

GeoMetrix Group Engineering Ltd.

**ENVIRONMENTAL RISK ASSESSMENT  
NAMEPI CREEK  
BRIDGE FILE 74397**

Reference number: B-0359-19



Prepared by:

**Basin Environmental Ltd.**

115 Nottingham Road  
Sherwood Park, Alberta, T8A 5M3  
Phone: 780.910.0615

Submitted to:

**GeoMetrix Group Engineering Ltd.**

1227 91 Street SW  
Edmonton, AB T6X 1E9  
December 2019

## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>3</b>
1.1.	Project Description .....	3
1.2.	Objectives .....	3
1.3.	Environmental Setting.....	3
1.4.	Methods .....	5
1.4.1	Desktop Assessment .....	5
1.4.2	Field Assessment .....	5
<b>2.0</b>	<b>REGULATORY FRAMEWORK .....</b>	<b>6</b>
<b>3.0</b>	<b>RESULTS AND MITIGATION MEASURES .....</b>	<b>7</b>
3.1.	Aquatic Resources .....	7
3.1.1	Mitigation Measures.....	7
3.2.	Site Contamination.....	8
3.2.1	Mitigation Measures.....	8
3.3.	Soils .....	9
3.3.1	Mitigation Measures.....	9
3.4.	Clubroot .....	9
3.4.1	Mitigation Measures.....	10
3.5.	Wetlands .....	10
3.5.1	Mitigation Measures.....	10
3.6.	Wildlife .....	12
3.6.1	Mitigation Measures.....	12
3.7.	Vegetation .....	13
3.7.1	Mitigation Measures.....	13
3.7.2	Rare Vegetation.....	13
3.7.3	Weeds And Non-Native Vegetation .....	13
3.7.3.1	Mitigation Measures.....	13
3.8.	Historic Resources .....	14

<b>4.0</b>	<b>CLOSING .....</b>	<b>15</b>
<b>5.0</b>	<b>REFERENCES .....</b>	<b>16</b>

## **LIST OF TABLES**

Table 1	Regulatory Approvals Potentially Required for BF74397.....	6
Table 2	Fish Species Documented Near the Proposed Project .....	7
Table 3	Incidental Wildlife Species Documented Near the Proposed Project .....	12

## **LIST OF FIGURES**

Figure 1	Location of BF 74397 Over Namepi Creek .....	4
Figure 2	Wetlands and Sensitive Environmental Features in the Project Study Area.....	11

---

## 1.0 INTRODUCTION

---

Basin Environmental Ltd. (Basin) was retained by GeoMetrix Group Engineering (GeoMetrix) to conduct an Environmental Risk Assessment (ERA) for Alberta Transportation Bridge File (BF) 74397, carrying Highway 28 over Namepi Creek (the Project). The Project is located near the town of Radway approximately 74 km north of Edmonton, Alberta in NE-31-58-20-W4 (Figure 1).

This ERA has been developed in accordance with Alberta Transportation's (AT) Design Bulletin #101/2018 (Environmental Risk Assessment). It identifies environmental sensitivities in the Project area and provides mitigation recommendations that must be addressed in the Contractor's ECO Plan.

### 1.1. PROJECT DESCRIPTION

---

The bridge is an existing single-span bridge structure carrying Highway 28 over Namepi Creek. The scope of work for the Project includes the installation of steel bracing between the pier piles. The scope of work for the Project involves limited work activities. Excavation and work below the high-water mark is not anticipated for the Project.

### 1.2. OBJECTIVES

---

This ERA includes a desktop review and a field investigation to identify potential environmental sensitivities in the study area of the Project (Figure 1). The objectives of this ERA are to:

- Identify environmental sensitivities in the Project area, including but not limited to: species at risk, sensitive wildlife (e.g., migratory birds), sensitive vegetation and/or Noxious or Prohibited Noxious weeds, water bodies, and invasive species or diseases, potential areas of soil contamination that may require consideration during Project planning.
- Outline applicable environmental legislation and potential regulatory (i.e., municipal, provincial, or federal) applications or approvals required for the Project.
- Determine site-specific mitigation measures for environmental protection that will require consideration in the Contractor's Environmental Construction and Operations (ECO) Plan.

### 1.3. ENVIRONMENTAL SETTING

---

The Project is located within the Dry Mixedwood Natural Subregion (DMNS) of the Boreal Forest Natural Region (Natural Regions Committee 2006). The DMNS is topographically highly variable due to its large extent and is comprised of mixed forest stands of aspen, aspen/white spruce, and white spruce/jack pine on upland sites (Natural Regions Committee 2006). Wetlands cover approximately 15 percent of this subregion and consist mostly of fens and mineral wetlands. Gray and dark gray Luvisols soils are typical of upland areas, while Gleysols and organic soils dominate wetland topography.

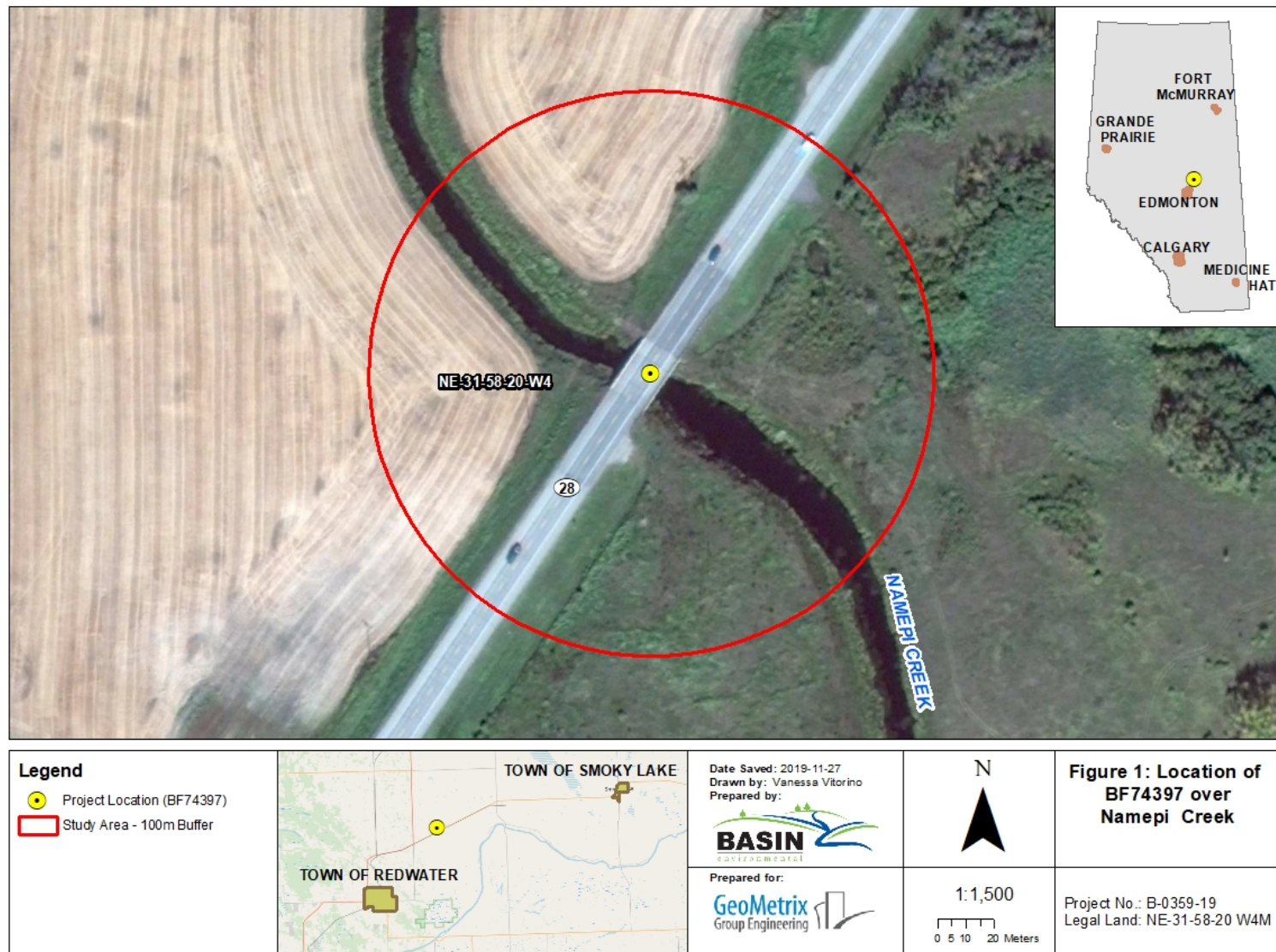


FIGURE 1 LOCATION OF BF 74397 OVER NAMEPI CREEK

---

## 1.4. METHODS

---

This ERA was developed using a combination of desktop and limited field reconnaissance to identify potential environmental sensitivities that could be impacted by the Project.

---

### 1.4.1 DESKTOP ASSESSMENT

---

Prior to the field assessments, a desktop review was conducted to identify potential environmental sensitivities and/or areas of operational constraints using aerial photographs and the following sources:

- Alberta Conservation Information Management System (ACIMS).
- Agricultural Regions of Alberta Soil Inventory Database (AGRASID).
- Alberta Merged Wetland Inventory.
- Environmental Site Assessment Repository (ESAR).
- Fisheries and Wildlife Management Information System (FWMIS).
- Landscape Analysis Tool (LAT).

---

### 1.4.2 FIELD ASSESSMENT

---

A limited site reconnaissance was conducted on 26 November 2019 by Suzanne Thompson, B.Sc., P. Biol of Basin. The Project footprint and 100 m surrounding buffer were selected as the study area (Figure 1). The study area was walked using meandering transects to assess potential environmentally sensitive features. The field assessment included the identification and assessment of the following:

- Significant wildlife features (dens, nests and hibernacula).
- Wetlands and water bodies that could be potentially impacted by the project.
- Sensitive vegetation (e.g., rare vegetation) or Noxious or Prohibited Noxious weeds within the study area.

Due to time of year and ground conditions at the time of the assessment, some features (i.e., vegetation) were not discernable. Field photos were taken and can be found in Appendix A. Where sensitive features were identified (i.e., wetlands), a field classification was completed.



## 2.0 REGULATORY FRAMEWORK

A review of potential regulatory requirements associated with typical bridge rehabilitation was conducted in support of the Project (Table 1).

TABLE 1 REGULATORY APPROVALS POTENTIALLY REQUIRED FOR BF74397

Legislation	Approval	Regulatory Trigger
<i>Federal</i>		
<i>Canadian Navigable Waters Act</i>	Approval	As per the <i>Canadian Navigable Waters Act</i> , the North Saskatchewan River is a Scheduled waterway.  If temporary structures (i.e. scaffolding, etc.) that will limit the total clearance of BF74397 are to be installed in support of the Project, requirements under the CNWA may apply (i.e., Public
<i>Provincial</i>		
<i>Water Act</i> Code of Practice for Watercourse Crossings	Notification	Installation, maintenance, repair, or replacement activity of a watercourse crossing that has the potential to impact bed and banks of a watercourse as defined in the Code of Practice for Watercourse Crossings. The Project is not anticipated to impact the bed and banks; therefore, notification is not required. If instream work is required, specifications and recommendations by a Qualified Aquatic Environmental Specialist (QAES) would be required.
<i>Public Lands Act</i>	Temporary Field Authorization	Any activity located outside of the existing crown disposition for the bridge crossing within the bed and shore of Namepi Creek will require a Temporary Field Authorization. No work below the bed and shore is anticipated, therefore, a <i>Public Lands Act</i> approval is not anticipated.

### 3.0 RESULTS AND MITIGATION MEASURES

The following section provides an overview of environmental sensitivities, and applicable mitigation that should be considered for the Project.

#### 3.1. AQUATIC RESOURCES

The Type 1 watercourse crossing structure (BF 74397) over Namepi Creek, is in the North Saskatchewan River watershed. A search of the Fisheries and Wildlife Management Information System (FWMIS) was conducted to determine potential fish species documented within a 2 km radius of the Project.

TABLE 2 FISH SPECIES DOCUMENTED NEAR THE PROPOSED PROJECT

Common Name <sup>1</sup>	Scientific Name	Provincial Status <sup>2</sup>	COSEWIC <sup>3</sup>	SARA Status <sup>3</sup>
Brook Stickleback	<i>Culaea inconstans</i>	Secure	Not Listed	Not Listed
Fathead Minnow	<i>Pimephales promelas</i>	Secure	Not Listed	Not Listed
Lake Chub	<i>Couesius plumbeus</i>	Secure	Not Listed	Not Listed
Cyprinid Spp.	Cyprinid spp.	-	-	-
Rainbow Trout	<i>Oncorhynchus mykiss</i>	*stocked	*stocked	*stocked

Namepi Creek is a coded Class C water body with a Restricted Activity Period (RAP) of April 16 to June 30 as per the Code of Practice St. Paul Management Area Map (Alberta Environment and Sustainable Resource Development [AESRD] 2006).

Work below the high-water mark is not anticipated for the Project. If work is anticipated to impact the bed and banks of the watercourse, a Notification under the Code of Practice for Watercourse Crossings is required. If instream work is required, specifications and recommendations by a QAES would also be required, and could potentially require regulatory review or Authorization under the *Fisheries Act*.

##### 3.1.1 MITIGATION MEASURES

Environmental sensitivities related to working in or around water that must be addressed in the Contractor's ECO plan include:

- Installation, inspection, and repair of appropriate sediment/erosion controls near disturbed areas.



- The Contractor must make efforts to prevent the release of deleterious substances into the North Saskatchewan River resulting from the operation of vehicles and equipment during rehabilitation activities.
  - The Contractor must ensure that no deleterious substances resulting from welding, grinding, etc. enter the North Saskatchewan River. If such works are to occur, appropriate mitigation measures to isolate such works will be required.
- Permanent alteration of fish habitat that could result from improper vegetation removal, improper soil stripping and handling, poor reclamation techniques/installation and improper short/long-term sediment and erosion control measures.
- Whirling disease is caused by *Myxobolus cerebralis*, a microscopic parasite that affects salmonid fish such as trout, salmon and whitefish. Whirling disease has been detected in the watershed (North Saskatchewan River) the Project is in (AEP 2015). To prevent the spread of whirling disease, the contractor must follow AEP "Decontamination protocol for watercraft and equipment" (AEP 2017)

### 3.2. SITE CONTAMINATION

---

The Environmental Site Assessment Repository (ESAR) was searched for previous environmental site assessments (ESAs) and/or records of contamination near the Project (AEP 2017b). No previous ESAs have been documented within NE-31-58-20-W4M.

---

#### 3.2.1 MITIGATION MEASURES

---

To avoid and minimize impacts to soils, wetlands and watercourses near the Project, the following mitigation measures are recommended:

- Ensure equipment is in good working order prior to entering the Project site. Inspect regularly to identify faults and to assess need for maintenance.
- Spill kits should always be available on the Project site, sized appropriately to contain/mitigate/clean-up the largest possible spill.
- Store chemicals and fuels with secondary containment, such as double-walled tanks or trays below the containers.
- Store chemicals and fuels at least 100 m from wetlands and water bodies.
- Do not fuel vehicles or equipment within 100 m of wetlands and waterbodies.
- Ensure chemicals and fuels are properly labelled and the Material Safety Data Sheets (MSDS) are available onsite.
- Any release of substances that could cause an adverse effect to the environment be reported to Alberta Environment and Parks. Remediation of impacted areas is the responsibility of the contractor responsible for the spill.

---

### 3.3. SOILS

---

Soil types and characteristics can vary depending on the landforms (i.e. wetlands, riparian areas, upland, etc.) present and play an important role in the re-establishment of vegetation during the reclamation process.

A search of the Agricultural Regions of Alberta Soil Inventory Database (AGRASID) indicates the Project area is within the soil polygon ID 19900 which is classified as having Orthic Dark Gray Chernozem (O.DGC) mineral soils that are well drained (AEP 2015). Additionally, landform slopes are undulating high relief ranging from 1-4%.

Borrow areas are not required as part of the Project, and limited soil excavation will be required. Field assessment directly related to soil types and characteristics was not conducted for this Project.

---

#### 3.3.1 MITIGATION MEASURES

---

Environmental sensitivities related to soils that must be addressed in the Contractor's ECO Plan include:

- Topsoil stripping is not anticipated for the Project; however, if required: topsoil shall be stripped, salvaged and stored separately from the B and C horizons to avoid admixing.
- Salvage should be completed when soil is not frozen or wet.
- Stored soil be covered to prevent erosion or establishment of weed species. Piles can be seeded to aid with these threats as well.
- Salvaged topsoil be replaced evenly over the disturbed area and re-seeded with an ecologically appropriate native seed mix following completion of the Project.
- Erosion and sediment control measures (i.e., sediment fencing) shall be installed in disturbed areas where erodible slopes contain less than a 15 m buffer from the high-water mark.
- Minimize time that soil is exposed in all areas of the Project. Use erosion control materials (e.g., coir matting) on steep slopes until re-vegetation has established.
- If supplemental fill is needed for the Project, soil must be free of contaminants, weed seeds and clubroot prior to use.

---

### 3.4. CLUBROOT

---

Clubroot a soil-borne disease, caused by the plant pathogen *Plasmodiophora brassicae* infects agriculture crops of the cabbage family such as canola, mustard, cabbage, cauliflower and, other crops. In 2007, Alberta's *Agricultural Pest Act* declared clubroot a pest allowing legislative authority for enforcement of control measures to limit the spread and impacts of clubroot.

According Alberta Agricultural and Forestry (AAF) cumulative clubroot infestations from 2003 – 2008, the Municipal District of Thorhild has the second highest infestation rating possible, with 10-49 fields infected by clubroot (AAF 2018).

---

### 3.4.1 MITIGATION MEASURES

---

Should an adjacent field be used for a lay down area or other activity, best management practices should be followed. Best management practices for the prevention of clubroot as outlined in the Alberta Clubroot Management Plan must be followed (Alberta Agriculture and Forestry [AAF] 2014). If imported soil material outside the Project area is required, clubroot testing may be required to ensure soil is clubroot free. Environmental sensitivities related to clubroot that must be addressed in the Contractor's ECO plan include:

- Reduce/eliminate the spread of clubroot in uninfected areas.
- Avoid contamination of equipment and materials with clubroot infected soils.
- Cruciferous weeds should be controlled to prevent the establishment of clubroot within the Project area.
- Vehicles and equipment should be cleaned and disinfected prior to coming onto the Project site to avoid importing clubroot contaminated soil.
- Use of soil conservation techniques (such as seeding or matting) can also reduce erosion and exposure of machinery and equipment to exposed soils.

### 3.5. WETLANDS

---

Wetlands support unique vegetation and wildlife are sensitive to overall disturbances caused by the introduction of deleterious substances, vegetation removal, soil contamination (i.e. weeds, admixing of soil types, etc.). The Alberta Wetland Policy regulated under the Alberta *Water Act* ensures the protection of Alberta's wetlands. Avoidance is a priority under the Policy.

Several wetlands were identified in the Project vicinity, including several graminoid marshes along the riparian boundary of the watercourse and one (1) shrubby swamp (Figure 2).

---

### 3.5.1 MITIGATION MEASURES

---

The identified wetlands are not within the immediate vicinity of the bridge and impacts to this wetland are not anticipated. However, construction crew should be mindful of the wetland's location, marking the boundaries so they are visible. If wetland impacts cannot be avoided, a *Water Act* approval would be required. Additional mitigation measures include:

- Ensure vehicles and equipment are clean and free of leaks when operating near wetlands.
- Site laydown and equipment outside of wetland boundaries. Vehicles or equipment shall not be permitted to drive through wetlands.
- Measures to prevent deleterious substances from entering the adjacent water bodies (e.g., fuel vehicles and equipment at least 100 m from wetlands).

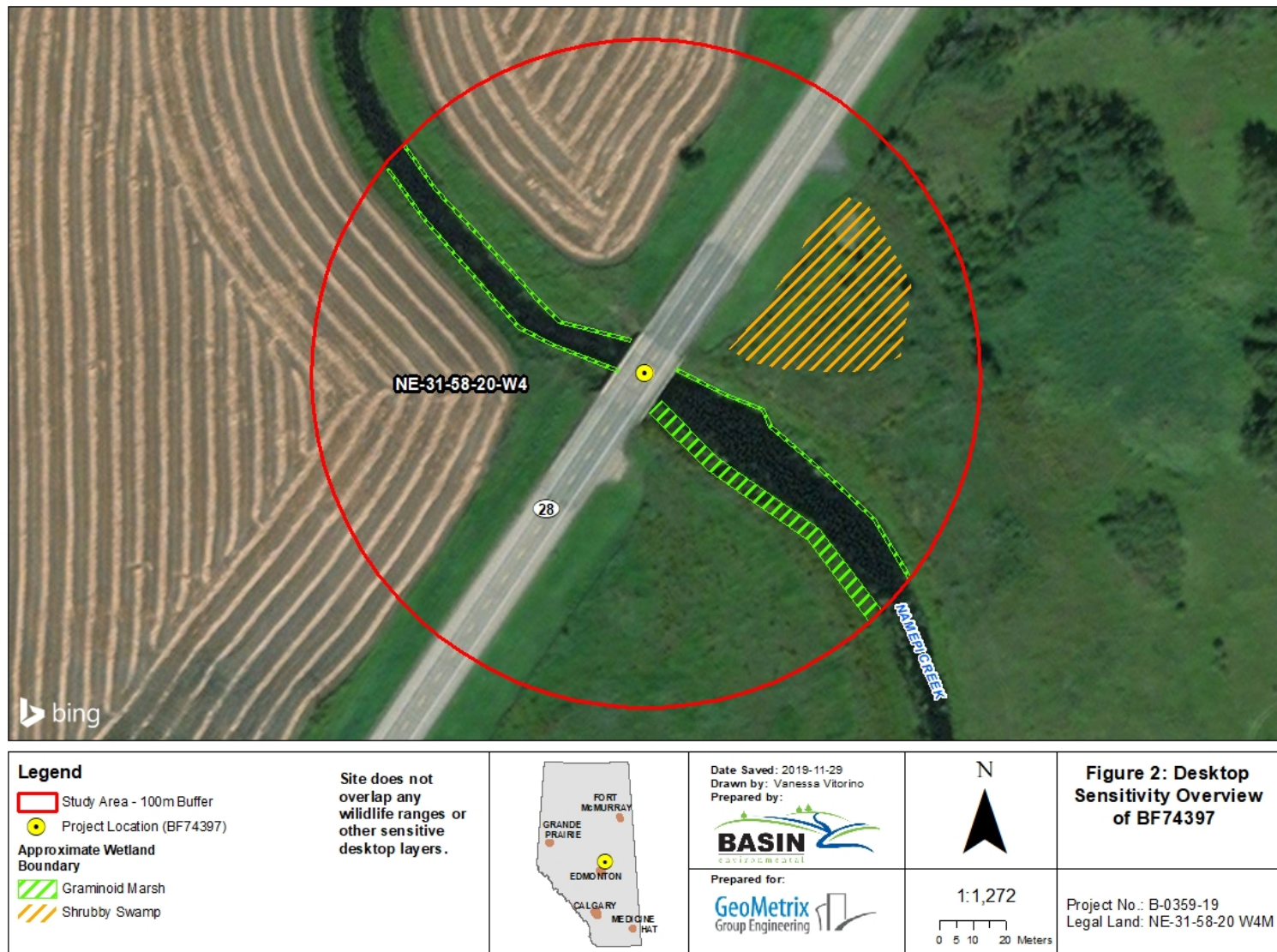


FIGURE 2 WETLANDS AND SENSITIVE ENVIRONMENTAL FEATURES IN THE PROJECT STUDY AREA

### 3.6. WILDLIFE

A search of FWMIS wildlife records within a 2 km radius of the Project area identified Great Blue Heron (*Ardea herodias*) as having the potential to occur in the area (AEP 2019, Table 3).

TABLE 3 INCIDENTAL WILDLIFE SPECIES DOCUMENTED NEAR THE PROPOSED PROJECT

Common Name <sup>1</sup>	Scientific Name	Provincial Status <sup>2</sup>	COSEWIC <sup>3</sup>	SARA Status <sup>3</sup>
Great Blue Heron	<i>Ardea herodias</i>	Sensitive	Special Concern	Special Concern

Sources: 1. AEP 2019; 2. AESRD 2015; 3. Government of Canada 2019

Based on a review of the Landscape Analysis Tool (LAT) Report for the Project revealed that the Project does not occur in any wildlife sensitivity layers.

The Alberta *Wildlife Act* protects prescribed wildlife species and their residences. Prior to the disturbance of vegetation (i.e., tree clearing), a wildlife/nest sweep is recommended prior to commencement of the Project.

The *Migratory Birds Convention Act* (MBCA) prohibits any activity that could disturb, destroy, remove or introduce a deleterious substance once a nest is completed and/or occupied. The bird-nesting season for the Project area is between April 14 to August 28 (Zone B4) (Government of Canada 2018).

A wildlife sweep was conducted on November 26, 2019. No important wildlife features (e.g., dens, hibernacula, nests) or sensitive species were observed within the Project area. Table 5 lists all the incidental species recorded during the wildlife sweep.

#### 3.6.1 MITIGATION MEASURES

Environmental sensitivities related to wildlife that must be addressed in the Contractor's ECO plan include:

- Migratory bird species (e.g., swallows) are known to nest on/within bridge structures and could have the potential to impact construction activities if they are scheduled during the bird-nesting season.
- Any vegetation removed from the Project area during the bird-nesting season has the potential to impact migratory bird species.
- Stop work if a nest, colony, den, burrow or roost is identified and consult an experienced Wildlife Biologist to establish appropriate mitigation, in consultation with local regulators, if required.
- Petroleum products must be stored in a way such that it is inaccessible to wildlife.



---

### 3.7. VEGETATION

---

During the 26 November 2019 field assessment, general notes on vegetation communities were taken. Due to the time of year, all plant species were senescent. All banks were dominated by graminoid species, with some

---

#### 3.7.1 MITIGATION MEASURES

---

Vegetation removal in riparian areas, wetlands and upland areas can increase erosion, reduce quality of habitat for fish and wildlife, disturb soils, impact reclamation time and physically harm wildlife. Environmental sensitivities related to vegetation removal that must be addressed in the Contractor's ECO plan include:

- Minimize removal of native vegetation.
- Any vegetation clearing should be delineated with snow fencing or other visible markers. No vegetation clearing shall be permitted outside those delineated areas.
- Re-seed bare areas with an ecologically appropriate seed mix immediately once area is no longer to be used.

---

#### 3.7.2 RARE VEGETATION

---

Alberta Conservation Information Management System (ACIMS) contains a database of sensitive and non-sensitive elemental occurrences such as rare natural ecological communities, vascular and non-vascular plant species, and invertebrates. A search of ACIMS on 27 November 2019, did not identify any elements of concern within the Project area (Alberta Parks 2017).

---

#### 3.7.3 WEEDS AND NON-NATIVE VEGETATION

---

The Alberta *Weed Control Act* aims to regulate noxious weeds, prohibited noxious weeds and weed seeds through reducing/eliminating the growth or spread of listed species (including seeds) by destroying all growing parts and ensuring reproductive mechanisms are rendered non-viable (Government of Alberta 2008). Noxious weeds must be controlled at a minimum, while Prohibited Noxious species must be removed entirely.

During the 27 November 2019 field assessment, large infestations of tansy (*Tanacetum vulgare* L.), a noxious weed throughout the study area.

---

##### 3.7.3.1 MITIGATION MEASURES

---

Noxious and Prohibited Noxious weeds can impact local native vegetation, wildlife and impede restoration efforts. Environmental sensitivities related to noxious weeds that must be addressed in the Contractor's ECO plan include:

- Avoid contamination of equipment with listed species under the *Alberta Weed Control Act*.
- Vehicles and equipment should be cleaned prior to coming onto the Project site to avoid the transfer of undesirable plant species.
- Conduct weed monitoring throughout the Project and until revegetation of bare areas is complete (if applicable). If noxious and prohibited noxious weeds are present within the Project area, develop mitigation and control strategies to remain compliant with *Alberta Weed Control Act*.
- Minimize the construction footprint and re-seed bare areas immediately following completion of activities in the area.

### 3.8. HISTORIC RESOURCES

---

The LAT Report obtained on 27 November 2019 was consulted for any known historic resources in the Project boundaries. The LAT Report determined that no sites of Historic Resource Value (HRV) are located within the Project area. The listing of historic resources may not be complete; therefore, pursuant to Section 31 of the *Historical Resources Act*, should any archaeological, paleontological, or historic period resources be discovered during construction activities, all activities shall be halted and the Historic Resources Branch of Alberta Culture and Tourism (780-431-2300) should be contacted immediately.



## 4.0 CLOSING

---

This report was prepared to identify potential environmental sensitivities and regulatory requirements that may impact Project planning and construction activities and require consideration within the successful Contractor(s) ECO Plan.

We trust the above meets your present requirements. If you have any questions, or require additional details please contact the undersigned.

Sincerely,

**Basin Environmental Ltd.**

Report Prepared by:

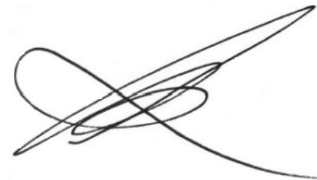


---

Suzanne Thompson, B.Sc., P.Biol, R.P.Biol.  
Project Manager, Biologist



Reviewed by:



---

Chris Rudge, B.Sc., P.Biol., EP, CPESC  
Project Manager, Biologist



## 5.0 REFERENCES

---

- Alberta Agriculture and Forestry (AAF). 2014. Alberta Clubroot Management Plan. Accessed November 2019. Website:  
[http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/agdex11519](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/agdex11519).
- Alberta Agriculture and Forestry (AAF). 2018. Cumulative Clubroot Infestation (2003 – 2008) in Alberta Map. Accessed November 2019. Website:  
[http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/prm14661/\\$FILE/Clubroot\\_Infestation\\_Map\\_2018\\_rgb.pdf](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/prm14661/$FILE/Clubroot_Infestation_Map_2018_rgb.pdf)
- Alberta Environment and Parks (AEP). 2015. Agricultural Regions of Alberta Soil Inventory Database (AGRASID). Accessed November 2019. Website:  
<https://soil.agric.gov.ab.ca/agrasidviewer/>
- Alberta Environment and Parks (AEP). 2017. Decontamination Protocol for Watercraft and Equipment. Accessed November 2019. Website:  
<https://open.alberta.ca/dataset/c6a491b1-632f-405a-8f1a-1bad4b16127d/resource/94afd608-483e-4637-b822-5bof57ca3coc/download/decontaminationprotocol-watercraft-equipment-aug30-2017.pdf>
- Alberta Environment and Parks (AEP). 2017b. Environmental Site Assessment Repository (ESAR). Accessed November 2019. Website: <http://www.esar.alberta.ca/esarmain.aspx>
- Alberta Environment and Parks (AEP). 2019. Fish and Wildlife Information Management Tool. Accessed November 2019. Website: <http://aep.alberta.ca/fish-wildlife/fwmis/access-fwmis-data.aspx>
- Alberta Environment and Sustainable Resource Development (AESRD). 2006. Code of Practice St. Paul Management Area Map. Accessed November 2019. Website:  
<https://open.alberta.ca/dataset/1bdbcc03-75a0-41dc-b33d-099c5bc536ad/resource/5f42aaff-f15f-478a-a948-33e5e229c9af/download/stpaul-codepracticecross-map-2012.pdf>
- Alberta Parks. 2017. Alberta Conservation Information Management System (ACIMS). Accessed November 2019. Website: [www.albertaparks.ca/acims-data#](http://www.albertaparks.ca/acims-data#)
- Government of Alberta. 2008. Weed Control Act. Queen's Printer. Edmonton, Alberta.

Government of Alberta. 2013. Alberta Wetland Policy. Edmonton, AB.

Government of Alberta. 2019. GeoDiscover Alberta Wetland Mapping Tool. Accessed August 2019. Website: <https://geodiscover.alberta.ca/GDAHTML/Viewer/?Viewer=GDAHTML>

Government of Canada. 1994. Migratory Birds Convention Act, 1994. Queen's Printer, Ottawa, ON.

Government of Canada. 2002. Species at Risk Act. Minister of Justice. Website: <https://lawslois.justice.gc.ca/eng/acts/s-15.3/>

Government of Canada. 2018. General Nesting Periods of Migratory Birds in Canada. Accessed August 2019. Website: [https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#\\_01](https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#_01).

Government of Canada. 2019. Fisheries Act. Minister of Justice. Website: <https://laws-lois.justice.gc.ca/PDF/F-14.pdf>

Government of Canada. 2019b. Navigation Protection Act. Minister of Justice. Website: <https://laws-lois.justice.gc.ca/PDF/N-22.pdf>

Province of Alberta. 2000a. Agricultural Pests Act. Queen's Printer, Edmonton, AB.

Province of Alberta. 2000b. Alberta Soil Conservation Act. Queen's Printer, Edmonton, AB.

Province of Alberta. 2000c. Alberta Wildlife Act. Queen's Printer, Edmonton, AB.

Province of Alberta. 2000d. Environmental Protection and Enhancement Act. Queen's Printer, Edmonton, AB.

Province of Alberta. 2000e. Historical Resources Act. Queen's Printer, Edmonton, AB.

Natural Resources Committee (NRC). 2006. Natural Regions and Subregions of Alberta. Compiled by D.J. Downing and W.W. Pettapiece. Government of Alberta. Pub. No. T/852.

## APPENDIX A- SITE PHOTOGRAPHS

---

**PHOTO 1**

**View of Bridge**  
(26 November 2019)



**PHOTO 2**

**View of Shrubby Swamp  
Adjacent to Project area**  
(26 November 2019)





### PHOTO 3

**View of riparian area and  
Graminoid Marsh areas  
along watercourse margins**  
(26 November 2019)



### PHOTO 4

**View of noxious weed  
infested riparian areas -  
Tansy**  
(26 November 2019)

