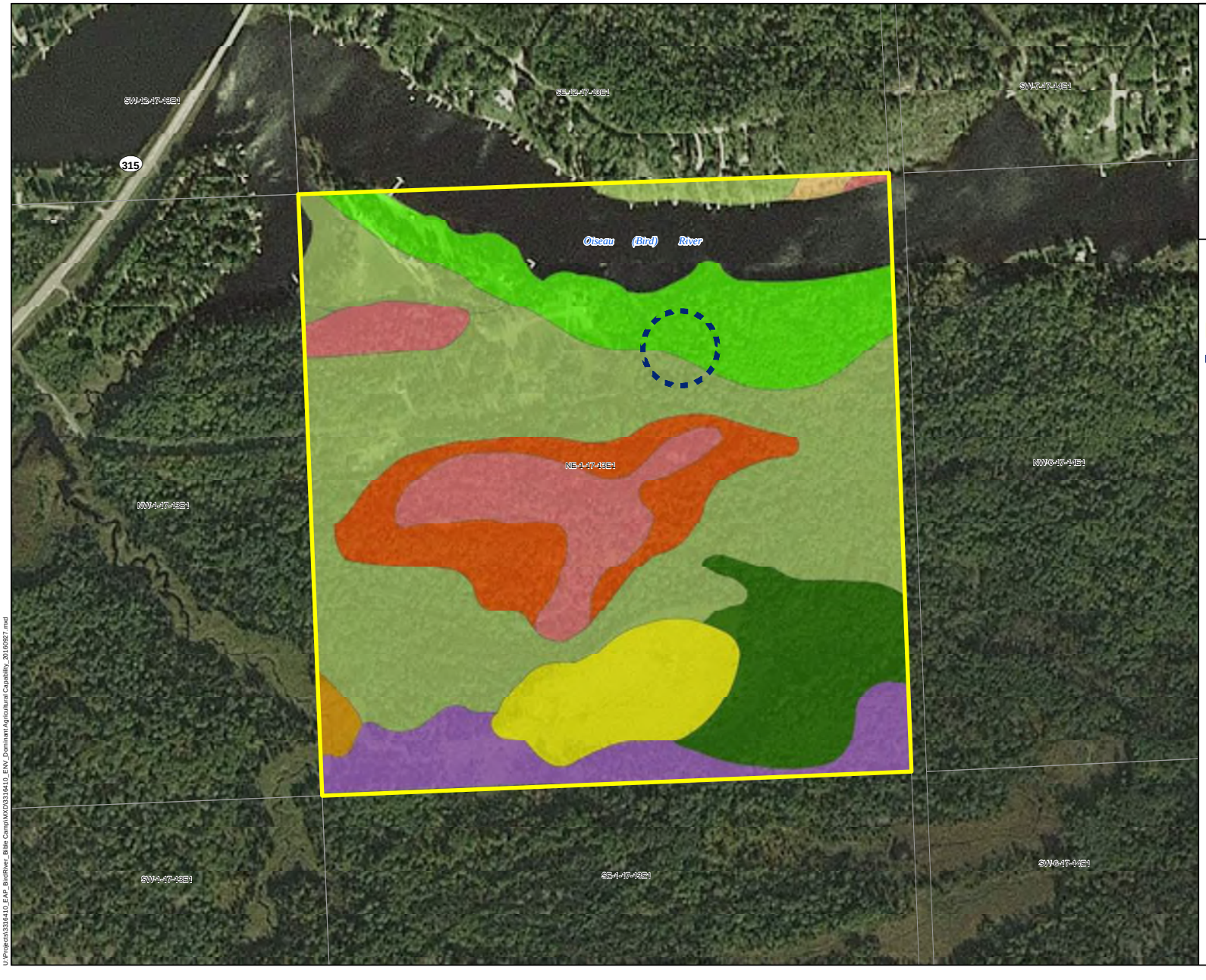
N

0 50 100 200
Metres

FIGURE 5
Dominant Soil Series
within Local Study Area

WSP | MMM GROUP

U:\Projects\3316410_EAP_BirdRiver_Bible Camp\MXD\3316410_ENV_Dominant Soil Series_20160927.mxd



BIRD RIVER BIBLE CAMP ENVIRONMENTAL ACT PROPOSAL

Legend

- Local Study Area
- Project Study Area
- Quarter Section Grid

Dominant Agricultural Capability Classification

- 3D
- 3DW-5W
- 3W
- 4TD-3DW
- 5W
- 6RP
- 6W
- 7R
- 7R-6RT

Agricultural Capability Classes

Class	Description
1	Class 1 soils have no significant limitations for crops.
2	Class 2 soils have moderate limitations that restrict the range of crops that can be grown or require moderate conservation practices.
3	Class 3 soils have moderately severe limitations that restrict the range of crops that can be grown or require special conservation practices.
4	Class 4 soils have severe limitations that restrict the crops that can be grown or require special conservation practices, or both.
5	Class 5 soils have severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible.
6	Class 6 soils are capable of only supporting perennial forae crops, and improvement practices are not feasible.
7	Class 7 soils have no capability for arable culture or permanent pasture.

Coordinate System: NAD 83, UTM Zone 14 N
Data Source: MLI, MMM, NRCan, Bing
Date Created: January 18, 2015
Revision Date: September 27, 2016

N

0 50 100 200
Metres

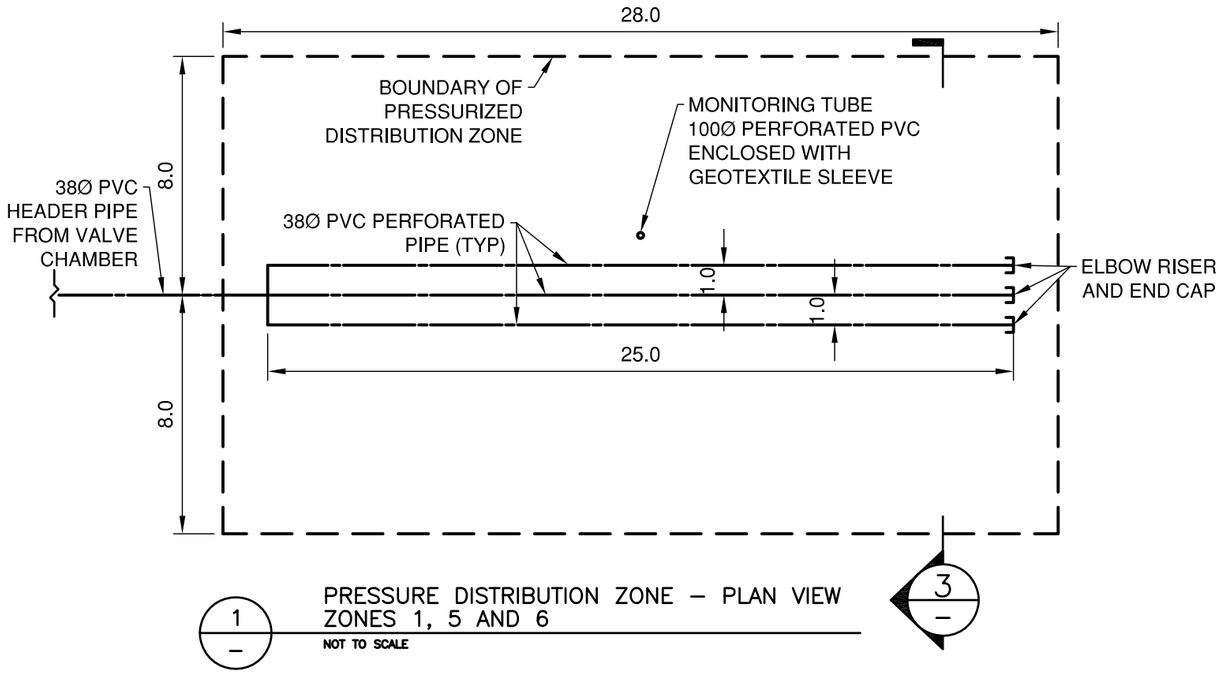
FIGURE 6
Dominant Agricultural Capability within Local Study Area

WSP | MMM GROUP

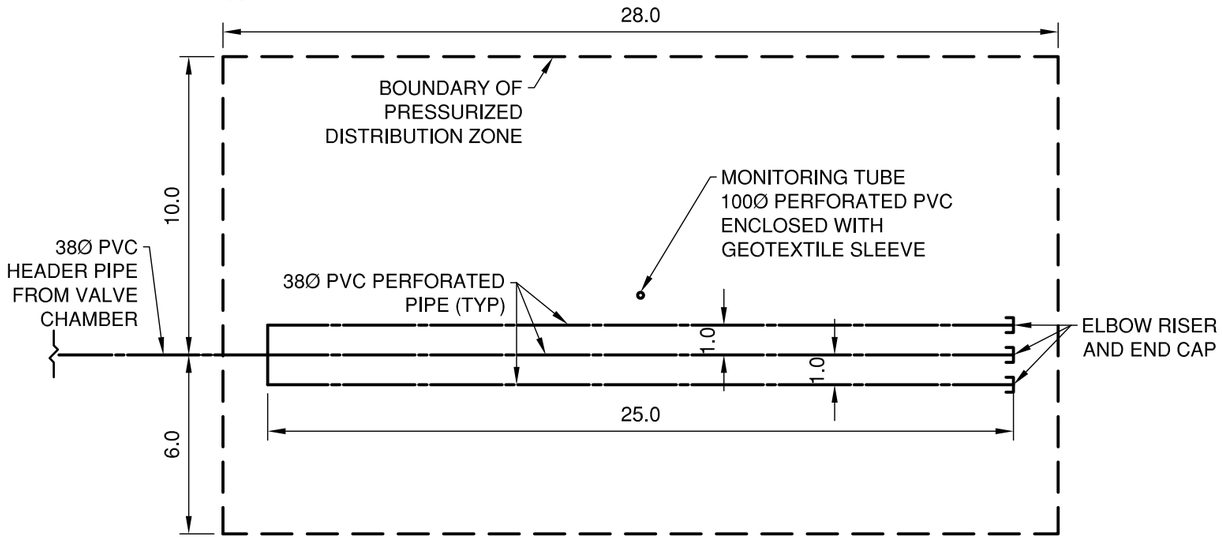
U:\Projects\3316410_EAP_BirdRiver_Bible Camp\MXD\3316410_ENV_DominantAgriculturalCapability_20160927.mxd

APPENDIX B

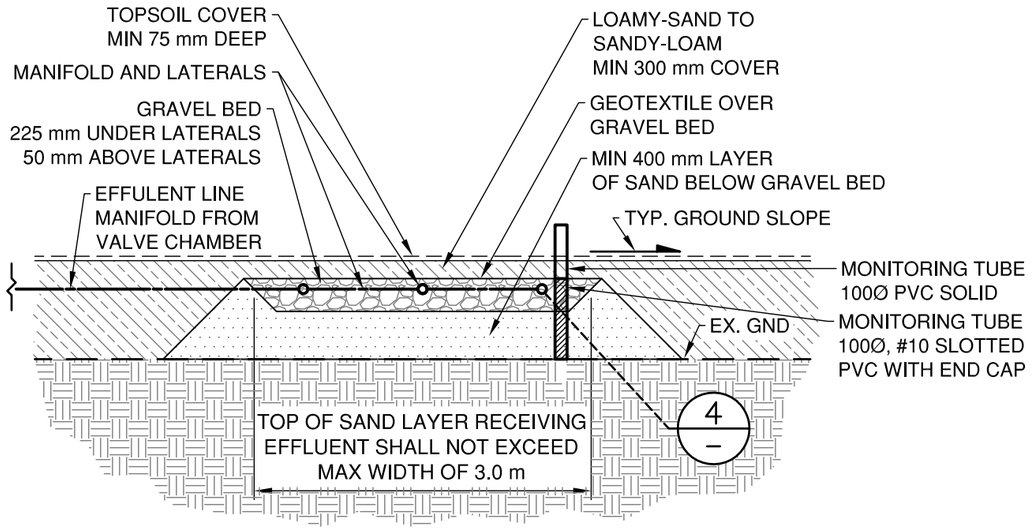
DRAWINGS - SEPTIC FIELD DESIGN



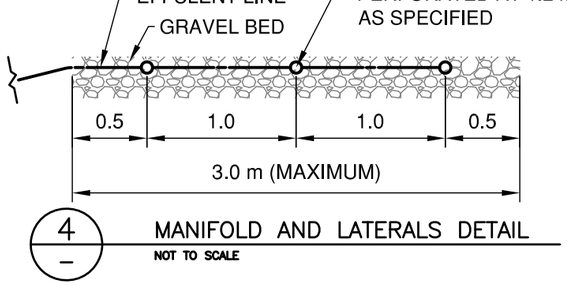
1 — PRESSURE DISTRIBUTION ZONE – PLAN VIEW
ZONES 1, 5 AND 6
NOT TO SCALE



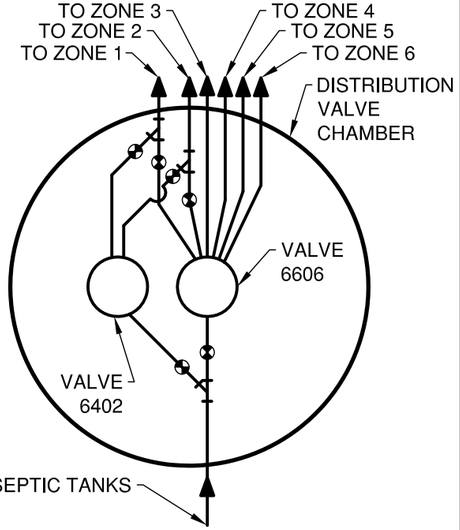
2 — PRESSURE DISTRIBUTION ZONE – PLAN VIEW
ZONES 2, 3 AND 4
NOT TO SCALE



3 — PRESSURIZED SAND MOUND FILTER (TYP.)
SECTION VIEW
NOT TO SCALE



4 — MANIFOLD AND LATERALS DETAIL
NOT TO SCALE



5 — VALVE CHAMBER DETAIL
NOT TO SCALE

WHOLE NUMBERS INDICATE MILLIMETRES;
DECIMALIZED NUMBERS INDICATE METRES

WSP
1600 BUFFALO PLACE
WINNIPEG, MANITOBA
CANADA R3T 6B8
PHONE: 204-477-6650 FAX : 204-474-2864
WWW.WSPGROUP.COM

XREF

PROJECT:
BIRD RIVER BIBLE CAMP
ENVIRONMENT ACT PROPOSAL

TITLE:
Drawing 1.0
PRESSURIZED SAND MOUND FILTER PLAN VIEW, SECTION VIEW, AND DETAILS

PROJECT NO: 151-14012-00
SCALE: AS SHOWN
DRAWN BY: DB/AP
CHECKED BY: AP/DK

SUPPLEMENTAL:
ADDENDUM: ☐
DIRECTIVE: ☐
CHANGE ORDER: ☐
REVISION: 0
DATE: 2016/09/27
SUPPLEMENTAL NO: C-XXX

STAMP

APPENDIX C
PHOTOGRAPHS

Photo 1. Geotechnical survey at septic field site.

Photo 2. Test pit showing soil profile as part of geotechnical survey.

MMM GROUP	Date Taken: November 24, 2015	Client: Southland Church
	Taken by: DKeam	Location: Bird River, MB
	Project No.: 3316410	

Photo 3. Conducting soil sampling in proposed septic field location.

Photo 4. View of proposed field location.

MMM GROUP	Date Taken: April 29, 2016	Client: Southland Church
	Taken by: BMoons	Location: Bird River, MB
	Project No.: 3316410	

Photo 5. View of understory vegetation in proposed septic field location.

Photo 6. Striped coralroot (*Corallorhiza striata*) identified during vegetation survey.

MMM GROUP	Date Taken: June 14, 2016	Client: Southland Church
	Taken by: BMoons	Location: Bird River, MB
	Project No.: 3316410	

Photo 7. Public open house for the proposed septic field at Bird River Bible Camp.

Photo 8. Public open house for the proposed septic field at Bird River Bible Camp.

MMM GROUP	Date Taken: July 23, 2016	Client: Southland Church
	Taken by: EBlackie	Location: Bird River, MB
	Project No.: 3316410	

APPENDIX D

SUPPORTING DOCUMENTS

ONSITE WASTEWATER MANAGEMENT SYSTEMS REGULATION

Manitoba Conservation

Approval of assumption of responsibility for decommissioning an out of service sewage ejector system

This approval for assumption of responsibility for decommissioning an out of service sewage ejector system after the transfer of land is issued to:

Current owner(s)

Name(s): Baptist General Conference Central District Canada

Person(s) assuming responsibility

Name(s): Southland Church

Legal Description upon which sewage ejector is located: (Section, Township, Range/Plan No.)

NE 01-17-13 E

Municipality: Alexander

Pursuant to Section 14.4 of Manitoba Regulation 83/2003 this approval is subject to the person assuming responsibility becoming the owner of the land on which the sewage ejector is located following the transfer of that land.

The person assuming responsibility for the sewage ejector system must take the system out of service and decommission it before the earlier of the following occurrences:

(a) that day that is two years after the day upon which the application was approved;

(b) a transfer or subdivision of the land subsequent to the transfer of land to the person assuming responsibility for the system.

Terms and Conditions: (if applicable)

None

Date: **December 14, 2015**

Approved by: _____
Director

Registered Mail

or Received by: _____

Land Titles

Schedule K, Section 123

The Real Property Act

I, DAVID KEHLER

of the City of Winnipeg

in the Province of Manitoba, Treasurer of CENTRAL CANADA BAPTIST CONFERENCE

make oath and say as follows:

1. I am the Treasurer of Central Canada Baptist Conference, the within named Caveator.

2. I believe that Central Canada Baptist Conference has a good and valid claim upon the said land and I say that this Caveat is not being filed for the purpose of delaying or embarrassing any person interested in or proposing to deal therewith.

3. The allegations in the within Caveat are true in substance and in fact."

SWORN before me at the City of Winnipeg in the Province of Manitoba, this 9th day of February A.D. 19 70.

A Commissioner for Oaths in and for the Province of Manitoba.

My Commission expires April 1st 1970

THE REAL PROPERTY ACT

Caveat

Registration

MURRAY MACLEAN & ASSOCIATES

CENTRAL CANADA BAPTIST CONFERENCE

Caveat Caveator Expires

FORM No. [illegible]

The Real Property Act

TO THE DISTRICT REGISTRAR FOR THE LAND TITLES DISTRICT OF WINNIPEG

TAKE NOTICE that

CENTRAL CANADA BAPTIST CONFERENCE

claim an equitable estate or interest in an estate in fee simple in possession in the undermentioned land by virtue of an easement agreement, in writing, dated the 31st day of December, 1968 and made between [illegible] of St. Boniface, in Manitoba, [illegible] BAPTIST CONFERENCE as Grantee, and affecting the following property:

The North-West quarter of Section One in the Seventeenth Township and Thirteenth Range, East of the Principal Meridian, in Manitoba, and all that portion of the South-West quarter of Section Twelve in said Township and Range, which lies to the South of the Southern limit of the Winnipeg River Power Reserve (Olmsted River) as shown on a map or plan of survey of Sections One, Two, Three, Ten, Eleven and Twelve of said Township approved and confirmed at Ottawa on the Fifteenth day of September 1921 by Thomas Shanks for the Surveyor General of Dominion Lands, excepting thereout, firstly: all that portion of said South-West quarter contained within the following limits, namely: Commencing at the point of intersection of the Southern limit of said quarter section with the South-Eastern limit of the land taken for public road as same is shown on a plan deposited in the Winnipeg Land Titles Office as No. 5428, thence North-Easterly along said South-Eastern limit to the most Southerly limit of the land taken for Water Storage as same is shown on a plan deposited in said Office as No. [illegible] thence Easterly and Southerly along the said Southern limit of said water storage to the Southern limit of said quarter section, thence Westerly [illegible] secondly: all that portion of the most Northerly [illegible] of said North-West quarter lying to the East of the South-Eastern limit of said road plan No. 5428, which lies to the West of a line drawn Southerly at right angles to the Northern limit of said North-West quarter from a point in the same distant Easterly thereon four hundred and twenty feet from said South-Eastern limit, thirdly: all that portion of said North-West quarter lying to the North-West of the North-Western limit of said road plan No. [illegible] South of a line drawn Easterly at right angles to the [illegible] said quarter section from a point in same distant Northerly thereon three hundred and fifty-one and five-tenths feet from said North-Western limit, fourthly: all those portions of said quarter section taken for Water Storage as shown on said plan No. [illegible], Subject to the reservations and provisoes contained in the Grant from the Crown.

This paper writing is attached to and forms part of a Caveat filed by CENTRAL CANADA BAPTIST CONFERENCE and dated the [illegible] day of February, A.D. 1970.

Per [signature]
Treasurer

Per [signature]
Executive Secretary

SIGNED in the presence of

Per [signature]
Treasurer

Per [signature]
Executive Secretary

[illegible] Associates [illegible] Manitoba

THIS AGREEMENT made this 31st day of December, A.D. 1969

BETWEEN:

PETER CARLSEN, of the City of St. Boniface, in Manitoba, Butcher,

(hereinafter called the "Grantor"),

OF THE FIRST PART,

- and -

CENTRAL CANADA BAPTIST CONFERENCE,

(hereinafter called the "Grantee"),

OF THE SECOND PART.

WHEREAS the Grantor is the registered owner of an estate in fee simple in possession of the following described land:

All that portion of the Northwest Quarter of Section 1, in the 17th Township and 13th Range East of the Principal Meridian, in Manitoba, lying to the Southeast of the Southeastern limit of the Public Road as the same is shown colored "pink" on a Plan deposited in the Winnipeg Land Titles Office as No. 6428, which lies between two lines perpendicularly distant 30.0 feet apart one on each side of the following described centre line; commencing at a point in the said Southeastern limit distant Southwesterly thereon 48.5 feet from the intersection of the said Southeastern limit with a straight line drawn South of parallel with and perpendicularly distant 660.0 feet from the Northern limit of said Quarter Section, thence Southerly in a straight line which forms an angle on its Northern side with the said Southeastern limit of 79 degrees and 30 minutes, a distance of 180.8 feet, thence Southeasterly in a straight line which forms an angle on its Northern side with the last described course of 167 degrees and 30 minutes a distance of 138.6 feet, thence Southeasterly in a straight line which forms an angle on its Northern side with the last described course of 210 degrees and 17 minutes a distance of 195.6 feet, thence Easterly in a straight line which forms an angle on its Northern side with the last described course of 125 degrees and 47 minutes, a distance of 423.7 feet, thence Easterly in a straight line which forms an angle on its Northern side with the last described course of 180 degrees and 48 minutes to the Eastern limit of the Northwest Quarter of said Section.

AND WHEREAS the Grantee requires and has requested a right-of-way in, over, upon and through all of the aforementioned land for the purpose of access to the Grantee's lands together with all necessary appurtenances thereto;

AND WHEREAS the Grantee is the registered owner of an estate in fee simple of certain land immediately adjacent to the above described property, said land owned by the Grantee being legally described as follows:

The North-east quarter of Section 1, Township 17 and Range 13 East of the Principal Meridian, in Manitoba, except that portion taken by the Manitoba Hydro-Electric Board

NOW THEREFORE this Agreement witnesseth that in consideration of the sum of One ($1.00) Dollar and other good and valuable consideration (the receipt of which is hereby acknowledged) now paid by the Grantee to the Grantor, the parties hereto mutually covenant and agree as follows:

1. The Grantor hereby grants to the Grantee, its successors and assigns and its successors in title forever, the right, licence and easement in all that land first described in this Agreement which said land is hereinafter called "the right-of-way" and shown colored "pink" on a plan of survey attached hereto and marked Exhibit "A" for the purpose and privilege as hereinafter set forth, that is to say, for the purpose of permitting the Grantee, its successors and assigns and successors in title and its servants, agents, workmen and members to enter upon the right-of-way at any time to use same generally as an access road to the Grantee's land as hereinbefore secondly described.

2. The Grantor hereby agrees that the rights herewith granted shall be exercisable forthwith and at any and at all times hereafter by the Grantee and by each of its respective servants, agents, employees, workmen, members either with or without vehicles, machinery or equipment free and without charge.

3. The Grantor hereby covenants and agrees that it will not erect or permit the erection of any building or other structure over the right-of-way or any part thereof, without the permission in writing of the Grantee being first had and obtained.

4. The Grantee agrees to exercise the rights hereby granted in a careful manner so as to cause a minimum inconvenience and damage to the Grantor or its successors in title and further covenants and agrees to pay the cost of maintaining the said right-

of-way in a good and sufficient state of repair and also covenants to maintain the said right-of-way in good and sufficient state of repair.

5. The Grantee covenants and agrees that it will indemnify and save harmless the Grantor and its successors and assigns and its successor in title of and from all manner of action, causes of action, suits, debts, claims or demands arising out of failure by the Grantee to exercise its rights as in this Agreement provided.

6. To the intent that the burden of all rights, licences, easements, grants, covenants and agreements contained in this Agreement may run with the said land, the Grantor covenants and agrees with the Grantee that the rights, licences and easements hereby granted shall enure to the benefit of the Grantee and its successors and assigns and successors in title and shall be binding on the Grantor and on the successors in title of the Grantor the owners or occupiers for the time being of the said land or any part thereof.

7. It is also agreed, wherever the singular and the masculine are used throughout this indenture the same shall be

construed as meaning the plural or feminine or neuter where the context or the parties hereto so require.

IN WITNESS WHEREOF Central Canada Baptist Conference has hereunto affixed its corporate seal duly attested to by the proper officers in that behalf and Peter Carlsen has signed his name and affixed his seal.

SIGNED, SEALED AND DELIVERED)
in the presence of:)

Witness

Peter Carlsen

CENTRAL CANADA BAPTIST CONFERENCE

Per:

Per:

DATED: , A.D. 19

BETWEEN:

PETER CARLSEN,

OF THE FIRST PART,

- and -

CENTRAL CANADA BAPTIST CONFERENCE,

OF THE SECOND PART.

A G R E E M E N T

NEWMAN, MACLEAN & ASSOCIATES,
Barristers & Solicitors,
Winnipeg 2, Manitoba.

PLAN SHOWING
Right of Way
IN
North West Quarter Section 6
Township 12 Range 8E. P.M.
IN
MANITOBA
Public
Road

STATUS OF TITLE

Title Number	**2846097/1**
Title Status	**Accepted**
Client File	508-46139-10

The Property Registry
A Service Provider for the Province of Manitoba

1. REGISTERED OWNERS, TENANCY AND LAND DESCRIPTION

SOUTHLAND CHURCH INC.

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

ALL THAT PORTION OF THE NE 1/4 OF SECTION 1-17-13 EPM
ACCORDING TO A MAP OR PLAN OF SAME APPROVED AND CONFIRMED AT OTTAWA
ON THE 15TH DAY OF SEPTEMBER, A.D. 1921 BY T. SHANKS FOR
THE SURVEYOR GENERAL
WHICH LIES TO THE SOUTH OF THE WINNIPEG RIVER POWER
RESERVE SHEWN ON SAID MAP OR PLAN
EXC WATER STORAGE ALL THAT PORTION TAKEN FOR WATER STORAGE SHEWN RED
ON PLAN 5936 WLTO
SUBJECT TO THE RESERVATIONS AND PROVISOES
CONTAINED IN THE GRANT FROM THE CROWN

The land in this title is, unless the contrary is expressly declared, deemed to be subject to the reservations and restrictions set out in section 58 of *The Real Property Act.*

2. ACTIVE INSTRUMENTS

Instrument Type:	**Caveat**
Registration Number:	**214800/1**
Instrument Status:	**Accepted**
Registration Date:	1970-02-10
From/By:	CENTRAL CANADA BAPTIST CONF.
To:	
Amount:	
Notes:	DOMINANT
Description:	No description

3. ADDRESSES FOR SERVICE

SOUTHLAND CHURCH INC.
BOX 219
STEINBACH MB
R5G 1M2

Geotechnical Assessment

LETTER REPORT

DATE: December 17, 2015

FILE: 151 14012 00

TO: **MMM GROUP**
111-93 Lombard Avenue
Winnipeg, Manitoba
R3B 3B1
ATTN: DARREN KEAM, M.SC, P.AG.

FROM: **SILVESTRE S. URBANO JR., P.ENG.**
Senior Geotechnical Engineer
WSP Canada Inc.
1600 Buffalo Place
Winnipeg, Manitoba R3T 6B8
Tel: (204) 477 6650

PHONE: 204-943-3178

FAX:

RE: GEOTECHNICAL REVIEW FOR THE NEW OPTAER SAGR WASTEWATER SYSTEM FOUNDATION RECOMMENDATION FOR THE PROPOSED STRUCTURE

A total of two testpits(TP1 at Site 1 and TP2 at Site 2) were excavated on November 24, 2015 for the proposed OPTAER SAGR Wastewater Treatment System at Bird River Bible Camp, MB. The new wastewater treatment system will consist of SAGR equipment shed, (4.6m x 6.1m) and basinaerate cells. This shed will be lightly loaded, heated and will house blowers, electrical panel, HVAC and power hook up. The aerated cells will be rectangular shaped and at least excavated to 1.2m depth. Based on these, it was requested that foundation recommendations for the proposed equipment shed and aerated cell be provided.

The two testpits excavated to 3.7m depth revealed a general soil profile consisting of a layer ofpeat moss/topsoil underlain by a clay layer which extended to the depth explored. The clay layer is fractured down to 1.8m depth and layered with silty clay at 1.8m to 3.7m depth. *Slight seepage was noted at 3m depth in TP1 only after completion of excavation.* Detailed descriptions of the subsurface conditions are attached as well as the testhole location plan. TP1 is located about 50m east of the main camp and TP2 is located about 100m east of TP1.

GEOTECHNICAL RECOMMENDATIONS

Foundation alternatives for the equipment shed, which were considered, include cast-in-place (CIP) concrete friction piles with temporary sleeves and thickened edge slab on engineered fill.

Both sites are acceptable for the proposed OPTAER SAGR wastewater treatment system with respect to soil conditions. However, Site 1 is preferred due to its flatter topography. Site 2's topography is flat near the access road and dropped off steeply towards the river.

The preferred foundation, which may be utilized for the proposed building structure, is a system of system of cast-in-place friction pile. However and since the equipment shed is lightly loaded, thickened edge slab on engineered fill could be used as foundation system provided that differential settlement of less than 25mm is acceptable and our recommendations are followed.

THICKENED EDGE SLAB ON ENGINEERED FILL

Alternatively, this foundation system may be used if the following recommendations are followed. The proposed structure may be supported by a concrete raft foundation founded on 600mm of granular fill over a non-woven geotextile(300mm subbase material topped by 300mm of base course material) compacted in 150mm lift to at least 100% Standard Proctor density. The suggested subbase is the use of crushed granular or limestone fill (100mm to 150mm down).

To reduce differential foundation settlement or heaving, subgrade preparation forthe raft foundation should be prepared as follows:

- Within the proposed structure area and at least 1.2m beyond the structure perimeter, remove 600mm of fill/topsoil material; topsoil/fill ranged from 200mm to 600mm thick. The anticipated depth of site stripping is the total depth of the granular fill and the thickness of concrete. However if additional fill is required to increase the lower areas, the depth of site stripping is the thickness of the topsoil which is about 200mm to 300mm. It is anticipated that the additional fill should comprised of granular fill (subbase material)

- Compact the subgrade uniformly with a vibratory roller to at least 95% Standard Proctor density (ASTM D698) prior to placing the non-woven geotextile and granular fill. If softened soil is encountered, this softened soil should be removed, covered with a geotextile and replaced by a 300mm thick of 150mm down, clean, crushed aggregate material. The granular fill material should be uniformly compacted to at least 98% Standard Proctor density (ASTM D698). All aggregate material used should passed the Manitoba Highways aggregate specification.

- For permanent frost protection of the heated building and to maintain lateral earth pressures against foundation walls, place a rigid insulation extending at least 1.2m around the perimeter over non-frost susceptible (pit-run aggregate) beyond the edges of the raft foundation. The pit-run aggregate should extend at least 1.2m beyond the edges of the raft foundation. *Provide a construction joint between a heated area and unheated areas to minimized differential settlement caused by different temperatures.*

Perimeter weeping tiles should be provided and covered with filter cloth and surrounded with a minimum of 150 mm of pea gravel. The bottom of the weeping tile should be at least 300 mm below the floor.

On the foregoing basis and contingent upon a minimum width of 400mm for the slab thickness, an allowable soil bearing pressure of 71.8 kPa(1500 psf) may be used. The associated total soil settlement is estimated to be 25 to 50mm. With Limit State Design (LSD), the following bearing resistances at Factored Ultimate Limit State (ULS) and Serviceability Limit State (SLS) are recommended for this foundation system; Factored ULS: 86.2 kPa (1800 psf) and SLS: 71.8 kPa (1500

psf). Note that an appropriate resistance factor was applied to the unfactored ULS to determine the factored ULS.

To avoid potential long term settlement caused by the roots of fast growing trees, all existing and new trees should be offset from the edges of the thickened slab, a minimum horizontal distance equal to the tree's mature height.

ADDITIONAL CONSIDERATIONS(AERATED CELLS, SEPTIC FIELD SUITABILITY)

For cell construction, there are no guidelines, which suggest that proposed inside slope and bottom of the cells should be provided with at least one metre layer consisting of soil having a permeability of less than $1x10^{-7}$ cm/s. *However, it is recommended that suitable clay of medium to high plasticity should be used to line the cell structure on the inside slope and bottom. The clay should be proof-rolled with vibratory roller at least 10 to 20 passes which is equivalent to 95% STD Proctor Density to expose any soft areas.*

The soils at the proposed cell sites (TP1 and TP2) consist mostly of relatively clay, underlain by stratified layer of CLAY and SILTY CLAY. Any significant silt or sand soil encountered should be removed and replaced with suitable high plasticity clay.*Silt or sand should not be used as liner.*

With respect to its Septic Field Suitability, soil samples from both testpits were submitted for Particle Size Analysis, attached. Both samples at 0.3m to 0.6m depth were classified as SILTY CLAY LOAM using the guideline from Manitoba Conservation Soil Texture Classification Triangle for Septic Fields. The application rate is 8.31 L/day/m2 and the percolation rate is 32-47.2 min/cm.

To ensure adequate site drainage, the following recommendations are made:

- A 10% slope (8 in. in 6.5 ft) should be considered for the first 1.8m (6 ft) from the foundation wall. It may be necessary to regrade at the end of the first year.
- Make sure that downspout extensions direct water away from walls. Provide splashblocks away from walls to prevent erosion and ponding.
- On a sloping site, grade from the centre out to the corners of the building. Provide a swale.

Concrete should be manufactured with sulphate-resistant (Type 50) cement, minimum compressive strength of 32 mPa and air content between 4% and 7%. Any concrete subject to cycles of freezing and thawing should be air entrained in accordance with the latest edition of CSA A23.1, Concrete Materials and Methods of Concrete Construction.

CLOSURE

The findings and geotechnical recommendations provided in this report were prepared by WSP Canada Inc. (the Consultant) in accordance with generally accepted professional engineering principles and practices. The recommendations are based on the results of field and laboratory investigations

and are reflective only of the actual testhole(s) and/or excavation(s) examined. Environmental Site Assessment (ESA) is not included in our scope of work. If conditions encountered during construction appear to be different than those shown by the testhole(s) and/or excavation(s) at this site, the Consultant should be notified immediately in order that the recommendations can be reviewed and modified as necessary to address actual site conditions.

This report is limited in scope to only those items that are specifically referenced in this report. There may be existing conditions that were not recorded in this report. Such conditions were not apparent to the Consultant due to the limitations imposed by the scope of work. The Consultant, therefore, accepts no liability for any costs incurred by the Client for subsequent discovery, manifestation or rectification of such conditions.

This report is intended solely for the Client named as a general indication of the visible or reported physical condition of the items addressed in the report at the time of the geotechnical investigation. The material in this report reflects the Consultant's best judgment in light of the information available to it at the time of preparation.

This report and the information and data contained herein are to be treated as confidential and may be used only by the Client and its officers and employees in relation to the specific project that it was prepared for. Any use a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. The Consultant 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 report has been written to be read in its entirety, do not use any part of this report as a separate entity.

All files, notes, source data, test results and master files are retained by the Consultant and remain the property of the Consultant.

Project No: 151-14012-00

Project: Bird River Bible Camp WW System

Client: Bird River Bible Camp c/o MMM Group

Location: Lac Du Bonnet, Manitoba

Enclosure:

Engineer: SSU

TP1 (Site 1)

WSP

SUBSURFACE PROFILE

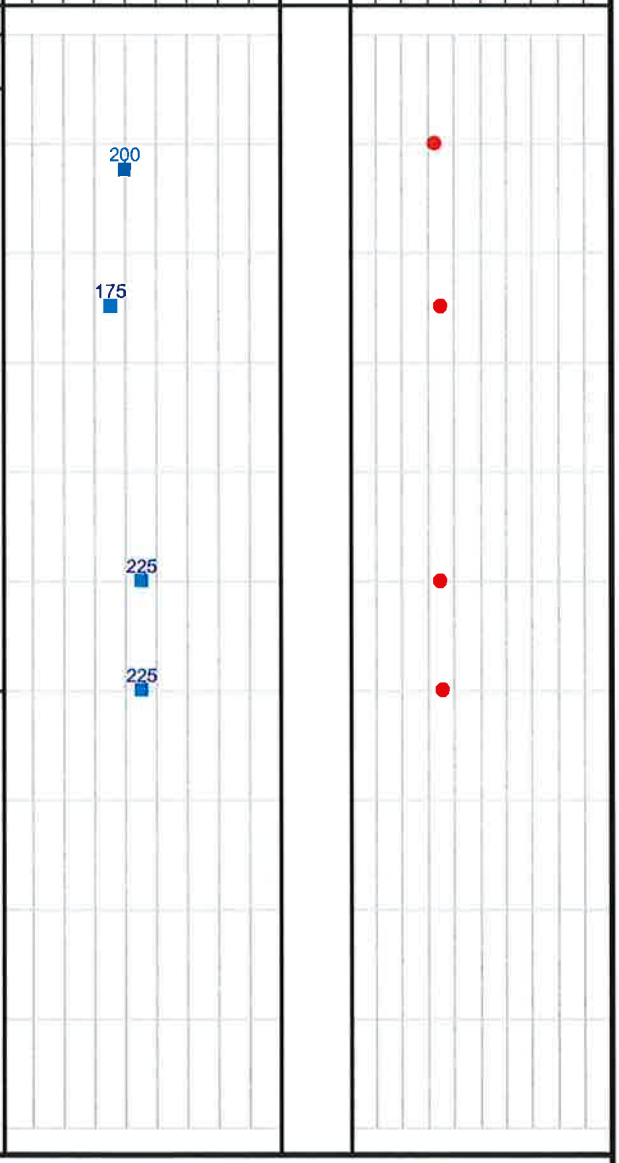
Depth (ft / m)	Symbol	Description	Depth/Elev., m
0 / 0		Ground Surface	206
0 – 1		***PEAT MOSS and TOPSOIL*** 300mm thick: 300mm of ROOTLETS with CLAY LOAM, black	206
1 – 12 / 0 – 3.7		***CLAY*** stiff, brown, fissured; trace of fine gravel at 1.2m, fractured, mottled; layered between brown clay and tan-brown silty clay; SLIGHT SEEPAGE at 3m. END OF TESTPIT AT3.7M.	
12 / 3.7		End of Testpit	202

SAMPLE

PP(kPa): 50, 150, 250, 350

SPT, N

Water Content %: 10, Wp, 30, 50, 70, Wl, 90



Drill Method: Backhoe

Drill Date: 11/24/15

Hole Size: 1m W x 3m L

WSP Canada Inc.
1600 Buffalo Place
Winnipeg, MB.
R3T 6B8

Elevation: Assumed 100.0m

Checked by: SSU

Sheet: 1 of 1

Project No: 151-14012-00

Client: Bird River Bible Camp c/o MMM Group

TP2 (Site 2)

Project: Bird River Bible Camp WW System

Location: Lac Du Bonnet, Manitoba

WSP

Enclosure:

Engineer: SSU

SUBSURFACE PROFILE

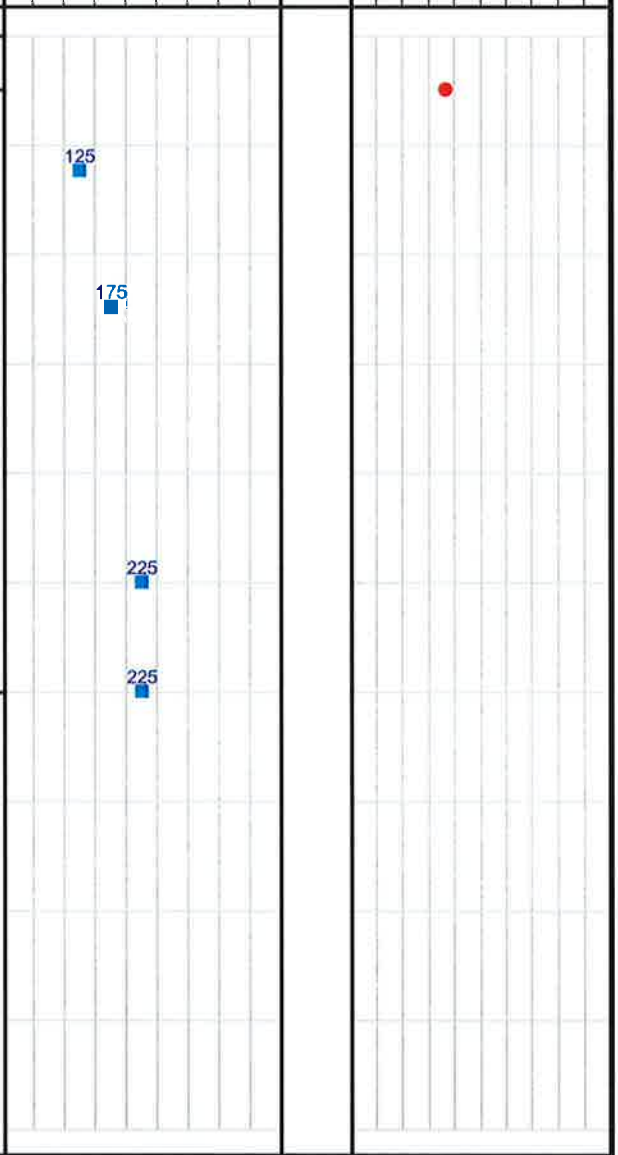
Depth (ft / m)	Symbol	Description	Depth/Elev., m
0 / 0		Ground Surface	206
0 / 0		***TOPSOIL*** 200mm thick: 200mm of ROOTLETS with CLAY LOAM, black	206
5 / 2		***CLAY*** stiff, brown, fissured; fractured at 1.2m, mottled; layered between brown clay and tan-brown silty clay below 1.8m; silty clay layer increased with depth. END OF TESTPIT AT3.7M.	
12 / 4		End of Testpit	202

SAMPLE

PP(kPa): 50, 150, 250, 350

SPT, N

Water Content %: 10, 30, 50, 70, 90 (Wp ------ 0 ------ Wl)



Drill Method: Backhoe

Drill Date: 11/24/15

Hole Size: 1m W x 3m L

WSP Canada Inc.
1600 Buffalo Place
Winnipeg, MB.
R3T 6B8

Elevation: Assumed 100.0m

Checked by: SSU

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

1402 Notre Dame Avenue, Winnipeg, MB R3E 3G5
Winnipeg, Manitoba Phone: 204 697-3854 Cell: 204 997-1355
Email: hmanalo@mts.net

MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: **WSP**	TEST NO:	PROJECT NO:
PROJECT: **Bird River Bible Camp**	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: **SU**	DATE TESTED: November 25, 2015	TESTED BY: GM

Test Pit No.	TP 1	TP 1	TP 1	TP 1	
Depth	1 ft - 2 ft	5 ft	10 ft	12 ft	
Tare No.					
Wt Wet Sample + Tare	399.0	214.1	197.9	235.8	
Wt Dry Sample + Tare	300.8	160.1	147.7	174.1	
Wt Water	98.2	54.0	50.2	61.7	
Wt Tare	7.6	4.2	4.2	4.3	
Wt Dry Sample	293.2	155.9	143.5	169.8	
Moisture Content (%)	33	35	35	36	
Test Pit No.	TP 2				
Depth	1 ft				
Tare No.					
Wt Wet Sample + Tare	392.3				
Wt Dry Sample + Tare	289.1				
Wt Water	103.2				
Wt Tare	7.4				
Wt Dry Sample	281.7				
Moisture Content (%)	37				
Test Pit No.					
Depth					
Tare No.					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
Moisture Content (%)					
Test Pit No.					
Depth					
Tare No.					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
Moisture Content (%)					

H. MANALO CONSULTING LTD.

H. MANALO CONSULTING LTD.
1402 Notre Dame Avenue, Winnipeg, MB R3E 3G5
Phone: 204 697 3854 Cell: 204 997-1355
hmanalo@mts.net

PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

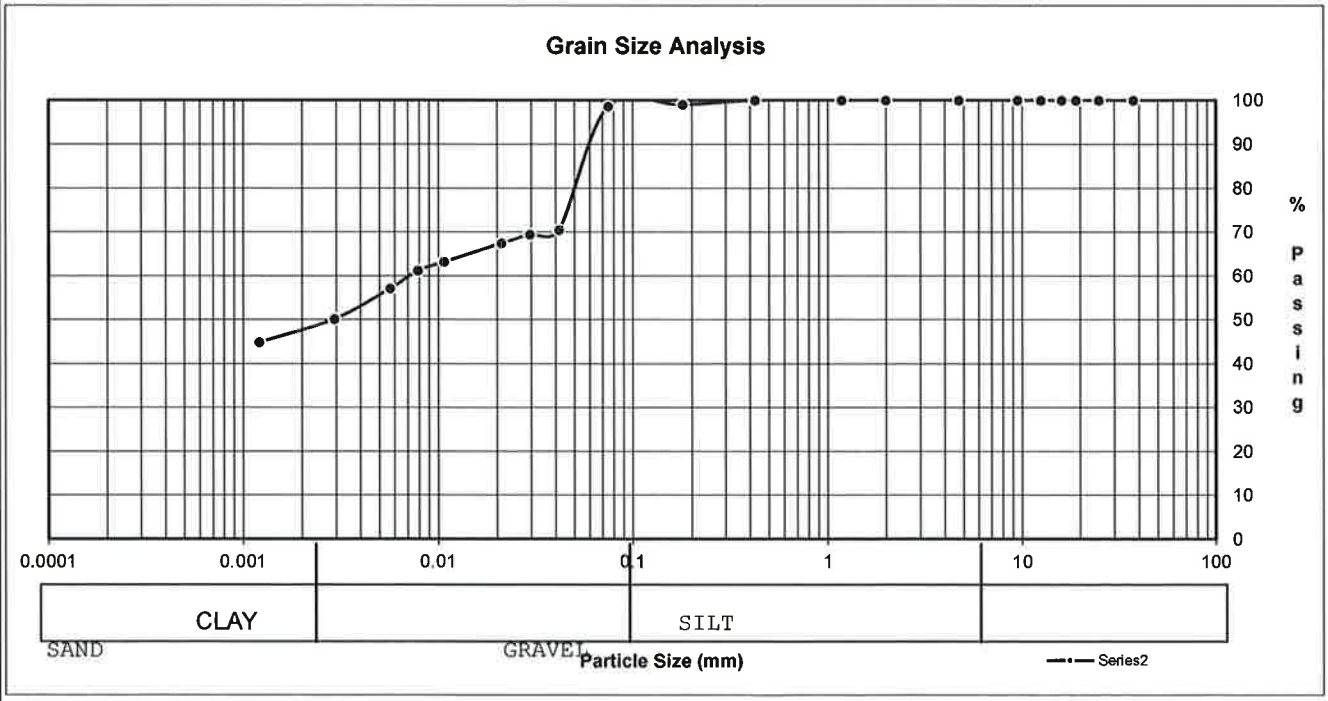
CLIENT: WSP Canada
1600 Buffalo Place
Winnipeg, MB R3T 6B8
ATTN: Silvestre Urbano Jr., P. Eng.
PROJECT: Bird River Bible Camp

PROJECT NO. 1502-30

Date Sampled:	unknown	Date Received:	24-Nov-15
Sampled By:	Client	Date Tested:	26-Nov-15

Material Identification
B.H./T.H. No. **TP1 @ 1'- 2'**
Sample No. **3**
Sample Source
Specific Gravity of Material: 2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0416	70.4
9.50	100.0	0.0295	69.4
4.75	100.0	0.0211	67.4
2.00	100.0	0.0107	63.2
1.18	100.0	0.0079	61.2
0.425	100.0	0.0057	57.1
0.180	99.0	0.0029	50.2
0.075	98.6	0.0012	44.8



SOIL DESCRIPTION	% Composition		D10	
		Gravel	D30	
	1	Sand	D60	0.00569
	54	Silt	Cu	#DIV/0!
	45	Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318
Technician: GM

Reviewed by: Hermie Manalo

H. MANALO CONSULTING LTD.

H. MANALO CONSULTING LTD.
1402 Notre Dame Avenue, Winnipeg, MB R3E 3G5
Phone: 204 697 3854 Cell: 204 997-1355
hmanalo@mts.net

PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

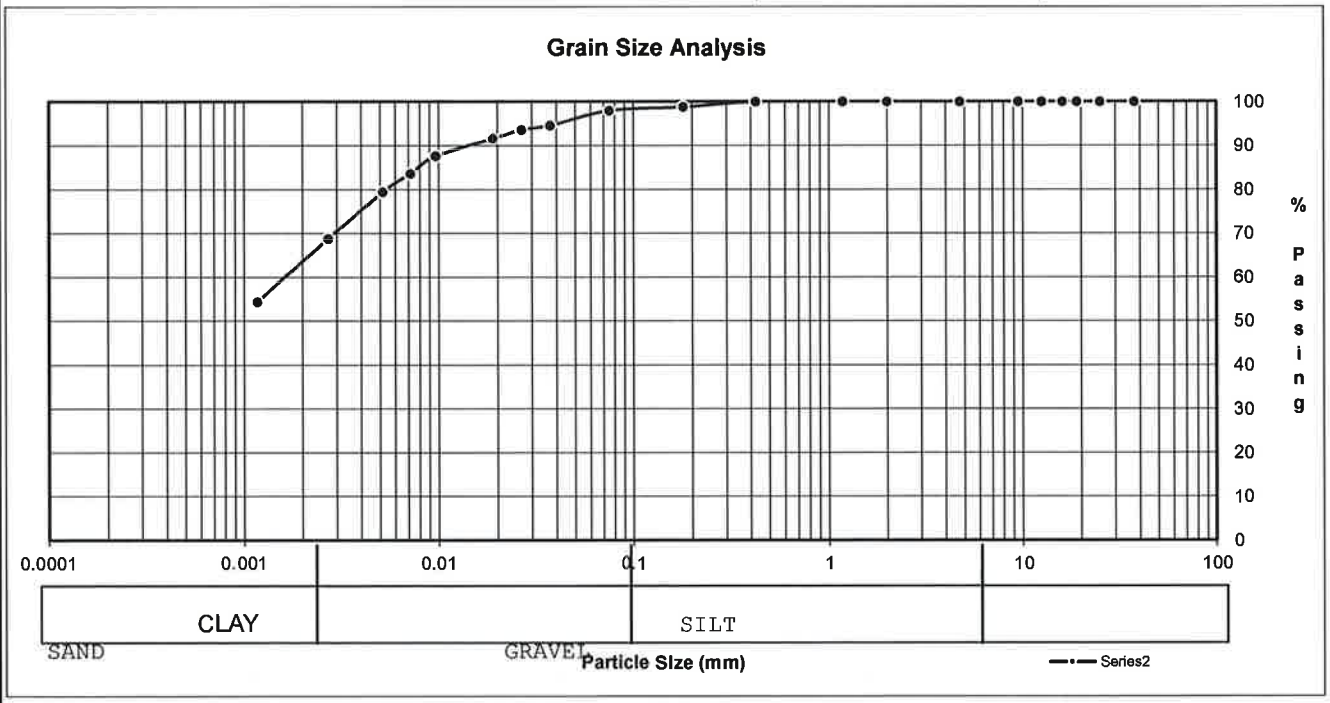
CLIENT: WSP Canada
1600 Buffalo Place
Winnipeg, MB R3T 6B8
ATTN: Silvestre Urbano Jr., P. Eng.
PROJECT: Bird River Bible Camp

PROJECT NO. 1502-30

Date Sampled:	unknown	Date Received:	24-Nov-15
Sampled By:	Client	Date Tested:	26-Nov-15

Material Identification
B.H./T.H. No. **TP2 @ 1'**
Sample No. **2**
Sample Source
Specific Gravity of Material: 2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0373	94.6
9.50	100.0	0.0265	93.6
4.75	100.0	0.0189	91.6
2.00	100.0	0.0096	87.6
1.18	100.0	0.0072	83.6
0.425	100.0	0.0052	79.4
0.180	98.8	0.0027	68.8
0.075	98.0	0.0012	54.5



SOIL DESCRIPTION	% Composition		D10	
		Gravel	D30	
	2	Sand	D60	0.00118
	44	Silt	Cu	#DIV/0!
	54	Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM

Reviewed by: Hermie Manalo

CASH CLIENTS - WINNIPEG
ATTN: DAN DUECK
Crete-X Constrution
3-20 Brandt St Suite 276
Steinbach MB R5G 1Y2

Date Received: 06-JAN-15
Report Date: 12-JAN-15 14:39 (MT)
Version: FINAL

Client Phone: 204-355-8020

Certificate of Analysis

Lab Work Order #: L1564192

Project P.O. #: Client paid $220.00
Job Reference: BIRD RIVER BIBLE CAMP - LAC DU BONNET
C of C Numbers:
Legal Site Desc:

Chantal Bouchard

Chantal Bouchard
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1564192-1 DAN DUECK - CRETE-X - BIRD RIVER BIBLE CAMP Sampled By: Dan Dueck on 25-OCT-14 @ 09:00 Matrix: Soil **Grain size plus prep** **Grain size analysis for MB Conservation** Grain Size Curve	SEE ATTACHED				09-JAN-15	12-JAN-15	R3130549

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
GRAIN SIZE-MC-SK	Soil	Grain size analysis for MB Conservation	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.

Reference:

Burt, R. (2009). Soil Survey Field and Laboratory Methods Manual. Soil Survey Investigations Report No. 5. Method 3.2.1.2.2. United States Department of Agriculture Natural Resources Conservation Service.

** ALS test methods may incorporate modifications from specified reference methods 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

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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.

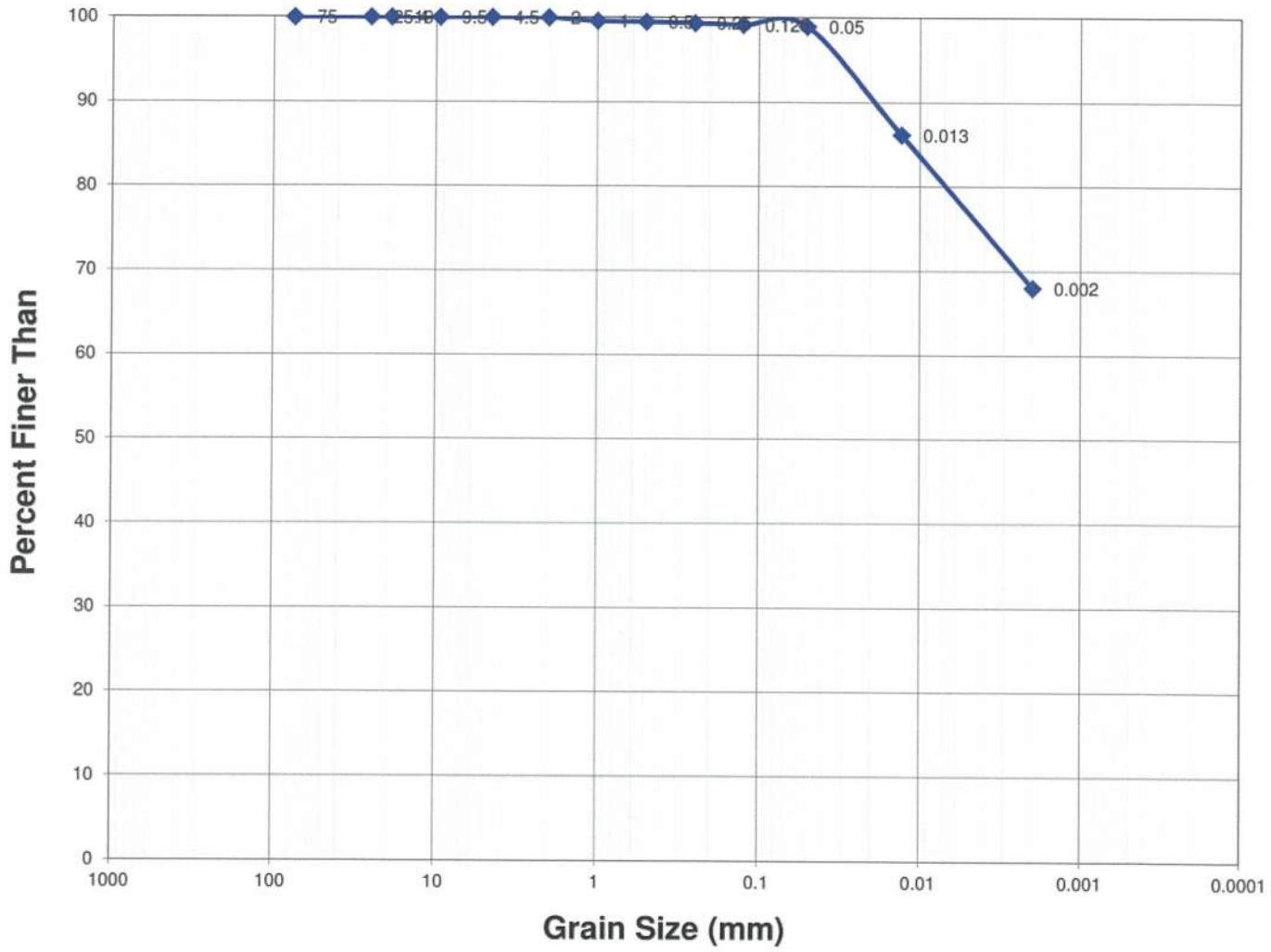
Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES
Environmental Division

819-58th Street, Saskatoon, SK S7K 6X5

Client Name: DAN DUECK
Project:
Sample ID: DAN DUECK - CRETE-X - BIRD RIVER BIBLE CAMP
Lab ID: L1564192-1

Particle Size Distribution Curve



Summary of Results

ASTM D422-63 Classification

Size Class	Size Range	Wt. (%)
Gravel	4.75mm - 3"	0
Sand	0.074mm - 4.75mm	1
Silt	0.005mm - 0.074mm	26
Clay	< 0.005mm	73

Texture: Clay

MMM Group Ltd.
ATTN: DARREN KEAM
111-93 Lombard Ave
Winnipeg MB R3B 3B1

Date Received: 03-MAY-16
Report Date: 09-MAY-16 15:25 (MT)
Version: FINAL

Client Phone: 204-943-3178

Certificate of Analysis

Lab Work Order #: L1763237

Project P.O. #: NOT SUBMITTED
Job Reference: 3316410
C of C Numbers:
Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	MU	Qualifier*	D.L.	Units	Bias	Extracted	Analyzed	Batch
L1763237-1 WP6 6-18"									
Sampled By: B MOONS on 29-APR-16 @ 14:30									
Matrix: SOIL									
Grain size plus prep									
Grain size analysis for MB Conservation									
Grain Size Curve	SEE ATTACHED	-				-	06-MAY-16	09-MAY-16	R3453903
L1763237-2 WP6 30-36"									
Sampled By: B MOONS on 29-APR-16 @ 14:30									
Matrix: SOIL									
Grain size plus prep									
Grain size analysis for MB Conservation									
Grain Size Curve	SEE ATTACHED	-				-	06-MAY-16	09-MAY-16	R3453903
L1763237-3 WP7 6-18"									
Sampled By: B MOONS on 29-APR-16 @ 14:30									
Matrix: SOIL									
Grain size plus prep									
Grain size analysis for MB Conservation									
Grain Size Curve	SEE ATTACHED	-				-	06-MAY-16	09-MAY-16	R3453903
L1763237-4 WP7 30-36"									
Sampled By: B MOONS on 29-APR-16 @ 14:30									
Matrix: SOIL									
Grain size plus prep									
Grain size analysis for MB Conservation									
Grain Size Curve	SEE ATTACHED	-				-	06-MAY-16	09-MAY-16	R3453903

* 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**
GRAIN SIZE-SEPTIC-SK	Soil	Grain size analysis for MB Conservation		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.

Reference:

Burt, R. (2009). Soil Survey Field and Laboratory Methods Manual. Soil Survey Investigations Report No. 5. Method 3.2.1.2.2. United States Department of Agriculture Natural Resources Conservation Service.

** 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

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: L1763237 Report Date: 09-MAY-16

Client: MMM Group Ltd.
111-93 Lombard Ave
Winnipeg MB R3B 3B1
Contact: DARREN KEAM

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed

Quality Control Report

Workorder: L1763237 Report Date: 09-MAY-16

Client: MMM Group Ltd.
111-93 Lombard Ave
Winnipeg MB R3B 3B1
Contact: DARREN KEAM

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

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.

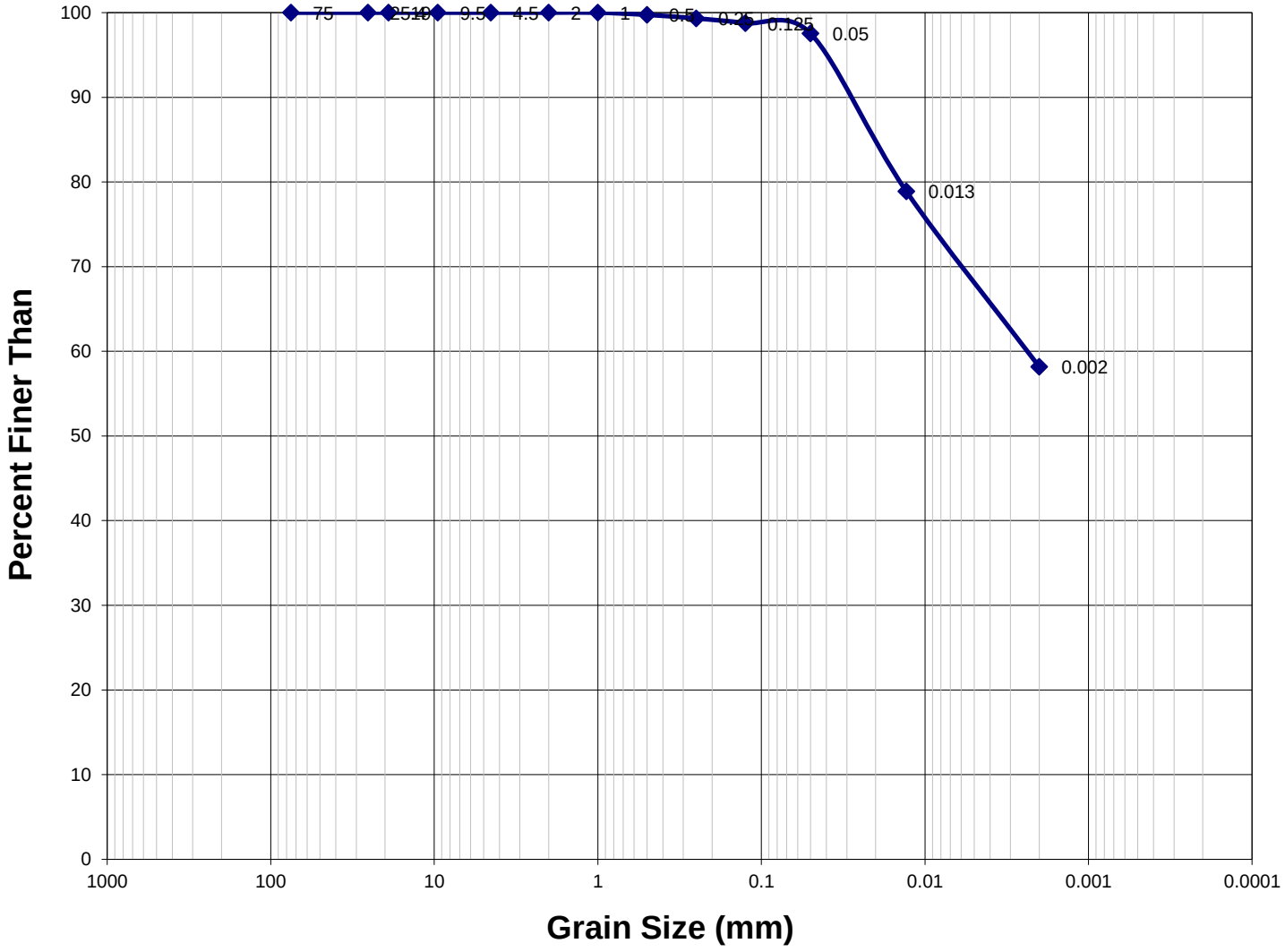
Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES
Environmental Division

819-58th Street, Saskatoon, SK S7K 6X5

Client Name: MMM Group Ltd.~(Winnipeg)
Project:
Sample ID: WP6 6-18"
Lab ID: L1763237-1

Particle Size Distribution Curve



Summary of Results

ASTM D422-63 Classification

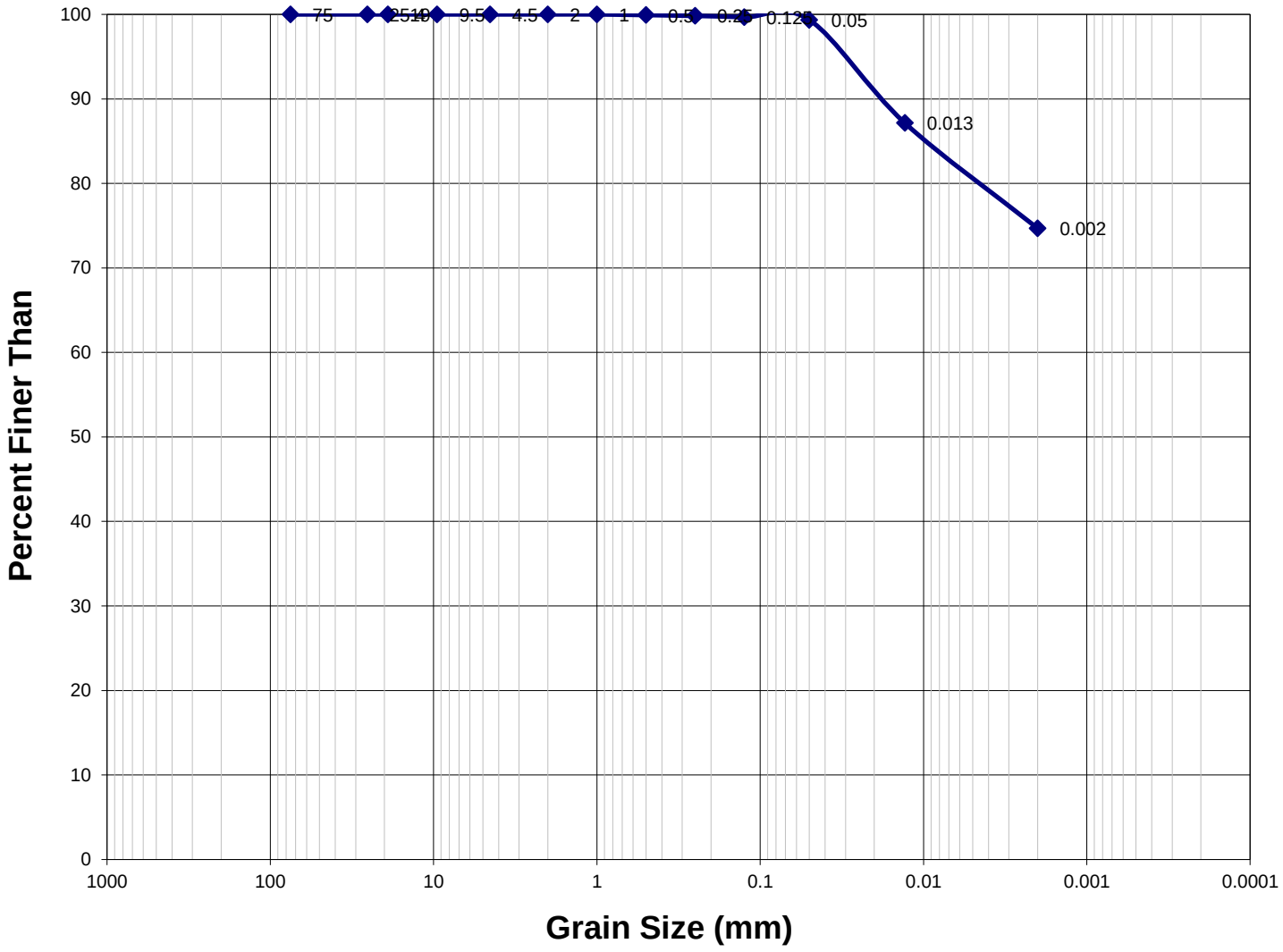
Size Class	Size Range	Wt. (%)
Gravel	4.75mm - 3"	0
Sand	0.074mm - 4.75mm	2
Silt	0.005mm - 0.074mm	34
Clay	< 0.005mm	64

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES
Environmental Division

819-58th Street, Saskatoon, SK S7K 6X5

Client Name: MMM Group Ltd.~(Winnipeg)
Project:
Sample ID: WP6 30-36"
Lab ID: L1763237-2

Particle Size Distribution Curve



Summary of Results

ASTM D422-63 Classification

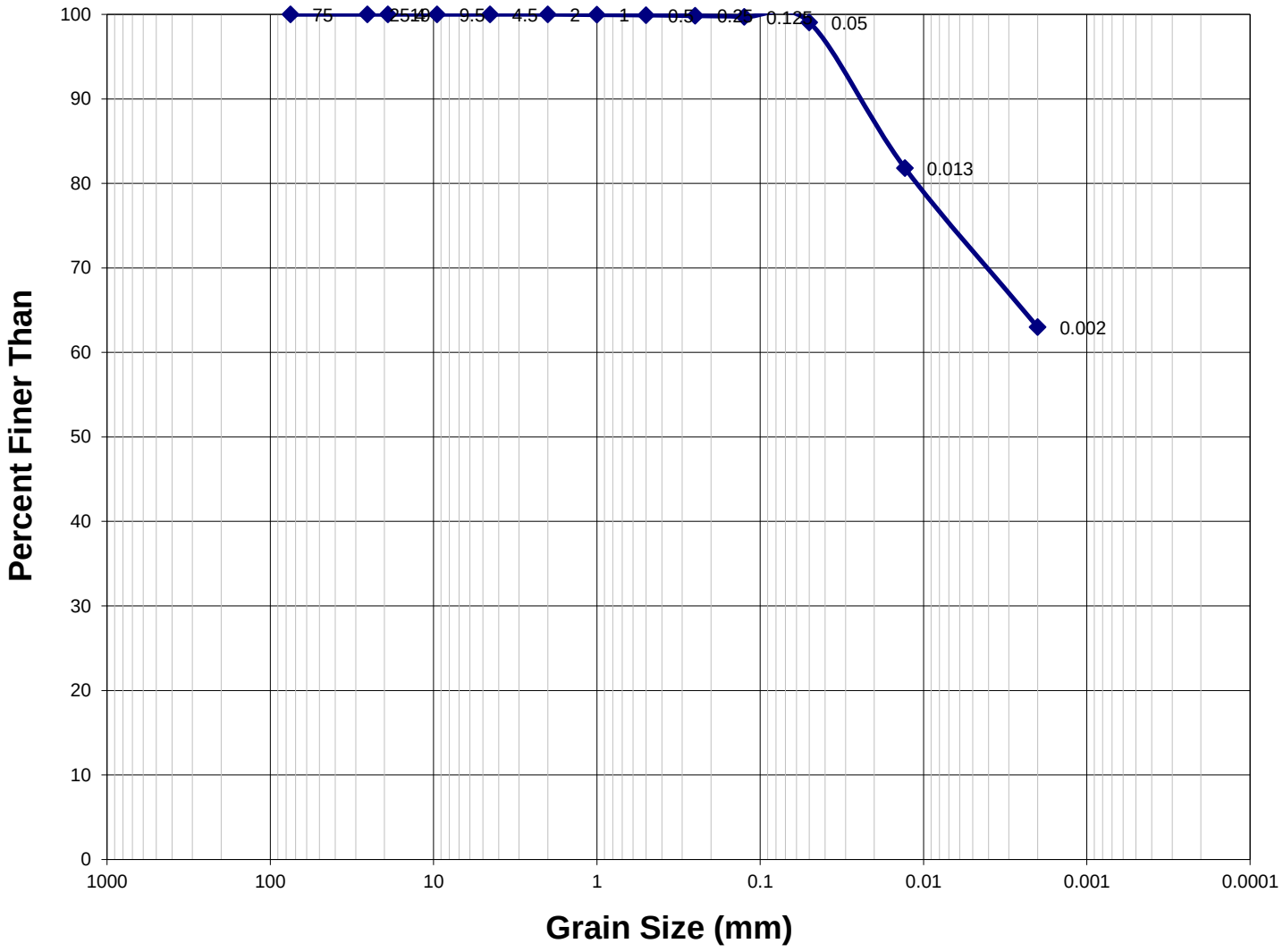
Size Class	Size Range	Wt. (%)
Gravel	4.75mm - 3"	0
Sand	0.074mm - 4.75mm	1
Silt	0.005mm - 0.074mm	21
Clay	< 0.005mm	78

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES
Environmental Division

819-58th Street, Saskatoon, SK S7K 6X5

Client Name: MMM Group Ltd.~(Winnipeg)
Project:
Sample ID: WP7 6-18"
Lab ID: L1763237-3

Particle Size Distribution Curve



Summary of Results

ASTM D422-63 Classification

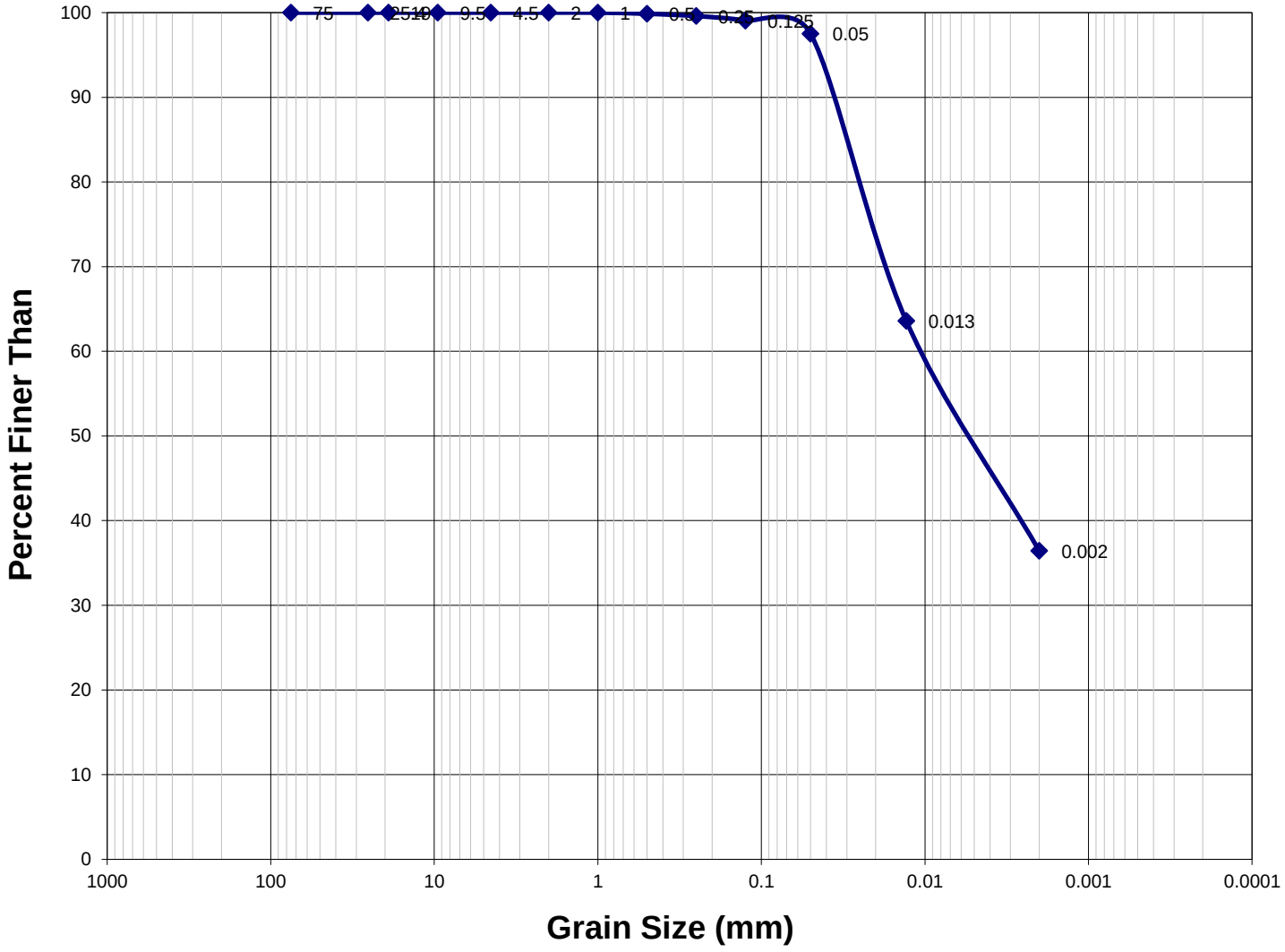
Size Class	Size Range	Wt. (%)
Gravel	4.75mm - 3"	0
Sand	0.074mm - 4.75mm	1
Silt	0.005mm - 0.074mm	31
Clay	< 0.005mm	68

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES
Environmental Division

819-58th Street, Saskatoon, SK S7K 6X5

Client Name: MMM Group Ltd.~(Winnipeg)
Project:
Sample ID: WP7 30-36"
Lab ID: L1763237-4

Particle Size Distribution Curve



Summary of Results

ASTM D422-63 Classification

Size Class	Size Range	Wt. (%)
Gravel	4.75mm - 3"	0
Sand	0.074mm - 4.75mm	2
Silt	0.005mm - 0.074mm	54
Clay	< 0.005mm	44

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L1763237-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	MMM Group Limited
Contact:	Darren Keam
Phone:	204-943-3178
	Company address below will appear on the final report
Street:	93 Lombard Avenue
City/Province:	Winnipeg, MB
Postal Code:	R3B 3B1
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: keamd@mmm.ca

Email 2:

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: accountspayable@mmm.ca

Email 2:

Project Information

ALS Account # / Quote #:

Job #: 3316410

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#:

Major/Minor Code: | Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (lab use only)

ALS Contact: J. Dalmaijer | **Sampler:** B.Moons

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Particle Size Analysis	Moisture	Number of Containers
	WP6 6-18"	29-Apr-16	14:30	Soil	R	R	1
	WP6 30-36"	29-Apr-16	14:30	Soil	R	R	1
	WP7 6-18"	29-Apr-16	14:30	Soil	R	R	1
	WP7 30-36"	29-Apr-16	14:30	Soil	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Brian Moons	Date: 2016-05-03	Time:	Received by: JS	Date: May 3rd	Time: 12:00	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Groundwater Well Logs

Groundwater Well Logs

LOCATION: 1-17-13E

Well_PID: 26669
Owner: BIRD R BIBLE CAMP
Driller: JOHN B. CASWELL DRILLING
Well Name: TH #1
Well Use: TEST WELL
Water Use:
UTMX: 735641.776
UTMY: 5588725.2
Accuracy XY: UNKNOWN
UTMZ:
Accuracy Z:
Date Completed: 1976 Jul 06

WELL LOG

From (ft.)	To (ft.)	Log
0	21.0	CLAY BROWN& GREY
21.0	42.0	GRANITE GNEISS

No construction data for this well.

Top of Casing: ft. below ground

No pump test data for this well.

REMARKS

OFF PTH #315, 400 FT S OF RIVER

LOCATION: 1-17-13E

Well_PID: 29193
Owner: BIRD R BIBLE CAMP
Driller: JOHN B. CASWELL DRILLING
Well Name: TH #2
Well Use: TEST WELL
Water Use:
UTMX: 735641.776
UTMY: 5588725.2
Accuracy XY: UNKNOWN
UTMZ:
Accuracy Z:
Date Completed: 1976 Jul 06

WELL LOG

From (ft.)	To (ft.)	Log
0	31.0	CLAY; BROWN, GREY
31.0	42.0	GRANITE GNEISS

No construction data for this well.

Top of Casing: ft. below ground

No pump test data for this well.

REMARKS

OFF PTH #315, 150 FT S OF RIVER

Driller's Report

Contractor: Friesen Drillers Ltd. License #: 607-14 Phone: (204) 326-2485

Address: 307 PTH 12 N Steinbach, MB R5G 1T8 Driller: Peter Friesen Assistant: Dale Teeple

Date well completed: June 26, 2014

Well Location

QTR NE SEC 1 TWP 17 RGE 13 E X W

R.L. Parish

Address of Well 95437 Hwy 315- Bird River Camp

GPS Reading

Lat. N° 50.40882

Lon W° 95.67830

Well Owner

Name Central Canada Baptist Conference c/o Southland Church

Address 190 PTH 52 W. Phone

Steinbach R5G 1M2

Accuracy: ±

Sat Count:

CONTRACTOR AFFADAVIT

I certify that to the best of my knowledge the information provided herein is accurate and true and complies with The Ground Water ans Water Well Act and Well Drilling Regulation

Signature of Contractor

Well Identification

Well Use	Production	X	Test Well		Recharge		Irrigation	
	Domestic	X	Livestock		Industrial			
	Municipal		Dewatering		Not Used			
Water Use	Geothermal				Observation			
	Other (Specify)							

Depth Below Ground in Feet From	To	DESCRIPTION WELL LOG	From	To	Water Record
0	75	Clay			
75	400	Granite			

Water Temperature F° / C°:

Depth Below Ground Level From	To	Casing	Open Hole	Perfor-ations	Gravel Pack	Casing Grout	Inside Diameter	Outside Diameter	Screen Slot size	TYPE	MATERIAL	MAKE
0	77	x					6	6 5/8		Welded	Steel	
77	400		x				5 1/16					

Top of Casing: 2 X Feet above Below Ground Level Well must be vented X

Pitless Unit: Feet above Below Ground Level Not Installed X

Remarks:

Pump Installation By Drilling Contractor: Yes No X

Location Sketch of Well

Field Test: Iron 2.2 Grains Hardness 22

PUMPING TEST

Date of Test: June 26, 2014 Air Lifting

Bailing Recovery Flowing Rate IGPM

Other (Specify) Pumping X 5 IGPM

Water level before pumping (Static) Feet Above Below 38

Pumping level at end of test Feet Above Below 103

Duration of test 13 HRS 30 Minutes

Recommended pumping rate I.G.P.M.

With pump intake at (feet) below ground level

MB CDC File Search Results

Manitoba

Memorandum

DATE: June 7, 2016

TO: Brian Moons
Biologist
Environment Management
MMM Group
111-93 Lombard Ave.
Winnipeg, Manitoba
R3B 3B1

FROM: Christina Nesbitt
Impact Assessment
Archaeologist
Historic Resources Branch
Main Floor, 213 Notre
Dame Avenue
Winnipeg MB
R3B 1N3
christina.nesbitt@gov.mb.ca

PHONE NO: (204) 945-8145

SUBJECT: Heritage Resources Search Request 3316410
NE 1-17-13 E
HRB Review and Comments

HRB FILE: AAS-16-10396

Further to your memo requesting a heritage screening in NE 1-17-13 E, I have examined the location of the Project (the "Planned Area``) in conjunction with the Historic Resources Branch (``HRB``) records for areas of potential concern. The potential to impact significant heritage resources has been deemed high in this area and HRB has some concerns with the project.

Under Section 12(2) of The Heritage Resources Act of Manitoba, being the governing legislation for HRB, if the Minister of Culture, Heritage, and Tourism has reason to believe that heritage resources or human remains are known, or thought likely to be present, on lands that are to be developed, then the owner/developer may be required to conduct at his/her own expense, a heritage resource impact assessment (HRIA) and mitigation, if necessary, prior to the project's start.

The Historic Resource Branch recommends that the developer contract a qualified archaeological consultant to conduct a Heritage Resources Impact Assessment (``HRIA``) of the Planned Area, in order to identify and assess any heritage resources that may be negatively impacted by development. If desirable, HRB will work with the developer/land owners and its consultant(s) to draw up terms of reference for the HRIA. HRB may provide a list of qualified archaeological consultants upon request.

If you have any questions, please feel free to contact me at the above noted particulars.

Christina Nesbitt

Sahulka, Danette

From: Friesen, Chris (CWS) <Chris.Friesen@gov.mb.ca>
Sent: March-21-16 8:57 AM
To: Brian Moons
Subject: Bird River EAP

Brian

Thank you for your information request. I completed a search of the MB Conservation Data Centre rare species database which resulted in the following occurrences:

Eastern Whip-poor-will (Antrostomus vociferus), S3B, ESEA: Threatened, SARA: Threatened, COSEWIC: Threatened Mink Frog (Lithobates septentrionalis), S3 Water Stargrass (Heterantha dubia), S2S3

Further information on this ranking system can be found on our website at http://www.gov.mb.ca/conservation/cdc/consranks.html and these designations can be found at http://web2.gov.mb.ca/laws/statutes/ccsm/e111e.php, http://www.cosewic.gc.ca/ and http://www.sararegistry.gc.ca/default_e.cfm.

Manitoba's recommended setback distances can be found at http://www.gov.mb.ca/conservation/cdc/pubs.html

The information provided in this letter is based on existing data known to the Manitoba CDC of the Wildlife and Ecosystem Protection Branch at the time of the request. These data are dependent on the research and observations of our scientists and reflects our current state of knowledge. An absence of data does not confirm the absence of any rare or endangered species. Many areas of the province have never been thoroughly surveyed, however, and the absence of data in any particular geographic area does not necessarily mean that species or ecological communities of concern are not present. The information should, therefore, not be regarded as a final statement on the occurrence of any species of concern nor should it substitute for on-site surveys for species or environmental assessments. Also, because our 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 passes before it is utilised.

Third party requests for products wholly or partially derived from the Biotics database 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 data from our database, as 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 contact me directly at (204) 945-7747.

Chris Friesen

Coordinator
Manitoba Conservation Data Centre
204-945-7747
chris.friesen@gov.mb.ca
http://www.gov.mb.ca/conservation/cdc/

-----Original Message-----
From:
Sent: March-08-16 11:55 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 Tuesday, March 8, 2016 at 11:54:55

DocumentID: Manitoba_Conservation

Project Title: Bird River EAP

Date Needed: 2016/03/31

Name: Brian Moons

Company/Organization: MMM Group

Address: 111 - 93 Lombard Avenue

City: Winnipeg

Province/State: Manitoba

Phone: 204-943-3178

Fax: 204-943-4948

Email: moonsb@mmm.ca

Project Description: Development of an EAP for the Bird River Bible Camp in support of an upgrade to their wastewater system.

Information Requested: Rate and at-risk species within the study area

Format Requested: Microsoft word with map if possible.

Location: Bird River @ PR 315
NE 1/4, Section 1, Township 17, Range 13, Meridian E1.

action: Submit

APPENDIX E

PUBLIC ENGAGEMENT

MMM Group Limited
111 - 93 Lombard Avenue
Winnipeg, MB Canada R3B 3B1
t: 204.943.3178 | f: 204.943.4948

www.mmmgrouplimited.com

June 2, 2016 Ref. No.:3316410-000

To Whom it May Concern:

RE: On-site Wastewater Treatment System for Bird River Bible Camp

MMM Group Limited (MMM), a WSP Global Company, has recently been retained by Southland Church, owners of Bird River Bible Camp, to undertake the design of an on-site wastewater treatment system and completion of an Environment Act Proposal (EAP) report.

Bird River Bible Camp is a children's summer camp located on the Bird River in the Rural Municipality of Alexander (see map on reverse). The camp operates over July and August with approximately 150 people on site each week. The camp's existing wastewater treatment system is outdated and no longer meets the province's environmental standards for on-site wastewater treatment systems or the needs of the camp. To aid the camp in the selection of a new preferred wastewater treatment system option, a feasibility assessment and wastewater model analysis was undertaken. Based on the evaluation, the camp elected to install a septic field system which will be designed to handle up to 230 persons daily at 15,000 litres of peak water use per day.

You are invited to attend a meeting that includes an overview of the proposed wastewater treatment system followed by a small group discussion to learn about your interests and/or concerns of the proposed design.

Bird River Bible Camp Proposed On-site Wastewater Treatment System
Stakeholder Meeting
(Presentation with Small Group Discussion)

Date: Thursday, June 16, 2016
Time: 2:30 p.m. - 3:30 p.m.
Location: Lac du Bonnet Regional Library
84 - 3rd Street, Lac du Bonnet, Manitoba

We kindly ask that you RSVP your attendance by contacting Erika Blackie at 204-943-3178 or by email at BlackieE@mmm.ca.

If you're not able to attend the meeting, a Public Open House is scheduled for:

Bird River Bible Camp Proposed On-site Wastewater Treatment System
Public Open House
(Drop-in Format)

Date: Saturday, July 23, 2016
Time: 11:00 a.m. - 2:00 p.m.
Location: Bird River Bible Camp
95437 Hwy 315, RM of Alexander, Manitoba

Thank you,
MMM Group Limited

EBlackie

Erika Blackie
Junior Planner
Planning & Development

Location of Bird River Bible Camp

MMM GROUP

MEETING REPORT

Date:	June 21, 2016	**Project:**	Bird River Bible Camp
Date of meeting:	June 16, 2016	**Project Number:**	3316410
Location:	Lac du Bonnet Regional Library	**Author:**	Erika Blackie

Purpose: Proposed on-site wastewater treatment system stakeholder meeting

Attendees:	**E-Mail**	**Phone**
Diane Oertel (DO), Manitoba Sustainable Development	Diane.oertel@gov.mb.ca	204-345-1486
Mac Kinghorn (MK), RM of Alexander	gmkinghorn@gmail.com	204-340-6081
Frank Terra (FT), RM of Lac du Bonnet	terraf@lacdubonnet.com	204-345-6771
Ryan Warkentin (RW), BRBC Southland Church	ryanw@mysouthland.com	204-326-9020
Darren Keam (DK), MMM Group	keamd@mmm.ca	204-943-3178
Erika Blackie (EB), MMM Group	blackiee@mmm.ca	204-943-3178

Item	Details
	DK presented project information. Questions and discussion occurred throughout.
	Question: Do you run any off-season programs? (i.e., rentals, conferences). ***Answer***: BRBC currently does not operate beyond its 10-week children's camp and currently has no plans to start.
	Question: Is there any greywater entering the system? ***Answer***: Yes, all water is processed through the septic field.
	Question: Will the collection system be addressed in the EAP? ***Answer***: Yes.
	Question: What is being proposed for overland flooding and drainage? ***Answer***: The engineer is currently assessing options. The ideal scenario is that there is enough vegetation to create a hydrological buffer.
	Question: What level Wastewater Certified Operator is required? ***Answer***: Level 1.
	Question: Will surface water testing be conducted? ***Answer***: No. There are too many natural indicators that can influence surface nutrient and phosphorus levels in the river. It's also quite a time intensive and expensive process.
	MK commented that the Bird River Cottage Owners Association frequently tests the Bird River and that they may share the information if BRBC is interested.
	Question: Are there any concerns of the system breaking down because of "drying out", i.e., there isn't enough effluent movement for the size of the pods? ***Answer****:* No. The only time when pipes could crack is over winter but all lines will be flushed out as part of the camp's shut-down procedures.
	Question: Will the septic field be open to kids? ***Answer***: The septic field design can accommodate people walking on top of it. It's not expected for the septic field to become a playing space for kids as the camp and its activities are oriented away from the proposed location.
	Question: What will happen with the existing system? ***Answer***: The tanks will be de-commissioned as per the province's standards. The lines will stay in as it is not required by the province to be removed.

Item	Details	Action

Item	Details

Question: When the tender goes out for contract will it be shared with local contractors?
Answer: BRBC's community includes contractors. The decision of how it is tendered will be up to BRBC.

General Comments:

DO stated that the above ground systems, as proposed, are much better than the below ground systems as there are more options.

MK noted that his colleague has installed a similar system on top of granite quite successfully and the system works so well that the grass on top has to be watered.

PT shared that he installed a very similar system for his house and has had no issues with it. DK elaborated that the proposed septic field is like six home units, only larger and with increased sand depth.

PT stated that it is a good system and he sees no issue with it.

MK has no particular concerns and stated that it's great that the expanded system will allow more children to enjoy the area.

111 - 93 Lombard Avenue, Winnipeg, MB R3B 3B1 | t: 204.943.3178 | f: 204.943.4948 | www.mmmgrouplimited.com

Bird River Bible Camp







INVITES YOU TO ATTEND:

Proposed On-site Wastewater Treatment System Public Open House

Date: Saturday, July 23, 2016

Time: 11:00 a.m. - 2:00 p.m.

Location: Bird River Bible Camp

95437 Hwy 315, RM of Alexander, Manitoba

Drop-by format (come and go)

Please drop-by to view project information, provide your comments, and speak with project and camp staff.

To review copies of the materials presented and for additional information posts as they become available please visit **www.birdriver.camp**

Project Contact: Erika Blackie 204-943-3178 or blackiee@mmm.ca

WSP | MMM GROUP

BIRD RIVER BIBLE CAMP
A MISSION OF SOUTHLAND CHURCH

PUBLIC OPEN HOUSE

Bird River Bible Camp invites you to attend a Public Open House for their proposed on-site wastewater treatment system. Please drop-by to view project information, provide your comments, and speak with project and camp staff.

PROPOSED ON-SITE WASTEWATER TREATMENT SYSTEM PUBLIC OPEN HOUSE

Date: Saturday, July 23, 2016

Time: 11:00 a.m. - 2:00 p.m.

Location: Bird River Bible Camp, 95437 Hwy 315, RM of Alexander, Manitoba

Format: Drop-in (come and go)

To review copies of the materials presented and for additional information posts as they become available please visit www.birdriver.camp

Contact Us:

If you have any questions or comments, please contact: Erika Blackie at 204-943-3178 or blackiee@mmm.ca

WSP | MMM GROUP

BIRD RIVER BIBLE CAMP
A PROJECT OF SOUTHLAND CHURCH

Welcome 1

Bird River Bible Camp

PROPOSED ON-SITE WASTEWATER TREATMENT SYSTEM PUBLIC OPEN HOUSE

- Thank you for joining us today.
- The following boards share highlights on the proposed on-site wastewater treatment system and the Environmental Act Proposal for Bird River Bible Camp.
- Please fill out a comment sheet before you leave.

Project Introduction 2

- Bird River Bible Camp (BRBC) is a children's summer camp located on the Bird River.
- Established in 1952 the camp operates for an 8-week season over July and August.
- Approximately 150 people (100 campers and 50 staff) are on site each week (Monday to Friday).
- The camp's existing wastewater treatment system is outdated and no longer meets the province's environmental standards for on-site wastewater treatment systems or the needs of the camp.
- MMM Group Limited (MMM), a WSP Global Company, was retained by BRBC to design an on-site wastewater treatment system and completion of an Environment Act Proposal (EAP) in support of provincial licensing of the project.

Site Area 3

- BRBC is located approximately 40 kilometres northwest of the Town of Lac du Bonnet, on the east side of Provincial Road 315 and on the south shore of the Bird River.
- The camp properly encompasses approximately 65 hectares (160 acres).

Wastewater Management Option Evaluation 4

- In 2015, MMM completed a feasibility assessment and wastewater model analysis to help the camp select a new preferred wastewater treatment system option.
- Three wastewater management options were evaluated:
  1. a holding tank
  2. a subsurface disposal system (septic field)
  3. a small wastewater treatment plant or lagoon
- To meet the camp's future wastewater management needs, BRBC elected to install a septic field system. This decision was based on the wastewater management options evaluation including: capital cost, annual maintenance requirements, environmental sustainability, and life expectancy.

Septic Field Design

5

- The septic field system is designed to manage and naturally treat approximately 15,000 litres of wastewater per day, accommodating an estimated 230 people per day (150 campers and 80 staff).
- The system includes a series of solids holding tanks, buried in a tank nest, and a septic field of six independent treatment "pods" which are elevated mounds constructed of sand and gravel.
- The solids tank will have a capacity for 140% of daily flow and a pump-out chamber with a minimum of 20% of daily flow.
- Each pod is approximately 448m² (16m x 28m) for a total treatment area 2,688m².
- All components of the treatment system (i.e. holding tank, distribution line and valve) will be new on-site and the old tanks and old septic field will be decommissioned according to regulatory requirements.
- The field has been designed by a qualified engineer and will be installed by an experienced, qualified contractor meeting and exceeding Provincial regulatory requirements.

Conceptual Septic Field Layout

6

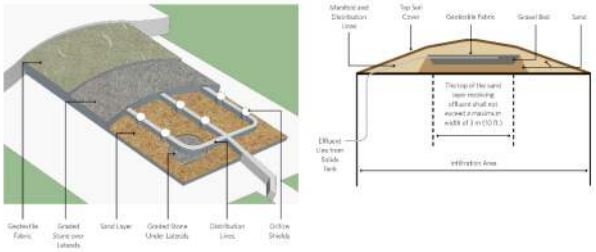
Wastewater Treatment

7

- The solids tank, septic field, and natural processes work together to treat the wastewater. As wastewater enters the solids tank a corresponding volume of liquid (no solids) overflows into a smaller out-put chamber. When the volume of liquid builds to a predetermined volume, the liquid (effluent) will be pumped approximately 100 metres east to the treatment pods.
- Each pod is a Pressurized Sand Treatment Mound System designed for heavy clay content soil with a treatment area two times larger than what is required for the flow.
- A distribution valve evenly distributes effluent into the six pods, minimizing oversaturation of the soil in any one pod.
- As the effluent trickles from the distribution valve through the pods, the effluent is naturally treated as it percolates and filters through the 0.6 m of sand in an aerobic environment.
- Native soils will continue the filtration treatment and surrounding native vegetation will uptake the water and any contributed nutrients that may remain.
- To ensure safe operations and regular maintenance, BRBC will retain a Small Systems Water and Wastewater Facility Operator.

Pressurized Sand Treatment Mound System - Stone

8



Proposed Location & Existing Environment 9

- The septic field will be located approximately 50 metres off of the Bird River shoreline surrounded by dense forest.
- The existing environment is a mature, mixed wood boreal forest with dominant tree species of aspen, birch, fir and spruce.
- The common wildlife species includes various song bird and waterfowl species, small mammals such as red squirrel and snowshoe hare, as well as larger mammal species such as white-tailed deer.
- Manitoba Conservation Data Center reports mink frog, eastern whip-poor-will and water stargrass as species of conservation concern in the local area.
- The following ecological surveys will be completed within the study area:
  - Vegetation, bird and amphibian surveys with focus on species of conservation concern
  - Observations of incidental wildlife during surveys

Construction Considerations 10

- The 50 metre setback from the Bird River ensures that the flood zone and nutrient management setback distances are established.
- The mature forest surrounding the field will be maintained to provide a nutrient buffer to effluent migration from the septic field.
- The septic field will be constructed over natural leaf litter and woody debris which increases effluent retention time in the field while at the same time increasing treated water distribution into the soils.
- Shallow groundwater monitoring wells will be installed in order to evaluate movement and quality of shallow groundwater.

Environmental Act Proposal 11

- Under the *Environment Act*, an Environmental Act Proposal (EAP) is required for the proposed wastewater treatment system since the anticipated peak effluent is greater than 10,000 L per day.
- The EAP will include details on:
  - The proposed new on-site wastewater treatment system including design, capacity and components
  - The existing environmental conditions at the proposed site
  - Potential environment effects from the project
  - Proposed mitigation measures to minimize impact from the project on the environment
  - Public Consultation and Feedback
  - Any follow-up monitoring plans
- The EAP will be submitted to Manitoba Sustainable Development, Environmental Approvals Branch and if approved, the project will be granted an Environment Act License (EAL).

Next Steps & Timeline 12

Frequently Asked Questions 13

1. How will the wastewater management system impact the surrounding natural environment?

- **Answer:** The impact to the surrounding natural environment will be minimal. Selective tree clearing will be conducted wherever possible to maintain natural vegetation cover. Any vegetation clearing will also be completed outside of the breeding bird season (April 15 to August 30) to minimize impact to bird and other wildlife species during the spring and summer breeding periods. Required nutrient management setback distances of >30m from the Bird River will be established (proposed site is nearly 50m from shoreline).

2. How will this impact the water quality?

- **Answer:** Through design criteria and field placement, there are no anticipated impacts to surface or groundwater. The existing on-site domestic use well is installed to a depth of 400 feet, with over 75 feet of clay over burden, which is more than adequate protection from the field leachate from the septic field. A component of the EAP will be to install shallow groundwater monitoring wells in order to evaluate movement and quality of shallow groundwater in the clay layer.

Frequently Asked Questions 14

3. With the new system, are there plans for the camp to expand its operations?

- **Answer:** The new wastewater treatment system is being installed as it is a more environmentally sustainable system and will allow for the camp to host additional seasonal campers in the future. It is anticipated that after the system upgrade, the camp will be able to host up to 230 people (staff and campers) per week. Campers are onsite during the week (Monday to Friday) and the camp is closed on regular and long weekends.

4. When will construction begin?

- **Answer:** Construction will not begin until after the Environment Act Licence for the project has been granted, the target is for fall of 2017 to install the treatment field.

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5. How can I learn more?

- **Answer:** Please visit the Bird River Bible Camp website to review copies of the materials presented here today and for additional information posts as they become available. www.birdriver.camp

6. How can I stay informed about the EAP process?

- **Answer:** To stay informed about the EAP process, please visit the Manitoba Sustainable Development, Environmental Approvals Public Registry Website at: http://www.gov.mb.ca/conservation/eal/registries/index.html

Bird River Bible Camp
Proposed On-site Wastewater Treatment System
Public Open House Comment Sheet
July 23, 2016

1. Are you (check all that apply):

- ☐ A seasonal resident in the Lac du Bonnet area
- ☐ A year-round resident in the Lac du Bonnet area
- ☐ Visitor to the Lac du Bonnet area
- ☐ Other: (please specify) _____

2. How did you find out about this open house?

- ☐ Email
- ☐ Word of mouth
- ☐ Bird River Bible Camp Website
- ☐ Other: (please specify) _____
- ☐ Public Message Board

3. What are your thoughts on the proposed septic field wastewater management system?

4. **What are your thoughts on the location and environmental considerations (Board 8)?**

5. **Do you have any additional comments about the project?**

Thank you for your feedback and participation.
Please return your comment sheet to the sign-in table.

APPENDIX F

TABLES - VEGETATION AND WILDLIFE SPECIES

Table A. Plant Species Observed During Vegetation Survey - Bird River Bible Camp

Species Name	Scientific Name	MB CDC Rank
Trees		
Balsam Poplar	*Populus balsamifera*	S5
Balsam Fir	*Abies balsamea*	S5
Red Ash	*Fraxinus pennsylvanica*	S5
Trembling Aspen	*Populus tremuloides*	S5
White Birch	*Betula papyrifera*	S5
White Spruce	*Picea glauca*	S5
Willow species	*Salix sp.*	
Shrubs		
Highbush-cranberry	*Viburnum opulus*	S5
Mountain Maple	*Acer spicatum*	S5
Prickly Rose	*Rosa acicularis*	S5
Red Osier Dogwood	*Cornus sericea*	S5
Twining Honeysuckle	*Lonicera dioica*	S5
Wild Red Raspberry	*Rubus idaeus*	S5
Forbs, Grasses, Mosses		
Bicknell's Geranium	*Geranium bicknellii*	S5
Blue Flag	*Iris versicolor*	S4
Bunchberry	*Cornus canadensis*	S5
Common Oak Fern	*Gymnocarpium dryopteris*	S5
Common Plantain	*Plantago major*	SNA
Coralroot (Striped)	*Corallorhiza striata*	S3S4
Coralroot species	*Corallorhiza sp.*	
Dewberry	*Rubus pubescens*	S5
False Spikenard	*Maianthemum stellatum*	S5
Feather moss species		
Fleabane speceis	*Erigeron sp.*	
Flodman's Thistle	*Cirsium flodmanii*	S4
Horsetail species	*Equisteum sp.*	
Kidneyleaf Buttercup	*Ranunculus abortivus*	S5
Mitrewort	*Mitella nuda*	S5
Nodding Trillium	*Trillium cernuum*	S4
Northern Bedstraw	*Galium boreale*	S5
Northern Starflower	*Trientalis borealis*	S5
Palmate-leaved Colt's-foot	*Petasites frigidus var. palmatus*	S5
Poison-ivy	*Toxicodendron rydbergii*	S5
Smooth Wild Strawberry	*Fragaria virginiana*	S5

Table. A Continued

Species Name	Scientific Name	MB CDC Rank
Forbs, Grasses, Mosses		
Snakeroot	*Sanicula marilandica*	S5
Twinflower	*Linnaea borealis*	S5
Two-leaved Solomon's-seal	*Maianthemum canadense*	S5
Wild Columbine	*Aquilegia canadensis*	S5
Wild Ginger	*Asarum canadense*	S3S4
Wild Peavine	*Lathyrus venosus*	S5
Wild Sarsaparilla	*Aralia nudicaulis*	S5
Yellow Avens	*Geum aleppicum*	S5
Non-native Species		
Alfalfa	*Medicago sativa*	SNA
Common Dandelion	*Taraxacum officinale*	SNA
Clover speces	*Melilotus sp.*	SNA

Tabel B. Incidental Wildlife Species Observed - Bird River Bible Camp

Weather Conditions				
Temperature (ºC)	**Cloud Cover**	**Wind**	**Precipitation**	**Moon Phase**
18-23	3-4 (>75%)	2-3 (light to gentle breeze)	none	Waxing Gibbous

Species List					
TY	**EV**	**Species Name**	**Scientific Name**	**MB CDC Rank**	**Notes**
B	OB	Red-eyed vireo	*Vireo olivaceus*	SNA	At the Site
B	OB, SM, P	American Robin	*Turdus migratorius*	S5B	At the Site
B	VO	Merlin	*Falco columbarius*	S5B, SUN	In the general study area
B	OB	Sparrow Sp.			At the Site
B	SI - wing drumming	Ruffed Grouse	*Bonasa umbellus*	S4S5	In the general study area
B	VO, P	Eastern Whip-Poor-Will	*Antrostomus vociferus*	S3B	The Ontario Ministry of Natural Resources detection survey protocol for the Eastern Whip-poor-will was followed. A pair of Whip-poor-wills were heard calling at 22:00 - 22:15 hrs approximately 50-100 m south of the Site along a rock ridge.
H	OB	Wood Frog	*Lithobates sylvaticus*	S5	At the Site
H	OB	Northern Leopard Frog	*Lithobates pipiens*	S4	In the general study area
H	VO	Grey Tree Frog	*Hyla versicolor*	S4S5	In the general study area
H	OB	Snapping Turtle	*Chelydra serpentina*	S3	In the Bird River, west of the Site
M	OB	White-tailed deer	*Odocoileus virginiana*	S5	In the general study area
M	VO	Red squirrel	*Tamiasciurus hudsonicus*	S5	In the general study area

FAUNAL TYPE CODES (TY):

B = Bird M= Mammal H = Herpetofauna L= Lepidoptera F = Fish O = Other

EVIDENCE CODES (EV):

Breeding Bird - Possible	Breeding Bird - Probable	Breeding Bird - Confirmed
SH = Suitable Habitat	T = Territory	DD = Distraction
SM = Singing Male	A = Anxiety Behaviour	NE = Eggs
	P = Pair	NY = Young
	D = Display	FS = Food/Faecal Sac
	N = Nest Building	FY = Fledged Young
	V = Visiting Nest	NU = Used Nest

Other Wildlife Evidence		
OB = Observed	DP = Distinctive Parts	CA = Carcass
VO = Vocalization	TK = Tracks	FY = Eggs or Young
HO = House/Den	FE = Feeding Evidence	SC = Scat
SI = Other Signs (specify)		

APPENDIX G
STANDARD LIMITATIONS

STANDARD LIMITATIONS
ENVIRONMENTAL INVESTIGATIONS and CHARACTERIZATION PROGRAMS

These Standard Limitations form part of the Report to which they are appended and any use of the Report is subject to them.

1. EXCLUSIVE USE BY CLIENT

This Report was prepared for the exclusive use of the client identified as the intended recipient. Any use of the Report by any other party without the written consent of MMM Group Limited is the sole responsibility of such party. MMM Group Limited accepts no responsibility for damages that may be suffered by any third party as a result of decisions made or actions taken based on the Report.

2. SCOPE, TERMS AND CONDITIONS OF CONTRACT

The observations and investigations (hereinafter referred to as the "Work") upon which this Report is based were carried out in accordance with the scope, terms and conditions of the contract or the proposal pursuant to which the Work was commissioned. The conclusions presented in the Report are based solely upon the scope of services described in the contract or the proposal and governed by the time and budgetary constraints imposed by them.

3. STANDARD OF CARE

The principles, procedures and standards relevant to the nature of the services performed are not universally the same. The Work has been carried out in accordance with generally accepted environmental study and/or professional practices, industry standards and environmental regulations, where applicable. No other warranties are either expressed or implied with respect to the professional services provided under the terms of the contract or the proposal and represented in this Report.

4. SCOPE OF THE WORK

This Report may be based in part on information obtained at discrete sampling and/or monitoring locations. The conditions reported herein were those encountered at the subject property at the time the Work was performed and as present at the discrete sampling/monitoring locations, if any. Conditions between sampling/monitoring locations may be different than those encountered at the sampling/monitoring locations and MMM Group Limited is not responsible for such differences.

5. REASONABLE CONCLUSIONS

The conclusions contained in this Report are based on the Work and may also consider a review of information from other sources as identified in the Report. The accuracy of information from other sources was not verified unless specifically noted in the Report, nor was it determined if the reviewed information constituted all information that exists and pertains to the subject property.

The conclusions made are based on reasonable and professional interpretation of the information considered. If additional information concerning conditions of relevance to this Report is obtained during future work at the subject property, MMM Group Limited should be notified in order that we may determine if modifications to the conclusions presented in this Report are necessary.

6. REPORT AS A COMPLETE DOCUMENT

This Report must be read as a whole and sections taken out of context may be misleading. If discrepancies occur between the preliminary (draft) and final versions of the Report, the final version of the report shall take precedence.

7. LIMITS OF LIABILITY

MMM Group Limited's liability with respect to the Work is limited to re-performing, without cost, any part of the Work that is unacceptable solely as a result of failure to comply with industry standards. MMM Group Limited's maximum liability is limited in accordance with terms in the original contract, provided that notice of claim is made within regulated timelines as of the date of delivery of the Report.