



Stantec Consulting Ltd.
500-311 Portage Avenue, Winnipeg MB R3B 2B9

March 9, 2021
File: 111219960

Attention: Shannon Kohler, Director
Environmental Approvals Branch
Manitoba Conservation and Climate
1007 Century Street
Winnipeg, MB R3H 0W4

Dear Shannon,

Reference: Application for an Environment Act Licence for a Regional Wastewater Lagoon Expansion in the RM of Springfield, MB, on SE 11-11-5E

On behalf of the Rural Municipality of Springfield, we are submitting two (2) paper copies and (1) USB copy of the Application for a new Environment Act Licence for a Regional Wastewater Lagoon Expansion in the RM of Springfield, MB, in SE 11-11-5E.

The \$7,500 Licence Application Fee is enclosed and is being sent by Stantec on behalf of the Rural Municipality of Springfield. The undersigned is to be contacted regarding any questions that may arise.

This project is being funded under the Manitoba Restart Program and it is fundamental that construction take place in 2021 as funding under this Program expires in March 2022.

Regards,

Stantec Consulting Ltd.



Tim Stratton P.Eng.
Senior Project Manager
Phone: 204-478-8997
Fax: 204-453-9012
tim.stratton@stantec.com

Attachment: Two (2) paper copies and one (1) USB copy of the Application for a new Environment Act Licence

- c. Phil Pawluk, Manager of Waste & Water – Rural Municipality of Springfield
- Andrew March, P.Eng. – Manitoba Water Services Board

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**Application for an Environment
Act Licence for a Regional
Wastewater Lagoon Expansion
in the RM of Springfield, MB, on
SE 11-11-5E**

March 9, 2021

Prepared for:

Manitoba Conservation and Climate
Environmental Approvals Branch
1007 Century Street
Winnipeg, MB R3H 0W4



Proponent:

Rural Municipality of Springfield
P.O. Box 219,
100 Springfield Centre Dr.
Oakbank, MB R0E 1J0

Prepared by:

Stantec Consulting Ltd.
500 – 311 Portage Avenue
Winnipeg, MB R3B 2B9

Project No.: 111219960

Environment Act Proposal Form



Name of the development: Regional Wastewater Lagoon Expansion	
Type of development per Classes of Development Regulation (Manitoba Regulation 164/88): Class 2 Development - Waste Treatment & Storage	
Legal name of the applicant: Rural Municipality of Springfield	
Mailing address of the applicant: Box 219, 100 Springfield Centre Drive	
Contact Person: Phil Pawluk, P.Eng., Manager of Water and Waste	
City: Oakbank	Province: Manitoba Postal Code: R0E 1J0
Phone Number: (204) 444-7359 Fax: (204) 444-2389 email: ppawluk@rmofspringfield.ca	
Location of the development: RM of Springfield	
Contact Person: Phil Pawluk, P.Eng., Manager of Water and Waste	
Street Address: Box 219, 100 Springfield Centre Drive	
Legal Description: SE 11-11-5E	
City/Town: Oakbank	Province: Manitoba Postal Code: R0E 1J0
Phone Number: (204) 444-7359 Fax: (204) 444-2389 email: ppawluk@rmofspringfield.ca	
Name of proponent contact person for purposes of the environmental assessment: Tim Stratton, P.Eng., Stantec Consulting Ltd.	
Phone: (204) 478-8997	Mailing address: 500-311 Portage Avenue, Winnipeg, MB R3B 2B9
Fax: (204) 453-9012	
Email address: tim.stratton@stantec.com	
Webpage address: www.stantec.com	
Date: 2021-03-09	Signature of proponent, or corporate principal of corporate proponent: 
	Printed name: Tim Stratton, P.Eng., Stantec Consulting Ltd.

PRINT


RESET

APPLICATION FOR AN ENVIRONMENT ACT LICENCE FOR A REGIONAL WASTEWATER LAGOON EXPANSION IN THE RM OF SPRINGFIELD, MB, ON SE 11-11-5E

This document entitled Application for an Environment Act Licence for a Regional Wastewater Lagoon Expansion in the RM of Springfield, MB, on SE 11-11-5E was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of the Rural Municipality of Springfield (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by 

(signature)
Tim Stratton, P.Eng.

Reviewed by 

(signature)
Brett Ransom, P.Eng.



APPLICATION FOR AN ENVIRONMENT ACT LICENCE FOR A REGIONAL WASTEWATER LAGOON EXPANSION IN THE RM OF SPRINGFIELD, MB, ON SE 11-11-5E

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APPLICATION FOR AN ENVIRONMENT ACT LICENCE FOR A REGIONAL WASTEWATER LAGOON EXPANSION IN THE RM OF SPRINGFIELD, MB, ON SE 11-11-5E

Development Information and Background
March 9, 2021

1.0 DEVELOPMENT INFORMATION AND BACKGROUND

Stantec was retained by the Manitoba Water Services Board to undertake a Pre-Design Report, Environment Act Proposal, Design and Tendering for a Regional Wastewater Lagoon Expansion in the RM of Springfield. The expansion site is on SE-11-11-5E and is directly south of the three most southerly cells of the existing RM of Springfield Regional Wastewater Lagoon.

The RM of Springfield has been approved for funding through the Manitoba Restart Program which requires that construction take place in 2021. Therefore, there is an urgency in obtaining an EAP for this project.

The *“Rural Municipality of Springfield Regional Wastewater Lagoon Expansion - Pre-Design Report”* is attached in **Appendix 1**. This report details the organic and hydraulic lagoon loading, environmental screening, topographic survey, test hole logs, hydraulic conductivity test results, and preliminary design plans.

The proposed lagoon expansion consists of 3 new secondary cells, 6.8 ha, 7.5 ha and 7.5 ha, full supply liquid level, west to east as shown on Plan C-101 attached. The new cells will be clay lined and treated effluent will be discharged into Cooks Creek Diversion as the existing cells presently do.

The proposed expansion will meet the hydraulic and organic loading requirements to the design year of 2032.



APPLICATION FOR AN ENVIRONMENT ACT LICENCE FOR A REGIONAL WASTEWATER LAGOON EXPANSION IN THE RM OF SPRINGFIELD, MB, ON SE 11-11-5E

Description of Development
March 9, 2021

2.0 DESCRIPTION OF DEVELOPMENT

2.1 CERTIFICATE OF THE TITLE AND LEGAL DESCRIPTION

The site land is in the RM of Springfield on SE 11-11-5E, Title Number 1936391/1, which is attached in **Appendix 2**.

2.2 OWNER

The RM of Springfield is the registered Owner of SE 11-11-5E.

2.3 EXISTING LAND USE

The site is presently an open field on which agricultural crops are sometimes grown.

2.4 LAND USE DESIGNATION

The land is zoned AG: Agricultural General Zoning District. The land is adjacent to the existing wastewater lagoon and has been reserved for lagoon expansion as required. The zoning description is attached in **Appendix 2**.

2.5 PUBLIC MEETINGS OR HEARINGS

Public meetings or hearings have not been held for this project.

2.6 AGRICULTURAL OR INDUSTRIAL WASTE

No agricultural or industrial wastes, including petroleum products, will be put into the proposed wastewater treatment system.

2.7 DOMESTIC WATER SUPPLY

Water in the Municipality is generally treated groundwater from wells.

2.8 SCHEDULE AND FUNDING

This project is funded by the Manitoba Restart Program for construction in 2021. Therefore, an accelerated approval of this Environment Act Proposal is critical.



**APPLICATION FOR AN ENVIRONMENT ACT LICENCE FOR A REGIONAL WASTEWATER LAGOON
EXPANSION IN THE RM OF SPRINGFIELD, MB, ON SE 11-11-5E**

Environmental Impact and Management Practices
March 9, 2021

3.0 ENVIRONMENTAL IMPACT AND MANAGEMENT PRACTICES

Environmental impact and management practices are contained in the Pre-Design Report in **Appendix 1**.



APPLICATION FOR AN ENVIRONMENT ACT LICENCE FOR A REGIONAL WASTEWATER LAGOON EXPANSION IN THE RM OF SPRINGFIELD, MB, ON SE 11-11-5E

Incidents, Malfunctions, and Operations
March 9, 2021

4.0 INCIDENTS, MALFUNCTIONS, AND OPERATIONS

4.1 GENERAL

The effects of incidents and malfunctions for the development are primarily related to the potential for equipment operations, and silt control. The following sections outline the potential effects from incidents and the measures proposed to prevent them.

The Community should upgrade the Emergency Response Plan for the proposed wastewater treatment system operation, if necessary. All practices conducted at the site will be performed in accordance with the *Workplace Safety and Health Act*, which will serve to reduce potential effects on health and safety. Personal protective equipment and safety equipment will be provided for employees working in the facility where required.

4.2 SPILLS

During construction and operation, there is potential for environmental effects due to fuel and chemical spills and/or leaks of lubricants from equipment and activities at the site. Spills could result in the release of hazardous materials and/or equipment fluids or fuels from equipment or vehicles, chemical spills from improper storage and handling procedures and wastewater from equipment failure. As a result of spills, effects on the air quality, soil degradation, surface water, and human health and safety are possible.

Adherence to standard environmental protection practices will minimize the risks associated with accidental spills and adverse effects. Emergency response plans, procedures and equipment will also address the potential for accidental release of fuel, chemical or other hazardous materials and will serve to reduce the effects. MSDS information will be available for alum which is the only chemical anticipated to be used in the wastewater treatment system.

4.3 CONSTRUCTION

Potential effects resulting from spills occurring during the construction phase is anticipated to be irregular and short-term in duration. A spill, if it were to occur, would predominantly be contained within the site; the magnitude of a spill effect could range from negligible to moderate and would depend on the size of the spill.

Potential effects on soil are considered low given the small amount of equipment and quantity of fuel, lubricants and materials that would present at the project site. An emergency spill kit to remediate small accidental spills, leaks or releases will be maintained on the project site during construction. Surface water and near-surface groundwater has the potential to be affected by the accidental release of contaminants and improper storage and disposal of construction wastes generated on-site and via runoff from the site.



APPLICATION FOR AN ENVIRONMENT ACT LICENCE FOR A REGIONAL WASTEWATER LAGOON EXPANSION IN THE RM OF SPRINGFIELD, MB, ON SE 11-11-5E

Incidents, Malfunctions, and Operations
March 9, 2021

4.4 OPERATION

Improper storage or spills, leaks or accidental releases can adversely affect the soil at the project site. The existing lagoon cells will be clay lined and so the potential for the release of raw or partially treated sewage that could affect soil quality is very low.

4.5 TRANSPORTATION AND ACCIDENTS

Transportation accidents can result in the release of vehicle fluids to the environment (i.e., diesel, gasoline, oils, etc.) and the materials the vehicles were transporting (i.e., alum, sewage, sludge). Effects related to such releases can include air, soil, water and groundwater quality effects with potential for subsequent effects on the environment and human health.

During the construction phase, there will be an increase in the number of vehicles travelling to and from the project site with construction equipment and associated materials. To minimize impact on residential neighborhoods, access to the lagoon site will be provided by selected routes.

Operational traffic at the construction site (i.e., deliveries and hauling) would operate at reasonable speeds to minimize the potential for on-site transportation accidents. The Contractor will be mandated to utilize qualified drivers and qualified companies to transport materials and waste products to and from the site to further minimize the potential for transportation risks.

4.6 PREVENTION MEASURES

Measures to prevent adverse effects include:

- Regular waste materials will be deposited and stored in appropriate containers and removed from the site on a regular basis for disposal at an appropriate licenced facility.
- Refueling of vehicles and equipment will adhere to proper procedures and will use designated refueling areas or will be refueled off-site.
- Emergency spill kits will be maintained on-site and staff will be trained to properly deploy spill kit materials and clean-up spills.
- Vehicles and equipment will be maintained to minimize leaks. Regular inspections of hydraulic and fuel systems on equipment and machinery will be undertaken on a routine basis. Leaks detected will be repaired immediately by trained personnel.
- Chemical (i.e., alum) transfers, if required, from tanker to storage tanks will be monitored at all times.
- Existing traffic control measures (i.e., speed limits, signage) will be adhered to.

The Community as a part of their Health and Safety Program will include policies related to emergency preparedness and response plan, workplace hazardous materials information system (WHMIS) and spill response procedures.



APPLICATION FOR AN ENVIRONMENT ACT LICENCE FOR A REGIONAL WASTEWATER LAGOON EXPANSION IN THE RM OF SPRINGFIELD, MB, ON SE 11-11-5E

Incidents, Malfunctions, and Operations
March 9, 2021

4.7 SUMMARY

To prevent incidents and malfunctions, the operation of the proposed treatment system will be conducted in accordance with regulatory requirements. The implementation of and adherence to measures outlined in an Emergency Response Plan to mitigate potential effects related to accidents and malfunctions will serve to reduce the likelihood of these events occurring.



APPLICATION FOR AN ENVIRONMENT ACT LICENCE FOR A REGIONAL WASTEWATER LAGOON EXPANSION IN THE RM OF SPRINGFIELD, MB, ON SE 11-11-5E

Lagoon Management Practices
March 9, 2021

5.0 LAGOON MANAGEMENT PRACTICES

Proposed environmental management practices will be undertaken in accordance with recommended “Operation and Maintenance of Sewage Lagoons” manual and Environment Act Licence, both as issued by Manitoba Conservation and Climate.

5.1 OPERATION

Normally, the lagoon would be discharged twice per year, between June 15 and October 31. The maximum water level in the cells is 1.5 m. The following procedure would be followed with respect to discharging the lagoon.

Step 1: Close the valves between the primary cells and secondary cells two weeks before sampling.

Step 2: Sample the secondary cells after the connecting valve between the primary cells and secondary cells has been closed for two weeks. Sample bottles and sample preservation and submission procedures can be obtained from accredited laboratories.

Step 3:

- a) If the samples tested meet criteria, open the discharge valves from the secondary cells, and discharge the contents. Discharge would be completed within two weeks.
- b) If the samples tested do not meet criteria, it is necessary to repeat the sampling until bacteriological criteria are met. Once met, discharge can take place.

Step 4: When the secondary cells are drained, the discharge valves would be closed.

Step 5: Open the valves between the primary cells and the secondary cells and control the water levels in the cells such that there is a minimum of 0.30 m.

5.2 MAINTENANCE

Spring, Summer and Fall Maintenance

The majority of maintenance is carried out in the spring, summer and fall of each year as weather permits. Typical maintenance tasks include:

- Grass on the dykes of the lagoon should be cut on a regular basis. The grass should not exceed 0.3 meters in length. Deep rooted weeds should be removed to prevent deterioration of the dykes and liner system.
- Inspect fence and gate for damage and repair as required.



APPLICATION FOR AN ENVIRONMENT ACT LICENCE FOR A REGIONAL WASTEWATER LAGOON EXPANSION IN THE RM OF SPRINGFIELD, MB, ON SE 11-11-5E

Lagoon Management Practices
March 9, 2021

- Gate valves should be operated in spring, summer and fall to ensure they are in proper working order.
- If encountered, animals burrowing on the dykes of the lagoon should be removed and the holes filled. If assistance in animal control is required, contact Manitoba Conservation.
- Check for erosion on the dykes. If erosion is present, erosion repairs should be undertaken. This may include re-grading, grass planting or stone rip rap.
- Regular road and turn around maintenance should be undertaken to ensure access to the site at all times. Culverts should be cleared of blockage.
- Ensure the discharge valves are closed when not draining.
- Inspect and maintain drainage.
- Monitor wastewater dumping.

Winter Maintenance

- Monitor wastewater dumping.

5.3 SLUDGE DISPOSAL PLAN

The Sludge Disposal Plan is as follows:

Sludge in the primary cells would be monitored on an annual basis and removed when a significant accumulation occurs (300-400 mm). With respect to the three new secondary cells, sludge likely won't require removal for 30 plus years.

At removal time, the sludge would be dewatered on site, removed from site, and applied to agricultural land or an appropriate landfill in accordance with disposal methods approved by the Province of Manitoba.



APPENDIX 1

**Rural Municipality of Springfield
Regional Wastewater Lagoon Expansion - Pre-Design Report**



**Rural Municipality of Springfield
Regional Wastewater Lagoon Expansion
Pre-Design Report**

March 9, 2021

Prepared for:

The Manitoba Water Services Board
Unit 1A - 2010 Currie Boulevard
Brandon, MB R7B 4E7

and

The RM of Springfield
100 Springfield Drive
P.O. Box 219
Oakbank, MB R0E 1J0

Prepared by:

Stantec Consulting Ltd.
500-311 Portage Avenue
Winnipeg, MB R3H 2B9




Project No. 111219960

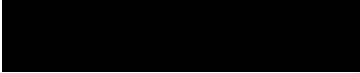


**RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION
PRE-DESIGN REPORT**

This document entitled Rural Municipality of Springfield Regional Wastewater Lagoon Expansion Pre-Design Report was prepared by Stantec Consulting Ltd. ("Stantec") for the accounts of the Manitoba Water Services Board and the RM of Springfield (the "Clients"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by 

(signature)
Tim Stratton, P.Eng., FEC

Reviewed by 

(signature)
Brett Ransom, P.Eng.



**RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION
PRE-DESIGN REPORT**

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RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Introduction
March 9, 2021

1.0 INTRODUCTION

Stantec was retained by the Manitoba Water Services Board to undertake a Pre-Design Report, Environment Act Proposal, Design and Tendering for a regional wastewater lagoon expansion for the RM of Springfield.

The RM of Springfield has been approved for funding for their lagoon for expansion of 3 secondary cells to their existing 3 primary and 5 secondary cells. Currently, stored wastewater exceeds the freeboard area of the cells at times prior to discharge in the spring. This indicates that the existing lagoon system slightly exceeds capacity. The expansion design year is 2032 to utilize the available land owned by the RM. The expansion site consists of clay soil, with pockets of silt, that meets the Manitoba Conservation and Climate hydraulic conductivity parameter of 1×10^{-7} cm/sec.

The lagoon expansion cells will discharge, as is the current practice, east to the west ditch of Willowdale Road and drain south to the large south drainage ditch along Corbett Road which is the Cooks Creek Diversion. The Cooks Creek Diversion drains to the Red River Floodway, to the Red River, and then into Lake Winnipeg.

This project is to be funded under the Manitoba Restart Program, with construction in 2021. There is therefore urgency in obtaining an Environment Act Licence.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Scope of Work
March 9, 2021

2.0 SCOPE OF WORK

a) Preliminary Design Services

- Project kick-off meeting with MWSB, RM of Springfield and associated stakeholders;
- Review the scope of the project as defined by the Board documents;
- Review all previous reports and documentation that may be related to the project;
- Review records and plans of existing works related to the project;
- Review all regulatory requirements;
- Consult with MWSB and Municipal staff on project related issues;
- Review the existing RM of Springfield Wastewater Treatment Master Plan to confirm:
 - the existing wastewater treatment lagoon's organic treatment and hydraulic retention capacities based on the current Environment Act Licence and generally accepted engineering principles.
 - the wastewater treatment lagoon's loadings (residential population, REU, truck haul, commercial) to a year 2032 design.
- Submit and present a draft technical memorandum outlining all of the above, make recommendations and provide cost estimates to the MWSB and Municipal staff for comments;
- Present the draft technical memorandum to the RM of Springfield;
- Incorporate comments and submit the final Technical Memorandum including four (4) hard copies and two (2) copies on USB to the MWSB for distribution;
- Submit draft Environment Act Proposal (EAP) to the MWSB and Municipality for comments;
- Complete and submit two (2) paper copies and one (1) electronic copy on USB of an EAP to Manitoba Conservation and Climate, Environmental Approvals Branch, including application fee;
- Submit three (3) hard copies and three (3) copies on USB of the EAP to the MWSB for distribution to the municipality;
- Respond to queries during Technical Advisory Committee (TAC) Proposal review.

b) Design and Tendering Services

- Obtain and analyze surveys, soils investigation and other surface and subsurface data as may be required;



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Scope of Work
March 9, 2021

- Complete a geotechnical investigation to confirm suitability of in-situ soils in the proposed expansion area using a \$15,000 geotechnical survey allowance;
- Select final design criteria;
- Prepare and submit design plans and tender documents at 66% and 95% completion to the MWSB and Municipality for comments;
- Provide capital cost estimates of the opinion of probable costs for the 66% and 99% reviews, and Engineer's tender estimate;
- Facilitate 66% and 99% design review meetings with the MWSB and Municipality;
- Make presentation to the Municipality at the 66% design stage for discussions and comments;
- Make corrections and changes to the above as required by the MWSB and Municipality and as required to obtain approval of the regulatory agencies and utilities having jurisdiction;
- Submit applications and obtain approvals and/or services as may be required by regulatory agencies, railway authorities, utilities, etc;
- Prepare and submit to the MWSB and Municipality monthly progress reports throughout the design period;
- Prepare and supply a minimum of six (6) sets of plans, specifications and contract documents and a PDF electronic copy of tendering purposes;
- Organize test hole digs including the locates during the tender;
- Provide assistance to bidders who may have questions regarding tenders and authoring addenda as necessary;
- Attend a pre-tender site meeting;
- Review, analyze and evaluate tenders, and recommend contract awards.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Wastewater Lagoon Expansion Site
March 9, 2021

3.0 WASTEWATER LAGOON EXPANSION SITE

The expansion site is an agricultural field zoned AG/Agricultural directly south of the southern 3 cells of the existing lagoon. The site is located on SE 11-11-5E and has been reserved by the RM for lagoon expansion as required. The site is essentially level and balanced cut/fill elevations allowing matching top of dike and cell bottoms to existing cell elevations.

The in-situ clay soil meets hydraulic conductivity requirements as detailed in Section 4, and enables clay lining of the lagoon. The treated effluent drains into an existing ditch system. There are no residences within 500 m of the lagoon expansion area.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Test Hole Drilling and Hydraulic Conductivity Testing
March 9, 2021

4.0 TEST HOLE DRILLING AND HYDRAULIC CONDUCTIVITY TESTING

Twelve (12) test holes were drilled to a depth of 3 m by Paddock Drilling on January 7, 2021. Stantec provided the hole layout and logged all test hole soils.

The soils are characterized as stiff, moist, high plasticity light brown clay, with silt inclusions. Organic topsoil averaged approximately 300 mm in depth.

Shelby Tube clay samples were taken at test holes 6, 8 and 10 and three tubes were tested at the Stantec Laboratory for hydraulic conductivity. All holes were dry.

The results of the hydraulic conductivity testing are as follows:

Test Hole 6;	0.6 m to 1.8 m result; 7.5×10^{-9} cm/sec	Passed
Test Hole 8;	1.1 m to 1.8 m result; 9.3×10^{-7} cm/sec	Failed
Test Hole 10;	0.6 to 1.4 m result; 6×10^{-9} cm/sec	Passed

The failed test for Test Hole 8 is suspect. The test was run twice as the soil did not set up properly in the test vessel. There were roots in the soil sample. There are also pockets of silt in the overall lagoon site which in the past have been removed and replaced with clay. For these reasons, and because the other tests showed very good results, we are discounting the Test Hole 8 test result. We therefore conclude that the clay soil is suitable for clay lining. The existing cells have the same soil and meet the required 1×10^{-7} cm/sec hydraulic conductivity. Pockets of silt encountered during construction will be removed and replaced with clay.

Test hole logs and test results are attached in **Appendix A**. Test hole locations are shown on the contour plan C-102 in **Appendix C**.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Site Topographic Survey
March 9, 2021

5.0 SITE TOPOGRAPHIC SURVEY

Stantec conducted a GPS topographic survey of the expansion site on January 7, 2021. The site is relatively flat with an average ground elevation of 242.15. Adjacent drainage ditches, dikes, and roads were tied into the survey. As-built elevations of existing dikes and cell bottoms were available from the Municipality. The site is suitable for construction of new lagoon cells.

The contours are shown on attached plan C-102 in **Appendix C**.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

12-Year Design Wastewater Loading
March 9, 2021

6.0 12-YEAR DESIGN WASTEWATER LOADING

The following design criteria for the lagoon expansion are based on data and future development estimates provided by the Municipality. Stantec has made estimates of wastewater flow where Municipality backup data is missing. The Municipality has noted that there are times when the freeboard is exceeded during winter storage. We have therefore allowed for 100% I&I for piped systems which is on the high side but reflects reported lagoon overloading. We have also allowed for 60 residential equivalent units per year of expansion to the design year of 2032 which is on the higher sided of Municipality anticipated development but reasonable.

The summary of design criteria are as follows:

6.1 HYDRAULIC LOADING

- Design year is 2032
- Existing calculated winter hydraulic storage

Primary Cell 1a + 1b 360 x 360 x 1.2 x 50%	=	77,760 m ³
Primary Cell 2 360 x 145 x 1.2 x 50%	=	31,320 m ³
Primary Cell 3 335 x 220 x 1.2 x 50%	=	44,220 m ³
Secondary Cell 1 360 x 203 x 1.2	=	87,696 m ³
Secondary Cell 3 360 x 202 x 1.2	=	87,264 m ³
Secondary Cell 4 360 x 202 x 1.2	=	87,264 m ³
Secondary Cell 7 243 x 335 x 1.2	=	97,686 m ³
Secondary Cell 8 242 x 335 x 1.2	=	<u>97,284 m³</u>
TOTAL		610,494 m ³
SET TOTAL EXISTING STORAGE AT		<u>610,000 m³</u>



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

12-Year Design Wastewater Loading
March 9, 2021

- Required Existing Winter Storage:
 - 1,225 metered residential equivalent units (REU's) x 3.0 people x 200 lpcpd = 735,000 l/day
 - 813 unmetered REU's x 3.0 people x 300 lpcpd (estimated) = 731,700 l/day
 - Infiltration = 100% of above totals = 1,466,700 l/day
 - Holding Tanks (as recorded for 2020 by the RM) 49,553,010 l ÷ 365 = 135,762 l/day

Total Estimated Average Day Winter Flow	=	3,069,162 l
Required winter storage = 3,069,162 x 230 days	=	705,908 m³

- Infiltration on average day = 100% of piped flow
- Infiltration on maximum day = 125% of piped flow
- Estimated annual development = 60 REU's annually = 180 people at 3.0 persons per unit
- Increase in design year winter hydraulic storage
 - = 180 x 12 years x 200 lpcpd x 230 days = 99,360 m³
 - + 100% I&I = 198,720 m³
- Total estimated required storage in 2032 = 705,908 m³
 - + 198,720 m³ = 904,628 m³
- Total storage increase with the proposed 3 secondary cell expansion = 284,000 m³.
- Total available storage with expansion = 894,000 m³ which is 99% of the estimated 905,000 m³ winter storage.
- Total primary cell FSL area required in 2032 = 20.8 hectares which is satisfied by the existing 25.0 hectares primary cell area

6.2 ORGANIC LOADING

- Total existing primary cell FSL area = 25.0 hectares
- Maximum day trucked septage loads = 12



**RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION
PRE-DESIGN REPORT**

12-Year Design Wastewater Loading
March 9, 2021

- Maximum Day Current Organic Loading:

– Piped Wastewater = 1,467 m ³ x 250 mg/ℓ = 366.7 + 25%	=	458.4 kg/day BOD ⁵
– Trucked Wastewater – 135.7 m ³ x 250 mg/ℓ = 33.9 kg/day BOD ⁵ + 25%	=	42.4 kg/day BOD ⁵
– Trucked Septage Allow 12 loads per day x 4,550 ℓ /load x 7000 mg/ ℓ =	=	382.2 kg/day BOD ⁵
– Infiltration = 1,833,000 ℓ x 25 mg/ ℓ = 45.8 kg/day BOD ⁵ + 25%	=	57.3 kg/day BOD ⁵
		940.3 kg/day BOD ⁵
Total Maximum Day Organic Loading	=	940.3 kg/day BOD⁵
Required Primary Cell Area = 940.3 ÷ 56	=	16.8 hectares

The existing primary cells have a full liquid supply area of 25.0 ha. Therefore, the required 2032 design year area of 16.8 ha is met with the existing primary cell area.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Wastewater Lagoon Design Criteria
March 9, 2021

7.0 WASTEWATER LAGOON DESIGN CRITERIA

The design criteria for the clay lined lagoon cells are:

- 4/1 inside slopes;
- 3/1 outside slopes;
- Constructed of site clay;
- Top to bottom cell elevation differential = 2.5 m;
- Maximum liquid operating depth = 1.5 m;
- Dead space at bottom = .3 m and not to be used for hydraulic storage calculations;
- Dike top width = 3 m;
- Domestic waste only;
- Seeding on top and outside slopes;
- Lagoon cells are positioned as shown on drawing C-101;
- Rip Rap on top 6 m of inside slopes;
- Interconnecting pipe systems with valves between new and existing dikes;
- Treated effluent discharge pipe system with valve to existing lagoon drainage ditch;
- Perimeter ditch on outside of new cells;
- Perimeter 1.2 m high barbed wire fence around new cells and connecting with existing fences;
- New 5 m wide double swing gate.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Treated Effluent Quality
March 9, 2021

8.0 TREATED EFFLUENT QUALITY

The lagoon will be designed to provide the following treated effluent parameters:

- BOD₅ $\leq 25 \text{ mg/l}$
- Total Suspended Solids $\leq 25 \text{ mg/l}$
- Fecal Coliform $\leq 200 \text{ MPN/100 ml}$
- Total Phosphorus $\leq 1 \text{ mg/l}$

Phosphorous levels will be regularly monitored.

8.1 PHOSPHOROUS REMOVAL BY CHEMICAL PRECIPITATION IF REQUIRED IN THE FUTURE

If required in the future, the proposed mitigation plan for achieving phosphorus reduction is chemical precipitation using alum. We propose using liquid alum solution rather than granular form. Liquid alum (48.5%) provides a consistent concentration compared to preparing alum solution from granular form. Dry granular may still be used, however care will need to be taken when preparing the solution to achieve a consistent and proper dose.

To achieve the best results, alum must be injected directly into the lagoon, and mechanically mixed to ensure the entire cell reacts to precipitate phosphorus. Methods of adding and mixing alum include using a small motorboat with an outboard motor. The boat would be equipped with a storage tank and injection pump for delivering Alum. Alum is injected into the propeller wash and is mixed by the action of the propeller. The level of mixing depends on the size of the propeller and motor, the speed at which the boat travels and the spacing between passes.

To determine the approximate alum dosage, phosphorous samples will be taken and tested prior to injection. After approximately 3 to 4 days of settling, a second phosphorus sample would be taken and tested to confirm if the effluent is ready for discharge. Alum injection and mechanical mixing would be repeated if the level of total phosphorous was still in excess of 1.0 mg/L.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Environmental Screening
March 9, 2021

9.0 ENVIRONMENTAL SCREENING

9.1 DESCRIPTION OF DEVELOPMENT

9.1.1 Introduction and Background

The Rural Municipality (RM) of Springfield has an existing eight (8) cell facultative wastewater lagoon southeast of Oakbank. The existing lagoon is operating at capacity and exceeds the freeboard at times prior to spring release. As such, the RM of Springfield is seeking to expand their wastewater lagoon.

The addition of three (3) new secondary cells is proposed to the existing lagoon to serve the RM of Springfield. A Wastewater Lagoon Expansion Study was conducted, supporting this Environment Act Proposal (EAP), to address this requirement. The Project will involve the following:

- construction of three (3) new secondary cells south of, and immediately adjacent to, the existing secondary cells; and
- construction of a new access road off Willowdale Road and a new culvert at the crossing of the drainage ditch.

Once treated in the lagoon, the wastewater effluent will be discharged likely twice a year after mid-June and at the end of October. The effluent will flow east into the west ditch along Willowdale Road. The effluent will then flow south 390 m (approx.) to a large drainage ditch along the south side of Corbett Road (i.e., Cooks Creek Diversion). The Cooks Creek Diversion leads to the Red River Floodway to the west that ultimately joins with the Red River to the north of the City of Winnipeg.

9.1.2 Legal Description

The wastewater lagoon expansion site is located south of the existing secondary cells at the RM of Springfield wastewater lagoon, 3.3 km southeast of Oakbank, Manitoba in the southeast quarter of Section 11, Township 11, Range 5E. The parcel of land to be occupied by the expanded wastewater lagoon is owned by the RM of Springfield under Certificate of Title #1936383/1 (WLTO).

9.2 DESCRIPTION OF THE ENVIRONMENT

9.2.1 Terrestrial Vegetation and Wetlands

The proposed new wastewater lagoon expansion site is located in the Lake Manitoba Plain Ecoregion, Winnipeg Ecodistrict. Soils in the ecodistrict are characterized as predominantly imperfectly drained Gleyed Humic Vertisols and Gleyed Vertic Black Chernozems and poorly drained Gleyed Humic Vertisols and Humic Gleysols (Smith et al. 1998). The subject part of the ecodistrict drains via Cooks Creek and the Cooks Creek Diversion in a northwesterly and westerly direction to the Red River Floodway and Red



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Environmental Screening
March 9, 2021

River, part of the Red River watershed that is part of the Nelson River drainage system. The ecodistrict is predominantly a smooth, level to gently sloping clayey glaciolacustrine plain that has developed on calcareous, clayey glaciolacustrine sediments (Smith et al. 1998). Vegetation in the ecodistrict originally consisted of tall grass prairie, meadow grass prairie, and meadow grass communities. These areas have since been replaced by cultivation and an extensive network of drainage ditches (Smith et al. 1998). The Project site consists predominantly of open agricultural field. No wetland areas are located on the Project site.

9.2.2 Surficial Geology

The site of the proposed lagoon expansion is relatively flat across the quarter-section. The site is underlain by offshore glaciolacustrine sediments, consisting of clay, silt, and minor sand (1-20 m thick) deposited from glacial Lake Agassiz (Matile et al. 2004). Drift thickness in the area varies from 10-20 m (Manitoba Conservation and Water Stewardship 2014). The soil stratigraphy at the proposed site for the new secondary cells is composed of light brown clay and silt to at least 3 m depth (Stantec 2021).

9.2.3 Wildlife and Fish Species

Wildlife habitat in the ecodistrict consists of cultivated agricultural areas with pockets of tree cover along stream channels, with bur oak and trembling aspen and shrub undergrowth on better drained sites. Common wildlife species are white-tailed deer, coyote, rabbits, ground squirrels, and waterfowl (Smith et al. 1998).

A review of the Manitoba Conservation Data Centre (MBCDC) species database for existing records of rare and protected wildlife species in the Lake Manitoba Plain Ecoregion indicated the potential for numerous species, including: northern leopard frog, western grebe, bobolink, red-headed woodpecker, great gray owl, plains pocket gopher, monarch, and plains garter snake. The northern leopard frog (*Lithobates pipiens*) is designated as Special Concern (western boreal/prairie populations) and barn swallow (*Hirundo rustica*) is designated as Threatened under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). A request was submitted to MBCDC for existing records of rare and protected wildlife species in the Project area. The records indicated no listed or tracked species occurrences within the Project footprint. One occurrence of a bird species, bobolink, was identified within 2 km of the Project in SE11-11-5E (MBCDC 2021). According to the MBCDC this species is ranked S3S4B – meaning the species holds a vulnerable/apparently secure, breeding population status. The MBESEA and the federal SARA list this species as being Threatened (MBCDC 2021). The Migrant loggerhead shrike ranked SXB (presumed extirpated, breeding) is listed as Endangered under MBESEA and SARA and is identified as being a general area bird species occurrence of low locational accuracy (MBCDC 2021).

A search of the Manitoba Herp Atlas (MHA) database found no records of an amphibian species near the Project site. The closest amphibian sightings (tree frogs) were recorded at a gravel pit, approximately 13 km northwest of the Project site, adjacent to the east side of the Floodway (iNaturalist 2021).



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Environmental Screening
March 9, 2021

According to Milani (2013), Cooks Creek Diversion is considered Type D habitat, meaning it provides simple habitat for non-indicator fish species [forage fish]. Common fish species found within the Cooks Creek Diversion downstream of the site consist of brook stickleback and white sucker. Cooks Creek Diversion flows to the west of proposed new lagoon expansion site and ultimately to the Red River Floodway. Cooks Creek Diversion does not provide habitat for any aquatic species at risk (Fisheries and Oceans Canada 2019).

9.2.4 Water Resources

The groundwater supply in the RM of Springfield varies in quantity and quality. The main aquifer is formed by Carbonate rock or from sand and gravel aquifers. These deposits can usually provide a water supply to meet domestic requirements. Good water quality is readily available from the Carbonate Aquifer, although poorer quality water in this aquifer is a concern near Oakbank (Manitoba Conservation and Water Stewardship 2014). The RM of Springfield operates municipal wells in sand and gravel and a pipeline serves the Oakbank area.

An adjacent unnamed municipal drain to the east and the Cooks Creek Diversion are the main surface water drainage channels in proximity to the Project site (i.e., approx. 390 m to the south of the proposed site).

9.2.5 Land Use

The site for the new secondary cells is designated as “Agricultural Preserve Area” under the existing development plan and identified as “AG – Agricultural General Zoning District” under the existing zoning by-law. Under Utilities and Municipal Services policies in the Development Plan, government, public and private utilities are permitted in any land use designation, subject to requirements of municipal zoning by-laws. The construction, operation and maintenance of the proposed lagoon expansion is considered a permitted use under the RM of Springfield Zoning By-law.

The site for proposed secondary cell expansion is open space agricultural land. Land uses adjacent to the Project site in the RM of Springfield include agricultural land use to the west, east and south and a wastewater lagoon to the north. Residential development is located to the north of the Project site in Oakbank. The closest residence to the proposed lagoon expansion site is approximately 742 m to the southeast. Provincial Road (PR) 206 is located approximately 2.4 km to the west of the proposed wastewater lagoon expansion site. A snowmobile trail and a Manitoba Hydro transmission line are located approximately 445 m to the north between the existing secondary cells and primary cells at the wastewater lagoon (Mussio Ventures Ltd. 2018). A municipal airport/landing strip is located approximately 6.0 km northwest of the Project site, west of Oakbank. There are no First Nation Reserve lands in close proximity to the Project site.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Environmental Screening
March 9, 2021

9.2.6 Heritage Resources

Heritage resources, and their associated artifacts and cultural data, are protected under *The Heritage Resources Act*. A request was submitted to the Historic Resources Branch (HRB) for a heritage screening of the site (HRB 2021). The HRB examined the location in conjunction with Branch records for areas of potential concern and determined that the potential to impact heritage resources was low based on available data (HRB 2021). There are no known archaeological sites, historic trails and areas that have potential for unknown heritage resources at, or in close proximity to, the Project site.

9.3 ENVIRONMENTAL SCREENING EFFECTS

The following sections address the environmental screening for the proposed development.

a) Effects on Wildlife

There is potential for disturbing or displacing wildlife species present in the general project area and the site via construction activities (e.g., excavation) and noise generation from equipment and vehicles.

Project-related disturbance activities (e.g., excavation) to wildlife species of conservation concern and wildlife habitat can be reduced by avoiding the applicable sensitive breeding window for migratory bird wildlife species – mid-April to end of August (Environment and Climate Change Canada 2019). Efforts should be made during construction to limit ground disturbance to the Project site to reduce risk of incidental take of birds or their nests. Should it not be possible to avoid ground clearing and excavation activities during the migratory bird breeding window, it is recommended that pre-clearing nest surveys be completed.

A request was submitted to MBCDC for existing records of rare and protected species in the Project area. No records of listed or tracked species occurrences were found in the Project footprint.

A search of the MHA database did not reveal the presence of amphibians or reptile species at the Project site. Due to the presence of water bodies (i.e., Cooks Creek Diversion) in the vicinity and open grassed areas, there is potential for amphibian and reptile species to occur in the general Project area. Workers should be aware of the potential for reptiles and amphibian species to be present at the site and avoid injury or disturbances to wildlife in the operation of equipment and construction of the development.

b) Effects on Fisheries and Surface Water/Groundwater

Potential effects on fish and fish habitat are related to the release of sediments from construction activities associated with lagoon excavation (i.e., blown dust, exposed surface run-off) and from lagoon effluent discharges into surface water bodies utilized by fish.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Environmental Screening
March 9, 2021

Sediments from construction activities are not expected to affect surface water bodies used by fish at the Project site. Project-related disturbance activities from sediment transport will be addressed through the implementation of mitigation measures to address erosion control.

The nearest water body to the Project site is the Cooks Creek Diversion, approximately 390 m south of the lagoon expansion site. The expansion at the wastewater lagoon will enable continued wastewater treatment to occur, discharging only treated effluent to a municipal ditch east of the Project. Effluent will then flow south in the ditch to Cooks Creek Diversion. Forage fish species may potentially be present in this creek (considered Type D habitat [Milani 2013]). The new lagoon secondary cells will be designed for winter storage of 230 days (average day flow). It is expected that the new lagoon system will discharge treated effluent to the Willowdale Road perimeter ditch from June 16 to October 31 thereby avoiding sensitive spawning windows for fish species and associated effects. No commercial or industrial waste will be going into the new lagoon, only domestic wastewater.

c) Vegetation Effects

There is potential for removal of ground vegetation cover through construction work at the site for the secondary cells. The proposed site for the new lagoon cells is predominantly a grassed fringe surrounding a cultivated agricultural field. A request was submitted to MBCDC for information on existing records of rare and protected species in the Project area. There were no records of listed or tracked species occurrences in the Project footprint. Efforts should be made to limit vegetation removal during construction to the Project footprint (i.e., secondary cells, access road).

d) Soil and Terrain Effects

There is potential for disturbance of soils and terrain through construction work at the site. The secondary cells will be excavated to an average depth of 0.7 m after the topsoil layer is removed (0.3 m of topsoil, 0.4 m of in-situ clay). A suitable compacted clay liner will be used on the bottom of the excavated cells following completion of excavation. The finished dike will be approximately 1.8 m above the existing ground surface. Effects to soil and terrain will be reduced by limiting travel and excavation activities on the site to the Project footprint to the extent practical.

e) Air Quality

There is potential for emissions, including greenhouse gases (GHGs) and fugitive dust generation, from construction equipment and vehicle movements during construction works at the site. Localized increased volatile organic compound (VOC) levels could result from fuels used during construction. Fuel may be transported to the site to fuel equipment. These emissions will be limited to the extent practical by ensuring the use of properly maintained equipment is specified in the contractor specifications and excessive idling is avoided at the site.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Environmental Screening
March 9, 2021

Nuisance odours can occur for a short time in spring during the thawing period from lagoons that are not sized properly or are organically overloaded. The proposed new lagoon will be sized with capacity to address current and future needs. Potential odours could be carried by variable winds and cause a nuisance to nearby residents. The proposed expansion is located at the site of the existing lagoon system and the closest residence is located approximately 740 m to the southeast of the site, which is beyond the 300 m setback established for wastewater treatment systems (Manitoba Sustainable Development 2017). The prevailing winds are expected to be principally from the south, based on Winnipeg weather station data (the closest weather station with wind data to the Project site, Environment and Climate Change Canada 2019), therefore Project odours are not anticipated to be of concern.

f) Noise Effects

There is some potential for noise effects in the immediate area during construction from the operation of construction equipment and vehicles. Noise effects could cause temporary disturbance to residents and wildlife in the area. The distance to the nearest residence (approx. 740 m from the Project site) is expected to provide sufficient mitigation for nuisance noise effects at the residence. A nest sweep of the area will be conducted prior to construction (if occurring during the applicable breeding window) to determine necessary measures to mitigate noise effects on wildlife.

g) Socio-economic

The land for the new lagoon system is appropriately designated for its intended use under the applicable By-laws. The proposed Project will create temporary construction employment and contribute to the local economy in the surrounding area through the purchase of goods and services during construction.

The proposed Project will effectively address existing capacity issues with added treatment over a 10-year design period. Accordingly, socio-economic effects are considered sufficiently mitigated or positive.

h) Heritage Resources

The HRB examined Branch records for areas of potential heritage concern at the Project site and surrounding area. The records check confirmed that the potential to impact heritage resources was low and there are no known archaeological sites, historic trails or areas that have potential for unknown heritage resources at the Project site. As such there are no anticipated effects to heritage resources. If heritage resources are encountered during project construction, construction will be stopped and the HRB will be contacted to determine required mitigation measures.



**RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION
PRE-DESIGN REPORT**

Opinion of Capital and O&M Costs
March 9, 2021

10.0 OPINION OF CAPITAL AND O&M COSTS

Stantec's opinion of capital cost is as follows:

(to nearest
\$5,000)

	DESCRIPTION OF WORK	ESTIMATED QUANTITIES	UNIT	UNIT PRICE	TOTAL
1	Topsoil Stripping, Stockpiling and Replacement	85,000	C.M.	\$8	\$680,000
2	Common Excavation	75,000	C.M.	\$7	\$525,000
3	Unsuitable Material Removal	5,000	C.M.	\$9	\$45,000
4	Interconnecting Pipe Structures	5	Each	\$25,000	\$125,000
5	Discharge Structure	1	L.S.	\$30,000	\$30,000
6	A-Base for Roads	100	Tonnes	\$40	\$5,000
7	C-Base for Roads	150	Tonnes	\$40	\$5,000
8	Culvert	1	Each	\$5,000	\$5,000
9	Ditching	1	L.S.	\$25,000	\$25,000
10	Seeding	1	L.S.	\$30,000	\$30,000
11	Fence	1	L.S.	\$50,000	\$50,000
12	Rip Rap	10,000	Tonnes	\$60	\$600,000
				TOTAL	\$2,125,000
				Engineering and Construction Contingency (approximately 25%)	\$535,000
				Opinion of Total Capital Costs	\$2,660,000

The costs do not include land or MWSB costs.

The operation and maintenance cost is estimated to be approximately \$30,000 annually for labor, equipment, materials, testing, and minor maintenance.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Conclusion
March 9, 2021

11.0 CONCLUSION

A clay lined three (3) secondary cell expansion to the Springfield Regional Wastewater Lagoon will provide the organic loading and hydraulic storage requirements to the design year of 2032. The expansion can be constructed with the in-situ clay as a clay lined facility.

Our opinion of construction capital cost is \$2,125,000. The total capital cost of the facility is estimated to be \$2,660,000 including engineering and construction contingency, but excluding land and MWSB costs.

The expansion must be constructed in 2021 in order to meet the requirements of the Manitoba Restart Program.



RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Recommendation
March 9, 2021

12.0 RECOMMENDATION

Stantec recommends that the three (3) secondary cell clay lined facultative lagoon expansion, as described in this report, be designed, tendered and constructed on SE 11-11-5E in the 2021 construction season, if budget is available.



APPENDIX A

Drilled Test Hole Logs and Hydraulic Conductivity Test Results

SE 11-11- 5E; Oakbank

Test Hole Logs from January 7, 2021 Drilling

Test Hole Locations Shown on the Contour Plan

TH 1	0 – 0.3 m 0.3 – 3.0 m dry hole	topsoil Medium plastic light brown clay (typical) with some silt
TH 2	0 – 0.3 m 0.3 – 1.1 m 1.1 – 3.0 m dry hole	topsoil clay clay with some silt
TH 3	0 – 0.3 m 0.3 – 1.1 m 1.1 – 3.0 m dry hole	topsoil clay clay with some silt
TH 4	0 – 0.3 m 0.3 – 1.1 m 1.1 – 3.0 m dry hole	topsoil clay clay with some silt
TH 5	0 – 0.3 m 0.3 – 1.1 m 1.1 – 3.0 m dry hole	topsoil clay clay with some silt
TH 6	0 – 0.3 m 0.3 – 0.6 m 0.6 – 1.4 m 1.4 – 3.0 m dry hole	topsoil clay Shelby Tube sample taken clay with some silt
TH 7	0 – 0.3 m 0.3 – 1.5 m 1.5 – 3.0 m dry hole	topsoil clay clay with some silt
TH 8	0 – 0.3 m 0.3 – 1.1 m 1.1 – 1.8 m 1.8 – 3.0 m dry hole	topsoil clay with some silt Shelby Tube sample taken clay
TH 9	0 – 0.3 m 0.3 – 1.1 m 1.1 – 3.0 m dry hole	topsoil clay clay with some silt

SE 11-11- 5E; Oakbank

Test Hole Logs from January 7, 2021 Drilling

Test Hole Locations Shown on the Contour Plan

TH 10	0 – 0.3 m	topsoil
	0.3 – 0.5 m	clay
	0.5 – 1.3 m	Shelby Tube sample taken
	1.3 – 3.0 m	clay with some silt
	dry hole	
TH 11	0 – 0.3 m	topsoil
	0.3 – 0.6 m	clay
	0.6 – 3.0 m	clay with some silt
	dry hole	
TH 12	0 – 0.3 m	topsoil
	0.3 – 3.0 m	clay with some silt
	dry hole	



Stantec Consulting Ltd.
 199 Henlow Bay, Winnipeg, MB R3Y 1G4
 Tel: (204) 488-6999

ASTM D5084 - MEASUREMENT OF HYDRAULIC CONDUCTIVITY OF SATURATED POROUS MATERIALS USING A FLEXIBLE WALL PERMEAMETER

TO Stantec Consulting Ltd.
 500-311 Portage Avenue
 Winnipeg, Manitoba
 R3B 2B9

PROJECT Springfield Lagoon Expansion

PROJECT NO. 111219960

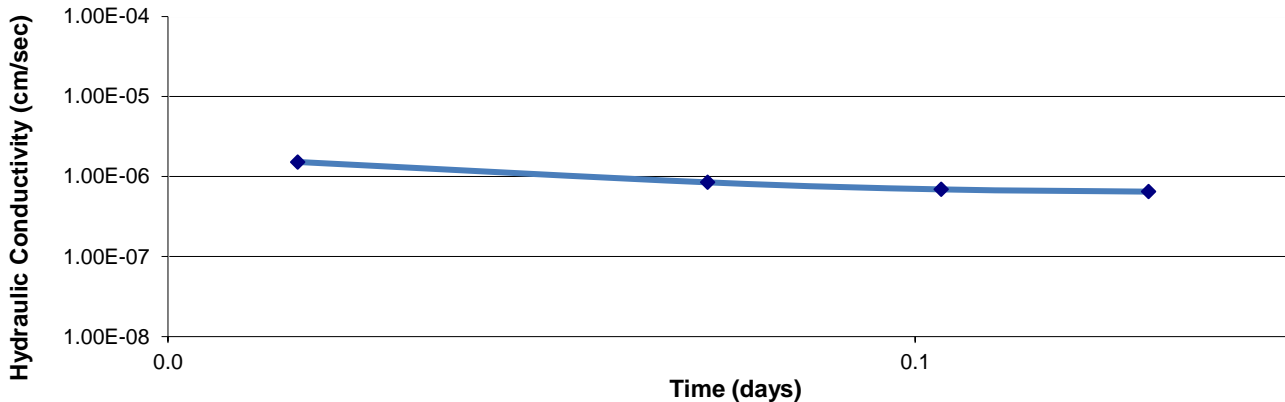
ATTN: Tim Stratton

REPORT NO. 1

SAMPLE ID: TH8 @ 3.5' - 6'
 SOIL DESCRIPTION: Clay, brown, stiff, moist, high plasticity, trace rootlets


DATE TESTED: January 12 to January 28, 2021
 CONFINING PRESSURE (kPa): 137.9
 EFFECTIVE SATURATION STRESS (kPa): 34.5
 ASSUMED SPECIFIC GRAVITY: 2.63
 HYDRAULIC GRADIENT: 18.7
 TYPE OF PERMEANT LIQUID: De-aired Water
 HYDRAULIC CONDUCTIVITY, "k" (cm/s): 1.0E-06
 HYDRAULIC CONDUCTIVITY, "k₂₀" (cm/s): **9.3E-07**

	Height (mm)	Diameter (mm)	Wet Mass (g)	Dry Density (g/cm ³)	Water Content by Mass (%)	Water Content by Volume (%)	Saturation (%)
Initial Reading	76.4	71.3	536.0	1.400	25.3	35.4	75.7
Final Reading	79.4	73.3	601.4	1.319	36.0	47.5	95.3



COMMENTS:
 36 cm of soil recovered from tube. Sample taken from 20 - 27 cm.

REPORT DATE: 2021.Jan.29

REVIEWED BY  Guillaume Beauce, P.Eng.

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
 199 Henlow Bay, Winnipeg, MB R3Y 1G4
 Tel: (204) 488-6999

ASTM D5084 - MEASUREMENT OF HYDRAULIC CONDUCTIVITY OF SATURATED POROUS MATERIALS USING A FLEXIBLE WALL PERMEAMETER

TO Stantec Consulting Ltd.
 500-311 Portage Avenue
 Winnipeg, Manitoba
 R3B 2B9

PROJECT Springfield Lagoon Expansion

PROJECT NO. 111219960

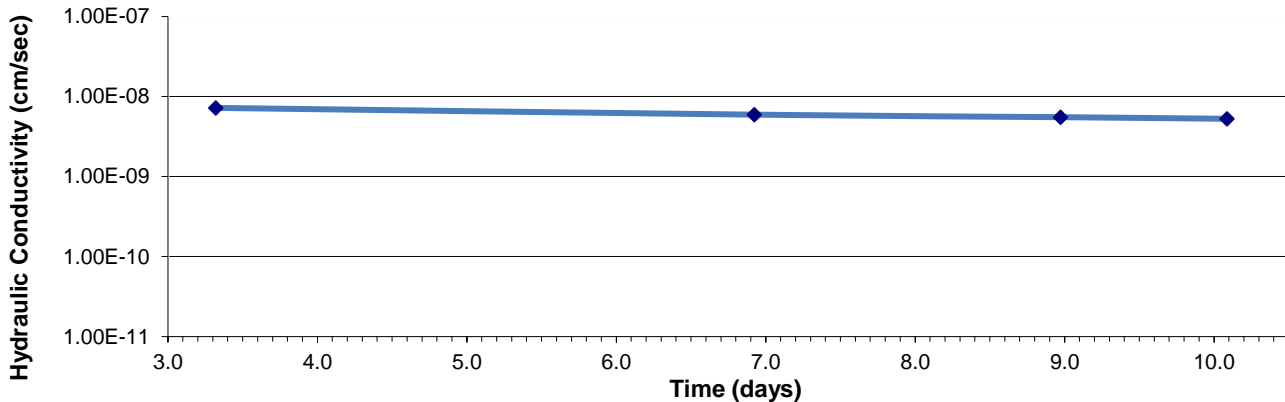
ATTN: Tim Stratton

REPORT NO. 2

SAMPLE ID: TH10 @ 2' - 4.5'
 SOIL DESCRIPTION: Clay, brown, very stiff, moist, high plasticity

DATE TESTED: January 12 to February 1, 2021
 CONFINING PRESSURE (kPa): 137.9
 EFFECTIVE SATURATION STRESS (kPa): 34.5
 ASSUMED SPECIFIC GRAVITY: 2.75
 HYDRAULIC GRADIENT: 19.0
 TYPE OF PERMEANT LIQUID: De-aired Water
 HYDRAULIC CONDUCTIVITY, "k" (cm/s): 6.6E-09
 HYDRAULIC CONDUCTIVITY, "k₂₀" (cm/s): **6.0E-09**

	Height (mm)	Diameter (mm)	Wet Mass (g)	Dry Density (g/cm ³)	Water Content by Mass (%)	Water Content by Volume (%)	Saturation (%)
Initial Reading	77.8	71.5	596.8	1.459	30.9	45.0	95.9
Final Reading	78.1	72.0	630.4	1.445	37.4	54.1	114.0



COMMENTS:
 54 cm of soil recovered from tube. Sample taken at 23 to 31 cm.

REPORT DATE: 2021.Feb.03

REVIEWED BY Guillaume Beauce, P.Eng.

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
 199 Henlow Bay, Winnipeg, MB R3Y 1G4
 Tel: (204) 488-6999

ASTM D5084 - MEASUREMENT OF HYDRAULIC CONDUCTIVITY OF SATURATED POROUS MATERIALS USING A FLEXIBLE WALL PERMEAMETER

TO Stantec Consulting Ltd.
 500-311 Portage Avenue
 Winnipeg, Manitoba
 R3B 2B9

PROJECT Springfield Lagoon Expansion

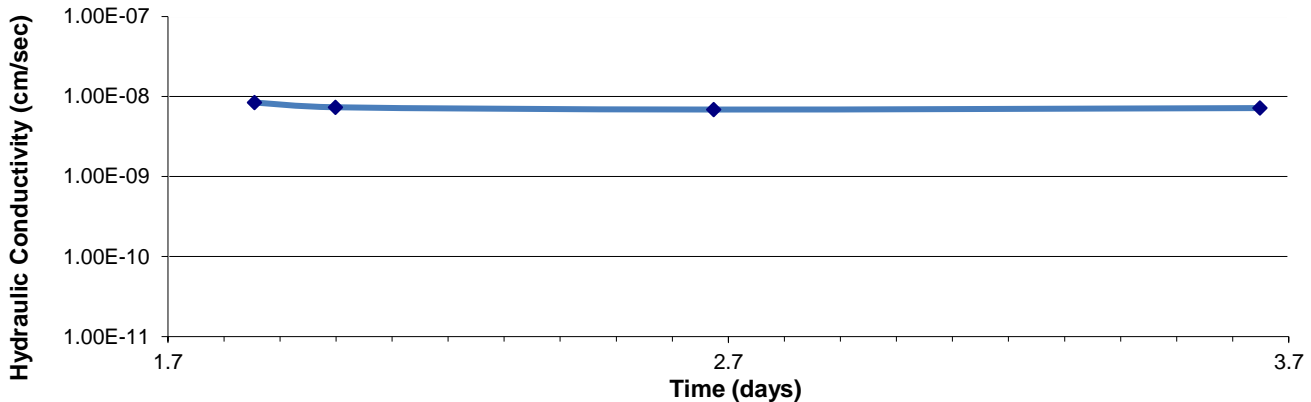
PROJECT NO. 111219960

ATTN: Tim Stratton

REPORT NO. 3

SAMPLE ID: TH6 @ 2' - 4.5'
 SOIL DESCRIPTION: Clay, brown, very stiff, moist, high plasticity, trace silt, trace rootlets, trace fine to medium-grained sand
 DATE TESTED: February 1 to February 12, 2021
 CONFINING PRESSURE (kPa): 137.9
 EFFECTIVE SATURATION STRESS (kPa): 34.5
 ASSUMED SPECIFIC GRAVITY: 2.76
 HYDRAULIC GRADIENT: 18.8
 TYPE OF PERMEANT LIQUID: De-aired Water
 HYDRAULIC CONDUCTIVITY, "k" (cm/s): 8.3E-09
 HYDRAULIC CONDUCTIVITY, "k₂₀" (cm/s): 7.5E-09

	Height (mm)	Diameter (mm)	Wet Mass (g)	Dry Density (g/cm ³)	Water Content by Mass (%)	Water Content by Volume (%)	Saturation (%)
Initial Reading	77.1	71.7	585.7	1.484	26.6	39.5	85.4
Final Reading	78.9	72.7	628.9	1.404	37.0	51.9	105.6



COMMENTS:
 56 cm of soil recovered from tube. Sample taken at 0.91 to 1.01 m depth.

REPORT DATE: 2021.Feb.17

REVIEWED BY Guillaume Beauce, P.Eng.

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

APPENDIX B

Environmental Screening References

RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Appendix B - References
March 9, 2021

REFERENCES

COSEWIC. 2009. COSEWIC Assessment and Update Status Report on the Northern Leopard Frog *Lithobates pipiens*. Rocky Mountain populations, Western Boreal/Prairie populations, Eastern populations in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON. vii + 69 pp.

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RURAL MUNICIPALITY OF SPRINGFIELD REGIONAL WASTEWATER LAGOON EXPANSION PRE-DESIGN REPORT

Appendix B - References
March 9, 2021

Matile, G.L.D. and G.R. Keller. 2004. Surficial Geology of the Winnipeg Map Sheet (NTS 62H), Manitoba. Manitoba Industry, Economic Development and Mines, Manitoba Geological Survey, Surficial Geology Compilation Map Series, SG-62H, 1:250,000.

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Stantec Consulting Ltd. 2021. Rural Municipality of Springfield Regional Wastewater Lagoon Expansion Pre-Design Report. Prepared for The Manitoba Water Services Board and the RM of Springfield. Winnipeg, MB.

Personal Communications

2021. Impact Assessment Archaeologist, Historic Resources Branch, Manitoba Sport, Culture and Heritage. Email correspondence with Senior Environmental Planner, Stantec Consulting Ltd., February 11, 2021.

2021. Information Manager, Manitoba Conservation Data Centre, Wildlife and Fisheries Branch, Manitoba Sustainable Development. Email correspondence with Senior Environmental Planner, Stantec Consulting Ltd., February 17, 2021.



APPENDIX C

Preliminary Design Plans

APPENDIX 2

Certificate of Title and Zoning Description

STATUS OF TITLE

Title Number **1936391/1**
Title Status **Accepted**
Client File **Misc. Title Search**



1. REGISTERED OWNERS, TENANCY AND LAND DESCRIPTION

THE RURAL MUNICIPALITY OF SPRINGFIELD

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

SE 1/4 11-11-5 EPM,
EXC, FIRSTLY: RIGHT OF WAY OF NORTHERN EXTENSION RLY,
PLAN 898 WLTO, AND
SECONDLY: TRANSMISSION LINE, PLAN 3438 WLTO;
SUBJECT TO THE RESERVATIONS AND PROVISIOES 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

No active instruments

3. ADDRESSES FOR SERVICE

THE R. M. OF SPRINGFIELD
BOX 219
628 MAIN ST.
OAKBANK, MB.
ROE 1J0

4. TITLE NOTES

No title notes

5. LAND TITLES DISTRICT

Winnipeg

6. DUPLICATE TITLE INFORMATION

Duplicate not produced

7. FROM TITLE NUMBERS

1346095/1 All

8. REAL PROPERTY APPLICATION / CROWN GRANT NUMBERS

No real property application or grant information

9. ORIGINATING INSTRUMENTS

Instrument Type: **Transfer Of Land**

Registration Number: **2828236/1**

Registration Date: **2003-03-17**

From/By: **VAN RYSSEL ENTERPRISES, INC.**

To: **RURAL MUNICIPALITY OF SPRINGFIELD**

Consideration: **\$384,000.00**

10. LAND INDEX

SE 11-11-5E

EXC PLANS 898, 3438 AND RES

**CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA STORAGE
SYSTEM OF TITLE NUMBER 1936391/1**

SECTIONS AGRICULTURAL ZONING DISTRICT
82-85 REGULATIONS

84.0 AG: Agriculture General Zoning District

84.1 General Purpose

To provide a Zoning District for general agricultural uses or other uses that is related to or compatible with agriculture.

84.2 Permitted Uses

- | | |
|---|---|
| 1) Agriculture Support Industry | 13) Government Service |
| 2) Agri-Business | 14) Greenhouse, Plant and Tree Nursery |
| 3) Agricultural Activities | 15) Home Occupation |
| 4) Agricultural Crop Protection Warehouse | 16) Livestock Operation of up to and including 200 A.U. |
| 5) Agricultural Implement Sales and Service | 17) Protective and Emergency Service |
| 6) Agricultural Product Storage | 18) Public Utility Service |
| 7) Animal Shelter and Veterinary Service | 19) Residential Related Farm |
| 8) Communal Farm Dwelling | 20) Small Animal Breeding and Boarding Establishment |
| 9) Equestrian Establishment | 21) Specialized Agriculture |
| 10) Farm Produce Outlet | 22) Single Family Dwelling |
| 11) Farmstead Dwelling | 23) Wildlife and Conservation Reserve |
| 12) Forestry Use | |

84.3 Conditional Uses

- | | |
|--------------------------------|---|
| 1) Aircraft Landing Field | 15) Livestock Operation of more than 200 and up to and including 400 A.U. |
| 2) Anhydrous Ammonia Facility | 16) Mineral Exploration |
| 3) Auctioneering Establishment | 17) Mobile Home Dwelling |
| 4) Bed and Breakfast Home | 18) Natural Resource Development |
| 5) Bulk Storage Facility | 19) Outfitter |
| 6) Car Broker | 20) Portable Asphalt Plant |
| 7) Carnival | 21) Recycling Depot |
| 8) Cemetery | 22) Small Scale Industry |
| 9) Composting | 23) Temporary Additional Dwelling or Mobile Home Dwelling |
| 10) Cottage Dwelling | 24) Wayside Pit and Quarry |
| 11) Game Farm | 25) Wind Farm |
| 12) Group Home | 26) Pet Cemetery |
| 13) Guest Cabin | 27) Processing Use |
| 14) Home Industry | 28) Airport and Related Facilities |
| | 29) Wind Turbine Personal Use |

84.4 Site Regulations for Agricultural and Residential Use Classes: Permitted and Conditional Uses	84.5 Site Regulations for Non-Agricultural and Non-Residential Use Classes: Permitted and Conditional Uses	84.6 Site Regulations: Accessory Uses, Buildings and Structures																																						
<table border="0"> <tr><td>1) Site Area</td><td>min. 32.38 ha. (80.00 acres)</td></tr> <tr><td>2) Site Width</td><td>min. 201.17 m. (660.00 ft.)</td></tr> <tr><td>3) Front Yard</td><td>min. 38.10 m. (125.00 ft.)</td></tr> <tr><td>4) Rear Yard</td><td>min. 15.24 m. (50.00 ft.)</td></tr> <tr><td>5) Side Yard</td><td>min. 15.24 m. (50.00 ft.)</td></tr> <tr><td>6) Building Height</td><td>max. 10.67 m. (35.00 ft.)</td></tr> <tr><td>7) Dwelling Area</td><td>min. 55.74 sq. m. (600.00 sq. ft.)</td></tr> </table>	1) Site Area	min. 32.38 ha. (80.00 acres)	2) Site Width	min. 201.17 m. (660.00 ft.)	3) Front Yard	min. 38.10 m. (125.00 ft.)	4) Rear Yard	min. 15.24 m. (50.00 ft.)	5) Side Yard	min. 15.24 m. (50.00 ft.)	6) Building Height	max. 10.67 m. (35.00 ft.)	7) Dwelling Area	min. 55.74 sq. m. (600.00 sq. ft.)	<table border="0"> <tr><td>1) Site Area</td><td>min. 0.80 ha. (2.00 acres)</td></tr> <tr><td>2) Site Width</td><td>min. 60.96 m. (200.00 ft.)</td></tr> <tr><td>3) Front Yard</td><td>min. 22.86 m. (75.00 ft.)</td></tr> <tr><td>4) Rear Yard</td><td>min. 7.62 m. (25.00 ft.)</td></tr> <tr><td>5) Side Yard</td><td>min. 7.62 m. (25.00 ft.)</td></tr> <tr><td>6) Building Height</td><td>max. 10.67 m. (35.00 ft.)</td></tr> </table>	1) Site Area	min. 0.80 ha. (2.00 acres)	2) Site Width	min. 60.96 m. (200.00 ft.)	3) Front Yard	min. 22.86 m. (75.00 ft.)	4) Rear Yard	min. 7.62 m. (25.00 ft.)	5) Side Yard	min. 7.62 m. (25.00 ft.)	6) Building Height	max. 10.67 m. (35.00 ft.)	<table border="0"> <tr><td>1) Site Area</td><td>N/A</td></tr> <tr><td>2) Site Width</td><td>N/A</td></tr> <tr><td>3) Front Yard</td><td>min. 38.10 m. (125.00 ft.)</td></tr> <tr><td>4) Rear Yard</td><td>min. 15.24 m. (50.00 ft.)</td></tr> <tr><td>5) Side Yard</td><td>min. 15.24 m. (50.00 ft.)</td></tr> <tr><td>6) Building Height</td><td>max. 9.15 m. (30.00 ft.)</td></tr> </table>	1) Site Area	N/A	2) Site Width	N/A	3) Front Yard	min. 38.10 m. (125.00 ft.)	4) Rear Yard	min. 15.24 m. (50.00 ft.)	5) Side Yard	min. 15.24 m. (50.00 ft.)	6) Building Height	max. 9.15 m. (30.00 ft.)
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84.7 Additional Regulations for Permitted and Conditional Uses

- 1) A Home Occupation shall be developed in accordance with Section 44.0 of this By-law.
- 2) A Livestock Operation shall be developed in accordance with Section 51.0 of this By-law.
- 3) A Small Animal Breeding and Boarding Establishment shall be developed in accordance with Section 53.0 of this By-law.
- 4) The maximum building height regulation of 10.67 m. (35.00 ft.) shall not apply to farm buildings and farm related storage facilities as determined by the Development Officer.
- 5) Water supply and sewage disposal shall be provided in accordance with *The Environment Act, The Public Health Act, and The Drinking Water Safety Act*.
- 6) A dwelling unit, including a Single Family Dwelling, is allowed when on the same site with a permitted use or conditional use development where, in the opinion of Council, the dwelling is essential for the maintenance, operation and care of the permitted use or conditional use.
- 8) For any Forestry Use that is adjacent to the AR: Agriculture Restricted, HA: Hamlet Area or RR: Rural Residential Zoning Districts, the minimum yard regulations shall be increased to 50.29 m. (165.00 ft.) for the yard(s) adjacent to any of these Zoning Districts.
- 9) Despite Section 84.4 of this By-law, the site regulations for new residential lots created as per Policy 8.3 (3) and Policy 8.3 (4) in the *Springfield Development Plan* shall be in accordance with Section 84.5 of this By-law.
- 10) Despite Section 84.4 of this By-law, the following Agricultural Use Class developments shall be subject to the site regulations listed under Section 84.5 of this By-law:
 - a) Agri-Business;
 - b) Agricultural Crop Protection Warehouse;
 - c) Agricultural Implement Sales and Service;
 - d) Agricultural Product Storage;
 - e) Agriculture Support Industry;
 - f) Anhydrous Ammonia Facility;
 - g) Farm Produce Outlet; and
 - h) Small Animal Breeding and Boarding Establishment.
- 11) Despite the regulations pertaining to the AG: Agriculture General Zoning District, for lands shown on the Zoning District Map as AG-1:
 - a) Vacation Farm Operations shall be considered as a conditional use development and shall be developed in accordance with Policy 8.3(21) in the *RM of Springfield Development Plan*.
 - b) The site regulations for new residential lots created as per Policy 8.3 (22b) in the *RM of Springfield Development Plan* shall be in accordance with Section 62.4 of this By-law.

- 12) Despite Section 84.2 of this By-law, any Livestock Operation within the Urban Centre, Hamlet or other Settlement Centre Urban Limit Line as shown on the Zoning Map shall be deemed a conditional use.
- 13) Subject to Council approval, Livestock Operations greater than 400 A.U. shall be rezoned to A.I.: Agricultural Intensive Zoning District.
- 14) A Single Family Dwelling within 304.80 m. (1,000.00 ft.) of the property limits of an active Natural Resource Development or sites that are zoned either MX: Industrial Extractive or MXH: Industrial Extractive Holding Zoning Districts shall be deemed a conditional use.
- 15) Buildings, structures and hedges adjacent to Provincial Highways, Provincial Roads and Provincial Access Roads shall be setback in accordance with *The Highways Protection Act* and *The Highways and Transportation Act*.

84.8 Additional Regulations for Conditional Uses Only

- 1) A Home Industry shall be developed in accordance with Section 43.0 of this By-law.
- 2) A Temporary Additional Dwelling or Mobile Home Dwelling shall be developed in accordance with Section 49.0 of this By-law.
- 3) An Anhydrous Ammonia Facility shall be developed in accordance with Section 52.0 of this By-law.
- 4) A Natural Resource Development shall be developed in accordance with Section 54.0 of this By-law.
- 5) A Wayside Pit and Quarry shall be developed in accordance with Section 55.0 of this By-law.
- 6) A Bed and Breakfast Home shall be developed in accordance with Section 45.0 of this By-law.
- 7) A Car Broker shall be developed in accordance with Section 48.0 of this By-law.