City of Portage la Prairie

2021 Residual Biosolids Land Application Program

As per Environment Licence 1907

Portage la Prairie
City of Possibilities

97 Saskatchewan Avenue East
Portage la Prairie, MB R1N 0L8
www.city-plap.com

2021 Residual Biosolids Land Application Program

City of Portage la Prairie, Water Pollution Control Facility

Report to Manitoba Sustainable Development

Introduction

The City of Portage la Prairie (the City) owns and operates a wastewater treatment system known as the Water Pollution Control Facility (WPCF). Flows from the McMillan Industrial Park as well as Poplar Bluff Industrial Park are received into and pre-treated in the Low-Rate Anaerobic Reactor (LRAR). This pre-treated wastewater is combined with municipal flows and conveyed to the Sequencing Batch Reactors (SBRs) that provide secondary treatment. Waste Activated sludge (WAS) is the residual solids that are generated through this process and required to be removed from the SBRs to ensure ongoing treatment. WAS is thickened through the addition of polymer and dewatered by gravity belt. The material is then stabilized in the anaerobic digester to produce Biosolids material that is suitable for land application as a fertilizer. Biosolids are stored throughout the year in the Bulk Volume Fermenter (BVF) or the Biosolids Storage Tanks (BSTs). Solids also accumulate within the LRAR and require removal to ensure adequate capacity and sludge depth within the Reactor. The process of removing the material to inject on agricultural land as a soil enhancement product begins once weather and harvest conditions allow. Injection of material helps to reduce runoff, prevent vector attraction, and minimize odours.

The removal, hauling, analyses and injection of this stored material constitutes the Biosolids Land Application program and is regulated under Environment Act License (EAL) #1907. During the fall of 2021, the City conducted its annual Residual Biosolids Land Application program and applied 606.5 dry tonnes of material to farmland.

Field Selection Process

After calculating how much land would be needed based on the quantity of biosolids to be removed, the City of Portage la Prairie administration contacted owners of land located in the Rural Municipality of Portage la Prairie. Initial screening consisted of reviewing the proposed land

application area and determining the subsurface geological formation. This was obtained from a map of the Rural Municipality of Portage la Prairie on which was superimposed areas that had met the requirements under EAL 1907. The criteria can be listed as follows:

i) Depth of clay or clay till of less than 1.5 metres between the soil surface and the water table;

ii) Within 100 metres of an identifiable boundary of an aquifer which is exposed to the ground surface;

iii) Where, prior to the application of biosolids, the soil pH is less than 6.0;

iv) Where the surface slope of the land is greater than 5 percent;

v) where, prior to application of biosolids, the level of nitrate-nitrogen exceeds 100 kilograms per hectare in the upper 60 cm of the soil; or

vi) Where, prior to the application of biosolids, the concentration of sodium bicarbonate extractable phosphorous, as P, exceeds 60 micrograms per gram in the upper 15 centimetres of the soil.

All sites that met the above criteria were considered for biosolids application. Potential fields for use were advertised in the local newspaper as well as on the City of Portage la Prairie website and in the Citizen's Info flyer that is distributed to homes. Letters of notification were also sent to Manitoba Conservation and Climate and the Rural Municipality of Portage la Prairie. Copies of the ad and letters are included in this report. Areas selected were then subject to soil testing processes and final selection.

Nutrient Testing

Soil testing was carried out on all usable fields to determine the pH, sodium bicarbonate extractable phosphorous, as P, and nitrate nitrogen according to the following criteria as specified in EAL #1907.

Parameter	**Depth of Analysis (cm)**
Phosphorous	15
pH	15
Potassium	15
Nitrate-Nitrite	60
Total Nitrogen	60

Core samples were obtained from the selected application sites, as per license requirements. One core sample was collected for each 2-hectare area and combined to form a composite sample for analysis. A sample for clay analyses and to verification of water table was also taken. An external laboratory was contracted by the City of Portage la Prairie to conduct all soils testing.

Heavy Metals

Soil samples were collected and analysed for background heavy metal concentrations. Heavy metal application was limited to one-third of the initial maximum addition of each heavy metal to be applied in any single application period as per environment license. All heavy metal analysis was conducted by an external laboratory. See Appendix B for background heavy metal concentration results. Back-ground heavy metal concentrations in the soil not exceeding the following:

Metal	**Background Concentration (kg/h)**
Cadmium	2.88
Copper	90
Nickel	90
Lead	90
Zinc	270
Mercury	0.9
Chromium	216

For 2021, land section 28-12-8, owned by Westroc Colony, was sampled, analyzed, and approved for use. Once a field had been tested and selected for application, prior to application, an agreement with the landowner was signed specifying the restrictions on future growing conditions. Copies of this agreement are also included in this report.

Biosolids Sampling and Testing

It is also necessary to sample and analyze the residual solids material to determine nutrient and metals levels. This is used to firstly- confirm the material contains levels lower than the maximum allowable concentration before applying and secondly- to determine the application rate that the material can be applied to ensure the cumulative amounts are below license limits.

Once approval was received, the BSTs, BVF, and LRAR biosolids were sampled and analyzed in accordance with Clause 1, Appendix A of EAL 1907, for the following components:

a. conductivity

b. pH

c. total solids

d. volatile solids

e. nitrate nitrogen

f. total Kjeldahl nitrogen

g. ammonia nitrogen

h. organic nitrogen

i. total phosphorous

j. lead

k. mercury

I. nickel

m. potassium

n. cadmium

o. copper

p. zinc

q. chromium

Based on the reported results, the materials contained in the BVF, BSTs and LRAR met the required criteria and were available for land application.

Sludge Handling

Bulk Volume Fermenter

Sludge was withdrawn from the BVF by means of internal lateral sludge lines that are normally used for sludge recirculation within the BVF. Sludge was pumped directly to the trucks through a sludge transfer port and an overhead fill pipe. City staff continuously monitored the entire filling process and operation of the sludge pumps. Communication was maintained by means of two-way radios.

Any spillage observed was attributed to material dripping from the hose after a truck was filled. All spillage that occurred was contained on a concrete spill pad that was washed after each load hauled. The spilled material and wash water were conveyed to the headworks of the WPCF by means of a gravity collection line to a pumping station.

Biosolids Storage Facility

The contents of the storage tank were thoroughly mixed using the Seepex progressive cavity pumps in the facility and pumped to tanker trucks through an overhead fill line. City staff continuously monitored the entire filling process and operation of the sludge pumps.

Any spillage observed was attributed to material dripping from the hose after a truck was filled. All material that drips from the overhead filling hose is collected on the concrete spill pad that is washed down into a pit that conveys all material back to the Biosolids Storage Tanks.

Low-Rate Anaerobic Reactor

Sludge was withdrawn from the LRAR by means of internal lateral sludge lines that are normally used for sludge recirculation within the LRAR. Sludge was pumped directly to the trucks through a sludge transfer port and an overhead fill pipe. City staff continuously monitored the entire filling process and operation of the sludge pumps. Communication was maintained by means of two-way radios.

Any spillage observed was attributed to material dripping from the hose after a truck was filled. All spillage that occurred was contained on a concrete spill pad that was washed after each load hauled. The spilled material and wash water were conveyed to the headworks of the LRAR by a pumping station located at the fill site.

Biosolids Transportation and Transfer Station

The biosolids was hauled via tanker truck to the field. Transportation routes were determined prior to application and Manitoba Conservation and Climate, and the RM of Portage la Prairie were notified of the intended routes. Copies of these notification letters are included with this report.

Biosolids was transferred from the tanks via a sludge transfer pump to the nurse tank. The nurse tank can hold approximately four tank loads. Cam-lock connections were used for all hose connection mitigating any spillage, which may have occurred during the sludge transfer stage. The nurse tank directly feeds the Drag-Line injection system.

Injection

All biosolids injection was conducted by a Drag-Line injection system which had been modified to allow for injection and to allow for a furrow spacing of 0.50 metres (20 inches). A total of 6 furrows were created with each pass.

Injection rate was based on the ground speed of the Dragline and the solids and ammonia information of the sludge. Concentration of percent solids and ammonia data was transferred to the field by means of two-way radio. This data was used by the operator of the Drag-Line equipment to estimate the speed of the unit by means of an injection rate chart. Approximately 100 kg/ha of plant available nitrogen was applied to each application area as based on the following formula:

$$S = \frac{N_p}{(NO_3\text{–}N + NH_3\text{–}N + F \times \text{Org-N})}$$

Where:

S= sludge application rate (dry kg/ha)

N_p= plant available nitrogen requirement (kg/ha) = 100 kg/ha

NO_3-N= nitrate nitrogen content of sludge (kg/kg sludge)

NH_3-N= ammonia nitrogen content of sludge (kg/kg sludge)

F= organic nitrogen mineralization factor (0.2 dimensionless)

Org-N= organic nitrogen content of sludge (kg/kg sludge)

Biosolids Testing During Land Application

During the land application program, ongoing testing of samples from the BSTs, BVF and LRAR are conducted. One grab sample is collected from every tanker to form a composite sample of five tankers. Each composite is analyzed for solids and ammonia content.

The ammonia and solids testing that occurs during the biosolids hauling process are analyzed in-house by City of Portage lab techs. Solids are determined using a moisture balance and ammonia is determined via Flow Injection Analysis in accordance with APHA Standard Methods for the Examination of Water and Wastewater 20th Ed, 1998 Method 4500-NH_3 H. Flow Injection Analysis.

The ongoing testing of ammonia and solids for each composite sample ensures that the application rate is being adjusted accordingly as the program proceeds. The spreadsheets used to determine rates, also calculates the applied quantity of metals, Phosphorous, and Nitrogen along with the background soil composition to ensure the cumulative values do not exceed license requirements. This information is documented in the Biosolids Application Recording sheets which are included in this report. A copy of this report is also given to each landowner.

Summary

Residual solids were removed and transported for land application between August 30 – September 16, 2021. In total, 606.5 dry tonnes were removed and injected including 59.4 dry tonnes from the BVF, 249 tonnes from the LRAR and 298 dry tonnes from the Biosolids Storage Tanks. All metals and nutrient application requirements were met. There were no incidents or spills that occurred during the land application process. Follow up with the landowner indicated they were content with the application process and are willing to have residual solids applied in future years. As this was a new land owner, additional follow up will occur in the fall of 2022 to determine the affect, if any, on crop production.

APPENDIX A
LAND SOLICITATION AND ADVERTISING

Portage la Prairie
City of Possibilities

97 Saskatchewan Avenue East
Portage la Prairie, MB R1N 0L8
www.city-plap.com

February 26, 2021

Mr. Tyler Kneeshaw
Regional Supervisor
Environmental Compliance and Enforcement
Sustainable Development
25 Tupper Street North
Portage la Prairie, MB R1N 3K1

Re: 2021 Residual Biosolids Application Program

Dear Mr. Kneeshaw:

The City of Portage la Prairie intends to conduct land application of residual biosolids in the fall of 2021. The following land areas that have been identified as potential application sites and pending soil analysis, biosolids **may** be applied to the following agricultural lands:

LEGAL LAND DESCRIPTIONS

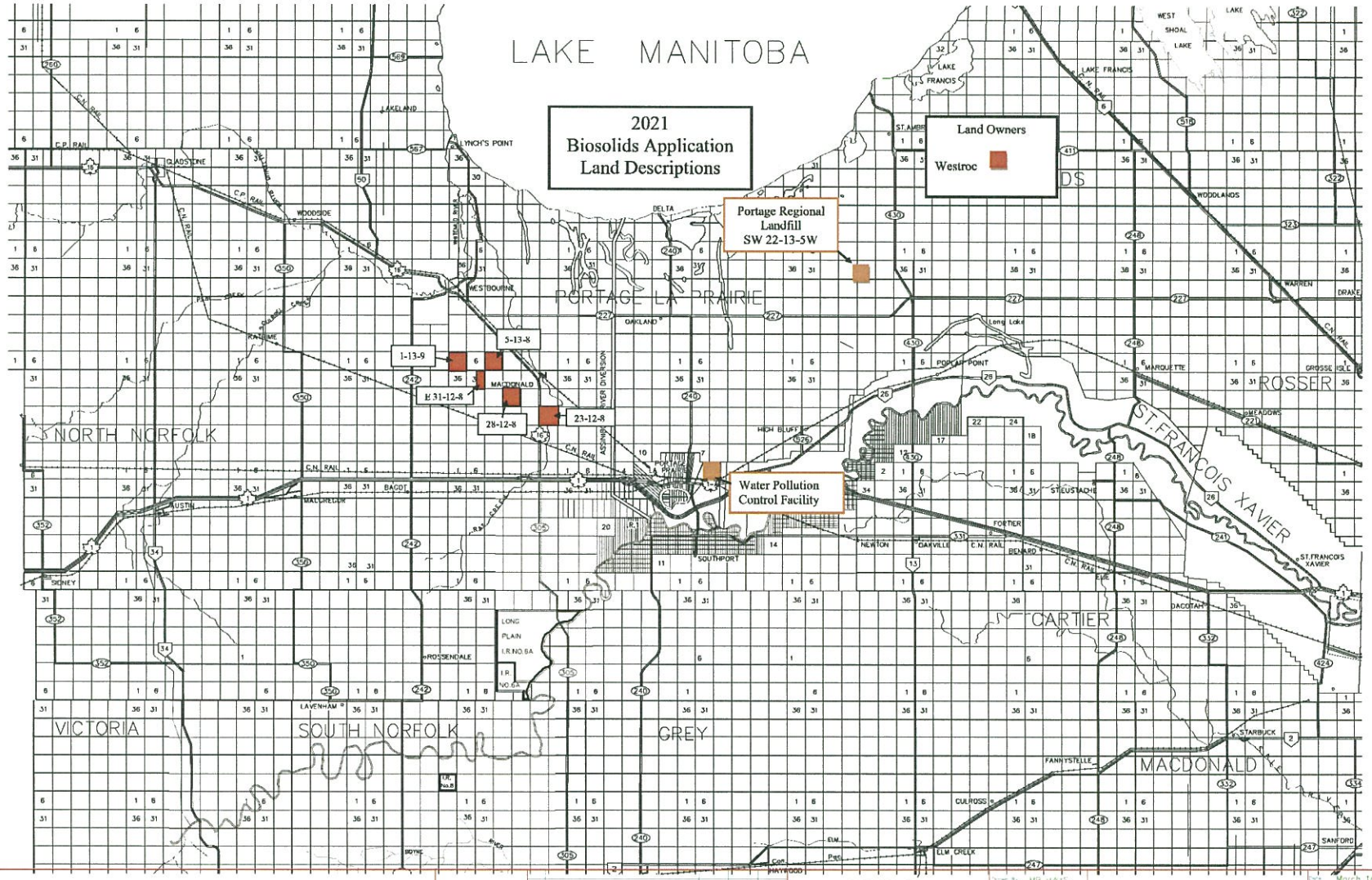
Owner: Westroc Colony	1-13-9
	5-13-8
	23-12-8
	28-12-8
	E 31-12-8

As required in Environment Act License 1907, Clause 17, notice of intent to land apply to the above noted sites will be printed in the Portage Daily Graphic March 11th edition. The notice will also be in the March issue of the City of Portage la Prairie Citizens Info page and posted to the City website. A copy of the intended routes of transport as well as a confirmation of start date will be sent once they are confirmed by the contractor. Please contact me at 204-239-8359 if you have or receive any concerns regarding the above sites.

A map of the Portage la Prairie region with fields identified has been included with this letter.

Sincerely,

Karly Friesen
Director of Utility


LAKE MANITOBA
2021
Biosolids Application
Land Descriptions
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Portage Regional
Landfill
SW 22-13-5W
Water Pollution
Control Facility
5-13-8
1-13-9
E 31-12-8
28-12-8
23-12-8
PORTAGE LA PRAIRIE
NORTH NORFOLK
SOUTH NORFOLK
VICTORIA
GREY
CARTIER
ROSSER
MACDONALD
ST.FRANCOIS XAVIER
LAKELAND
GLADSTONE
WOODSIDE
WESTBOURNE
OAKLAND
MACDONALD
HIGH BLUFF
SOUTHPORT
NEWTON
OAKVILLE
ST.EUSTACHE
DACOTAH
WOODLANDS
WARREN
DRAKE
MEADOWS
MARQUETTE
GROSSE ISLE
FANNYSTELLE
STARBUCK
CULROSS
ELM CREEK
SANFORD
ROSSENDALE
LAVENHAM
BAGOT
SIDNEY
AUSTIN
LONG PLAIN I.R. NO. 6A
I.R. NO. 6
I.R. No.8
C.N. RAIL
C.P. RAIL
ASSINIBOINE RIVER DIVERSION
THE CITY OF
PORTAGE LA PRAIRIE
OPERATIONS DEPARTMENT
ENGINEERING DIVISION
Possible
Disposal Areas
For WPCF
March 14/97
1:10000
1 of 1
M-214

Portage la Prairie
City of Possibilities

97 Saskatchewan Avenue East
Portage la Prairie, MB R1N 0L8
www.city-plap.com

February 26, 2021

Ms. Nettie Neudorf, CPA, CGA, CMMA
Chief Administrative Officer
Rural Municipality of Portage la Prairie
35 Tupper Street South
Portage la Prairie, MB R1N 1W7

Re: 2021 Residual Biosolids Application Program

Dear Ms. Neudorf:

The City of Portage la Prairie intends to conduct land application of residual biosolids in the fall of 2021. Below you will find the land areas that have been selected. A copy of the land map has been included as well. Pending soil analysis, biosolids **may** be applied to the following agricultural lands:

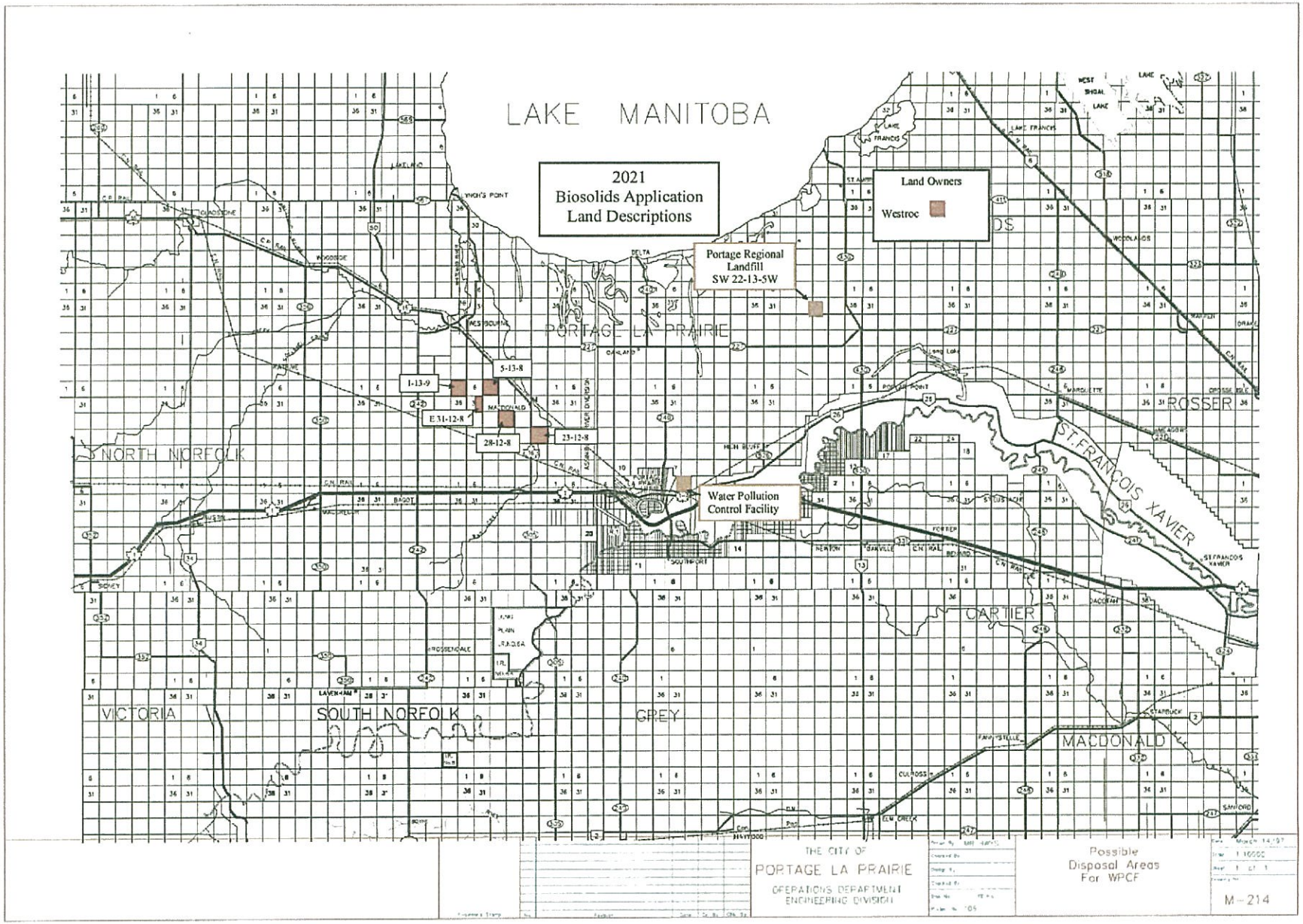
LEGAL LAND DESCRIPTIONS

Owner: Westroc Colony	1-13-9
	5-13-8
	23-12-8
	28-12-8
	E 31-12-8

As required in Environment Act License 1907, Clause 17, notice of intent to land apply to the above noted sites will be printed in the Portage Daily Graphic March 11th edition. The notice will also be in the March issue of the City of Portage la Prairie Citizens Info page and posted to the City website. A copy of the intended routes of transport as well as a confirmation of start date will be sent once they are confirmed by the contractor. Please contact me at 204-239-8359 if you have or receive any concerns regarding the above sites.

Sincerely,

Karly Friesen
Director of Utility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ST. FRANCOIS XAVIER
THE CITY OF
PORTAGE LA PRAIRIE
OPERATIONS DEPARTMENT
ENGINEERING DIVISION
Possible
Disposal Areas
For WPCF
M-214

Memo

To: Donna Core

From: Karly Friesen

CC: Kathy Boros

Date: February 26, 2021

Re: Biosolids Application Ad for Citizens Info Page

Donna, please run this ad in our Citizen's info page as well as on our website/social media. An ad will also need to be placed in the Portage Graphic. This is a legal requirement of our environment license.

The City of Portage la Prairie intends to conduct the Residual Biosolids Land Application Program commencing in the fall of 2021.

Pending soil analysis, biosolids **may** be applied to the following agricultural lands:

LEGAL DESCRIPTION

1-13-9; 5-13-8; 28-12-8; 23-12-8; E 31-12-8

A map of land locations can be found at www.city-plap.com

Please contact Karly Friesen, Manager, Director of Utility at 204-239-8359 if you have or receive any concerns regarding the above sites.

APPENDIX B

APPLICATION AREA SUMMARY, SOIL TESTING, BIOSOLIDS TESTING AND ANALYTICAL RESULTS

FALL

28-12-8

Portage la Prairie
City of Possibilities

97 Saskatchewan Avenue East
Portage la Prairie, MB R1N 0L8
www.city-plap.com

August 18, 2021

Mr. Tyler Kneeshaw
Regional Supervisor – Environment Officer
Manitoba Conservation and Climate
309 – 25 Tupper Street North
Portage la Prairie, MB R1N 3K1

Re: Truck Routes for 2021 Residual Biosolids Application Program

Dear Mr. Kneeshaw:

Please find the enclosed route maps for the fall Residual Biosolids Land application for review and comment. It is intended to only utilize field S 28-12-8 for the duration of the program. Transport and application of biosolids is scheduled to begin on Monday, August 30, 2021, pending dry weather conditions. Should there be any concerns throughout the hauling process with traffic and/or dust, please contact myself as the contractor is responsible for both items.

Please direct any questions or concerns regarding routing prior to Friday, August 27, 2021, via email to kfriesen@city-plap.com.

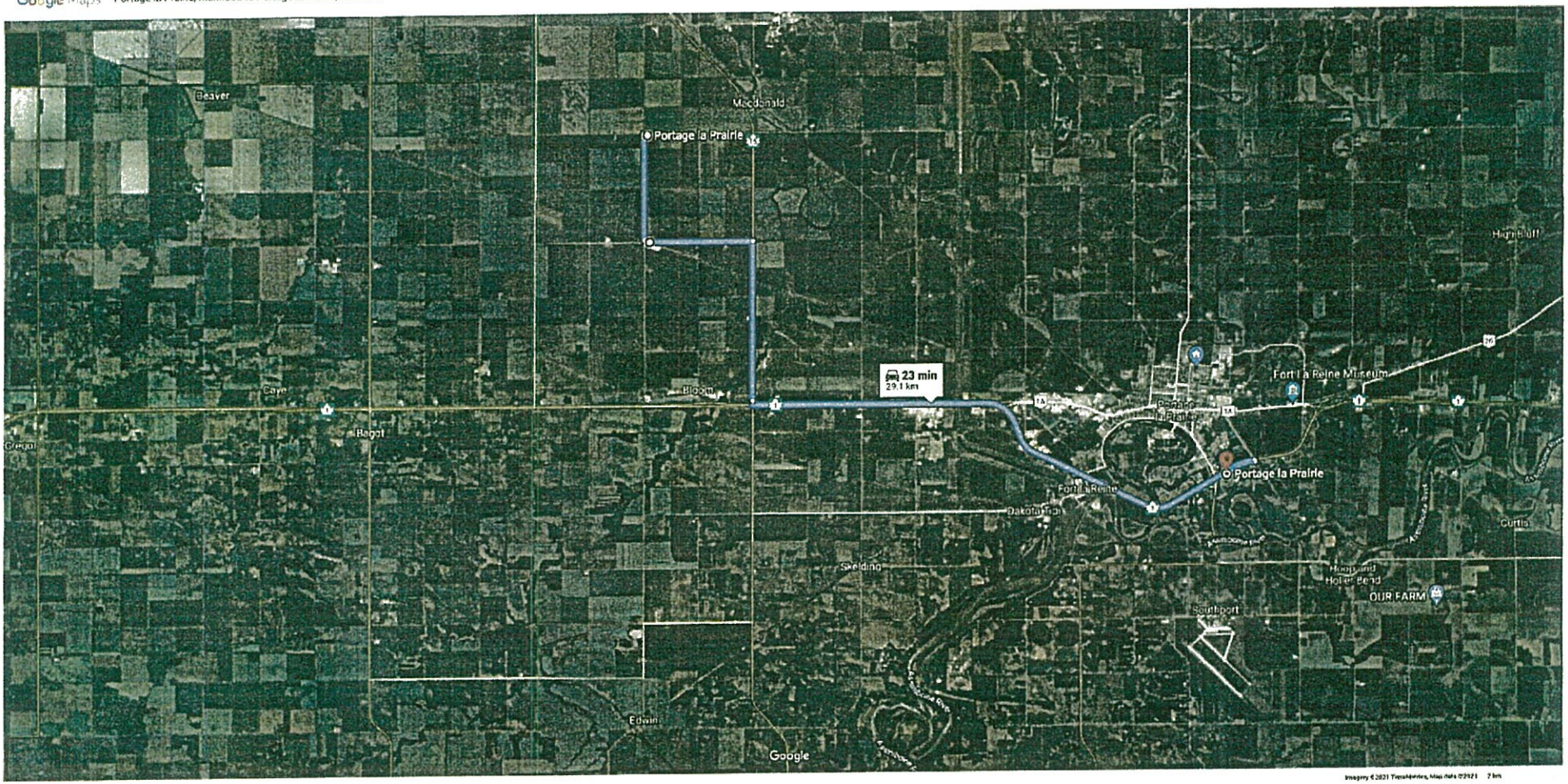
Sincerely,

Karly Friesen
Director of Utility
City of Portage la Prairie

To WPCF from Field S-28-12-8

Google Maps Portage la Prairie, Manitoba to Portage la Prairie, Manitoba

Drive 29.1 km, 23 min



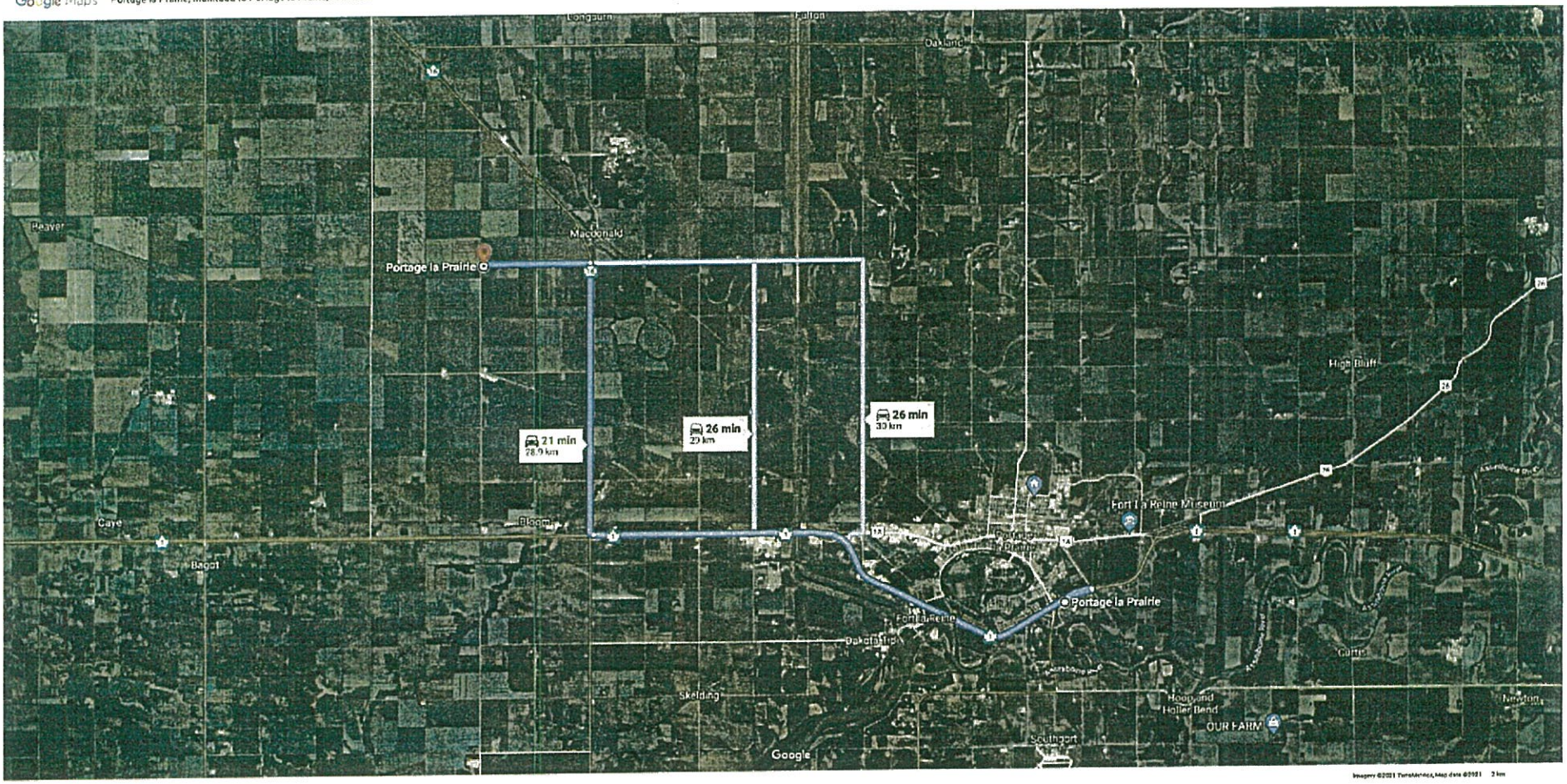
via Trans-Canada Hwy/MB-1 E 23 min

Explore Portage la Prairie

To Field S 28-12-8 From WPCF

Google Maps Portage la Prairie, Manitoba to Portage la Prairie, Manitoba

Drive 28.9 km, 21 min



via Trans-Canada Hwy/MB-1 W and MB-16 W — 21 min

via Trans-Canada Hwy/MB-1 W, Rd 41W and Rd 71N — 26 min

via Trans-Canada Hwy/MB-1 W, Rd 39W and Rd 71N — 26 min

Explore Portage la Prairie

Portage la Prairie
City of Possibilities

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August 18, 2021

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Please direct any questions or concerns regarding routing prior to Friday, August 27, 2021, via email to kfriesen@city-plap.com.

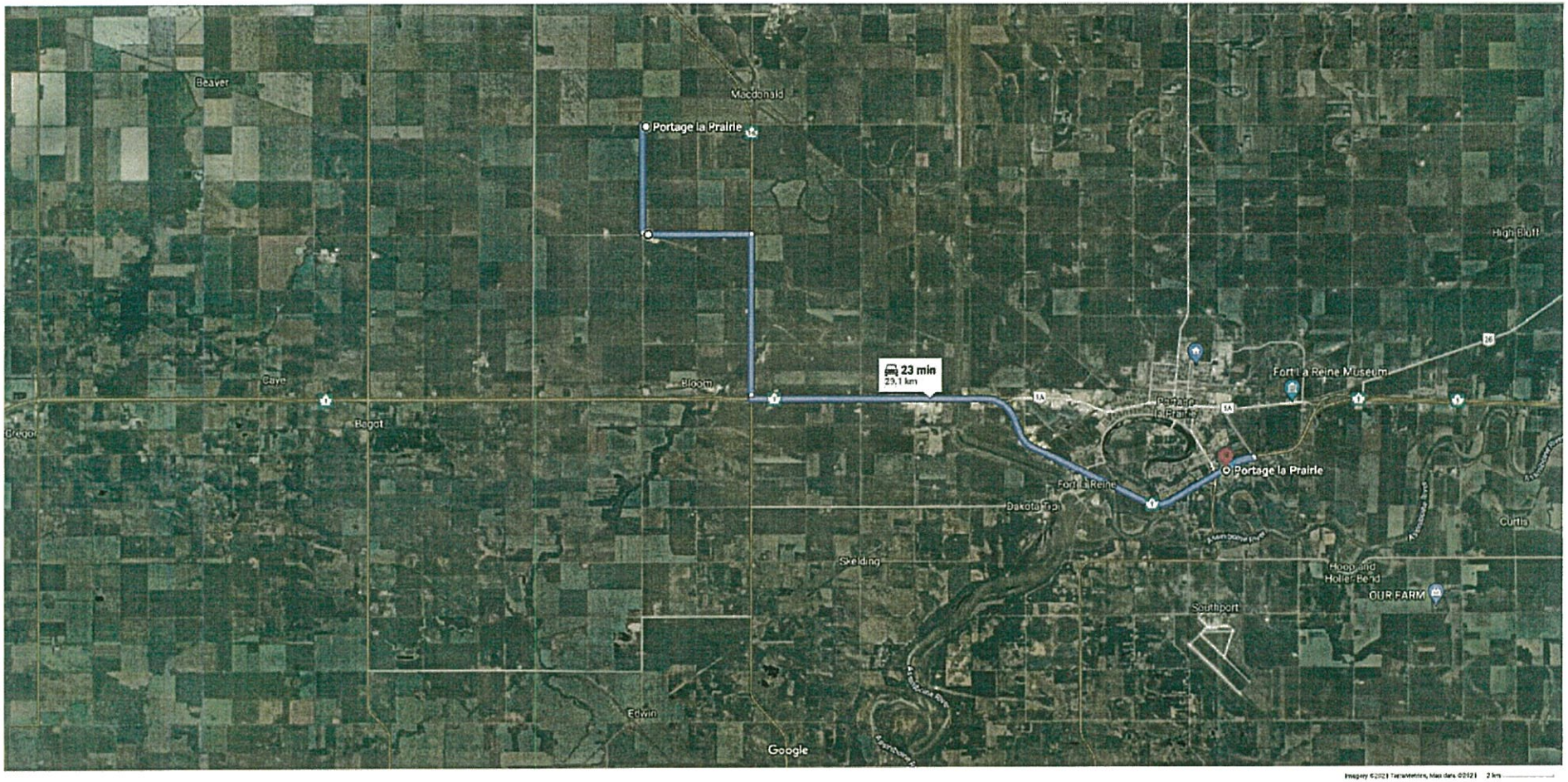
Sincerely,

Karly Friesen
Director of Utility
City of Portage la Prairie

To WPCF from Field S-28-12-8

Google Maps Portage la Prairie, Manitoba to Portage la Prairie, Manitoba

Drive 29.1 km, 23 min



Imagery ©2021 TerraMetrics, Map data ©2021 2 km

via Trans-Canada Hwy/MB-1 E — 23 min
22 min without traffic — 29.1 km

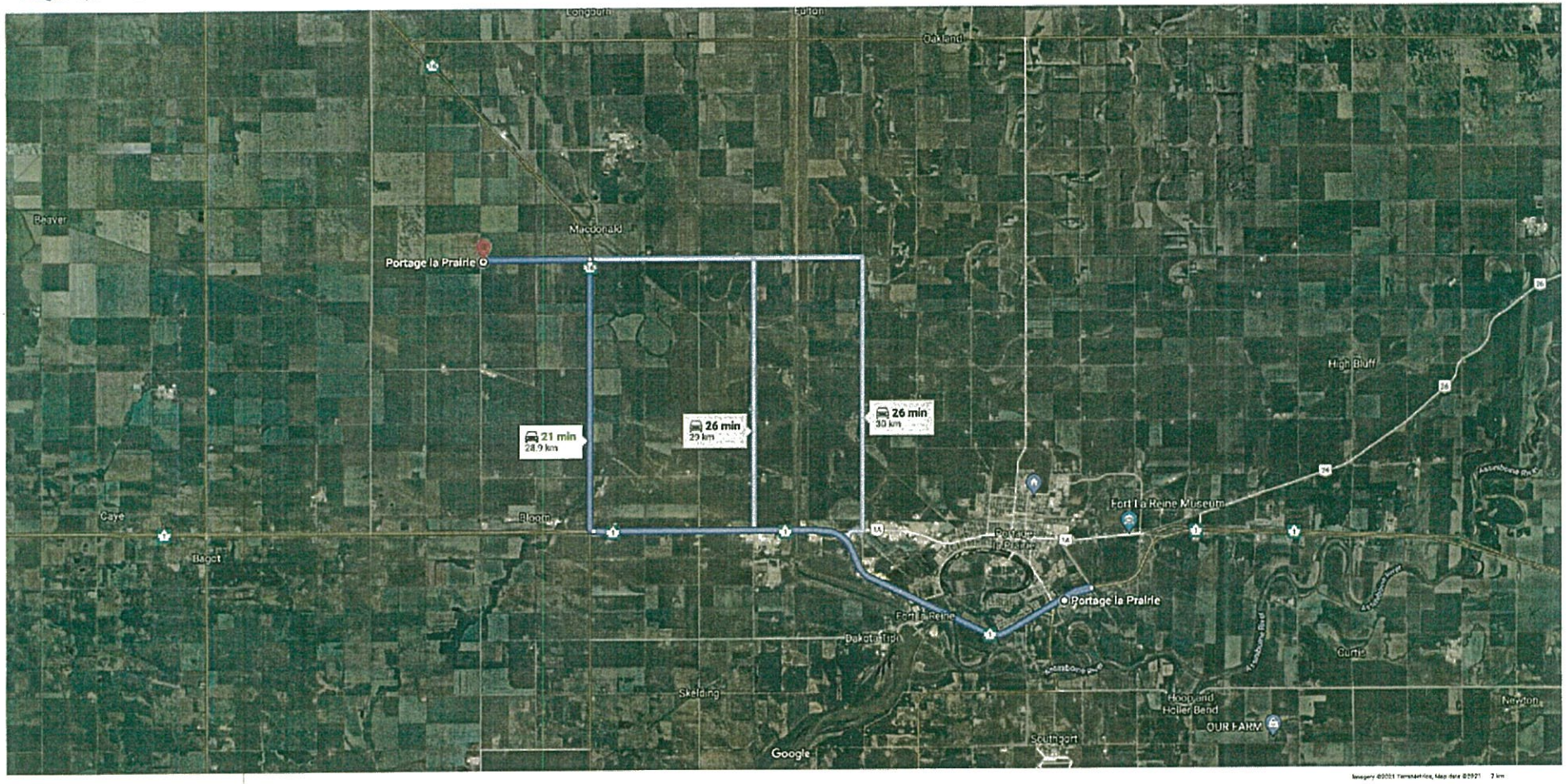
Explore Portage la Prairie

Restaurants Hotels Gas stations Parking Lots More

To Field S 28-12-8 From WPCF

Google Maps Portage la Prairie, Manitoba to Portage la Prairie, Manitoba

Drive 28.9 km, 21 min



via Trans-Canada Hwy/MB-1 W and MB-16 W — 21 min (28.9 km)
Fastest route, the usual traffic

via Trans-Canada Hwy/MB-1 W, Rd 41W and Rd 71N — 26 min (29.0 km)

via Trans-Canada Hwy/MB-1 W, Rd 39W and Rd 71N — 26 min (30.0 km)

Explore Portage la Prairie

Restaurants Hotels Gas stations Parking Lots More

LETTER OF AGREEMENT

Ms. Karly Friesen
Director of Utility
City of Portage la Prairie
97 Saskatchewan Ave. E.
Portage la Prairie, MB
R1N 0L8

Dear Land Owner:

I hereby agree to permit the City of Portage la Prairie to apply wastewater treatment residual biosolids to the land, which I own as described below, on the understanding that:

1. The biosolids will be injected approximately 15 cm below the surface.
2. The biosolids will be injected to a maximum rate of 10 dry tonnes per hectare. (Maximum allowable over a 4-year period.)
3. Application will occur in the 2021 crop year, or as otherwise indicated.
4. Biosolids application will not be closer than 300 meters to a dwelling not belonging to the owner or lessee of the land on which biosolids are applied.
5. Biosolids will not be applied within 15 meters of a ditch draining less than one section and 30 meters from drains serving a larger watershed.
6. All roadways, access roads, and ditches will be repaired to the original condition upon completion of the application program, to the satisfaction of the City, municipality and the landowner.
7. The City makes no warranties or representations as to the fertilizer content nor any soil conditioning effect of the biosolids.
8. The City will determine background levels of nutrients, heavy metals, pH, and clay depth prior to the application of biosolids. This information will be provided to the landowner.
9. The City will assess the biosolids quality prior to the application program and will monitor it throughout the program. Test results will be provided to the landowner.
10. Temporary halting of the application due to wet field conditions will occur upon mutual agreement between representatives of the City, contractor and landowner.
11. Biosolids may be injected at a maximum rate of addition of plant-available nitrogen of 100 kilograms per hectare.
12. The cumulative mass per hectare of each heavy metal in the soil does not exceed the respective value stipulated in the City's Environment Act License, and that not more than one-third of the initial maximum addition of each heavy metal will be applied in this year's program.
13. The City will restore the field to a condition similar that as found prior to the application program.

LETTER OF AGREEMENT

I, on my part, agree to:

a) Plant a cereal, oilseed, forage, field pea, or lentil crop at the beginning of the next growing season. Only these listed crops will be grown for three growing seasons following biosolids application. A crop will not be grown that is a vegetable or a fruit and livestock will not be allowed to graze for three growing seasons after biosolids application on the land.
b) Provide crop information to the City on an annual basis.
c) Consider the soil and biosolids test results prior to applying nitrogen fertilizer in the growing season following biosolids application and restrict the addition of plant-available nitrogen to a maximum of 100 kg/ha, including that derived from the application of biosolids. Fertilizer, including that derived from biosolids, will be applied at the recommended agronomic rates.
d) Release and discharge the City of Portage la Prairie of and from all claims, demands, actions or causes of actions which I have or may have as the result of the application of wastewater biosolids to my land.
e) Provide the City with a letter of acceptance upon completion of the biosolids application indicating my acceptance of field conditions.
f) Notify the lessee of the land (if applicable) of this agreement.

Yours truly,

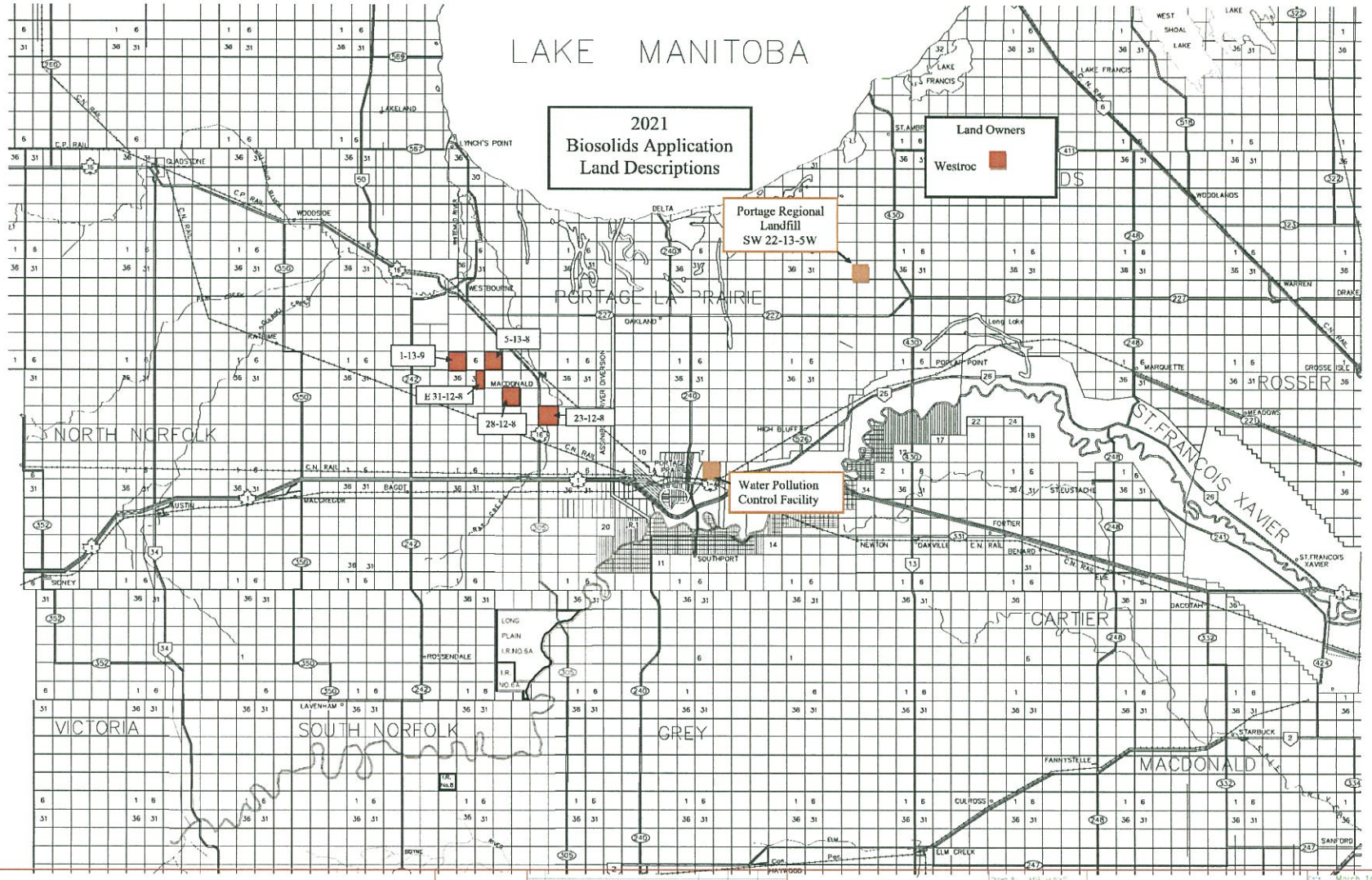
Ron Snor
Land Owner

City Representative

July 30, 2021
Date

Feb 16/21
Date

Land Location(s): 1-13-9; 5-13-8; 33-12-8; 23-12-8
23-12-8 - added due to early harvest KA.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N. CARTIER
LAKELAND
WOODSIDE
WESTBOURNE
OAKLAND
MACDONALD
HIGH BLUFF
SOUTHPORT
NEWTON
OAKVILLE
BAGOT
MACGREGOR
AUSTIN
SIDNEY
ROSSENDALE
LAVENHAM
LONG PLAIN I.R. NO.6A
I.R. NO.6
I.R. No.8
LAKE FRANCIS
WEST SHOAL LAKE
WOODLANDS
WARREN
DRAKE
MARQUETTE
GROSSE ISLE
MEADOWS
ST. FRANCOIS XAVIER
DACOTAH
STARBUCK
FANNYSTELLE
CULROSS
SANFORD
ELM CREEK
HAYWOOD
THE CITY OF
PORTAGE LA PRAIRIE
OPERATIONS DEPARTMENT
ENGINEERING DIVISION
Possible
Disposal Areas
For WPCF
March 14/97
1:10000
1 of 1
M-214

	Name of Land Owner		Westroc						
	Legal Description		28-12-8						
	Land Owner Authorization		Yes						
	Dist. >300m from residences								
	Map Enclosed		Yes						
	Year Field previously Used								
	GPS	**Lat**				**Long**			
		Date	**Date**	**Date**	**Date**	**Date**	**Date**		
		BVF 16/9/2021	**BVF 16/9/2021 lbs/ac**	**BST 16/9/2021**	**BST 16/9/2021 lbs/ac**	**LRAR 15/9/2021**	**LRAR 15/9/2021 lbs/ac**		**Comments**
Field Soil Analaysis mg/kg 0-15 cm	Cadmium	0.47		0.47		0.47			
	Calcium	15000		15000		15000			
	Chromium	35		35		35			
	Copper	29		29		29			
	Lead	13		13		13			
	Mercury	0.050		0.050		0.050			
	Nickel	35		35		35			
	pH	7.55		7.55		7.55			
	Phosphorus < 60 ug/g	620		620		620			
	Potassium	4400		4400		4400			
	Soil Nitrate Nitrogen 0-60cm<100kg/ha	5.7		5.7		5.7			
	Zinc	92		92		92			
Bio-Solids Analysis mg/kg	Ammonia Nitrogen	260		460		180			
	Cadmium	0.0817		0.0288		0.139			
	Chromium	0.6		0.629		0.971			
	Conductivity	4800		5800		3400			
	Copper	6		9.54		7.44			
	Lead	0.282		0.270		0.398			
	Mercury	0.0068		0.000577		0.000030			
	Nickel	1.040		0.619		1.670			
	Nitrate Nitrogen	0.05		0.05		0.01			
	Organic Nitrogen	382		730		84			
	pH	7.17		7.33		7.39			
	Potassium	310		208		387			
	Total Nitrogen	642		1190		264			
	Total Phosphorus	93		330		26			
	Total Solids	24400		39800		55200			
	Volatile Solids	13800		26900		28400			
	Zinc	18.400		9.790		28.800			
Cummulative Results Kg/Hectare	Cadmium < 2.88	0.846	0.755	0.846	0.755	0.847	0.755		
	Chromium < 216	63.00	56.21	63.00	56.21	63.01	56.22		
	Copper < 90	52.24	46.61	52.22	46.59	52.33	46.69		
	Lead < 90	23.40	20.88	23.40	20.88	23.41	20.88		
	Mercury < 0.9	0.090	0.08	0.090	0.08	0.090	0.08		
	Nickel < 90	63.00	56.21	63.00	56.21	63.01	56.22		
	Nutrient Appl. Rate PAN<100/kg	101.81	90.83	102.94	91.84	89.57	79.91		98.48 field average
	Solids <10	4.35	3.88	3.81	3.40	20.81	18.57		9.32 field average
	Zinc < 270	165.68	147.82	165.67	147.81	165.97	148.07		
	Phosphorus	1117.44	996.95	1116.35	995.99	1117.94	997.40		
	Comments								

ASSINIBOINE INJECTIONS LTD

BOX 160 177 NOTRE DAME AVE NOTRE DAME, MB ROG 1M0 PH: 204-248-2559 FAX: 204-248-2799

DAILY SLUDGE APPLICATION PLAN

DATE: _____

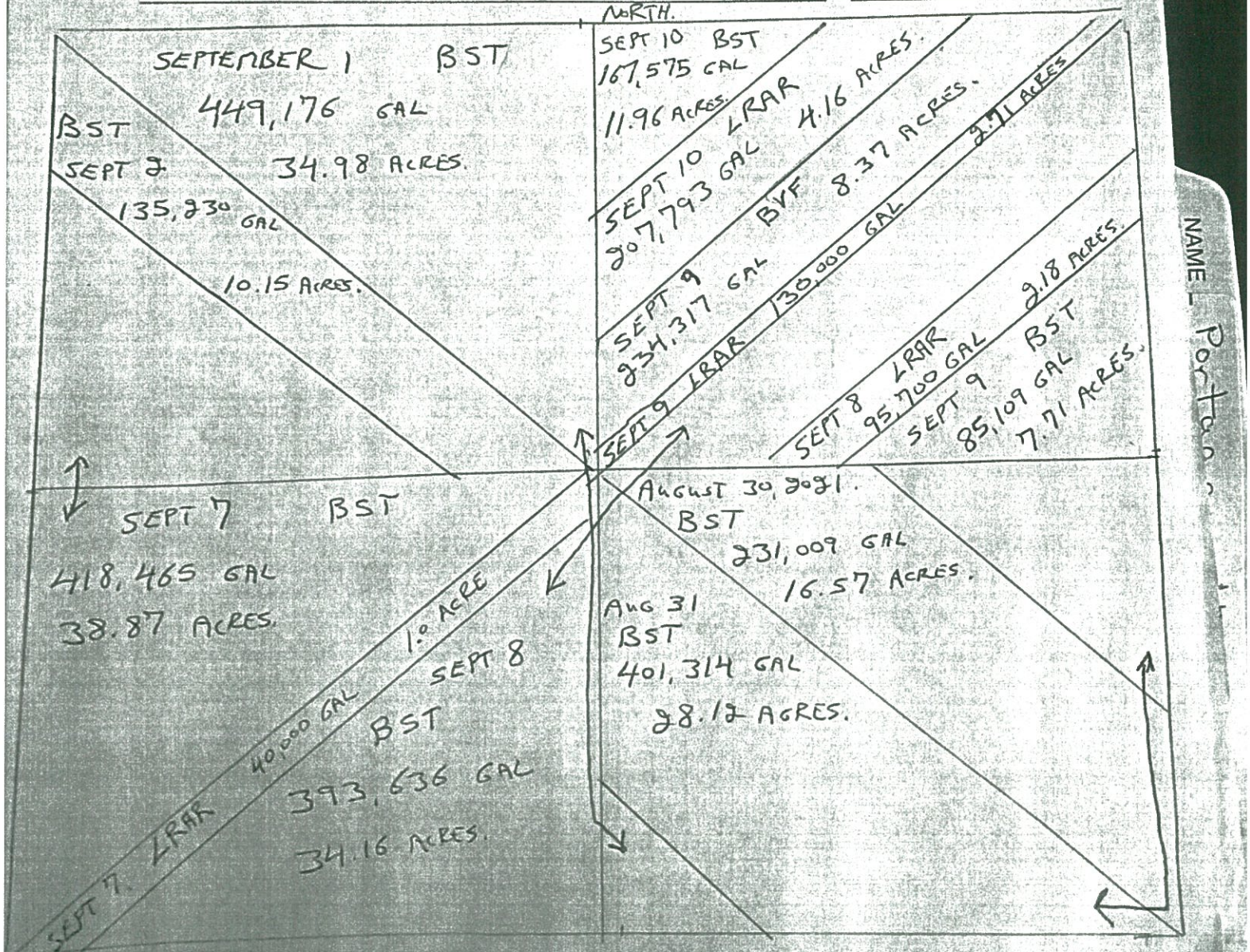
FARMERS NAME: _____

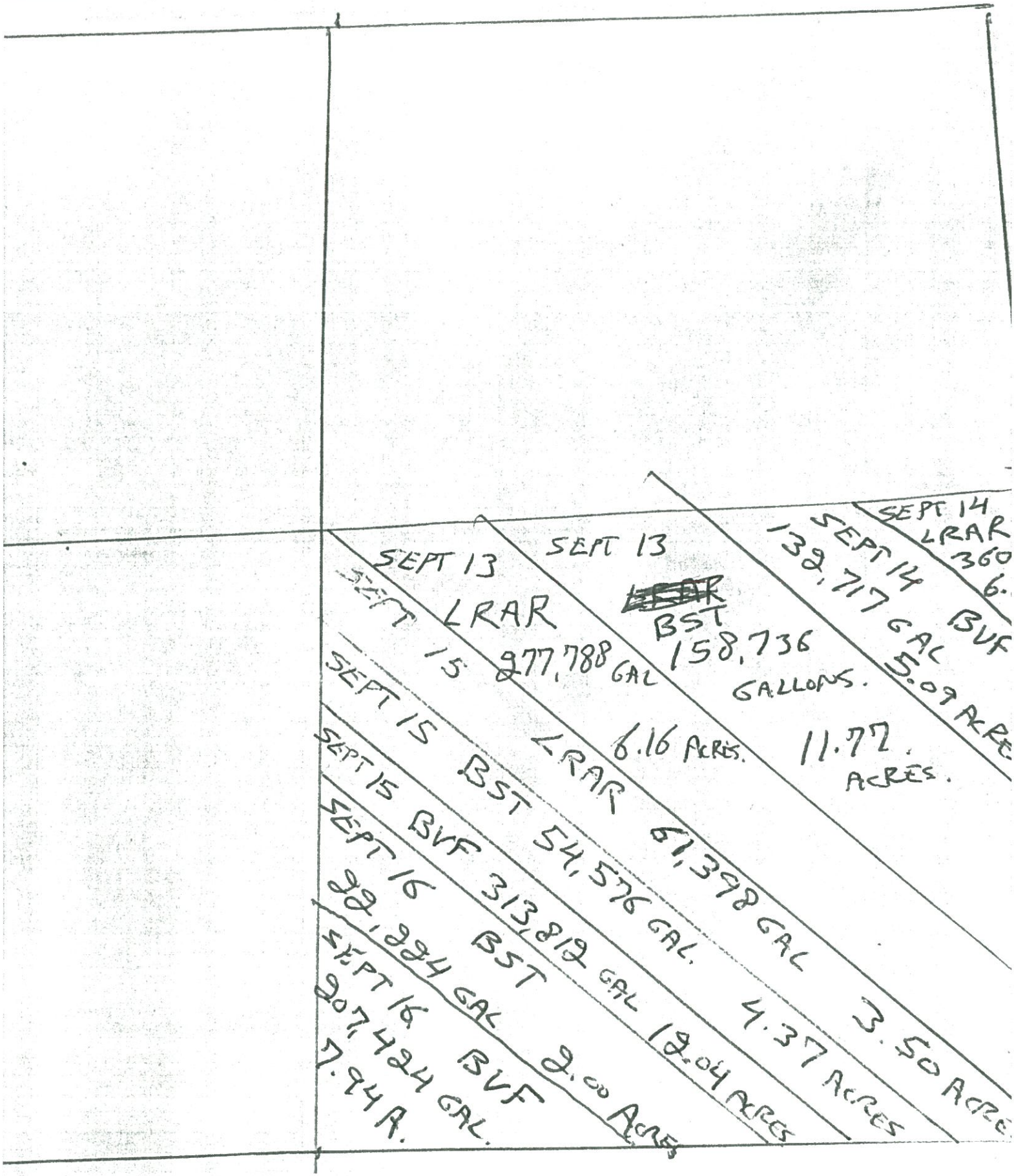
FIELD: SEC. ____ TWP _____ RGE _____

APPLICATION TYPE: INJECTION

DEPTH : 6" HA: _____ CM3: _____

N




SEPT 13
LRAR
277,788 GAL
6.16 ACRES.
SEPT 13
~~LRAR~~
BST
158,736
GALLONS.
11.77
ACRES.
SEPT 14
LRAR
132,717 GAL
5.09 ACRES
SEPT 14
LRAR
360
6.
BVF
SEPT 15
LRAR 61,398 GAL
4.37 ACRES
3.50 ACRES
SEPT 15
BST 54,576 GAL.
19.04 ACRES
SEPT 15
BVF 313,812 GAL
2.00 ACRES
SEPT 16
BST
22,224 GAL
SEPT 16
BVF
207,424 GAL.
7.94 A.

EPT 16, 2021

Westroc
28-12-8

Your P.O. #: W02866
Site Location: WPCF Lab
Your C.O.C. #: 40205

Attention: Aaron Stechesen

CITY OF PORTAGE LA PRAIRIE
Water Pollution Control Fac.
400 River Road
Portage la Prairie, MB
Canada R1N 3V6

Report Date: 2021/09/08
Report #: R3068719
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C161131
Received: 2021/08/20, 14:15

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Elements by ICP -Soils (1)	1	2021/08/26	2021/08/27	AB SOP-00001 / AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS - Soils (1)	1	2021/08/26	2021/08/26	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Moisture (1)	1	N/A	2021/08/24	AB SOP-00002	CCME PHC-CWS m
Soluble NO2 (N);Soluble NO2 (N) + NO3(N) (1)	1	2021/08/26	2021/08/27	AB SOP-00091	SM 23 4500 NO3m
Available(10:1) Wet NO2(N);NO2(N)+NO3(N) (1)	1	2021/08/26	2021/08/27	AB SOP-00091	SM 23 4500 NO3m
NO3 (N) Available (10:1) Wet (1)	1	2021/08/22	2021/08/27		Auto Calc
Nitrate-N (soluble) (1)	1	2021/08/25	2021/08/27		Auto Calc
Phosphorus (Available by ICP) (1)	1	2021/08/26	2021/08/26	CAL SOP-00152 / AB SOP-00042	EPA 6010d R5 m
pH @25C (Soluble) (1)	1	2021/08/24	2021/08/24	AB SOP-00033 / AB SOP-00006	SM 23 4500 H+B m
Atterberg Limits (Dry) (2)	1	N/A	N/A	PTC SOP-00213	ASTM D4318
Soluble Paste (1)	2	2021/08/24	2021/08/24	AB SOP-00033	Carter 2nd ed 15.2 m
Nitrogen (Total Available) (1)	1	2021/08/26	2021/08/30	AB SOP-00093	SM 23 4500-N C m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

Your P.O. #: W02866
Site Location: WPCF Lab
Your C.O.C. #: 40205

Attention: Aaron Stechesen

CITY OF PORTAGE LA PRAIRIE
Water Pollution Control Fac.
400 River Road
Portage la Prairie, MB
Canada R1N 3V6

Report Date: 2021/09/08
Report #: R3068719
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C161131
Received: 2021/08/20, 14:15

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Calgary Environmental
(2) This test was performed by Bureau Veritas Edmonton Petroleum

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
08 Sep 2021 16:40:55

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bureauveritas.com
Phone# (204) 772-7276

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

BV Labs Job #: C161131
Report Date: 2021/09/08

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF Lab
Your P.O. #: W02866
Sampler Initials: AS

RESULTS OF CHEMICAL ANALYSES OF SOIL

BV Labs ID		AEG339			AEG340			AEG341		
Sampling Date		2021/08/19 17:00			2021/08/19 17:00			2021/08/19 17:00		
COC Number		40205			40205			40205		
	UNITS	21-08-50	RDL	QC Batch	21-08-51	RDL	QC Batch	21-08-52	RDL	QC Batch
Calculated Parameters										
Available (KCl) Nitrate (N)	mg/kg				5.7	4.0	A328321			
Soluble Nitrate (N)	mg/L				19	2.0	A331729			
Nutrients										
Available (NH4F) Phosphorus (P)	mg/kg	14	1.0	A332647						
Available (KCl) Total Nitrogen (N)	mg/kg				<5.0	5.0	A332639			
Available (KCl) Nitrite (N)	mg/kg				<2.0	2.0	A332635			
Soluble Parameters										
Soluble pH	pH	7.55	N/A	A329511						
Soluble Nitrite (N)	mg/L				15	2.0	A332620			
Saturation %	%	57	N/A	A329748	61	N/A	A329748			
Physical Properties										
Liquid Limit	wt%							74	1.0	A345099
Plastic Limit	wt%							23	1.0	A345099
Plasticity Index	wt%							51	1.0	A345099

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

BV Labs Job #: C161131
Report Date: 2021/09/08

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF Lab
Your P.O. #: W02866
Sampler Initials: AS

PHYSICAL TESTING (SOIL)

BV Labs ID		AEG340		
Sampling Date		2021/08/19 17:00		
COC Number		40205		
	UNITS	21-08-51	RDL	QC Batch
Physical Properties				
Moisture	%	15	0.30	A329073
RDL = Reportable Detection Limit				

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

BV Labs Job #: C161131
Report Date: 2021/09/08

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF Lab
Your P.O. #: W02866
Sampler Initials: AS

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		AEG339		
Sampling Date		2021/08/19 17:00		
COC Number		40205		
	UNITS	21-08-50	RDL	QC Batch
Elements				
Total Aluminum (Al)	mg/kg	22000	10	A332811
Total Boron (B)	mg/kg	13	2.0	A332811
Total Calcium (Ca)	mg/kg	15000	50	A332811
Total Iron (Fe)	mg/kg	27000	10	A332811
Total Lithium (Li)	mg/kg	19	10	A332811
Total Magnesium (Mg)	mg/kg	12000	20	A332811
Total Manganese (Mn)	mg/kg	780	10	A332811
Total Phosphorus (P)	mg/kg	620	20	A332811
Total Potassium (K)	mg/kg	4400	25	A332811
Total Sodium (Na)	mg/kg	160	50	A332811
Total Strontium (Sr)	mg/kg	52	10	A332811
Total Sulphur (S)	mg/kg	370	20	A332811
Total Antimony (Sb)	mg/kg	<0.50	0.50	A332808
Total Arsenic (As)	mg/kg	10	1.0	A332808
Total Barium (Ba)	mg/kg	180	1.0	A332808
Total Beryllium (Be)	mg/kg	0.99	0.40	A332808
Total Cadmium (Cd)	mg/kg	0.47	0.050	A332808
Total Chromium (Cr)	mg/kg	35	1.0	A332808
Total Cobalt (Co)	mg/kg	12	0.50	A332808
Total Copper (Cu)	mg/kg	29	1.0	A332808
Total Lead (Pb)	mg/kg	13	0.50	A332808
Total Mercury (Hg)	mg/kg	<0.050	0.050	A332808
Total Molybdenum (Mo)	mg/kg	<0.40	0.40	A332808
Total Nickel (Ni)	mg/kg	35	1.0	A332808
Total Selenium (Se)	mg/kg	<0.50	0.50	A332808
Total Silver (Ag)	mg/kg	<0.20	0.20	A332808
Total Thallium (Tl)	mg/kg	0.34	0.10	A332808
Total Tin (Sn)	mg/kg	<1.0	1.0	A332808
Total Uranium (U)	mg/kg	1.2	0.20	A332808
Total Vanadium (V)	mg/kg	69	1.0	A332808
Total Zinc (Zn)	mg/kg	92	10	A332808
RDL = Reportable Detection Limit				

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

BV Labs Job #: C161131
Report Date: 2021/09/08

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF Lab
Your P.O. #: W02866
Sampler Initials: AS

GENERAL COMMENTS

Sample AEG341 [21-08-52] : The <425 micron fraction was 86.5 wt% of the entire sample.

Results relate only to the items tested.

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

BV Labs Job #: C161131
Report Date: 2021/09/08

QUALITY ASSURANCE REPORT

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF Lab
Your P.O. #: W02866
Sampler Initials: AS

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A329073	Moisture	2021/08/24					<0.30	%	5.4	20		
A329511	Soluble pH	2021/08/24			100	97 - 103			0.38	N/A	100	98 - 102
A329748	Saturation %	2021/08/24							1.7	12	103	75 - 125
A332620	Soluble Nitrite (N)	2021/08/27	103	75 - 125	104	80 - 120	<0.20	mg/L	NC	30		
A332635	Available (KCl) Nitrite (N)	2021/08/27	104	75 - 125	104	80 - 120	<2.0	mg/kg	NC	20		
A332639	Available (KCl) Total Nitrogen (N)	2021/08/30	101	75 - 125	99	80 - 120	<5.0	mg/kg	NC	N/A	98	80 - 120
A332647	Available (NH4F) Phosphorus (P)	2021/08/26	104	75 - 125	105	80 - 120	<1.0	mg/kg	4.2	35		
A332808	Total Antimony (Sb)	2021/08/26	105	75 - 125	111	80 - 120	<0.50	mg/kg	NC	30	132	15 - 182
A332808	Total Arsenic (As)	2021/08/26	94	75 - 125	103	80 - 120	<1.0	mg/kg	NC	30	110	53 - 147
A332808	Total Barium (Ba)	2021/08/26	132 (1)	75 - 125	108	80 - 120	<1.0	mg/kg	1.0	35	107	80 - 119
A332808	Total Beryllium (Be)	2021/08/26	104	75 - 125	110	80 - 120	<0.40	mg/kg	NC	30		
A332808	Total Cadmium (Cd)	2021/08/26	100	75 - 125	105	80 - 120	<0.050	mg/kg	NC	30	109	72 - 128
A332808	Total Chromium (Cr)	2021/08/26	103	75 - 125	104	80 - 120	<1.0	mg/kg	15	30	105	59 - 141
A332808	Total Cobalt (Co)	2021/08/26	98	75 - 125	106	80 - 120	<0.50	mg/kg	7.5	30	105	58 - 142
A332808	Total Copper (Cu)	2021/08/26	96	75 - 125	108	80 - 120	<1.0	mg/kg	2.2	30	109	83 - 117
A332808	Total Lead (Pb)	2021/08/26	100	75 - 125	106	80 - 120	<0.50	mg/kg	5.0	35	120	79 - 121
A332808	Total Mercury (Hg)	2021/08/26	100	75 - 125	108	80 - 120	<0.050	mg/kg	NC	35		
A332808	Total Molybdenum (Mo)	2021/08/26	105	75 - 125	110	80 - 120	<0.40	mg/kg	NC	35	121	67 - 133
A332808	Total Nickel (Ni)	2021/08/26	98	75 - 125	105	80 - 120	<1.0	mg/kg	3.6	30	113	79 - 121
A332808	Total Selenium (Se)	2021/08/26	98	75 - 125	107	80 - 120	<0.50	mg/kg	NC	30		
A332808	Total Silver (Ag)	2021/08/26	101	75 - 125	108	80 - 120	<0.20	mg/kg	NC	35	113	47 - 153
A332808	Total Thallium (Tl)	2021/08/26	98	75 - 125	105	80 - 120	<0.10	mg/kg	NC	30		
A332808	Total Tin (Sn)	2021/08/26	101	75 - 125	106	80 - 120	<1.0	mg/kg	NC	35	111	67 - 133
A332808	Total Uranium (U)	2021/08/26	104	75 - 125	112	80 - 120	<0.20	mg/kg	8.2	30	103	77 - 123
A332808	Total Vanadium (V)	2021/08/26	109	75 - 125	105	80 - 120	<1.0	mg/kg	3.1	30	112	79 - 121
A332808	Total Zinc (Zn)	2021/08/26	94	75 - 125	101	80 - 120	<10	mg/kg	NC	30	108	79 - 121
A332811	Total Aluminum (Al)	2021/08/28	NC	75 - 125	100	80 - 120	<10	mg/kg	22	35	105	74 - 126
A332811	Total Boron (B)	2021/08/28	113	75 - 125	105	80 - 120	<2.0	mg/kg	NC	30	70	70 - 130
A332811	Total Calcium (Ca)	2021/08/28	NC	75 - 125	100	80 - 120	<50	mg/kg	13	30	98	85 - 115
A332811	Total Iron (Fe)	2021/08/28	NC	75 - 125	99	80 - 120	<10	mg/kg	35 (1)	30	100	78 - 122
A332811	Total Lithium (Li)	2021/08/28	113	75 - 125	109	80 - 120	<10	mg/kg	NC	30		
A332811	Total Magnesium (Mg)	2021/08/28	110	75 - 125	104	80 - 120	<20	mg/kg	14	30	105	74 - 126

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

BV Labs Job #: C161131
Report Date: 2021/09/08

QUALITY ASSURANCE REPORT(CONT'D)

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF Lab
Your P.O. #: W02866
Sampler Initials: AS

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A332811	Total Manganese (Mn)	2021/08/28	NC	75 - 125	110	80 - 120	<10	mg/kg	29	30	113	76 - 124
A332811	Total Phosphorus (P)	2021/08/28	102	75 - 125	95	80 - 120	<20	mg/kg	22	30	93	82 - 118
A332811	Total Potassium (K)	2021/08/28	109	75 - 125	98	80 - 120	<25	mg/kg	25	35	84	55 - 145
A332811	Total Sodium (Na)	2021/08/28	104	75 - 125	100	80 - 120	<50	mg/kg	NC	35	94	61 - 138
A332811	Total Strontium (Sr)	2021/08/28	99	75 - 125	104	80 - 120	<10	mg/kg	23	35	107	75 - 123
A332811	Total Sulphur (S)	2021/08/28	98	75 - 125	94	80 - 120	<20	mg/kg	41 (1)	30	94	72 - 128

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

BV Labs Job #: C161131
Report Date: 2021/09/08

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF Lab
Your P.O. #: W02866
Sampler Initials: AS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Patrick (Pat) Aberle, Laboratory Supervisor - Tailings

Sandy Yuan, M.Sc., QP, Scientific Specialist

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

908

Custody Tracking Form

W40205-H

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form has a barcode or a Bureau Veritas eCOC confirmation number in the top right hand side. This number links your electronic submission to your samples. This form should be placed in the cooler with your samples.

First Sample: 21-08-50
Last Sample: 21-08-52
Sample Count: 3

Relinquished By				Received By			
Aaron Stechesen		Date	2021/08/20	Brooklyn Hiebert	BH	Date	2021/08/20
		Time (24 HR)	09:30 AM			Time (24 HR)	1415
		Date		Maria Mann		Date	2021/08/21
		Time (24 HR)				Time (24 HR)	10:20
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print): Aaron Stechesen

# of Coolers/Pkgs: 2

Rush ☐ Immediate Test ☐ Food Residue ☐

Micro ☐ Food Chemistry ☐

*** LABORATORY USE ONLY ***

Received At: 20-Aug-21 14:15

Labeled By: Customer Solutions

Verified By: C161131

KMV INS-0176

Lab Comments:

MAV 2021 08/2

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
		Y	6.9	9.1	2.3
		Y	7.9	4.3	6.7
~~Y~~	~~Y~~	ACTR			
Drinking Water Metals Preservation Check Done (Circle)				YES	NO

COR FCD-00383/3

Page 1 of 1

eCOC: W40205

Project Information: C161131
Job Received: 2021/08/20 14:15
Results Required By: 2021/08/27 13:00
Expected Arrival: 2021/08/20 13:00
Submitted By: Aaron Stechesen
Submitted To: Winnipeg

Invoice Information

Attn: Aaron Stechesen
CITY OF PORTAGE LA PRAIRIE
97 SASKATCHEWAN AVE E.
PORTAGE LA PRAIRIE , MB , R1N 0L8
Email to:
astechesen@city-plap.com

Report Information

Attn: Aaron Stechesen
CITY OF PORTAGE LA PRAIRIE
400 River Road
Portage la Prairie , MB , R1N 3V6
Email to:
astechesen@city-plap.com

Project Information

Quote #: C10414
PO/AFE#: W02866
Project #:
Site Location: WPCF Lab

Analytical Summary

A: 2021/08/27 13:00

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Heavy Metals	Atterberg Limits (Dry)	Available(10:1) Wet NO2 (N);NO2(N)+NO3(N)	Moisture	Nitrite-N and Nitrate-N (soluble)	Nitrogen (Total Available)	NO3 (N) Available (10:1) Wet	PH @25C (Soluble)	Phosphorus (Available by ICP)	Soluble Paste	Set Number
21-08-50	1	2021/08/19 17:00	SOIL	4	A							A	A	A	1
21-08-51	2	2021/08/19 17:00	SOIL	6			A	A	A	A	A			A	2
21-08-52	3	2021/08/19 17:00	SOIL	1		A									3

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.

Submission Information

# of Samples: 3

Sample Set Listing

Set 1 (1 sample)	Set 2 (1 sample)	Set 3 (1 sample)
21-08-50	21-08-51	21-08-52

Your P.O. #: W02866
Site Location: WPCF LAB
Your C.O.C. #: 40130

Attention: Aaron Stechesen

CITY OF PORTAGE LA PRAIRIE
97 SASKATCHEWAN AVE E.
PORTAGE LA PRAIRIE, MB
Canada R1N 0L8

Report Date: 2021/08/27
Report #: R3064211
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C160632
Received: 2021/08/18, 13:00

Sample Matrix: Waste Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Conductivity @25C	1	N/A	2021/08/23	AB SOP-00005	SM 23 2510 B m
Conductivity @25C	2	N/A	2021/08/24	AB SOP-00004	SM 23 2510 B m
Hardness Total (calculated as CaCO3) (2)	3	N/A	2021/08/27	BBY WI-00033	Auto Calc
Mercury (Total) by CV	3	2021/08/25	2021/08/26	AB SOP-00084	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	3	2021/08/19	2021/08/27		Auto Calc
Elements by CRC ICPMS (total)	3	2021/08/24	2021/08/27	CAL SOP-00265	EPA 6020 m
Ammonia-N (Total)	3	N/A	2021/08/26	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate and Nitrite	3	N/A	2021/08/25		Auto Calc
NO2 (N); NO2 (N) + NO3 (N) in Water	3	N/A	2021/08/23	AB SOP-00091	SM 23 4500 NO3m
Nitrate (as N)	3	2021/08/19	2021/08/25		Auto Calc
pH @25°C (3)	1	N/A	2021/08/23	AB SOP-00005	SM 23 4500-H+B m
pH @25C (3)	2	N/A	2021/08/25	AB SOP-00006	SM 23 4500 H+B m
Total Kjeldahl Nitrogen (Total)	3	N/A	2021/08/25	BBY WI-00033	Auto Calc
Nitrogen (Total)	3	2021/08/24	2021/08/24	AB SOP-00093	SM 23 4500-N C m
Total Phosphorus	3	2021/08/24	2021/08/25	AB SOP-00024	SM 23 4500-P A,B,F m
Total Solids (1)	3	N/A	2021/08/24	BBY6SOP-00035	SM 23 2540 B
Total Solids (Fixed and Volatile) (1)	3	2021/08/23	2021/08/24	BBY6SOP-00035	SM 23 2540 E

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your P.O. #: W02866
Site Location: WPCF LAB
Your C.O.C. #: 40130

Attention: Aaron Stechesen

CITY OF PORTAGE LA PRAIRIE
97 SASKATCHEWAN AVE E.
PORTAGE LA PRAIRIE, MB
Canada R1N 0L8

Report Date: 2021/08/27
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CERTIFICATE OF ANALYSIS

BV LABS JOB #: C160632
Received: 2021/08/18, 13:00

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Vancouver

(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

(3) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
27 Aug 2021 13:27:31

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bureauveritas.com
Phone# (403) 291-3077

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160632
Report Date: 2021/08/27

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF LAB
Your P.O. #: W02866

RESULTS OF CHEMICAL ANALYSES OF WASTE WATER

BST BVF URAR

BV Labs ID		AEC607			AEC608			AEC609		
Sampling Date		2021/08/17 10:00			2021/08/17 11:30			2021/08/17 11:30		
COC Number		40130			40130			40130		
	UNITS	21-08-47	RDL	QC Batch	21-08-48	RDL	QC Batch	21-08-49	RDL	QC Batch
Calculated Parameters										
Total Hardness (CaCO3)	mg/L	2640	0.50	A325868	2030	0.50	A325868	2240	0.50	A325868
Dissolved Nitrate (N)	mg/L	<0.050	0.050	A325779	<0.050	0.050	A325779	<0.010	0.010	A325779
Dissolved Nitrate (NO3)	mg/L	<0.22	0.22	A326828	<0.22	0.22	A325777	<0.044	0.044	A325777
Dissolved Nitrite (NO2)	mg/L	<0.16	0.16	A326828	<0.16	0.16	A325777	<0.033	0.033	A325777
Total Total Kjeldahl Nitrogen (Calc)	mg/L	1190	200	A324836	642	200	A324836	264	200	A324836
Misc. Inorganics										
Conductivity	uS/cm	5800	1.0	A329695	4800	1.0	A329695	3400	2.0	A328742
pH	pH	7.33	N/A	A331813	7.17	N/A	A331813	7.39	N/A	A328740
Total Solids (Fixed)	mg/L	12900 (1)	13	A328992	10600	10	A328992	26800	10	A328992
Total Solids (Volatile)	mg/L	26900 (1)	13	A328992	13800	10	A328992	28400	10	A328992
Total Solids	mg/L	39800	13	A328992	24400	10	A328992	55200	10	A328992
Total Residue	mg/L	40000 (1)	13	A328984	24000	10	A328984	55000	10	A328984
Nutrients										
Total Ammonia (N)	mg/L	460	4.5	A332594	260	3.0	A332594	180	1.5	A332594
Total Phosphorus (P)	mg/L	330 (2)	15	A329673	93 (2)	15	A329673	26 (2)	15	A329673
Dissolved Nitrite (N)	mg/L	<0.050 (3)	0.050	A328793	<0.050 (3)	0.050	A329208	<0.010	0.010	A328793
Dissolved Nitrate plus Nitrite (N)	mg/L	<0.050 (3)	0.050	A328793	<0.010	0.010	A329208	<0.010	0.010	A328793
Total Nitrogen (N)	mg/L	1200 (2)	200	A329322	640 (2)	200	A329322	260 (2)	200	A329322

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) RDL raised due to high concentration of solids in the sample.
(2) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.
(3) Detection limits raised due to matrix interference.

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BV Labs Job #: C160632
Report Date: 2021/08/27

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF LAB
Your P.O. #: W02866

MERCURY BY COLD VAPOR (WASTE WATER)

BV Labs ID		AEC607		AEC608		AEC609		
Sampling Date		2021/08/17 10:00		2021/08/17 11:30		2021/08/17 11:30		
COC Number		40130		40130		40130		
	UNITS	21-08-47	RDL	21-08-48	RDL	21-08-49	RDL	QC Batch
Elements								
Total Mercury (Hg)	ug/L	0.577	0.019	6.8	1.9	0.030	0.019	A331054
RDL = Reportable Detection Limit								

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BV Labs Job #: C160632
Report Date: 2021/08/27

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF LAB
Your P.O. #: W02866

ELEMENTS BY ATOMIC SPECTROSCOPY (WASTE WATER)

BV Labs ID		AEC607	AEC608	AEC609		
Sampling Date		2021/08/17 10:00	2021/08/17 11:30	2021/08/17 11:30		
COC Number		40130	40130	40130		
	UNITS	21-08-47	21-08-48	21-08-49	RDL	QC Batch
Total Metals by ICPMS						
Total Cadmium (Cd)	ug/L	28.8	81.7	139	0.060	A329785
Total Chromium (Cr)	ug/L	629	641	971	6.0	A329785
Total Copper (Cu)	ug/L	9540	6160	7440	3.0	A329785
Total Lead (Pb)	ug/L	270	282	398	1.2	A329785
Total Nickel (Ni)	ug/L	619	1040	1670	6.0	A329785
Total Zinc (Zn)	ug/L	9790	18400	28800	30	A329785
Total Potassium (K)	mg/L	208	310	387	0.30	A324742
RDL = Reportable Detection Limit						

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GENERAL COMMENTS

Sample AEC607 [21-08-47] : Sample was analyzed past method specified hold time for NO2 (N); NO2 (N) + NO3 (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AEC608 [21-08-48] : Sample was analyzed past method specified hold time for NO2 (N); NO2 (N) + NO3 (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AEC609 [21-08-49] : Sample was analyzed past method specified hold time for NO2 (N); NO2 (N) + NO3 (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

ELEMENTS BY ATOMIC SPECTROSCOPY (WASTE WATER) Comments

Sample AEC607 [21-08-47] Elements by CRC ICPMS (total): Detection limits raised due to sample matrix.
Sample AEC608 [21-08-48] Elements by CRC ICPMS (total): Detection limits raised due to sample matrix.
Sample AEC609 [21-08-49] Elements by CRC ICPMS (total): Detection limits raised due to sample matrix.

Results relate only to the items tested.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160632
Report Date: 2021/08/27

QUALITY ASSURANCE REPORT

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF LAB
Your P.O. #: W02866

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A328740	pH	2021/08/23			99	97 - 103			0.64	N/A		
A328742	Conductivity	2021/08/23			102	90 - 110	<2.0	uS/cm	0	10		
A328793	Dissolved Nitrate plus Nitrite (N)	2021/08/23	96	80 - 120	102	80 - 120	<0.010	mg/L	NC	20		
A328793	Dissolved Nitrite (N)	2021/08/23	94	80 - 120	103	80 - 120	<0.010	mg/L	NC	20		
A328984	Total Residue	2021/08/24			101	80 - 120	<10	mg/L	0.88	20		
A328992	Total Solids (Fixed)	2021/08/24					<10	mg/L	0.87	20		
A328992	Total Solids (Volatile)	2021/08/24			124 (1)	80 - 120	<10	mg/L	0.87	20		
A328992	Total Solids	2021/08/24			96	80 - 120	<10	mg/L	0.87	20		
A329208	Dissolved Nitrate plus Nitrite (N)	2021/08/23	112	80 - 120	103	80 - 120	<0.010	mg/L	0.71	20		
A329208	Dissolved Nitrite (N)	2021/08/23	96	80 - 120	103	80 - 120	<0.010	mg/L	0.53	20		
A329322	Total Nitrogen (N)	2021/08/24	102	80 - 120	91	80 - 120	<0.020	mg/L	1.4	20	81	80 - 120
A329673	Total Phosphorus (P)	2021/08/26	110	80 - 120	91	80 - 120	<0.0030	mg/L	1.2	20	90	80 - 120
A329695	Conductivity	2021/08/24			101	90 - 110	<1.0	uS/cm	NC	20		
A329785	Total Cadmium (Cd)	2021/08/26	102	80 - 120	105	80 - 120	<0.010	ug/L	NC	20		
A329785	Total Chromium (Cr)	2021/08/26	109	80 - 120	112	80 - 120	<1.0	ug/L	NC	20		
A329785	Total Copper (Cu)	2021/08/26	106	80 - 120	110	80 - 120	<0.50	ug/L	2.1	20		
A329785	Total Lead (Pb)	2021/08/26	99	80 - 120	104	80 - 120	<0.20	ug/L	NC	20		
A329785	Total Nickel (Ni)	2021/08/26	107	80 - 120	112	80 - 120	<1.0	ug/L	2.8	20		
A329785	Total Zinc (Zn)	2021/08/26	110	80 - 120	112	80 - 120	<5.0	ug/L	NC	20		
A331054	Total Mercury (Hg)	2021/08/25	95	80 - 120	99	80 - 120	<0.0019	ug/L	NC	20		
A331813	pH	2021/08/25			100	97 - 103			0	N/A		
A332594	Total Ammonia (N)	2021/08/26	100	80 - 120	102	80 - 120	<0.015	mg/L	NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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BV Labs Job #: C160632
Report Date: 2021/08/27

CITY OF PORTAGE LA PRAIRIE
Site Location: WPCF LAB
Your P.O. #: W02866

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

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Custody Tracking Form

W40130

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form has a barcode or a Bureau Veritas eCOC confirmation number in the top right hand side. This number links your electronic submission to your samples. This form should be placed in the cooler with your samples.

First Sample: 21-08-47
Last Sample: 21-08-49
Sample Count: 3

Relinquished By				Received By			
Aaron Stechesen		Date	2021/08/18	Brooklyn Hiebert	BH	Date	2021/08/18
		Time (24 HR)	09:30AM			Time (24 HR)	1300
		Date		Maria Mann		Date	2021/08/19
		Time (24 HR)				Time (24 HR)	0850
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print): Aaron Stechesen

# of Coolers/Pkgs: 1

Rush ☐ Immediate Test ☐ Food Residue ☐

Micro ☐ Food Chemistry ☐

***** LABORATORY USE ONLY *****

Received At

Labeled By

Verified By

Lab Comments: C160632

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
N	N	Y	7.7	2.8	4.7
U		ACTR			
Drinking Water Metals Preservation Check Done (Circle)				YES	NO

COR FCD-00383/3

Page 1 of 1

eCOC: W40130

Project Information:	C160632
Job Received:	2021/08/19 19:27
Results Required By:	2021/08/25 13:00
Expected Arrival:	2021/08/18 13:00
Submitted By:	Michelle Rivest (Hospedales)
Submitted To:	Winnipeg

Invoice Information

Attn: Aaron Stechesen
CITY OF PORTAGE LA PRAIRIE
97 SASKATCHEWAN AVE E.
PORTAGE LA PRAIRIE , MB , R1N 0L8
Email to:
astechesen@city-plap.com

Report Information

Attn: Aaron Stechesen
CITY OF PORTAGE LA PRAIRIE
400 River Road
Portage la Prairie , MB , R1N 3V6
Email to:
astechesen@city-plap.com

Project Information

Quote #:	C10414
PO/AFE#:	W02866
Project #:	
Site Location:	WPCF Lab

Analytical Summary

A: 2021/08/25 13:00

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Total Kjeldahl Nitrogen (Total)	Heavy Metals (Water)	Ammonia-N (Total)	Conductivity @25C	PH @25°C	Total Phosphorus	Total Solids	Total Solids (Fixed and Volatile)
21-08-47	1	2021/08/17 10:00	WASTE WATER	3	A	A	A	A	A	A	A	A
21-08-48	2	2021/08/17 11:30	WASTE WATER	3	A	A	A	A	A	A	A	A
21-08-49	3	2021/08/17 11:30	WASTE WATER	3	A	A	A	A	A	A	A	A

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.

Submission Information

# of Samples: 3

Details: Please proceed with analysis. Client is aware bottles submitted are not correct for requested analysis.

Delta Ag Services
City of Portage
Westroc 28-12-08

Test Date: Aug 19, 2021

Clay Test - 2.3 Ac
Soil Sample pts 2021
Portage Soils-Clip - 643.5 Ac
28-12-08 - 643.8 Ac

Clay Test Site1: had no detectable water table at the 1.5m depth.

Delta Ag SERVICES