APPENDIX

G HERITAGE RESOURCE IMPACT ASSESSMENT DRAFT

HERITAGE RESOURCE IMPACT ASSESSMENT
BOISSEVAIN WASTEWATER TREATMENT LAGOON UPGRADES
SE 23-03-20 & NW 14-03-20 WPM
MUNICIPALITY OF BOISSEVAIN-MORTON

Heritage Permit A144-24

AAS-24-22073 & AAS-24-22074

WSP# CA0017817.1877

Prepared For:

WSP CANADA INC.

c/o Jason Bunn, P. Eng

1600 Buffalo Place

Winnipeg MB, R3T 6B8

Prepared by:

NORTH ROOTS RESEARCH

15080-Rd 31W

Stanley, MB. R6T 0B4

December 4, 2024

North Roots Research
Historical & Genealogical Services

EXECUTIVE SUMMARY

The Municipality of Boissevain-Morton is proposing the upgrading and expansion of the existing Boissevain wastewater treatment lagoon (WWTL) located in part of SE 23-03-20 WPM. The Municipality has contracted WSP Canada Inc. ('WSP') to undertake studies to prepare an Environment Act Proposal. The upgrades to the existing facility include relining and upgrading the existing facultative secondary cell to an aerated primary cell, the construction of a new primary aerated cell and two SAGR cells, a new operations building, a chemical dosing system, a new outfall into Cherry Creek, and upgrading the raw wastewater lift station. The expansion and relining will require using a 1.0 m thick clay liner which will be sourced from a borrow area located in NW 14-03-20 WPM. WSP conducted geotechnical investigations in May 2024, and the resulting conductivities meet requirements, therefore confirming it as the preferred borrow source area. Upon approvals and issuance of an Environment Act Licence, tendering and construction is planned to begin in Summer 2025.

The project was screened by the Historic Resources Branch (HRB) (AAS-24-22073 and AAS-24-22074) as having potential for the presence of heritage resources in both the lagoon and borrow source area due to their proximity to corridors of Cherry Creek, tributaries and wetlands. Therefore, a Heritage Resource Impact Assessment (HRIA) is required to ensure heritage resources will not be impacted through construction and development under Section 12(2) of *The Heritage Resources Act* (1986).

North Roots Research was contracted by WSP to conduct the HRIA for the project. The archaeological assessment of the subject properties occurred on October 8 & 9, 2024 under Manitoba Heritage Permit A144-24. Methods consisted of a systematic pedestrian survey and a judgmental shovel testing program. The HRB had requested the shovel testing programs of 10-20 tests in the lagoon expansion area and 15-25 in the proposed borrow area depending on the extent of findings. A total of 25 subsurface tests were placed across both properties.

The HRIA of the proposed properties did not result in the discovery of heritage resources. **Based on the results of the HRIA, the recommendation is made that heritage clearance be granted for the project.**

The recommendations and comments presented in this report are those of the author and are subject to evaluation by the HRB. The discovery of heritage resources may occur during the construction phase of any proposed development. In these cases, the discovery of heritage resources should be reported immediately to the HRB to determine strategies for on-site assessment. In the event that human remains, or suspected human remains, are encountered, the local RCMP detachment and the HRB must be contacted immediately.

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Project Personnel

Project Manager & Permit Holder	Lisa C. Bobbie, M.A.
Archaeological Field Technicians	Derek R. Bobbie, B.Sc, BaCE
Report Preparation	Lisa C. Bobbie
	Derek R. Bobbie
GIS Mapping	Lisa C. Bobbie

1.0 INTRODUCTION

The Municipality of Boissevain-Morton is proposing the upgrading and expansion of the existing Boissevain wastewater treatment lagoon (WWTL) located in part of SE 23-03-20 WPM. The Municipality has contracted WSP Canada Inc. ('WSP') to undertake studies to prepare an Environment Act Proposal (EAP) in order to receive a new licence for the upgrades. The expansion and relining will require using a 1.0 m thick clay liner which will be sourced from a borrow area located in NW 14-03-20 WPM. WSP conducted geotechnical investigations in May 2024, and the resulting conductivities of the materials meet requirements, therefore confirming it as the preferred borrow source area. Upon approvals and issuance of an Environment Act Licence (EAL), tendering and construction is planned to begin in Summer 2025.

The project was screened by the Historic Resources Branch (AAS-24-22073 and AAS-24-22074) as having potential for the presence of heritage resources in both the lagoon and borrow source area due to their proximity to corridors of Cherry Creek, tributaries and wetlands. Therefore, a Heritage Resource Impact Assessment (HRIA) is required to ensure heritage resources will not be impacted through construction and development under Section 12(2) of *The Heritage Resources Act* (1986).

North Roots Research was contracted by WSP to conduct the HRIA on a 2.8 ha area in SE 23-03-20 WPM and 10.1 ha area in NW 14-03-20 WPM for the project to determine if heritage resources are located within the development's boundary and to assess any potential impact to heritage resources during development activities.

1.1 PROJECT OVERVIEW

The Municipality of Boissevain-Morton has an existing two-cell WWTL, located in the southeast quarter of 23-03-20 WPM. Llicence EAL No. 3415 was granted for the construction of a new lagoon north of the town; however, due to cost escalations, the Municipality has elected to upgrade the existing lagoon site, which requires the submission of a new EAP.

The upgrades to the existing facility include relining and upgrading the existing facultative secondary cell to an aerated primary cell, the construction of a new primary aerated cell and two SAGR cells, a new operations building, a chemical dosing system, a new outfall into Cherry Creek, and upgrading the raw wastewater lift station. The expansion and relining will require using a 1.0 m thick clay liner which will be sourced from a borrow area located in NW 14-03-20 WPM. The lagoon is located southwest of the town of Boissevain and is north of Municipal Road 15N and approximately 550 m west of the junction with PTH 10. The proposed borrow source area is approximately 1.6 kilometres west of PTH 10 and is located east of Municipal Road 116W (Figures 1 & 2).

The current landuse of the lagoon property is an open pastureland with pockets of lower-lying marshland. Cherry Creek is located immediately west of the lagoon expansion and runs in a westerly direction towards Whitewater Lake. Both properties are surrounded by agricultural fields, pastureland and marshland.

Figure 1. Project Location

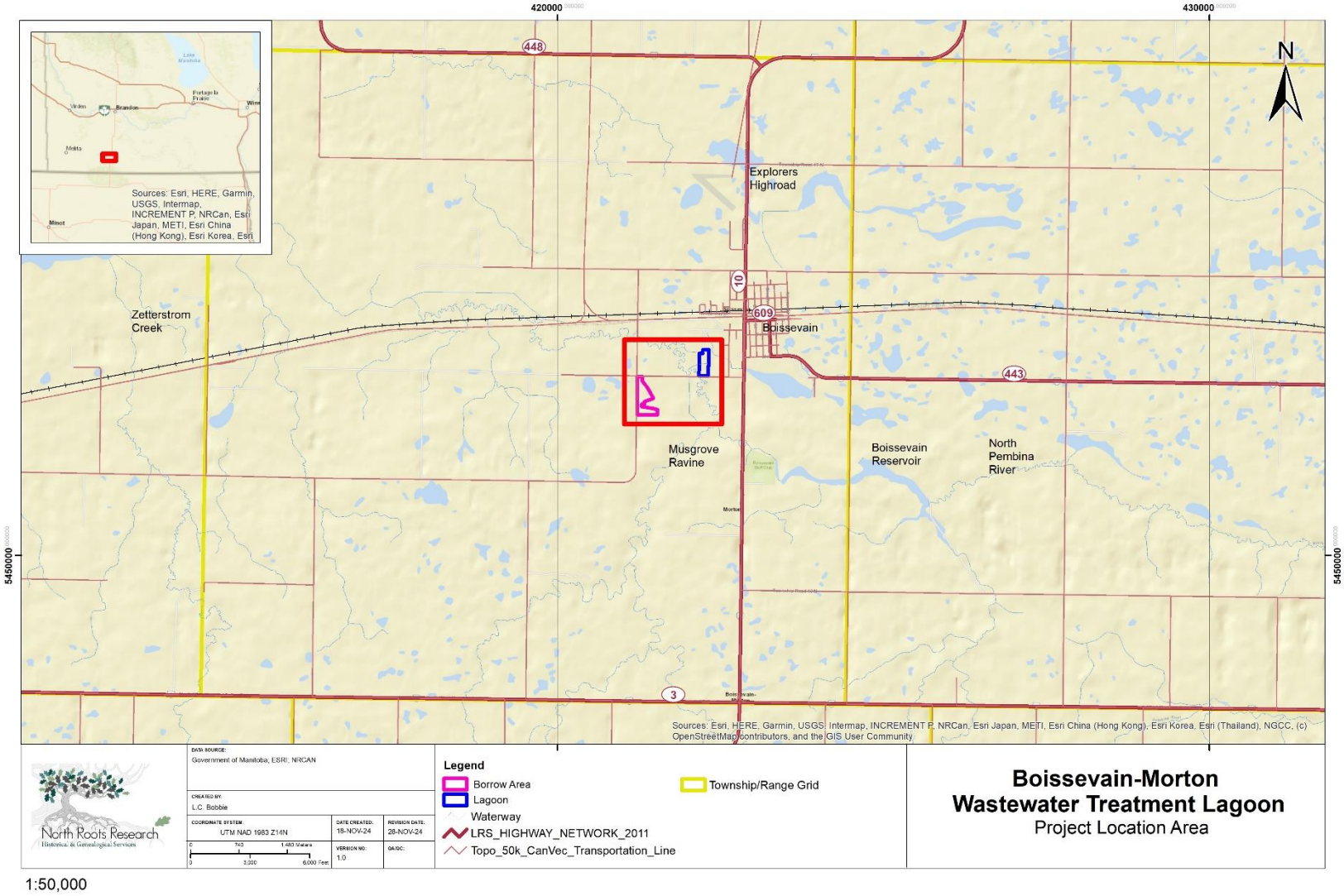
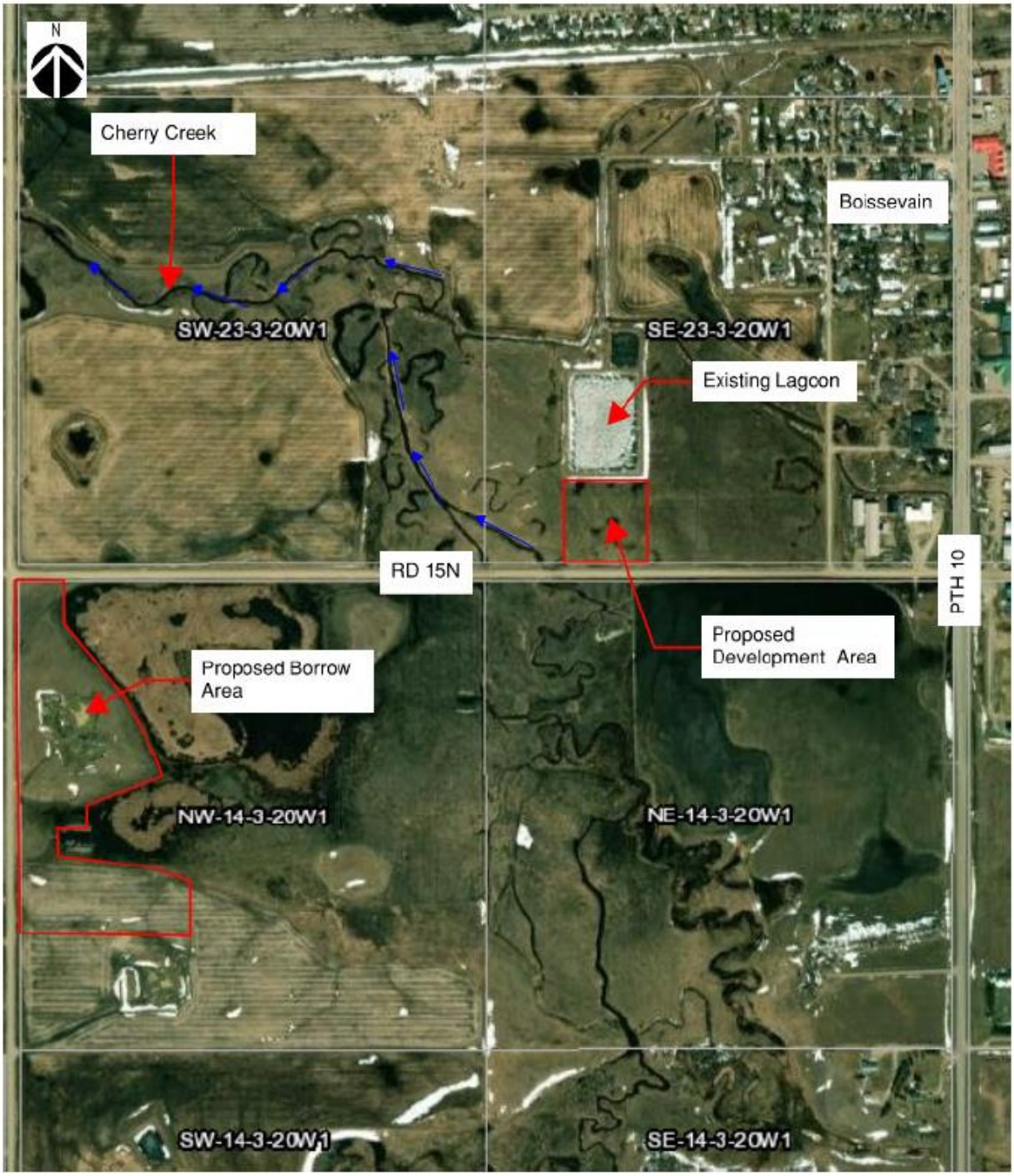


Figure 2. Location Map of Existing Lagoon, Proposed Lagoon Development and the Proposed Borrow Area (WSP Canada Inc. 2024)



2.0 BACKGROUND

The understanding of the heritage use and potential of a property begins with its environment. The environment shapes the type of human occupation and land use of an area. Major environmental factors, such as glaciers and glacial lakes, would affect the type of vegetation present which would then influence the presence of humans and animals to utilize these plant food sources. In addition, other types of natural resources such as rocks and minerals that could be utilized for tools and tool making may also influence occupation in conjunction with suitable habitation areas.

2.1 ENVIRONMENT

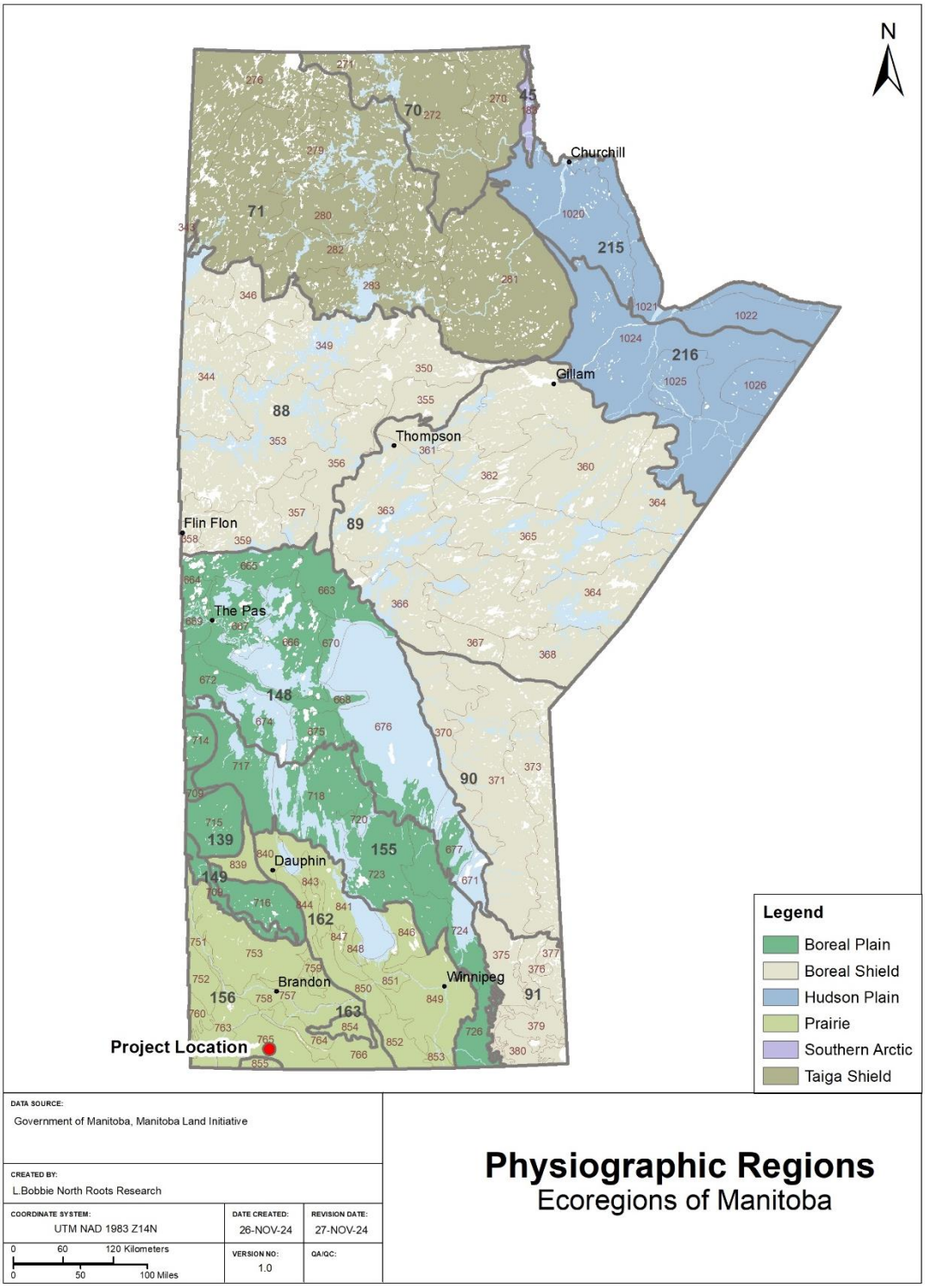
The project is situated southwest of Boissevain, located 73 km south of Brandon and 25 km north of the Canadian-American border. It is within the large Aspen Parkland Ecoregion (156) in the Prairie Ecozone (Figure 3). This ecoregion occupies the southwestern corner of the province and forms part of the extensive parkland belt between the closed boreal forest to the north and northeast and the treeless grasslands to the west. Smith et al. (1998:218) notes, in its native state, the landscape was a mosaic of trembling aspen and oak groves, mixed tall shrubs and rough fescue grasslands. The area now is predominantly agricultural lands and most of the natural vegetation has disappeared due to cultivation. The ecoregion slopes gently eastward and is drained by the Souris, Assiniboine, Qu'Appelle and Pembina rivers. These are undersized streams flowing in deeply incised broad valleys carved by glacial meltwaters.

More specifically, the study area falls within the Killarney Ecodistrict (765) which forms an arc around Turtle Mountain, starting and terminating at the International Boundary. The Ecodistrict is a dissected, level to very gently rolling morainal plain with elevations ranging from 460 masl to 580 masl. Intermittent creeks issue from deeply incised channels and gullies and are within the Hartney drainage division, part of the Souris River watershed.

Soils are well-drained Black Chernozemic soils developed on very strongly calcareous, loam to clay loam glacial till derived from local bedrock. Shale, limestone and granitic rock are predominant in the Ecodistrict (Smith et al 1998:238-239).

The nearby Turtle Mountains are the second highest range in Manitoba and are south of the study area. These were termed "The Blue Jewel of the Plain" by La Verendrye who documented them in 1738 (Boissevain's 75th Jubilee Special Committee:9).

Figure 3. Project Location Killarney Ecodistrict (765) and Aspen Parkland Ecoregion (156)



2.2 CULTURAL AND HISTORICAL BACKGROUND

The proposed development area lies within Treaty 2 lands (1871), which historically included the Ojibway (Saulteaux), Cree, Assiniboine and the Sioux, and are the traditional homelands of the Dakota, Anishinaabe, Anisininew, and Métis peoples.

Southwestern Manitoba is part of the Great Plains of North America. Human occupation and land use would have begun after deglaciation when the newly exposed landscape became habitable to humans as they migrated northward. A brief cultural chronology is presented below and is divided into the Precontact Period (12,000 – 300 yra[1]) and Contact Period (300-100 yra).

Precontact Period

The first human inhabitants arrived in the southwestern corner of Manitoba during the Palaeo Period (12,000-8,000 yra). These peoples were nomadic hunter-gatherers who tracked and hunted megafauna, such as the mammoth, using large lanceolate spear points. Cultural materials from this period are rare in Manitoba.

As the climate warmed during the Altithermal period, the once coniferous forest transitioned to grasslands encouraging herds of bison to migrate northwards. Several cultures depended upon the bison for their subsistence and expanded their spheres northward into southwestern Manitoba (Buchner 1990). This era, known as the Intensive Diversification Period (8,000 – 2,000 yra), represents a time of technological innovation with the use of atlatl darts and side-notched projectile points. These cultures exploited a more diverse resource base but still focused on big game hunting represented by the large communal bison kill sites. Extensive trade networks developed with agricultural village cultures to the south along the Missouri River, and to both coasts as evidenced by native copper from the Great Lakes and west coast marine shell artifacts found in Plains archaeological sites (Green 1998:34). High-quality raw materials for tools and weapons included Knife River Flint from North Dakota which were imported and traded into Manitoba during ancient times.

The next cultural phase which followed is known as the Woodland Period (2000 -300 yra) and is marked by the introduction of ceramics, the bow and arrow, bison pound structures and burial mounds (Syms 1977). These cultural groups had a broadly-based forest economy that included hunting a variety of large and small animals, fishing and gathering wild plant foods (Priess et al 1986). The Mound Builder culture, noted for their large and complex earthworks in southern Manitoba, flourished between 900 and 1,400 A.D. and are assigned to the Late Woodland Period, specifically the Blackduck and the Devil's Lake-Souisford complexes (Rempel 1994).

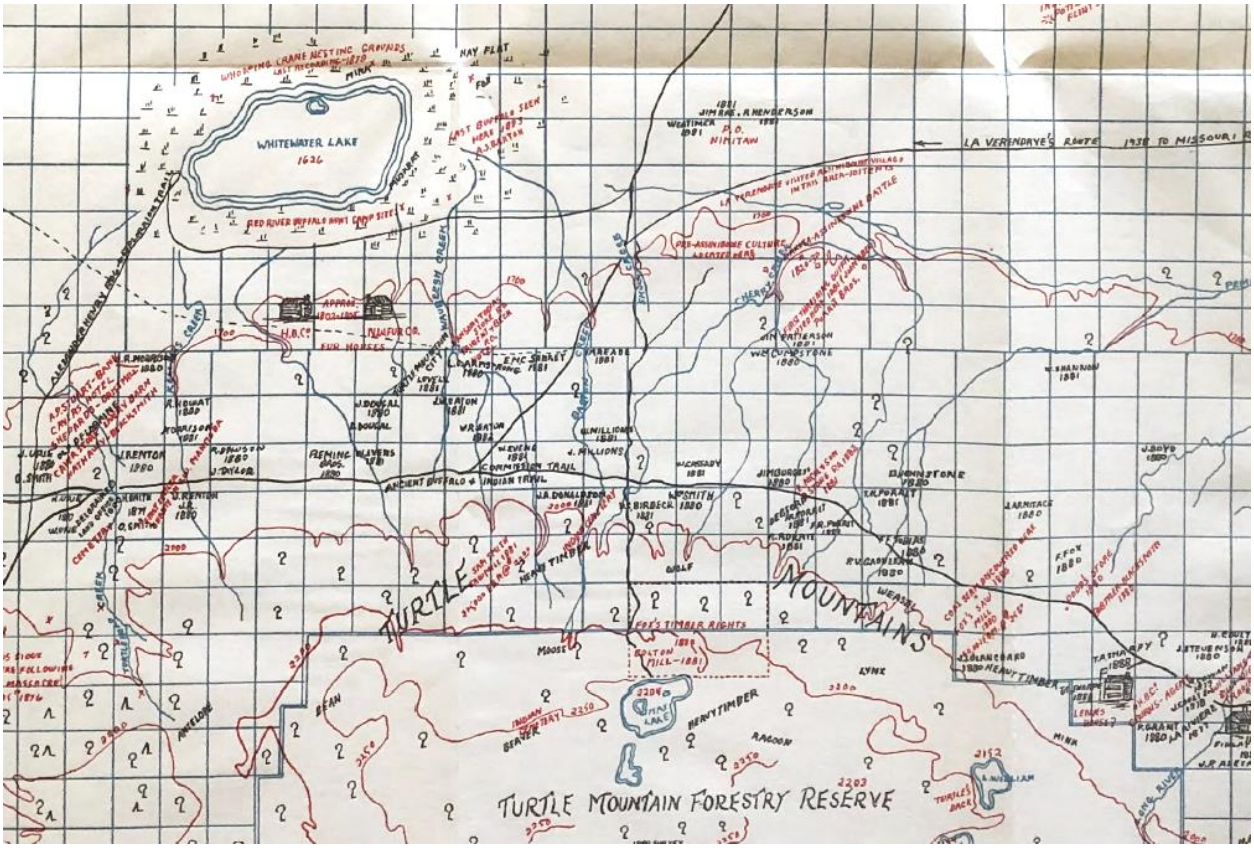
According to a local history book, stone hoes and pestles have been found near Cherry Creek, south and west of Boissevain, proving that agriculture had been practiced in the district by ancient cultures prior to the arrival of the Assiniboine to the area (Boissevain Special Committee on the 75th Jubilee 1956:16).

[1] Yra – years ago

Protocontact and Contact Period

The first European explorer to the area was La Verendrye in the 1730s on his journey to the Mandans (Boissevain and Morton Regional Library 1998). In 1809, Alexander Henry stated in his journal that between 8,000 to 10,000 Assiniboines lived in the Turtle Mountains and surrounding areas (Boissevain Special Committee on the 75th Jubilee 1956:17)(Figure 4). Noted avocational historian and archaeologist William Moncour wrote a driving tour guide for the Boissevain area. He notes that along 15N southwest of Cherry Creek, 'the last Aboriginal battle in southwestern Manitoba was fought in the 1850s when Assiniboine and Ojibway warriors made a surprise attack on a Dakota hunting party' (Boissevain and Morton Regional Library 1998). This was corroborated in a local history book, 'Beckoning Hills' published in 1956, which indicates the battle was fought in Musgrove Ravine which is located south of the town of Boissevain along Cherry Creek (Boissevain Special Committee on the 75th Jubilee 1956:189).

Figure 4. Excerpt from 'Map of Pioneer Settlement' (Boissevain Special Committee on the 75th Jubilee 1956)



The first homesteaders came to the area in the late 1870s and early 1880s and in 1885 the Canadian Pacific Railway (CPR) reached the townsite. Originally called Cherry Creek, the town was renamed after a prominent businessman and promoter of the CPR, Adolph Boissevain (Welch and Payne 2012).

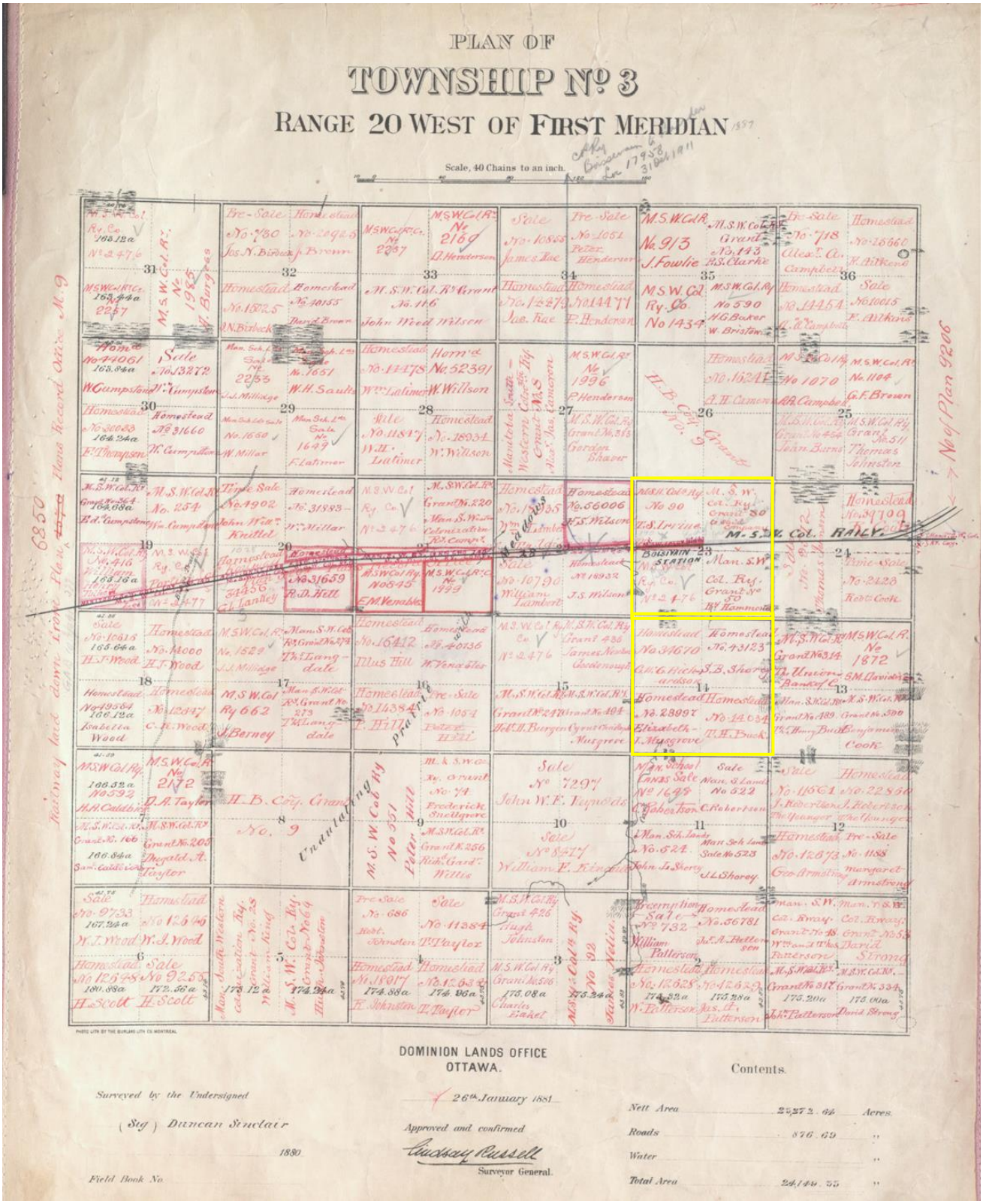
South of Boissevain in the Cherry Creek area, sandstone was quarried for many years from the ancient bed of a range of hills which were pushed back during the last glaciation. A large quarry known as the Musgrove

Ravine, was the location of the Shorey Quarry, from which stone for some of the early buildings in Boissevain was mined (Goldsborough 2021).

The original 1880 Dominion Land Survey township plan for the area was obtained from the Manitoba Archives (AM 1880) (Figure 5). On the survey plan it denotes the general area is 'Undulating Prairie with Meadows'. A historic cart trail, which may be the Mandan Trail, runs through the western boundary of the township in a north-south direction.

The original owners of the properties were, Henry Hammond who was granted ownership of the SE 23-03-20 WPM in 1889 and a George Wylie Gray Richardson the NW 14-03-20 WPM in 1906 (LAC 2022). Subsequent owners of SE 23-03-20 WPM were Wallace Hill in 1901, followed by C.A. Irvin in 1909 and then the Town of Boissevain. The NW 14-03-20 WPM was owned by William Merrill in 1900, the Shorey family in 1901, the Musgrove family in 1924, then Jacob Dyck in 1972.

Figure 5. Dominion Land Survey Township Maps 1880 (Archives of Manitoba); Sections 23 and 14 are highlighted in yellow



3.0 HERITAGE RESOURCE IMPACT ASSESSMENT

3.1 OVERVIEW

The purpose of the HRIA is to locate and document the presence or absence of heritage resources within a project area and interpret the site's context to help inform whether a site should be further mitigated or avoided. Heritage sites or archaeological sites within the province of Manitoba are protected under the *Heritage Resource Act* of 1986 (Government of Manitoba). Archaeological sites are resources which consist of objects, structures, or groups of objects that were abandoned in the past and are found in buried, submerged or surficial contexts. All registered archaeological sites in Canada are designated with a Borden Number, which is an alphanumeric code representing the location of the site and order in which it was discovered. Borden Number Blocks are measured in degrees and minutes Latitude and Longitude.

The archaeological assessment began with a review of existing archaeological sites in the general region. There are four registered archaeological sites within 2 km of the proposed project area. The sites consist of Precontact campsites and isolated finds of lithic tools. A summary of the sites can be found in Table 1.

Table 1: Listing of Known Archaeological Sites within 2 km Radius of the Study Area

Borden Number	Name	Site Type	Period	Description
DhMa-01	Musgrove Site	A. Campsite; D. Kill Site	Undetermined Precontact Period	Lithic tools and worked flakes within a 60ft area
DhMa-011	Buck's Hill Site	A. Campsite	Pelican Lake (3,300-1,850 yra) Avonlea (1,800-1,150 yra),	Lithic points, tools, pottery and flakes
DhMa-014	Dyck Site	A. Campsite	Woodland (2,000-350 yra)	Scatter of pottery sherds
DhMa-032	Boissevain Site	H. Uninterpreted	Undetermined Precontact Period	One end scraper, one small Medicine stone

3.2 FIELD INVESTIGATION

The HRIA investigation of the proposed properties occurred on October 8 and 9, 2024 under Heritage Permit A144-24. Field conditions were favourable with clear, sunny days and temperatures on average 10 degrees Celsius. The assessment was undertaken using a combination of pedestrian survey and judgemental shovel testing. The purpose of a pedestrian survey serves to locate surface evidence of archaeological sites, locate surface exposed artifacts, assess the heritage potential of the micro-topography, and evaluate the overall vegetation cover, disturbance, and surface visibility within the project area.

Investigation methods utilized hand-held GPS units (Garmin 78S) to record each pedestrian survey track and subsurface test location. Other relevant information was recorded in field notebooks and was photo-documented using a Nikon Coolpix W300 GPS camera. Subsurface tests were excavated via shovel and trowel. Where possible, soils are screened through 6 mm sized mesh; however, the densely packed hardpan soils were like concrete and had to be sorted through by hand using trowels. All excavated soils were

backfilled at the conclusion of each test. Details of each test recorded stratigraphy, size and location and the data was then entered into an Excel spreadsheet (Appendix B). Tests measured, on average, 45 cm x 45 cm and were excavated to subsoil or hardpan with depths varying between 24 cm to 66 cm depth below surface (dbs). A map of the HRIA investigation is provided in Appendix C.

3.2.1 Lagoon Expansion Area – SE 23-03-20 WPM

The assessment of the proposed lagoon expansion occurred on October 8, 2024 under favourable field conditions. The expansion footprint is situated immediately south and adjacent to the existing lagoon. The property consists of an open pastureland that has limited terrain features (Figure 6). Pockets of slightly lower lying marshland were noted within the field.

Nearby is a branch of Cherry Creek which was visually examined but not shovel tested, as it is located outside the project area. The creek is approximately 3 m wide and has short, slumping banks which have been impacted from cattle pasturing. The creek appears to have been modified along its margins in certain sections, with a deepening and straightening of portions of the creek. Large culverts under Municipal Road 15N indicate that the creek has the capacity to hold large amounts of water, likely during the spring run-off (Figure 7).

A pedestrian survey of the property was conducted. There was limited surface visibility due to the pasture grass cover. However, there were small pockets of exposed surface soils. These areas were examined for exposed heritage resources but none were noted. Field observations noted an area in the central part of the lagoon expansion footprint had been noticebly flattened by heavy machinery. The area around it was saturated and swampy so there is a possibility that grading and/or levelling with fill materials had been done to keep water from saturating and compromising the lagoon structure. While the ground is fairly saturated, standing open water was not observed, but is rather a swampy bog-like area. In satellite imagery there are relict channels of the creek, as its course has changed through the times. A majority of these relict channels are outside of the project footprint. There does appear to be a faint branch just south of the current lagoon. A few faunal materials were located on the surface and were identified as domestic bovine species, which can be a common occurance in pasturelands.

Judgemental subsurface testing occurred across the area and near the relict channel, as there were no visible terrain features of interest in which to focus testing. One subsurface test (BM01), close to the existing lagoon, a rubberized fabric rag was discovered at a depth of 27 cm (Figure 8). This could corroborate that fill materials had been brought in for the original construction of the lagoon or to grade or resurface the surrounding area. The soils encountered in the tests consisted of very dense grey to brown hardpacked silty clays and many tests showed a mottling of soils indicating previous disturbance (Figure 9). Surface compaction would likely be due to livestock and if heavy machinery was used in the area.

The testing and assessment of the property did not result in the discovery of heritage or cultural resources.

Figure 6. Open field south of existing lagoon – North aspect

Figure 7. Large culverts along Cherry Creek – North aspect

Figure 8. Recently crafted rag found in shovel test pit

Figure 9. Typical shovel test (BM01) - North wall profile

3.2.2 Borrow Area– NW 14-03-20 WPM

The assessment of the proposed borrow pit area occured on October 8 and 9, 2024. The property consists of open pastureland with grasses and thistle with some small shrubbery. The property has been previously impacted through former borrow source extraction. A large open pit covers an area measuring 115 m E-W and 125 m N-S within the northern half of the proposed borrow area (Figure 10). Smaller depressions were observed surrounding the main pit and are likely overgrown, smaller borrow pits. Northward from the main pit is the highest elevation on the property. However, the ground quickly transitions sloping downwards towards an expansive marshland which covers a large portion of the quarter section (Figure 11). To the south of the pit, the ground slopes down towards a cattle dugout which also forms part of the marshland (Figure 12).

The pasture area had no surface visibilty due to grass cover. A cursory pedestrian survey occurred in this area in order to ensure there were no surface features hidden in the grass. The archaeological crew placed subsurface tests (n=8) north of the pit, on the upper elevation, along the downslope towards the marsh, and south of the pit. Soils were exceedingly hardpacked silty clayey loam with gravel and cobbles, and then underlain by dark brown clays.

The assessment continued toward the southern part of the proposed borrow area, crossing over a barbed wire fence which separated the pasture from an agricultural field. The field rises above the marshland forming another hill with a good view of the general area (Figure 14 & 15). To the south and east, signs of additional borrow source extraction were noted. At the time of the survey, the field was a harvested crop of canola with a layer of chaff which had fair surface visibility. (Figure 15). There were no surface heritage resource finds during the pedestrian survey.

Subsurface testing (n=7) occurred across the hill, along its side slope and the foot of the hill situated above the marshland, was undertaken. In total 15 tests were excavated in the proposed borrow area with negative results.

Figure 10. Borrow pit in NW 14-03-20 WPM – North aspect

Figure 11. Marshland surrounding the borrow pit area – Northeast aspect

Figure 12. Livestock dugout – North aspect

Figure 13. Borrow pit areas in NW 14-03-20 WPM – North aspect

Figure 14. Slight hill in southern part of NW 14-03-20 WPM – South aspect

Figure 15. Surface visibility in cultivated portion of borrow area – East aspect

4.0 CONCLUSION AND RECOMMENDATIONS

The Heritage Resource Impact Assessment of the proposed Boissevain Wastewater Treatment Lagoon Upgrade was conducted under Heritage Permit A144-24 on October 8 and 9, 2024. The assessment covered the proposed lagoon expansion area and a proposed borrow area with judgemental subsurface testing (n=25) occurring across the two study areas.

The assessment of the property did not result in the discovery of heritage or cultural resources. The lagoon property has seen landscape modifications including cultivation and scraping of topsoils along with an admixing of fill material and modern debris. The borrow pit proposal area has also seen many terrain modifications through borrow material extraction and pasturing of livestock. **Based on the results of the HRIA, the recommendation is made that heritage clearance be granted for the project.** If development plans are altered, or if heritage resources are discovered during construction, the HRB must be notified. If human remains are discovered, the RCMP and the HRB must be contacted.

5.0 REFERENCES CITED

Archives of Manitoba (AM)

1880 "Range 20 West ". DLS Surveyor Duncan Sinclair. Township Plans, Department of Mines and Natural Resources Lands Branch. Digital Image Number GR13-004904; Location Code G 10676.

Boissevain and Morton Regional Library

1998 The La Verendrye Trail and Whitewater Settlement Tour. Prepared by William Moncour in 1982 for the Boissevain and Morton Regional Library, updated by Myra Houston, Amy Hicks, and Anna Grace Diehl. Online document on Pembina Manitou Archive PMA_2024_072413 https://pembinamanitouarchive.ca/search/whitewater

Boissevain's 75th Jubilee Special Committee

1956 "Beckoning Hills – Pioneer Settlement Turtle Mountain Souris Basin Areas. Derksen Printers Ltd., Steinbach, MB. Online document retrieved from University of Manitoba Digital Collections https://digitalcollections.lib.umanitoba.ca/islandora/object/uofm%3A3067227#page/1/mode/2up

Buchner, A.P.

1990 'Glacial Lake Agassiz'. In *Manitoba History*, accessed online Manitoba Historical Society https://www.mhs.mb.ca/docs/mb_history/19/lakeagassiz.shtml

Goldsborough, Gordon

2021 Historic Sites of Manitoba: Shorey Quarry (Municipality of Boissevain-Morton). Manitoba Historical Society online article http://www.mhs.mb.ca/docs/sites/shoreyquarry.shtml

Green, D.

1998 A re-evaluation of the Oxbow Dam Site (DhMn-1): Middle Holocene cultural continuity on the northern plains. Thesis University of Saskatchewan.

Government of Manitoba

1986 The Heritage Resources Act. C.C.S.M c.h39.1

Library and Archives Canada (LAC)

2022 "Henry Hammond" Folio 306, Libre 76, microfilm C-5996, Item 492682. Land Grants of Western Canada, 1870-1930 online database https://www.bac-lac.gc.ca/eng/discover/land/land-grants-western-canada-1870-1930/Pages/item.aspx?IdNumber=492728&

"Geo W G Richardson" Folio 65, Libre 30, microfilm C-5986, Item 492728. Land Grants of Western Canada, 1870-1930 online database https://www.bac-lac.gc.ca/eng/discover/land/land-grants-western-canada-1870-1930/Pages/item.aspx?IdNumber=492682&

Priess, P.J., P. W. Nieuwhof, S.B. Ebell

1986 Archaeological Investigation of the Junction of the Red and Assiniboine Rivers, 1984. Parks Canada Research Bulletin No. 241. https://www.theforks.com/uploads/bibliographies/1986-Junction_Rivers_RB-241_Priess.pdf

Rempel, G.

1994 Manitoba History: The Manitoba Mound Builders The Making of an Archaeological Myth, 1857-1900. In Manitoba History, Number 28. Online document accessed Aug 15, 2018 http://www.mhs.mb.ca/docs/mb_history/28/moundbuilders.shtml

Shorthouse, J. D.

2010 Ecoregions of Canada's Prairie Grasslands. In Arthropods of Canadian Grasslands (Volume 1): Ecology and Interactions in Grassland Habitats. Edited by J. D. Shorthouse and K. D. Floate. Biological Survey of Canada. pp. 53-81.

Smith, R.E., H. Veldhuis, G.F. Mills, R.G. Ellers, W.R. Fraser and G.W. Lelyk

1998 Terrestrial ecozones, ecoregions and ecodistricts of Manitoba: an ecological stratification of Manitoba's natural landscapes. Research Branch Technical Bulletin 98-9E. Land Resource Unit, Brandon Research Centre. Research Branch, Agriculture and Agri-Food Canada, Winnipeg, MB. Accessed online June 9, 2018 http://sis.agr.gc.ca/cansis/publications/ecostrat/provDescriptions/mbteee/mbteee_report.pdf

Syms, L.

1977 Cultural Ecology and Ecological Dynamics of the Ceramic Period in Southwestern Manitoba. Plains Anthropologist Memoir 12.

Welch, Deborah, and Michael Payne

2012 Boissevain. In The Canadian Encyclopedia. Retrieved from https://www.thecanadianencyclopedia.ca/en/article/boissevain

WSP Canada Inc.

2024 Boissevain-Morton Wastewater Treatment Lagoon Environment Act Proposal, The Manitoba Water Board Services Report Number: MWSB 23-53. Draft report submitted to Manitoba Environment and Climate Change Environmental Approvals Branch on November 15, 2024.

APPENDIX A:

Manitoba Heritage Permit A144-24

The Heritage Resources Act (Subsection 14(2) and Sections 52 and 53)

Heritage Permit No. A144-24

Manitoba
Sport, Culture, Heritage and Tourism

Pursuant to Section/Subsection: 53 **of *The Heritage Resources Act:***

Name: Lisa Bobbie
North Roots Research

Address: 15080 31 W
Stanley MB R6T 0B4

Attention: Lisa Bobbie

COPY

(hereinafter referred to as "the Permittee"),

is hereby granted permission to:

Conduct a heritage resource impact assessment (HRIA) of proposed borrow area and lagoon expansion (AAS-24-22073 and AAS-24-22074), within the southeast quarter of section 23 and the northwest quarter section 14 of township 3, range 20, east of the Principal Meridian (SE-23-3-20-WPM and NW-14-03-20-WPM) in the Rural Municipality of Boissevain-Morton.

during the period:

September 22nd, 2024 to October 31st, 2024

This permit is issued subject to the following conditions:

(1) That the information provided in the application for this permit dated the **September 5th, 2024** is true in substance and in fact;

(2) That the permittee shall comply with all of the provisions of *The Heritage Resources Act* and any regulations or orders thereunder; PLEASE NOTE ATTACHMENT RE: CUSTODY AND OWNERSHIP OF HERITAGE OBJECTS;

(3) That the Permittee shall provide to the Minister a written report or reports with respect to the Permittee's activities pursuant to this permit, the form and content of which shall be satisfactory to the Minister and which shall be provided on the following dates:

March 31st, 2025

(4) That this permit is not transferable;

(5) This permit may be revoked by the Minister where, in the opinion of the Minister, there has been a breach of any of the terms or conditions herein or of any provision of *The Heritage Resources Act* or any regulations, thereunder;

(6) Special conditions:

a. The permittee must obtain permission from any landowner, lessee or regulatory authority as applicable, concerning access to any property to be examined;

b. Neither the Government of Manitoba nor the party issuing this permit shall be liable for any damages resulting from any activities carried out pursuant to this permit, and the Permittee specifically agrees, in consideration for receiving this permit, to indemnify and hold harmless the Minister and the Government of Manitoba, the Minister and any employees and officials of the Government, against any and all actions, liens, demands, loss, liability, cost, damage and expense including, without limitations, reasonable legal fees, which the Government, Minister or any employee or official of the Government may suffer or incur by reasons of any of the activities pursuant to or related to this permit.

c. The permittee has, along with this permit, received enclosure:
Provisions Regarding Found Human Remains Under THE HERITAGE RESOURCES ACT, And Manitoba's Policy Respecting the Reporting, Exhumation and Reburial of Found Human Remains (1987).

COPY

Dated at the City of Winnipeg, in Manitoba this 19th day of September, 2024

[redacted]

Minister of Sport, Culture, Heritage and Tourism

Manitoba Sport, Culture, Heritage and Tourism
Historic Resources Branch

APPENDIX B:

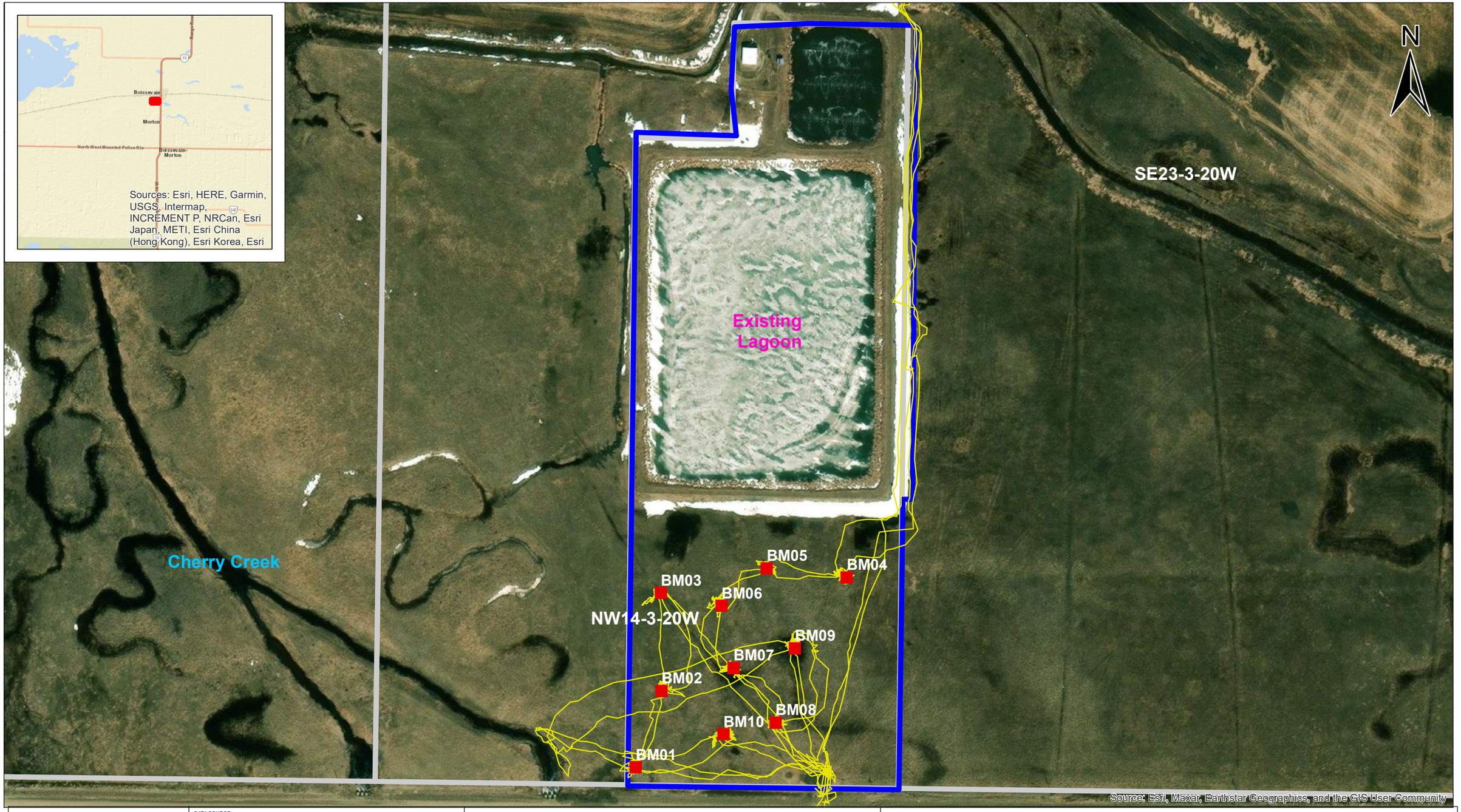
Shovel Test Forms

Subsurface Test ID	Result (Neg / Pos)	Zone	Easting	Northing	Elev (m)	Date	Extent (cm)	Extent (cm)	Depth (cm)	Ground cover	Tree Cover	Disturbance	Soil OH	Depth (cm)	Soil A	Depth (cm)	Soil B	Depth (cm)	Comments
Lagoon Expansion Area																			
BM1	N	14	422172	5452765	510	08-Oct-24	45	46	66	Grasses, snowberry, thistle, cocklebur	n/a	Fill material, refuse dumping	Hardpacked beige silt w/ gravel	0-15	Mottled black brown gret silt w/ wood fragments	15-49	Dk brown silt clay friable dense	49-66	27cmdbs rubber fabric, photo N wall & fabric
BM2	N	14	422186	5452805	508	08-Oct-24	45	47	54	Grasses, snowberry, thistle, cocklebur	n/a	Fill material, refuse dumping	Grey silt loam hardpack w/ white mold flacks	0-26	Dk grey brown silt clay friable dense	26-54			Photo N wall
BM3	N	14	422186	5452857	509	08-Oct-24	44	45	44	Grasses, snowberry, thistle, cocklebur	n/a	Fill material, refuse dumping	Black organic clay silt loam hardpacked	0-18	Grey brown silt clay very hardpacked	18-44			
BM4	N	14	422283	5452865	508	08-Oct-24	44	42	50	Grasses, snowberry, thistle, cocklebur	n/a	Fill material, refuse dumping	Mottled black/brown silt clay loam very hardpacked	0-50					Near lagoon, likely affected by original lagoon build
BM5	N	14	422241	5452870	511	08-Oct-24	43	42	50	Grasses, snowberry, thistle, cocklebur	n/a	Fill material, refuse dumping	Black grey silt clay loam very hardpacked	0-24	Grey brown silt clay friable moist	24-50			
BM6	N	14	422217	5452850	510	08-Oct-24	49	47	57	Grasses, snowberry, thistle, cocklebur	n/a	Fill material, refuse dumping	Grey brown silt hard clay becoming more friable	0-57					
BM7	N	14	422224	5452817	508	08-Oct-24	45	48	54	Grasses, snowberry, thistle, cocklebur	n/a	Fill material, refuse dumping	Dk grey silt clay loam	0-19	Grey brown sandy clay hard friable	19-54			
BM8	N	14	422246	5452789	507	08-Oct-24	46	47	47	Grasses, snowberry, thistle, cocklebur	n/a	Fill material, refuse dumping	Black/grey-brown mottled silt loam hard	0-26	Grey-brown silt clay friable	26-47			
BM9	N	14	422256	5452828	509	08-Oct-24	47	50	55	Grasses, snowberry, thistle, cocklebur	n/a	Fill material, refuse dumping	Black organic silt clay loam	0-32	Grey brown sand w/ clay	32-55			
BM10	N	14	422218	5452783	506	08-Oct-24	48	45	45	Grasses, snowberry, thistle, cocklebur	n/a	Fill material, refuse dumping	Black organic clay loam dense HP	0-20	Grey-brown silt clay friable	20-45			
Borrow Area																			
BM11	N	14	421312	5452571	504	08-Oct-24	46	46	57	Grasses, snowberry, thistle, cocklebur	n/a	Fill material, refuse dumping	Grey brown silt clay on down slope	0-57					Borrow source area
BM12	N	14	421270	5452590	507	08-Oct-24	42	45	20	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Lt brown silt clay w/ gravel hardpan extremely hard till	0-20					
BM13	N	14	421276	5452656	505	08-Oct-24	45	48	34	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Grey brown silt clay dense	0-34	Hardpan till	34+			
BM14	N	14	421240	5452692	502	08-Oct-24	45	50	24	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Lt brown silt clay w/ gravel & cobble	0-24					

Subsurface Test ID	Result (Neg / Pos)	Zone	Easting	Northing	Elev (m)	Date	Extent (cm)	Extent (cm)	Depth (cm)	Ground cover	Tree Cover	Disturbance	Soil OH	Depth (cm)	Soil A	Depth (cm)	Soil B	Depth (cm)	Comments
BM15	N	14	421253	5452495	507	08-Oct-24	46	48	28	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Brown grey silt clay topsoil	0-6	Lt brown & white mottled silt clay extremely hard	6-28	Hardpan	28+	top of hill
BM16	N	14	421287	5452392	521	09-Oct-24	47	46	47	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Dk grey brown silt clay hardpacked	0-47					
BM17	N	14	421315	5452351	510	09-Oct-24	40	41	40	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Dk grey silt clay very hardpack	0-26	Grey-brown silt clay HP dense moist	26-40			Flats
BM18	N	14	421270	5452333	508	09-Oct-24	45	40	44	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Grey silt clay very hard	0-11	Black clay HP dense moist	11-32	Grey clay HP moist	32-44	Flats
BM19	N	14	421267	5452194	515	09-Oct-24	46	48	46	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Dark tan silt hardpacked	0-8	Beige silt hardpacked	8-46			Top of hill, photo N wall
BM20	N	14	421318	5452181	515	09-Oct-24	47	47	46	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Brown silt clay loam w/ gravel hard	0-29	Lt brown silt hardpacked w/ calcium flecks	29-46			Top of hill
BM21	N	14	421379	5452174	514	09-Oct-24	46	46	30	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Lt brown silt hardpack w/ some gravel	0-30					
BM22	N	14	421441	5452175	511	09-Oct-24	43	49	42	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Black organic silt loam	0-33	Dk brown silt hard	33-42			On downslope of hill
BM23	N	14	421490	5452198	510	09-Oct-24	49	46	45	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Black organic silt loam hard w/ gravel	0-29	Brown silt hardpacked w/ gravel w/ slight clay	29-45			near marsh
BM24	N	14	421389	5452228	510	09-Oct-24	46	49	50	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Black organic silt loam moist	0-36	Dk brown silt highly clayed moist	36-50			near marsh
BM25	N	14	421300	5452240	511	09-Oct-24	46	50	51	Grasses, snowberry, thistle, cocklebur	n/a	Existing borrow pit; dugout	Black organic silt loam	0-46	Dk brown silt clay friable	46-51			

APPENDIX C:

MAP



North Roots Research
Historical & Genealogical Services

DATA SOURCE: Government of Manitoba; ESRI; NRCAN

CREATED BY: L.C. Bobbie

COORDINATE SYSTEM: UTM NAD 1983 Z14N

DATE CREATED: 20-OCT-23

REVISION DATE: 27-NOV-24

0 25 50 Meters
0 110 220 Feet

VERSION NO: 1.0

QA/QC:

Legend

- Shovel Test
- A144-24_PedestrianTracks
- Project Boundary
- Property Boundary

Municipality of Boissevain-Morton
Proposed Lagoon Area

Heritage Permit A144-24

SE-23-03-20 WPM

1:1,900

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0 40 80 Meters
0 180 360 Feet

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Legend

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Municipality of Boissevain-Morton
Proposed Borrow Area

Heritage Permit A144-24

NW-14-03-20 WPM

1:3,000